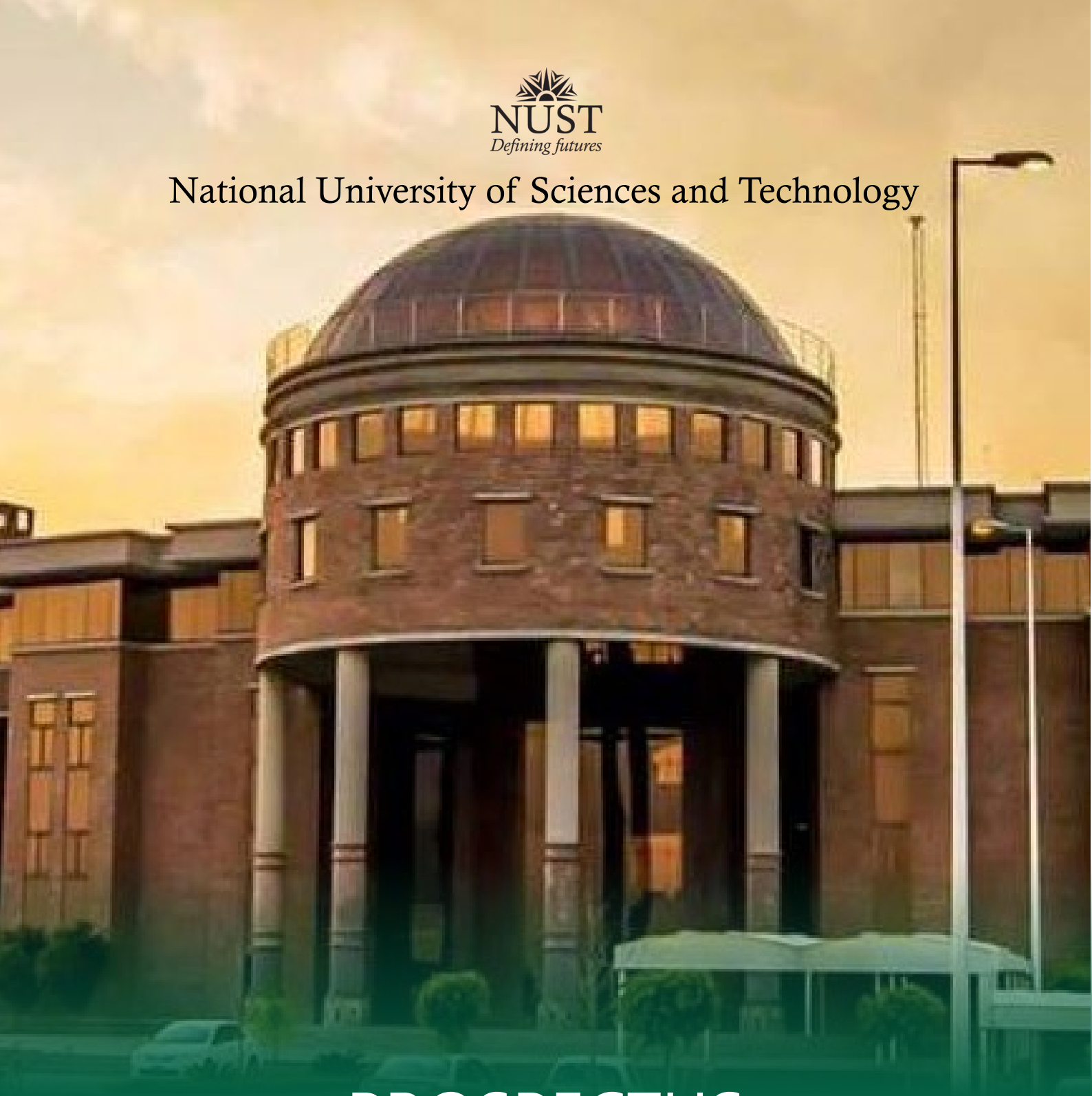
NUST
Defining futures

National University of Sciences and Technology



PROSPECTUS
2019

ENGINEERING, IT & COMPUTER SCIENCE

This prospectus contains basic information about the undergraduate, masters, and PhD programmes, life at the University, learning resources and advice to local and international students who wish to join the University in Fall 2019. It also shows the fee structure, funding modes (financial assistance), procedure for applying for admission and criteria for entry. Information about the constituent institutions, teaching faculties along with their expertise, and courses offered is also given. Brief descriptions of degree programmes and curricula details are listed with course titles, codes and credit hours.

Disclaimer

The information in this prospectus is correct at the time of its publication. Whilst every effort is made to ensure accuracy of information, the University does not accept liability for any inaccuracy or change outside reasonable control of the University. It is issued for general guidance of public and candidates wishing to enter the University in Fall 2019 and does not form part of any contract. The University intends to provide the courses and facilities described in the prospectus, but reserves the right to withdraw or make alterations to these courses or facilities if found necessary, without any prior notice. Likewise, fees for the programmes starting in 2019 are provisional and subject to change.

Welcome from the Rector

By the grace of Allah, NUST has been constantly accelerating its trajectory into the highest echelon of tertiary education institutions across the world. The University offers quality yet accessible higher education, not only in the traditional fields, but also in the emerging disciplines to meet contemporary as well as impending national needs. This is evident from the ever-increasing undergraduate and postgraduate courses being offered in tandem with fast-paced infrastructural expansion to accommodate the rising number of students. Besides developing professional expertise among the students, the university seeks to ingrain in them the spirit of inquiry, enterprise, dynamism, global perspective and a passion to serve the humanity. All this is achieved through the injection of co-curricular activities alongside academic pursuits, to prepare potential leaders who can face future challenges with resilience.
I would urge you to make a well-informed decision as your future relies on the choices you make today.

Looking forward to welcoming you at NUST!
Lt Gen Naweed Zaman, HI (M), (Retd)

Overall
400TH
QS World University Ranking
2020

Ranked
No. 1
University in the Field of Engineering & Technology
Higher Education Commission (HEC) Pakistan

Ranked
162
amongst
Asian Universities Time Higher Education (THE)
Rankings 2018

Ranked
87
among
Asian Universities
QS Asian university rankings - 2019

Ranked
224
amongst the Time Higher Education (THE) annual ranking of 2019 of the
Top 442 Universities from Emerging Economies

Ranked
265 & 239
in the Subject of Electrical & Electronic Engineering and Computer Science and Information System respectively
QS world university rankings 2019

Ranked
No.1
university in
Pakistan by
UniRank 2018

Ranked
279
in the field of
Engineering & Technology
QS world university rankings 2018

RANKED 179 YOUNG UNIVERSITY
Time Higher Education (THE) Ranking 2018

RANKED 51 YOUNG UNIVERSITY
QS World Ranking Ranking 2019

Awarded
APQN's BEST/Model Internal QA Award - 2014

Maintaining the overall global ranking among the top 500 world universities since 2007

CONTENTS

About the University

National University of Sciences and Technology (NUST) was established in March 1991 for promotion of higher scientific education in the country, especially in the fields of science and technology by providing stable and disciplined academic environment together with need-based research, pertinent to industrial requirements. The University was granted its Charter in 1993. Over the years, the university has expanded in scope, services and stature and has emerged as a leading comprehensive University in the public sector.

Within two decades, NUST has achieved important milestones and gained immense significance as an institution of higher education in Pakistan. The University produces professionals and researchers of very high calibre, capable of developing indigenous technologies to meet the growing demands of the 21st century. It is envisioned to grow as a center of excellence for the country's scientific and technological progress. An outstanding feature of the University is that while maintaining traditional values of excellence in teaching and research, it challenges conventional practices and creates new ways of developing and delivering courses, pertaining to emerging and cutting-edge disciplines, on most modern lines.

NUST is a new-age university defining new frontiers in teaching and research. The programmes are distinctive for their high-quality research orientation. Notwithstanding the significance of undergraduate courses, there is ever-growing emphasis on postgraduate studies and research output. Creativity and innovation are embedded as core values in all scholastic activities. The conducive academic environment at the campuses facilitates educational pursuits.

NUST has developed linkages with international universities of repute to ensure two-way flow of knowledge and to be in step with modern trends. Split programmes and visits of eminent professors from reputed foreign universities is a regular feature of the academic activity. These eminent scholars deliver lectures on the latest developments in their respective fields and also help update and review the academic programmes.

Defining Futures

Vision

To evolve NUST into a world class Centre of Excellence among Higher Education Institutions, leading the transformation of Pakistan towards a rapidly developing Knowledge Economy to realize the national objective of a progressive and prosperous country among comity of nations.

Mission

In pursuance of NUST vision, strive to achieve following mission goals:

- To develop NUST as a Comprehensive, Academic and Research led university with a focus on Creativity, Innovation and Entrepreneurship so as to amicably negotiate Social, Economic and Environmental challenges faced by the country.
- With foundations based on principles of Merit, Transparency and Fair Play, nurture talent by providing equal opportunity to all segments of polity.
- Empower students to develop their full potential acquiring leadership and social skills, to act as agent of change within the society.
- Improve global visibility by enhancing mutually beneficial linkages with international organizations and partner universities.
- Strengthen NUST financially to enable the university achieve its goals by raising awareness amongst local and international Pakistani diaspora including Alumni base around the world.
- Ensure conducive learning and working environment for students and staff at par with international standards.

Strategic Thrusts

Excellence in Teaching & Education

Provide high-quality education in sciences and technology while remaining accessible to all sections of the society.

Focus on Research

Undertake high-quality yet relevant research to support the emerging knowledge-based economy and society.

Spirit of Enterprise

Develop instruments and mechanism for promotion of enterprising spirit and entrepreneurial culture among NUST graduates and create strong linkages with industry.

Internationalisation and Global Vision

Develop strong international linkages to ensure inflow of new knowledge and state-of-the-art technologies, while building a positive international image of the University and the country.

Positive Social Impact

Structure curricula and programmes to influence a wider cross-section of the population in terms of education and absorption of new technologies.

Why Choose NUST?

Excellence does not grow in wilderness; it has to be pursued with singular zeal and commitment. National University of Sciences and Technology chronicles a tale of success inscribed with the galvanizing force of progressive vision and commitment par excellence. Although, barely two decades old, this premier national university, justifiably feels proud of its unprecedented success as a center of excellence.

- NUST is currently ranked **400** in world by QS, UK. In subject-wise ranking, NUST is ranked at **279** in discipline of Engineering & Technology, **265** in Electrical & Electronic Engineering and **239** in Computer Science & Information System. **374** in Mechanical, Aeronautical & Manufacturing Engineering and **397** in Physics & Astronomy.
- NUST is also ranked **87** in Asia by QS, UK in 2019.
- NUST is ranked at **224** amongst the Times Higher Education (THE) annual ranking list 2019 of the top 442 universities from **emerging economies.**
- NUST is ranked at **51** among the world's top 150 less than 50 year old universities by QA (UK of 2019).
- Higher Education Commission (HEC) has also ranked NUST a **No 1** university in Pakistan in the field of Engineering & Technology.
- NUST is ranked **162** in Asian by Times Higher Education (THE) Rankings of 2018
- NUST is ranked **179** among top 250 World universities under age of 50 by Times Higher Education (THE) Rankings of 2018.
- With its galaxy of **18** constituent teaching institutions, NUST provides quality education to its students.
- NUST's multi-disciplinary campuses offer undergraduate and postgraduate programmes in a wide range of fields, including Engineering & Technology, Life Sciences, Arts and Humanities, Natural Sciences, Social and Management Sciences.
- NUST is competitive in engaging the best to serve as faculty members. NUST faculty of over **1200** highly qualified and capable men and women includes **400+** PhDs', mostly qualified from premier International universities.
- NUST's high-profile international linkages for research and academic collaborations embrace over 130 celebrated centers of excellence in **32** countries around the globe.
- NUST has few equals in generous funding for education of talented but financially challenged students. It also provides sponsored education to students hailing from economically backward areas of Pakistan.
- Because of sound education and trusted skill levels, NUST graduates stay in demand for jobs, both in public and private sectors nationally and internationally. Several NUST graduates have launched their own business ventures.
- Being a NUSTIAN is a great transforming experience.
- NUST accepts and invests in the best-those with a passion to excel in life.

Location

NUST is located in the heart of the Capital (Sector H-12) Islamabad, amid a hub of research organisations and institutions of higher learning. It is easily accessible from the Kashmir Highway. It is at 35-minute drive from Benazir Bhutto International Airport and 5 minutes from the Motorway (M1). Apart from fascinating tourist attractions in and around the city, some famous historical sites (like Taxila and Kittas Raj) and hill stations (like Murree and Patriata) are within easy access. There are museums, theatres, parks, shopping centers and a diplomatic enclave which houses the foreign missions. The city is also known for its universities, colleges and research organisations.

Geography

Islamabad is located in the backdrop of lush green Margalla mountains in the foothills of the mighty Himalayas, at the northern rim of the Potohar Plateau. The area is undulating, interspersed with mountain streams and rivulets. It is co-located with the historic Gakhar city of Rawalpindi; thus displaying a beautiful blend of the ancient and the modern.

Climate

The city enjoys a continental climate with hot summers (May - June), rainy monsoons (July - August), fabulous fall (October - November), cold winters (December - January) and a blooming spring (March¬April). The climate is regulated by alpine mountains in the vicinity and manmade lakes (Khanpur, Rawal and Simli) which are also the sources of potable water for the twin cities. The temperature ranges from 4° C in January to 46° C in June.

Demography

The twin cities (Islamabad-Rawalpindi) have a population exceeding 4.5 million. There is a happy blend of different ethnic communities including members of foreign missions. Urdu is the lingua franca. However, English is also generally understood and spoken by the educated sections of the society. English is also the medium of instruction in the universities.

Academic Structure

NUST is a public sector university which functions under the aegis of the Ministry of Science and Technology. There is a Board of Governors and an Academic Council which oversee academic matters. Rector is the Chief Executive Officer. He is assisted by three Pro-Rectors. The University comprises five colleges (located away from the NUST Campus, H-12 Islamabad) and ten schools, and three research centers at the NUST Campus, H-12 Islamabad.

Academic Calendar

The academic year commences in September each year. There are two regular academic semesters of 18-20 weeks duration: September-January (Fall Semester), February-June (Spring Semester) and July-August (Summer Semester). Although summer semester is not a regular one but give the students opportunity to clear their deficient courses. The University observes summer vacation from August to September. Admissions are offered in the Fall Semester. The University functions from 9am to 5pm, 5 days a week. However, laboratories and libraries remain accessible to the researchers till late at night and even on weekends.

Transportation

Rent-a-car service is available at the airport, hotels and bus terminals. Radio cabs are also easily accessible. Public transport including Metro Bus Service plies on a number of routes in the twin cities besides yellow cabs (taxis) which ply round-the-clock. In case of yellow cabs, it is advisable to negotiate the fare in advance.

Who to Contact

At NUST, a student enters a novel phase of life; one that requires continuous support for one's academic, physical as well as mental growth and well-being. Keeping this in mind, the University offices function in a student-friendly manner and remain accessible and helpful. You can directly contact the right department or office for all your queries. Shown opposite are various student-related offices and their functions for you to find the right contact.

Pro-Rector (Academics)

Oversees all the offices which deal with academic and administrative issues of the students during their stay in the University.

Registrar and Controller of Examinations

Deals with the entire life-cycle of the students--from applying to NUST and registration of undergraduate students to issuance of transcripts and degrees. He also deals with matters pertaining to scholarships, transfers, migrations, discipline, etc.

Director Academics

Handles matters pertaining to academic regulations, programmes of studies and academic calendar.

Director Admissions

Deals with matters pertaining to NUST Entry Test.

Director Finance

Deals with matters pertaining to fee and finances of the students.

Director Administration

Deals with hostel accommodation, messing, security, transport and sports.

Director Postgraduate Programmes

Deals with matters pertaining to academic life-cycle of postgraduate students: from application, admission, registration, scholarship, academic progress to issuance of degree.

Director Student Affairs

Oversees student-led activities including libraries, clubs and societies & discipline.

Director Medical Services

Supervises health care and medical services.

Office of Research, Innovation & Commercialization (ORIC)

Provides guidance and support to the institutions for activities related to research and development.

Career Development Center

Helps the students in placement and job opportunities, guiding them in preparing resumes and learning interview techniques.

Center for Counseling and Career Advisory

Staffed with professional counselors and psychologists, the Center provides personalised counselling services to students to help them cope with adjustment problems and issues affecting their studies. They also conduct aptitude and psychological tests.

Developing Careers

Career Development Center (CDC)

Career Development Centre (CDC) provides resources and assistance in all aspects of the career development and job search processes. Current Undergraduate students and Post Graduate students are invited to utilize our services. The services offered by CDC are as follows:

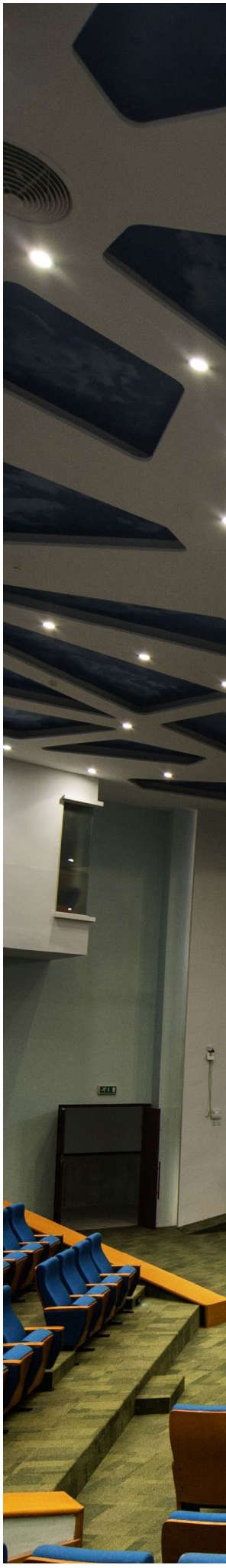
Career/Job Development Services:

- Career Development Workshops
- Career Coaching Services
  - Resume/cover letter critiques
  - Mock interviews
  - Networking/branding strategies
- One-o-One Career Counseling Sessions
- Focused Group Activities on Career Plans

Career Development Centre is focused to empower students to take personal responsibility for their lifelong career development. The overall goal is to challenge every student to examine their values, interest, skills and abilities and to define his or her life by providing opportunities for students to learn about themselves and the needs of society. In order to equip NUST graduates with tools and strategies to develop latest Job Market employability skills, publication on career guidance are provided through their campus management system. Career Development Centre has the following publications:

- Career Development Guide
- Resume Guide Book
- Internship Guide Book
- Job Search Handbook
- Interviewing Skills Manual
- Resume Writing Manual
- Skill Development Activities

Contact Us:
CIE Building, NUST H-12, Islamabad
cdc@ric.nust.edu.pk
051-90856270




Humanity means respect for the mankind
Learn to appreciate the true worth of Man -Iqbal
WEC-2013
5TH WORLD ENGINEERING CONGRESS
Advancement in Engineering, Technology & Science: Creating Synergies

Research and Development

Research is the focal point of university education all over the world. Universities significantly contribute towards creation of new knowledge and discovery of fresh frontiers of creativity and innovation.

Contribution to Research

NUST aims at emerging as a leading research-intensive university in Pakistan, comparable to the best in the world within the next 10 years. Our main thrust is on high-quality teaching and goal-oriented research and development (R&D). The University's PhD programmes help create the requisite research culture duly supported by well-qualified faculty and need-based research. In order to accomplish the requirements of research and development, high-quality laboratories and research facilities are made available to the faculty and students round-the-clock.

In the last 5 years, the faculty members completed 295 sponsored R&D projects and these included 31 projects sponsored by the university per se. Concurrently, during the same period, NUST students and faculty also published 3445 research papers in journals of repute and presented 2358 research papers in conferences, workshops, symposia etc. around the globe.

Research Collaborations

NUST seeks to garner expertise from a wide variety of sources (within/outside the country) in order to boost its academic & research activity. This in turn helps create deeper impact on the world of science and technology. Consequently, the University collaborates with leading international universities, professional organizations, commercial ventures, talented professionals and scholars to pursue its academic and research goals. Our faculty, researchers and students are constantly adding value to NUST by remaining actively engaged with professional groups and individuals in research, review of academic papers and organization of conferences, seminars and workshops etc. NUST has developed linkages with as many as 134 international universities and organizations of 32 different countries. These collaborations help our faculty remain up-to-date with current knowledge and ensure a two-way flow of knowledge.

Research is the focal point of University education all over the world. Universities significantly contribute towards creation of new knowledge and discovery of fresh frontiers of creativity & innovation.

R&D Eco-system

Directorate of Research Innovation and Commercialisation (RIC)

The role of RIC Directorate is to facilitate and co-ordinate research activities of NUST constituent institutions and to liaise with other national as well as international academics, research and industrial organizations to facilitate research at NUST. It also encapsulates NUST's research and intellectual property opportunities at the earliest stage, and translates these benefits to industry by working closely with industry through partnerships, collaborations and licensing. It also acts as a conduit to facilitate NUST graduates towards employment and internship in these industries with the focus on promoting and making NUST graduates the premium choice for the employers.

- **Project Coordination Office**: It promotes, facilitates and monitors cutting-edge research activities, including collaborative and inter disciplinary research, in areas related to the goals of the University. It gauges industry needs and process match making with NUST institutions to solve industrial problems. It also provides support for building Research capacity and capability of the University.

- **NUST Intellectual Property Office (IPO):** In the increasingly knowledge-driven economy, Intellectual Property (IP) is a key consideration. Keeping in view its importance, the University established NUST Intellectual Property Office with the following objectives.
  - Offering Intellectual Property protection to innovators/researchers by filing of Patents, Copyright, Trademarks, and Design Rights, etc.
  - Facilitating the commercial interests of and due rewards to innovators/researchers
  - Establishing a national network of Intellectual Property Rights related services.
  - Collaborating with International Organisation such as WIPO to facilitate the filing of Patents at international level
  - Intellectual Property Management

- **Technology Transfer Office (TTO):** The mission of TTO is to encapsulate NUST's research and intellectual property opportunities at the earliest stage, and to translate these benefits to industry by working closely with CIE constituent entities, as well as industry; through partnerships, collaborations, licensing and formation of spin-off companies. It is responsible for moving research results and discoveries from the laboratory to the marketplace. It does so by being fully aware of the university R&D activities, invention disclosures and market needs. It assesses commercial potential and successfully transfers technology for commercial applications. It also creates and manages synergies and collaborations with other research entities and organisations to facilitate commercialisation.

- **Career Development Center:** CDC provides programmes and services to students and alumni in exploring and making effective career choices. The programmes and services provide opportunities for NUST students and alumni to foster professional networks with employers and also assist employers in meeting their recruitment needs. The Industrial Liaison Office (ILO)is part of CDC.
  - **Industrial Liaison Office (ILO):** It predominantly maintains strong Academia Industry Linkage and facilitates students with the focus on promoting and making NUST graduates the premium choice for the employers.

Technology Incubation Center (TIC)

The Center has been established to facilitate and support the innovation engine of the University. It is the first model technology business incubator of Pakistan established under the academia. The objective is to provide an environment that attracts and nurtures technology based start-up companies, and transforms them into commercially viable enterprises. TIC provides a platform for NUST faculty/students and other entrepreneurs having commercially viable R&D output, to establish their own start-up companies in order to commercialise their R&D work as entrepreneurs.

The objectives of TIC include fostering an entrepreneurial culture, by providing the students and faculty of NUST, an opportunity to transform their technology-based business ideas to reality. These facilities are also open to the general public, provided they contribute to NUST knowledge base. It further aims to facilitate the availability of NUST resources to the incubatees in a mutually beneficial way by liaising with private/public sector funding sources, government agencies, industrial associations, chambers of commerce and industries to provide facilitation and networking for Incubatee companies. TIC has now also started offering services including pre-incubation, virtual Incubation and consultancies through Catalysts to incubatee companies, apart from its other business support services.

Professional Development Center (PDC)

NUST established Professional Development Center (PDC) in July 2007 under an initiative of Higher Education Commission (HEC) to provide continued education and professional development services to industry so that industry could acquire state of the art knowledge to maximize its productivity and efficiency. PDC leverages NUST technology base and faculty through its training events for creating industry academia linkages. Besides this, PDC also provides knowledge and training to NUST faculty and staff regarding best practices in managing a 21st century institution. It engages highly experienced trainers both from NUST and outside of NUST to conduct hands on exercise/case study based industry problem specific trainings. PDC has conducted hundreds of industry-focused workshops and has trained more than 11,200 professionals from about 850 organizations. It uses state of the art information, communication and learning technologies to deliver highly professional trainings. PDC also creates training partnerships with different organizations. Currently, PDC is the Professional Engineering Body of Pakistan Engineering Council (PEC) for carrying out continued professional development of PEC registered and professional engineers. PDC is also the official preparatory and exam center for Chinese Language test HSK (all levels). Professional Development Center of NUST is considered one of the most sought after institutions of Pakistan for short term courses in Engineering, IT and Management. PDC has maintained a tradition of excellence since its inception in 2007 as we cherish new standards in designing and delivery of our seminars, short courses and workshops. It is a promise to our participants that "We don't teach you, we provide you with an environment that makes you learn and discover yourself". PDC also offers Business English Language certification in collaboration with Cambridge University.

Science and Technology Ventures (STV)

ST Ventures is a project of NUST primarily established to commercialize NUST research out put and to undertake business ventures. It is also required to promote R&D and technological innovations through marketable products and technologies.
ST Ventures is also working in different fields of Renewable Energy Technology such as Solar Photovoltaic (PV), Solar Thermal and Bio-diesel with in-house available manpower and NUST resource persons.

It acts as one window facilitator for the NUST Institutes and Colleges for acquiring consultancy services. Based on the requirement of Industry/different organizations against their problems / issues, the relevant NUST Institutions are utilized for provisioning of resource persons (PhD/MS faculty or students doing their PhD or MS) depending upon the requirement and nature of a project, and accordingly a complete team is formed for timely execution of the projects.

University Advancement Office

University Advancement Office has been created with a mission to augment the efforts directed towards the realisation of the University's vision and strategic objectives. Its activities encompass resource generation and joint ventures by mobilising collective efforts and resources. The Office ultimately seeks to contribute towards self-sustenance of NUST.

National Science & Technology Park

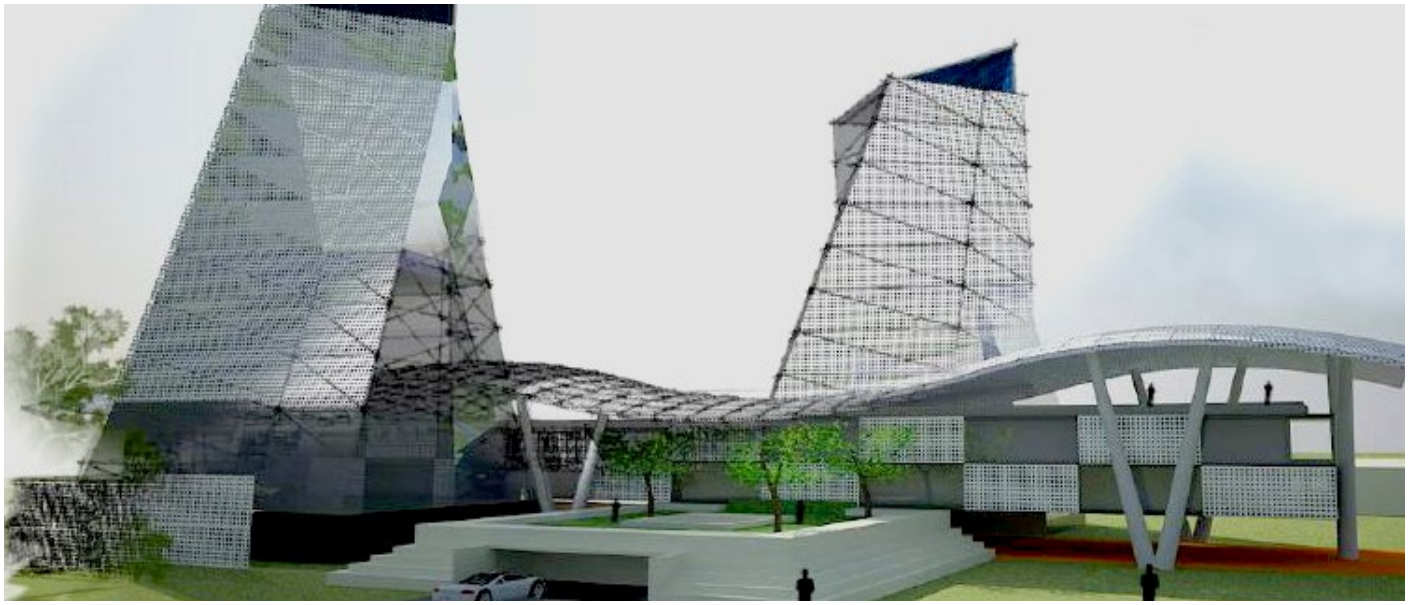
NUST aims to become a hub for public and private technological, financial and human capital through the establishment of a Technology Park at the NUST Campus, H-12, Islamabad. The project will encourage knowledge creation at the cutting-edge and develop organisational, human and social capital to compete in the global economy. It looks forward to building networks stretching far beyond major institutions to include entrepreneurs, investors, professionals and underprivileged communities for mentoring and learning.

The Park will promote interaction between institutional elements, i.e., universities, research parks, large companies, venture funds, etc. and non-institutional elements, i.e., talent, bodies of knowledge and virtual communities to create job opportunities for the youth and link local assets to global markets in order to generate value. It aims to stimulate economic activity in the country by developing a unique knowledge-based multi-industry cluster around the capital.

Based on the conviction that new research clusters in developing countries will capture an increasing share of global R&D investment and increase the volume added to technology innovations, NUST R&D initiatives will encompass an innovation center, an R&D center, a science center, a technology incubation center, a manufacturing resource center and a learning academy that will provide technical and vocational expertise, and entrepreneurship and leadership training. The expansive park will also host a research commercialisation center, university-industry liaison nucleus and event management and recreational facilities. The Park will have a distinctive knowledge brokering facility by means of which it will act as an information intermediary to provide advice on selection of goods or services, business intelligence or research data to interested parties.

Strategic Planning and Management Office (SP&MO)

After shifting of its Main Campus from Lalkurti, Rawalpindi to Sector H-12, Islamabad, NUST has grown at a very rapid pace. Presently, the total student's strength is 16062, comprising of 535 PhD students, 5229 MS/MPhil students and 10298 UG students. Till now, the university has awarded 29778 degrees, out of which 237 are PhD, 6072 are MS/MPhil and 23469 are UG degrees. The faculty strength is 898 with 408 PhDs. During the Financial Year 2016-17, a project of national importance i.e. Medical Devices Development Centre (MDDC) was approved by the Government of Pakistan, which has also been successfully established. During the Financial Year 2017-18, two major projects approved by the Government were National Centre of Artificial Intelligence and National Centre in Robotics and Automation. In Financial Year 2018-19, the major under approval projects are NUST Campus at Quetta and Upgradation / Replacement of Existing Laboratory Equipment at all campuses of NUST.
NUST is establishing its campus in Quetta in order to provide quality education for youth of Balochistan in the field of Engineering & Technology. The ground-breaking ceremony of NUST Quetta Campus was held on May 08, 2018. NUST would be offering undergraduate and postgraduate degrees in the field of Civil Engineering, Water Resource Management, Tunelling / Mining Engineering., Computer & Allied Sciences.



Student Support Services

NUST offers a broad array of resources that allow students to extend and deepen their learning through civic engagement and participation in, and leadership of an active network of student-initiated projects and organizations. Services have been established to address all issues of the students pertaining to their university life-cycle, from selection to graduation and alumni network management. The services include Center for Counselling and Career Advisory, IT Facilities, Clubs and Societies Office, NUST Archives, Sports Office, Hostels and Messing Office, Internship and Placement Office, Alumni Office and commercial Bank.

Center for Counseling and Career Advisory (C^3A)

The Centre offers professional, psychological and educational assessment, guidance and counselling and related services to the members of NUST community with a view to advancing and enhancing the academic and personal growth of students and other members of the University in general. NUST is the only university in Pakistan having a dedicated team of trained Psychologists and Counsellors conducting aptitude and psychological testing coupled with counseling and undertaking research projects at the same time.

The Centre also functions as a student/faculty support organization and strives to develop the students into wholesome and productive human beings. The testing facilities at C3A assist students in having a clearer understanding of their personality, their strengths and weaknesses and problematic areas of their lives, thus guiding the individuals towards best possible choices and better adjustment in everyday life.

Facilities available at the Centre are:

» Individual Counseling
» Group Counseling
» Psychological Testing
» Workshops and Trainings
» Seminars and Lectures
» Harassment Complaint Cell
» Counseling Camps
» Community Services
» Psycho-educational programmes/seminars

Assessment and Measurement is conducted for the following:

» Intelligence Quotient (IQ)
» Emotional Quotient (EQ)
» Achievement
» Personality
» Aptitude
» Ability
» Career-related issues
» Interests, Values, Opinions and Attitudes
» Anxiety and Depression
» Examination Stress, Anger, Leadership Styles, Psychological Well-being and Social Skills

Contact:
Call: 051-9085-1571, 051-9085-1579
Email: c3a@nust.edu.pk

IT and Computing Facilities Information and Communication Technologies (ICT) Facilities at NUST

Provision of ICT facilities and services to NUST faculty, students & administrative staff is the core functional role of ICT Directorate; this directorate provides facilities and services at NUST Main Campus, Sector H-12 Islamabad and support services to Schools and constituent Colleges. To provide Quality of Service (QoS) to our valued users, ICT Directorate is broadly providing following ICT facilities and services:-
ICT Infrastructure. NUST offers most modern computing and networking facilities and has the distinction of providing Internet access since early nineties. These include:-

» Main Data Center, which is acting as hub for dissemination of all ICT services to NUST community.
» Campus Optical Fiber Network, connecting all buildings with Main Data Center.
» Gigabit Local Area Networks (LANs) in all Schools
» High-speed Internet facility to the users through Pakistan Education and Research Network (PERN) programme of Higher Education Commission (HEC).
» Latest high-speed Wi-Fi connecting has recently been established in all boys and girls hostels under Smart University Project (SUP) through HEC.
» Central Authentication of all hostel Wi-Fi users for secured Internet access.
» Computing laboratories are equipped with state-of-the-art servers, computers, software and allied equipment, which are connected through high speed LAN.
» NUST Intranet is in place connecting all remote Campuses with Main Campus for information and resource sharing.

Campus Management System

To automate student academic life cycle processes NUST has implemented Campus Management Solution (CMS) in Fall-2015. CMS covers whole spectrum of student life cycle

activities from student Admission till graduation. Following are the main modules of CMS:

- Student Admission
- Course Enrollment
- Attendance
- Gradebook
- Student Financials
- Research Thesis Tracking & Management (RTTM)
- Financial Aid
- Student Self Service: for (Attendance Monitoring, Fee Invoices, Courses Enrollment, Grades View, Un-official Transcript, Feedback & Notifications)

Faculty Self Service: for (Attendance Marking, Grading, Personal Profiles update, Advise Students)

- Transcript Generation
- Alumni
- Feedback & Survey Forms

With implementation of CMS, students from anywhere can now view/monitor their Attendance, Assignments' marks, Grades, Fee invoices, Academic Progression, Notifications and generate their transcript on real time.

NUST Mobile Application

NUST has launched its first official mobile application in Aug 2017, which is available at Google Play Store. Mobile Application targeting the NUST Students, Parents and Employees. NUST Mobile application contains information about Student's Profile, Attendance, Timetable, Exam Results, NUST Notifications, and Payroll etc. Parents and Guardians are able to see the Attendance and Exam Results of their wards through a highly intuitive screen-design of the Mobile Application and employees have the capability of viewing their Payroll in addition to getting live notifications with the up to date happening in NUST.

NUST Web Portal

An elaborate NUST Web Portal (www.nust.edu.pk) build in Microsoft SharePoint Technology available for dissemination of vital information to general public, students and the faculty. It covers more than 40 NUST & its respective constituent schools/colleges/institutes domains, which provides information about the research, students clubs & societies, programmes and activities of those institutions, updated on regular basis. A complete online admission/registration system along with NUST Financial Aid Application Form has been provided to the prospective candidates to apply for NUST. Processes namely registration, filling application form, and discipline wise selections, online payment through credit card and result announcement are available online to the prospective students.

To promote paperless environment in the University, following computerized systems are also in place:

- Electronic Inter Office Note (e-ION) system for official correspondence and task management.
- Electronic Mail Tracking System (e-MTS) to maintain mail movement record and location of document (files, letters, faxes, etc.).

Human Resource Management/Development

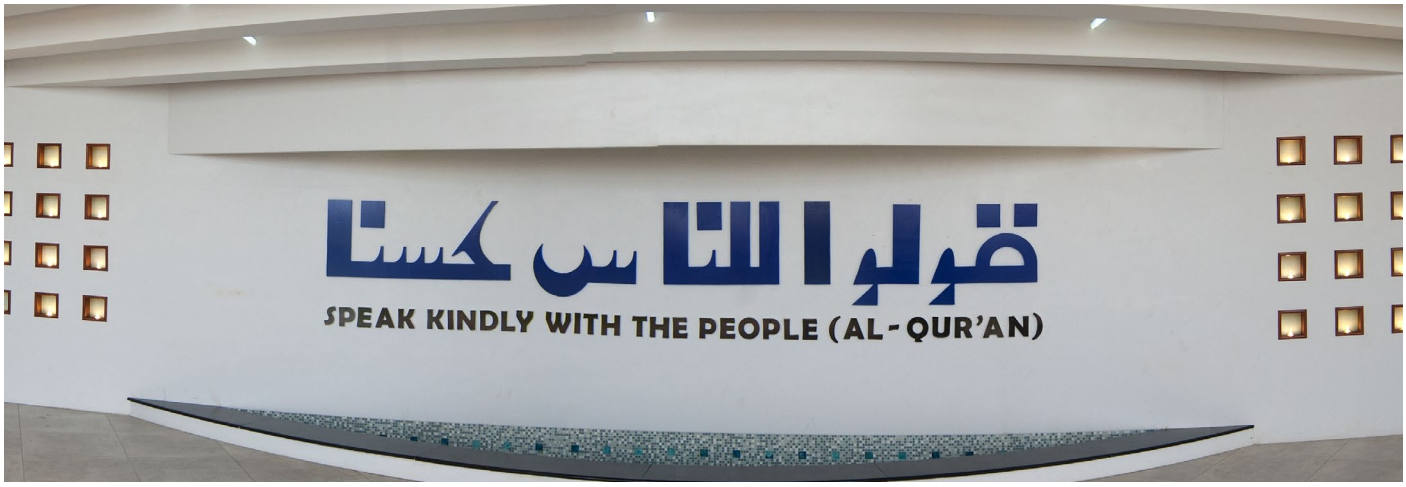
NUST is a multi-campus university employing faculty and staff from diverse disciplines. The HR Directorate recruits and retains the best workforce to contribute towards the continuing success of the University. It is actively engaged in development of faculty and staff to ensure high standard and quality of education.

The faculty at NUST is actively engaged in research activities and providing an environment of practical learning to the students. The HR Directorate supports such programmes for the faculty to keep their expertise up-to-date and develop their skills continuously. Eligible faculty is sent abroad for higher studies and research programmes, and is also assisted for placement in various schools on their return.

Career development is another notable function carried out by the HR Directorate. It has successfully carried forward the progress of the University to operate at an optimal level in times of financial crunch by exploring/offering fully funded scholarships.

Faculty Development Program

The programme was started in 2002. As many as 430 scholars have been sent abroad for higher studies, out of which 316 have joined back.



Student Affairs

Students' Clubs/Societies were established in 2011 under Student Affairs Directorate. The purpose was to provide an opportunity to every student to join a club or society keeping in view his potential and taste to nurture his leadership and managerial abilities. Response of the students has been highly encouraging. Hundreds of events are planned every year by the students from the forum of clubs and societies sponsored by Student Affairs Directorate.

Clubs and Societies

Clubs and Societies is a forum for grooming the students in leadership traits as per their peculiar aptitude and potential. It enhances their foresight and organizational abilities. They are expected to plan and execute their club activities as they perceive in consultation with the club members and Faculty Sponsors. It inculcates team spirit and ability to take everybody on board. It makes a person more responsible and mature.

Existing Clubs and Societies are allocated to institutions as under:

- NUST Entrepreneurs Club (NEC)
- NUST Science Soceity (NSS)
- NUST Literary Circle (NLC)
- NUST Book Club (NBC)
- NUST Bazm-e-Pakistan (NBP)
- NUST Adventure Club (NAC)
- NUST Environment Club (NEC)
- NUST Dramatic Club (NDC)
- NUST Debating Society (NDS)
- NUST Media Club (NMC)
- NUST Community Service Club (NCSC)
- NUST Fine Arts Club (NFAC)
- NUST BioReach Society
- NUST Leaders Society (NLS)
- NUST Excursion Club (NEC)
- NUST Digital Club (NDC)
- NUST Water Sports Club
- NUST Technical Amusement Club (NTAC)
- NUST Paragliding Club (NPC)
- NUST Quiz Club (NQC)
- NUST Trekking Club (NTC)
- NUST Archery Club (NAC)
- NUST Cultural Club (NCC)
- NUST Fitness Club (NFS)
- NUST Robotics Club (NRC)
- International Chapter (NMAC)
- GeneUs
- Physics & Astronomy
- NUST Economics Society
- Music Club
- American Academy of Environmental Engineers & Scientists (AAEES)

Administrative Aspects

All Clubs shall adhere to the following approved appointments:

- Faculty Sponsor
- President
- Secretary
- Press Secretary
- Treasurer

Half the Office Bearers must be from institutions other than the sponsor institution.

Scope of the Clubs & Societies

Every Club and Society has its own defined scope, aim and objectives which are in sync with the title of the society.

NUST Archive

Publishing and Student Affairs Directorate is also responsible for managing NUST Archive. The section collects/conserves archival material of historical importance including policy decisions, MoUs, artifacts, rare photographs and other miscellaneous documents. Digitization of documents is also maintained by the section.

National Level Visits

SA Dte is responsible for conduct of inbound and outbound national level visits of schools/colleges and universities. NUStians eagerly wait for trips to Northern areas and other recreational spots.

Summer School

SA Dte is starting its first summer school from July 2018. It will become a regular feature in future. It aims at providing pre-University experience to FSC/O level students who are preparing their mind to join university. Students of the age group of 16 years are eligible for the course.

High Achievers Award

Student Affairs Directorate arranges a simple but impressive ceremony once a year to recognize and certify the students who win a position in International, National or Inter-university competitions.

NUST Olympiad

Student Affairs Directorate arranges NUST Olympiad once in two year. It is a mega event of the Directorate and students eagerly await this event.

Orientation Week

NUST arranges orientation week for the Freshmen in September every year. Student Affairs Directorate plays lead role in the conduct of this event.

Healthcare Services

NUST is providing medical services to the entire NUST Campus, H-12, Islamabad through a purpose-built NUST Medical Center, while in institutions outside Islamabad the same are being provided through their respective medical outfits. NUST Medical Center has a team of qualified medical officers and trained paramedical staff, who provide services round-the-clock. The Center is supported with fully equipped ambulances to evacuate the serious patients to Armed Forces and other civil sector tertiary care facilities. With the establishment of NUST Medical Complex at NUST Campus, H-12, Islamabad, the services of a tertiary care hospital will be available on campus.

Accommodation

The newly built campus at H-12, Islamabad is located in the serene backdrop of majestic Margalla Hills. The NUST Campus, H-12, Islamabad blends old and modern architecture. The Kashmir Highway, which leads to M-1 (Motorway) linking it to the rest of the country through a wide range of motorways network, coasts along the campus which is only at 20-minutes drive from all the main terminals-air, bus and railways.

NUST Campus, H-12, Islamabad provides well-furnished and equipped male and female hostels named after great Muslim Scholars as under:

Girls Hostels

- Fatima Hostels (2 blocks) - PG Students
  Single Occupancy with attached washrooms
- Zainab Hostel, Ayesha Hostel - UG Students
  Bi / Tri-seater with community washrooms
- Khadija Hostel - UG/PG Students
  Tri-seater

Boys Hostels

- Rumi Hostels (3 blocks) - PG Students
  Single / Bi-seater Occupancy with attached washrooms
- Ghazali Hostels*
- Razi Hostels*
- Attar Hostels*

*2 blocks each

Monthly Accommodation Charges (NUST Campus, H-12, Islamabad)

Hostel Accommodation Charges for National Students

- Single occupancy with attached bath Rs. 6500/-
- Double occupancy with attached bath Rs. 5500/-
- Double occupancy with community bath Rs. 4500/-
- Tripple occupancy with community bath Rs. 4000/-

Married Students

- One bedroom apartment Rs. 9,000/-
- Two bedroom apartment Rs. 13,000/-

Note:

- Security Fee of Rs. 10,000/- (Refundable) will be charged at the time of allotment.
- Hostel includes accommodation charges only.

Visiting Faculty Accommodation

A guest block has been created for visiting faculty in the married student's hostel. The block is fully furnished with attached dining facilities.

Secure Environment

In addition to highly effective Campus security arrangements, all hostels have CCTV Cameras, protective boundary walls, security personnel and dedicated staff at each block.

Hostel Management

A qualified and experienced management team, composed as under, looks after hostel affairs:

- Deputy Director and AD Hostels with Office Staff, Manager (Hostels) and Caretakers.
- Deputy Director Hostels and AD Messing with experienced supervisors, Cooks and Waiters for preparing and serving food.

Manager (Hostels) with necessary staff remains available in each hostel round the clock.

Facilities

Facilities provided in the hostels include:

- Attached / Community washrooms
- Fully furnished rooms
- Central heating system
- High Speed internet connectivity
- Telephone
- Gymnasium, Billiard Table, Table Tennis
- TV lounges with Cable TV
- Dining Halls with attached kitchens and service areas
- Standby Generator
- Dhobi service (Free of cost)
- Medical Care
- Prayer Area
- Vending Machine

Allotment Procedure

Hostel accommodation in the relevant category is allotted as per Hostel Allotment SoP's. Students are required to apply on available online google docs form on NUST website http://nust.edu.pk/Campus-Life/Pages/Amenities-Facilities.aspx.

Messing

The hostels provide catering services and the boarders have a choice to enjoy a variety of wholesome food, prepared under hygienic conditions.

Charges

Mess Security Rs. 9,000/- (Refundable)
Monthly Charges Rs. 5,520/- (Rs. 184 per day)

Cafeteria and Shopping Complex

Aesthetically designed cafeterias and shopping complexes, called Concordia I and Concordia II, have been constructed in the northern and southern wings of the NUST Campus, H-12, Islamabad. Concordias offer the following services:

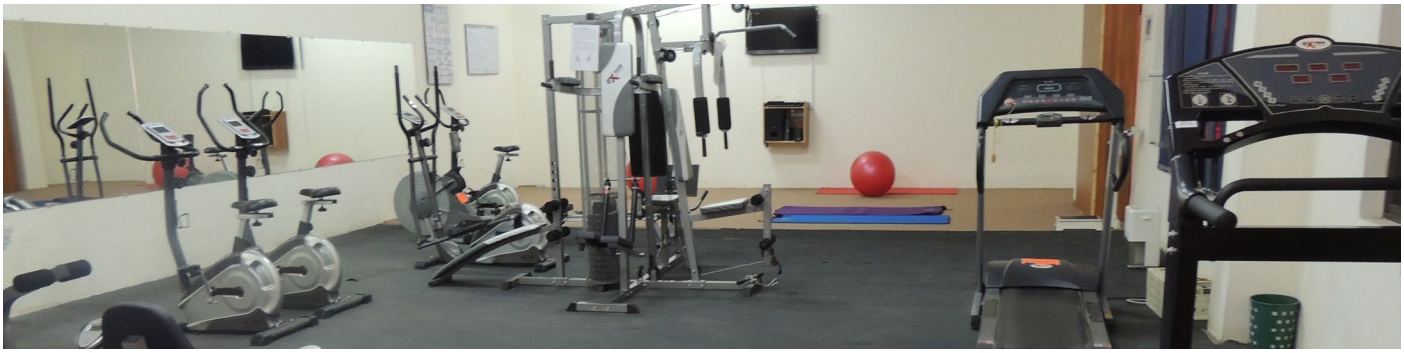
- Cafeteria
- Mini Mart
- Bakery
- Souvenir Shop
- Photographer Shop
- Barber Shop
- Ladies Shop / Parlor
- Cellular Shop
- Stationery Shop
- Book Shop
- Dining/Function halls
- Lawns with gazebos

Shuttle Service

The shuttle service facilitates the students to move around the Campus. On weekends/holidays, the shuttle service is extended to various terminals.

Sports and Recreation

NUST offers a wide variety of sports activities. All Colleges have elaborate sports infrastructure. The NUST Campus, H-12, Islamabad is developing at a fast pace and have the following facilities of international standard:-. Multipurpose hall,(Indoor Courts 1x Basketball, 1x Volleyball, 3x Badminton, 4x Table Tennis, 1x Snooker, 2x Fitness Gyms , 9x Fitness Gym (Hostels), 5x Basketball outdoor courts, 2x Football field, 8x Volleyball courts, 8x Futsal grounds, 5x Cricket grounds, 2x Squash courts. 1 x Netball ground, 1 x Handball ground, 1x Hockey ground, 16x Badminton courts, 3x Tennis courts, 5 x Pool tables, 17 x Table Tennis, 1 x Athletic ground and 1 x Tracking Trail (1.5 Km). NUST has also established a Riding Club in H-12 Campus being the pioneer University in Pakistan to have such a facility. Regular Inter-College/School Sports Competitions are held every year at the University. NUST teams have been participating and performing well in HEC Intervarsity Sports Competition both at the Zonal and National levels. No of our players have represented Pakistan in different Sports and achieved good positions at National Levels.



Quality Assurance and Internationalisation

Higher Education Commission set up Quality Assurance Agency (QAA) in 2002 and facilitated the establishment of Quality Enhancement Cells (QECs) at 10 public sector universities, in year 2006, including NUST. Up till now, a total of 130 such cells have been established at national universities.

Directorate of Quality Assurance was established at NUST to ensure quality enhancement of academic and research activities. Since NUST is a multi-campus university, Local Quality Enhancement Cells have been established at all constituent institutions as field set-ups. NUST Quality Assurance website (www.qa.nust.edu.pk) has been developed on NUST webportal and relevant information has been uploaded. The Directorate is actively engaged in self assessment of programmes, and internal quality audit of institutions at NUST for attaining international compatibility and competitiveness of its programmes.

NUST is member of the following international Quality assurance networks:

- International Network of Quality Assurance for Higher Education
- Asia-Pacific Quality Network

NUST has also obtained the membership of the following international associations and networks, for the purpose of international visibility and sharing information and good practices related to higher education:

- Association of Commonwealth Universities
- International Association of Universities
- Association of Management Development Institutions in South Asia
- United Nations Academic Impact
- International Association of Science Parks
- Association of Quality Assurance Agencies of Islamic World

NUST Campuses

H-12, Islamabad Campus

School of Electrical Engineering and Computer Science (SEECS)

NUST School of Electrical Engineering and Computer Science (formerly NIIT) chronicles an incredible tale of what focused efforts with a clear vision, singular commitment and a passionate quest for excellence are capable of achieving within the span of a decade. From its embryonic appearance in 1999 as a tiny IT wing of NUST, this school has blossomed into one of the finest seats of higher education. The philosophy of education at SEECS puts due premium on an essential blending of engineering and computing education with a sound orientation of social and humanitarian interests of the society. With the relocation of SEECS to the idyllic setting of NUST Campus, H-12, Islamabad, it is destined to set a new pace for cultivation of wholesome social and moral values in the students who are privileged to enter its portals.

NUST Business School (NBS)

NBS has evolved and emerged as a well established institute from NUST Institute of Management Studies NIMS. In the recent past it has proved itself as one of the finest and prestigious management schools of Pakistan offering both the UG and PG programmes with state-of-the-art learning infrastructure which includes well equipped class rooms, lecture and seminar halls, language and research labs, a fully functional library that offers both physical and digital sources of information along with top-of-the line teaching faculty with years of research and professional experience. NBS employs result based teaching methodology through its close liaison with the industry. Several initiatives such as joint field projects, research activities, workshops, seminar and lectures from professionals enrich the professional learning of the students. Its recent accreditation with the NBEAC has enhanced inter and intra-institutional cooperative practices as well as ensured professional mobility and employment opportunities for its graduates. We at NBS believe in continued improvement mechanism through periodic students' surveys, faculty and curriculum evaluation. Our increasing focus on research together with the initiatives to develop synergies with other centers of excellence within NUST will enable us to become business school par excellence.

School of Social Sciences and Humanities (S^3H)

The discipline of social sciences plays a vital role in understanding the function of society, studying individual behavior and evaluating social problems and their impact on society. Taking cognizance of the significance of social sciences and humanities discipline, NUST has recently established the School of Social Sciences and Humanities (S^3H). Founded in 2013, the history of the school can be traced back to 1999 when its seed began to germinate in the form of establishment of NUST Institute of Management Sciences (NIMS) which was renamed as NUST Business School (NBS) in 2008. Later, three social sciences departments namely Department of Economics, Department of Government and Public Policy, and Department of Mass Communication were launched and initially housed under the umbrella of NUST Business School. These three departments together with Department of Behavioral Sciences and Department of Career Counseling & Education converged into the School of Social Sciences and Humanities in the year 2013. A brand new state-of-the-art building of S^3H has been constructed and the school has shifted to new building in 2015.

School of Chemical and Materials Engineering (SCME)

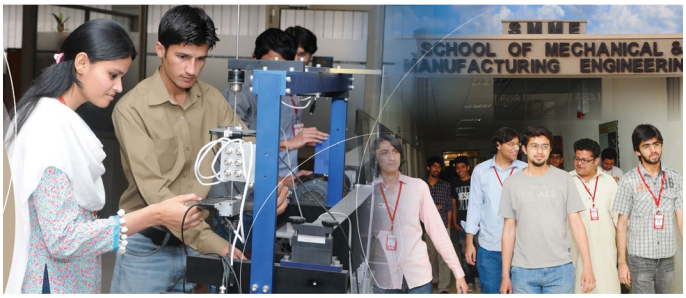
The School of Chemical and Materials Engineering (SCME) became functional in 2006 as a research-oriented school of NUST and is currently offering two undergraduate and three postgraduate degree programmes in the twin disciplines of Chemical Engineering, Materials Engineering and Nanoscience & Engineering. Setting up an educational institution in unique and highly specialised areas is a great challenge. It is very satisfying that within four years, the postgraduate programmes

stand fully established. The School has acquired the services of one of the best faculty in the country, besides establishing a rigorous self-assessment Quality Assurance process to ensure that our graduates get the best education possible. An equal emphasis is laid on development of their character and personality.

School of Civil and Environmental Engineering (SCEE)

School of Civil and Environmental Engineering was established in November 2008. It comprises four vibrant institutions namely National Institute of Transportation (NIT) , Institute of Environmental Science and Engineering (IESE), Institute of Geographical Information Systems (IGIS) and NUST Institute of Civil Engineering (NICE). SCEE is a modern and progressive engineering school of the country, the first of its kind that offers a wide choice of BE programmes in Civil, Geoinformatics and Environmental Engineering. In BE programmes, the students are given the option of selecting elective majors. SCEE has very strong postgraduate programmes (MS/PhD) in Structural Engineering, Geotechnical Engineering, Transportation Engineering, Water Resources Engineering, Environmental Engineering, Environmental Science, Geographic Information Systems, Urban & Regional Planning, Geotechnical & Tunneling, Remote Sensing and Construction Engineering & Management.

School of Mechanical and Manufacturing Engineering (SMME)



The School of Mechanical and Manufacturing Engineering (SMME) was established in 2008. SMME was set up to prepare human resource with essential skills in Mechanical Engineering and allied renewable technologies, with specific emphasis on manufacturing, automobile, power/energy and biomedical sectors to perform effectively in the technological world. The School has state-of-the-art laboratories related to mechanical, manufacturing, robotics and biomedical fields.

The School is offering an undergraduate programme in Mechanical Engineering and postgraduate programmes (MS and PhD) in Mechanical Engineering, Design and Manufacturing Engineering, Robotics and Intelligent Machine Engineering, Biomedical Sciences and Biomedical Engineering.

School of Art, Design and Architecture (SADA)

The School of Art, Design and Architecture is an addition to the elite league of NUST constituent Schools and Colleges. SADA was established in September 2010. The school now in its eight year is continuously working towards establishing one of the most modern and competitive schools of Architecture in the country. The School is all set to bring a truly world-class dimension to the field of education in art, architecture and design by collaborating with the world-renowned Department of Architecture of the Middle East Technical University (METU) Turkey, the first department established at METU in 1956, which is affiliated with various international bodies of architecture. This collaboration will be instrumental in combining the strengths of both world class universities, that collectively hold over seven decades of experience in creating, disseminating and re-inventing knowledge. This collaboration will go a long way in imparting a truly global perspective to our programmes; thereby amalgamating the best of both cultures in order to produce strikingly creative work by students and faculty alike. The school is presently offering a Bachelor of Architecture and Industrial Design Degree. It has well equipped studios, labs and workshops.

Research Center for Modelling and Simulation (RCMS)

Research Center for Modelling and Simulation was established at NUST in 2007 to set up Modelling and Simulation facilities for design and development in various disciplines through education, training and research, and to act as a platform to integrate these efforts by the government, academia and industry. The Center focuses on mathematical modelling and simulation of structures, fluids, electrical systems, communication systems, computer and network architecture, operations management, human behaviour and war scenarios. RCMS started its first MS degree programme in Computational Science and Engineering in Fall 2008 has been upgraded to PhD with specialisations in Fluid Flow and Structures and Computational Infrastructures and Visualisation. The curriculum has been structured to impart students with solid M&S foundational knowledge and skills. The Center also offers MS in Systems Engineering and Bioinformatics.

School of Natural Sciences (SNS)

Established in May 2004, School of Natural Sciences (SNS) formerly known as Centre for Advanced Mathematics and Physics (CAMP), is a young and thriving school that contributes vitally to the research output of not only NUST but also of the country. The research carried out at SNS is regularly published in international journals of repute. SNS offers MS and PhD programmes in the fields of Mathematics, Physics and Chemistry and, an exciting four-year undergraduate programme leading to the Bachelor of Science (BS) in Mathematics, Physics and Chemistry. Our postgraduate programmes emphasize breadth of understanding the core areas of Mathematics, Physics and Chemistry in addition to culminating in these demonstrating mastery in one of the many research directions that are pursued at SNS. The total number of papers published by the faculty at the start of SNS was about 330 of which 200 were in ISI listed journals with an impact factor of about 292 and impact factor per faculty of about 32.5.

Center for Counseling and Career Advisory (C^3A)

Center for Counseling and Career Advisory (C^3A) is a unit of NUST that provides primary mental health services. C^3A is offering this service, to all the NUST students, faculty, personnel and families of those associated, within and outside the NUST Campus, H-12, Islamabad. The core objective of C^3A is to provide professional counseling services, for educational, social, emotional and psychological issues that may inhibit personal or professional performance and advancement. The Center also offers workshops, seminars and lectures to augment the counseling process apart from carrying out research on a variety of psychological and educational issues.

Atta-ur-Rahman School of Applied Biosciences (ASAB)

The School was initially established as Center of Virology and Immunology in October 2007, to provide research and teaching facilities in the field of Virology and Immunology. Recently, it has been named after the eminent scientist, Dr Atta-ur-Rahman, who has very graciously accepted to be its patron and advisor. The School provides excellent research and teaching facilities in the field of applied biology in Pakistan. ASAB has dynamic interdisciplinary undergraduate and graduate programmes which prepare the students for pursuits in research and teaching in pure molecular as well as applied biology. The faculty includes members of Health, Plant and Industrial Biotechnology, Virology, Molecular Biology, Plant Biology, Biochemistry, Medicine, Neurology, Rheumatology, Immunology and Oncology. The research and training programmes have collaborations with other institutions in Pakistan and abroad. The School offers MS Healthcare Biotechnology, MS Plant Biotechnology, MS Industrial Technology and PhD Applied Biosciences.

US-Pak Center for Advanced Studies in Energy (USPCAS-E)

US-Pak Center for Advanced Studies in Energy (USPCAS-E) was launched in June 2011 to provide impetus to energy sector programmes and support and consolidate related activities/ projects with a view to contributing to national economy in times of energy crisis. It was inaugurated on January 9, 2012. Collaborating partners from Canada, USA, UK, RSA and KSA warmly participated in the event. The Center aims at providing sustainable supply of energy at affordable rates with greater share of renewable in the energy mix to reduce environmental footprint. The center's vision resides in setting up pilot plants to demonstrate the feasibility of specific programmes in the various energy sectors. Thus, takes the lead in moving from research and development to demonstration; a step that is considered vital for meaningful academia-industry collaboration. The Center offers MS and PhD in Energy Systems Engineering, MS in Thermal Energy Engineering and Electrical Engineering (Power) programmes.

Rawalpindi Campuses

Military College of Signals (MCS)

Since its inception, the Military College of Signals (MCS) has matured into a premier college of NUST and a center of professional excellence. MCS was established in 1947 as School of Signals. In 1960, it was affiliated with Royal School of Signals to fulfil the requirements of Pakistan Army in the field of Telecommunication Engineering. In 1977, it was affiliated with University of Engineering and Technology, Lahore for award of Telecommunication degree, thereby gaining its elevation as Military College of Signals. In 1991, MCS became a constituent college of National University of Sciences and Technology (NUST). The College also started undergraduate and postgraduate programmes in Software Engineering and postgraduate programme in Telecommunication, System Engineering and Information Security. In 2001, the College introduced PhD degrees in all its programmes.

College of Electrical and Mechanical Engineering (C of E&ME)

C of E&ME is situated along the Grand Trunk Road, at Rawalpindi-Islamabad nexus. Fascinating locale and congenial environment are indeed the hallmarks of this institution. It enjoys the distinction of being the largest constituent college of NUST in terms of doctoral positions in the faculty, student enrolment, diversity of training programmes, research and higher education, infrastructure and facilities. The College attained ISO-9001 certification in 1999; 9001-2000 in 2003 and 9001-2008 in 2009. It has been earning distinctions and acknowledgement in quality assurance and PEC accreditation evaluation. It offers a rich assortment of degree programmes ranging from undergraduate to postgraduate programmes in diverse disciplines, the main fields being Electrical, Mechanical, Software, Computer and Mechatronics Engineering as well as Engineering Management.

NUST Institute of Peace and Conflict Studies (NIPCONS)

NIPCONS was established at the NUST Campus, Tamizuddin Road, Rawalpindi in December 2009, with the primary mandate to plan / organize the system of education for Army cadets / Young Officers (YOs), compatible with the academic syllabus / standards of NUST and award UG degree (Bachelors of Military Art and Science [BMAS]) on completion of specified syllabus / credit hours. Additionally, the Institute is envisioned to grow as a Center of excellence in the field of Peace and Conflict Studies (CIPS). CIPS was established on 1st March 2013. Later, it was inaugurated by UNSG Ban Ki-moon on 13th August 2013. It is a unique institution – the only one of its kind established with the purpose of conducting research and training in matters related to UN Peacekeeping Operations (UNPKOs). Its mandate is, however, not restricted to the relatively narrow field of peacekeeping. The studies at CIPS are organized within the overarching discipline of Peace & Conflict Studies. This relatively new branch of social sciences is devoted to identifying and analysing the nature of conflict with a view to finding solutions through peaceful and non-violent means. The center is offering MS and PhD programme in Peace and Conflict Studies.

Risalpur Campuses

Military College of Engineering (MCE)

The School of Military Engineering was established after the end of World War-II in 1946 near Kirkee (Poona) in southern India. After the partition of the sub-continent and emergence of Pakistan, the School of Military Engineering was established at Sialkot in April 1948. The institute was shifted from Sialkot to Risalpur in the year 1952 and developed into an engineering institution.

Military College of Engineering is a premier college of NUST that offers an undergraduate degree in Civil Engineering. It has a rich legacy dating back to the post World War II era. Passing several milestones, MCE was granted degree awarding status through Presidential Ordinance of 1962. With the emergence of NUST,

MCE entered the folds of the University's constituent colleges in 1995. MCE was recertified as an ISO 9001-2000 institute after successfully meeting all quality standards in July 2008. MCE has the honour of producing 3157 BE graduates, including 60 foreign students.

College of Aeronautical Engineering (CAE)

College of Aeronautical Engineering (CAE) has a legacy which is as impressive as some of tis aforementioned counterparts. The college was established in 1965 with the help of USAF, which provided three experienced and qualified officers as its pioneering Principal and Head of Departments. This premier college offers undergraduate and postgraduate degrees in Aerospace and Avionics Engineering. Its programmes are fortified by foreign qualified faculty. The College was initially located at Pakistan Air Force (PAF) Base Korangi and was affiliated with the University of Karachi. Later, on the establishment of NED University of Engineering & Technology in March, 1977, affiliation of the College was transferred to NED University. In May, 1986, CAE was shifted to Risalpur and since then it is an integral part of the PAF Academy. It became a constituent college of National University of Sciences and Technology (NUST), Islamabad in 1994. The MS programme in Aerospace and Avionics Engineering commenced at CAE in 1997. In 1999 CAE achieved ISO 9000 certification for the quality management system of its academic programmes. Outcome Based Education (OBE) programme was started at CAE in 2014 after PEC became a provisional signatory of the Washington Accord (WA) of International Engineering Alliance (IEA).

Karachi Campus

Pakistan Navy Engineering College (PNEC)

The genesis of PN Engineering College lies in the Officers Training Section (OTS) which was set up in 1962. In 1966, the status of OTS was upgraded to that of a college and given the name of Pakistan Navy Engineering College (PNEC). PNEC was affiliated with Karachi University in the same year. In 1977, the affiliation of PNEC was transferred to NED University of Engineering & Technology. The college was shifted to its present location in 1982. In 1995 it became constituent college of National University of Sciences and Technology (NUST). PNEC Offering comprehensive undergraduate degrees in Electrical Engineering and Mechanical Engineering. Pakistan Naval Engineering College (PNEC), Karachi has the distinction of being the first educational institution of the country to have obtained ISO-9001 certification. Another milestone was achieved with the introduction of its first MS and PhD programmes in 1998. The College continues to diversify its programmes, and offers MS and PhD programmes in Electrical (Control) Engineering, Manufacturing Engineering & Management, and Mechanical Engineering. The College has also introduced MS in Naval Architecture programme from Fall 2018.

Fact file

The Super Computer installed at RCMS-NUST, the fastest GPU (Graphics Processing Unit), is graded as one of the best computing systems operating in any organisation/ academic institution in Pakistan. This supercomputer can perform parallel computation at a peak speed of 132 Teraflops i.e. 132 Trillion Operations per second. It is equipped with multi core processors and graphics co-processors with inter-processor communication speed of 40 Gbps.

INSTITUTIONS AND PROGRAMMES


UNIVERSITY MAIN OFFICE

MILITARY COLLEGE OF ENGINEERING (MCE), RISALPUR


SUK SYKD

Military College of Engineering

Civil engineers design, construct, manage and improve our environment. They develop our infrastructure and have a profound effect on the way we live through consideration of function, aesthetics, economics and sustainability.

The School of Military Engineering was established after the end of World War-II in 1946 near Rurkee (Poona) in southern India. After partition of the sub-continent and emergence of Pakistan, the School of Military Engineering was established at Sialkot in April 1948. The institute was shifted from Sialkot to Risalpur in the year 1952 and developed into an engineering institution.

Military College of Engineering (MCE) attained the status of a degree-awarding institution in 1962. In pursuit of academic excellence and to keep pace with the state-of-the-art technologies, the College took a lead by instituting postgraduate classes in 1988 offering specialization in the disciplines of structures and transportation engineering. In 1990, the College was affiliated with Michigan State University, USA, for split Masters Degree. National Institute of Transportation (NIT) was established at Risalpur in 1992, thereafter, Post Graduate (PG) programme was shifted from MCE to NIT. With the emergence of NUST, MCE became its constituent college in 1995. In year 2000, MCE got IS0-9001-2000 certification after successfully meeting all quality standards. MCE has the honour of producing 3,569 engineering graduates, including around 60 international students. Later, 285 students completed their masters and over 50 have done their PhD's from renowned universities of the country and abroad. MCE resumed postgraduate programmes in five rare disciplines Disaster Management, Construction Engineering & Management, Structural Engineering, Transportation Engineering and Geotechnical Engineering. The journey that started in 1948 from Sialkot, spans over 63 years of rich history and success. The College is committed to the pursuit of knowledge and professionalism.

Location and Significance

Risalpur is linked with Islamabad and Peshawar through Grand Trunk (GT) Road and Islamabad-Peshawar Motorway M-1. It is located just 5 kms from Rashaki Interchange on M-1 and is just an hour distance from Islamabad. Risalpur has rich educational and diverse history. It harbours three important institutions, i.e., MCE, College of Aeronautical Engineering (CAE), and PAF Academy.

Faculty Profiles

The Military College of Engineering is committed to high quality education. It provides excellence in teaching underpinned by research and links with business and industry. Dedicated faculty and staff make the learning experience both exciting and rewarding. The College endeavours to provide support and facilities of the highest possible quality.

Engr Jamil Masud,
Commandant
MSc (National Defence University) China
Discipline: Social Sciences
Specialisation: Art & Science of Warfare

Dr Intikhab Ahmed Qureshi, TI(M), Dean
PhD (Tsinghua University), China
Discipline: Civil Engineering
Specialisation: Transportation Engineering

Structural Engineering

Dr Adeel Zafar, HoD
PhD (UIUC) USA
Discipline: Civil Engineering
Specialisation: Structural Engineering

Dr Muhammad Rizwan
PhD (UET Lahore) Pakistan
Discipline: Civil Engineering
Specialisation: Structural Engineering

Dr Muhammad Shahid Siddique
MS (Bauhaus University Weimar) Germany
Discipline: Civil Engineering
Specialisation: Structural Engineering

Engr Bilal Sulaman Niazi
MS (NUST) Pakistan
Discipline: Civil Engineering
Specialisation: Structural Engineering

Engr Wisal Ahmad
MSc (NUST) Pakistan
Discipline: Civil Engineering
Specialisation: Structural Engineering

Engr Abdul Basit
MSc (NEDUET) Pakistan
Discipline: Civil Engineering
Specialisation: Structural Engineering

Disaster Management Department

Dr Nadeem Shahzad, HoD
PhD (NUST) Pakistan
Discipline: Civil Engineering
Specialisation: Environmental Engineering

Mrs Zarmina Akbar
MS (NUST) Pakistan
Discipline: Disaster Management
Specialisation: Disaster Managements

Mrs Razia Sharif
MS (NUST) Pakistan
Discipline: Disaster Management
Specialisation: Disaster Managements

Ms Somana Riaz
MS (NUST) Pakistan
Discipline: Disaster Management
Specialisation: Disaster Managements

Basic Sciences

Dr Imran Ullah
PhD (University Teknologi) Malaysia
Discipline: Mathematics
Specialisation: Mathematics

Dr Faisal Yousafzai, Head of Department
PhD (University of Science and Technology of China) China
Discipline: Mathemetics
Specialisation: Mathemetics

Mr Asim Khan
M.Phil (University of Peshawar) Pakistan
Discipline: Mathemetics
Specialization: Mathemetics

Mr Muhammad Danish Zia
M.Phil (NUST) Pakistan
Discipline: Mathemetics
Specialisation: Mathemetics

Water Resources

Dr Irfan Abid, HoD
PhD (Gorgia Tech) USA
Discipline: Civil Engineering
Specialisation: Water Resource Engg/ Hyd

Dr Arshad Ali
PhD (UET Peshawer) Pakistan
Discipline: Civil Engineering
Specialization: Environmental Engineering

Engr Khurram Sattar Khan
MS (University of Wisconsin Madison) USA
Discipline: Civil Engineering
Specialisation: Water Resources Engineering

Geotech Department

Dr Kamran Akhtar, HoD
PhD (University of Illinois at Urbana-Champaign) USA
Discipline: Civil Engineering
Specialisation: Geotechnical Engineering

Dr Mazhar Iqbal Arshad
PhD (Purdue University) USA
Discipline: Civil Engineering
Specialisation: Geotechnical Engineering

Engr Abdul Waheed
MS (NUST) Pakistan
Discipline: Civil Engineering
Specialisation: Geotechnical Engineering

Mr Zulfiqar Ali Khan
MS (The University of Punjab) Pakistan
Discipline: Geology
Specialisation: Engineering Geology

Dr Hamid Ashraf Yousafzai
PhD (WITS) South Africa
Discipline: Civil Engineering
Specialisation: Mining (Mineral Resource Management)

Mrs Samreen Musaddiq
MSc (NUST) Pakistan
Discipline: Geotechnical Engineering
Specialisation: Geotechnical Engineering

Dr Tariq Feroz
PhD (WITS) South Africa
Discipline: Civil Engineering
Specialisation: Mining

Engr Anwar Hussain Aftab
MS (UET, Taxila) Pakistan
Discipline: Civil Engineering
Specialisation: Geotechnical Engineering

Engr Syed Mohsin Ali
PhD (WITS) South Africa
Discipline: Civil Engineering
Specialisation: Mech Mining System

Construction Engineering & Management, Survey and Inter Disciplinary Engineering

Dr Rai Waqas Azfar Khan
PhD (NUST, Islamabad) Pakistan
Discipline: Civil Engineering
Specialisation: Engineering Management

Engr Rashid Aleem Ahsan
MSc (UET, Taxila) Pakistan
Discipline: Civil Engineering
Specialisation: Engineering ManagementEngr Khurram Iqbal

Engr Naveed Haider Mirza
MS (NUST) Pakistan
Discipline: Civil Engineering
Specialisation: Construction Engineering & Management

Engr Haroom Amal Khattak
BE (NUST) Pakistan
Discipline: Civil Engineering
Specialisation: Civil Engineering

National Institute of Transportation (NIT)

The National Institute of Transportation (NIT) is one of the pioneer constituent institutes of NUST. The Institute was established in 1991 at Risalpur, with the aim to develop competent scientific and technical manpower having international level skills to meet the country's need in the civil engineering sectors, specially transportation sector. Since its inception, this National institute has been providing a scientific platform for research and development in the core civil engineering fields to support the Nation and Army Corps of Engineers. NIT is aimed to impart advance higher education in core civil engineering fields (i.e. MS & PhD programs In Transportation Engineering, Structural Engineering and & Geotechnical Engineering). NIT is focused to become a center of excellence of international repute for education, research and training in core civil engineering areas, specially the transportation engineering. NIT has always played a leading role amongst the elite, both within and outside Pakistan, to work as a think tank, share expertise and suggest long term measures to identify and resolve the issues/ challenges being confronted, related to its mandate. The faculty of the institute has always been involved in national and international level research and development projects/collaboration. NIT has been located at NUST campus H-12, Islamabad from 2008 to 2018. Currently, NIT is situated at Risalpur Cantonment.

Vision & Mission

- Toeducate its students to serve the industry, community and country at large through innovative, socially acceptable and environment friendly solutions, with the spirit of professionalism and responsible citizenship.
- To develop competent scientific and technical manpower having international level skills to meet the country's need in country's need in the civil engineering sectors, specially transportation sector.
- Provide integrated teaching and research facility for postgraduate work leading to award of master's and doctoral degree in Transportation Engineering, Structural Engineering and & Geotechnical Engineering.
- Provide engineering research support to the problems identified by defence and other national organizations.
- Arrange international seminars, workshops and symposiums in areas of special national interest.
- Collaborate with national and international organizations for research and training.

Faculty Profile (NIT) (Transportation Engineering Department)

Dr Intikhab Ali Qureshi, TI(M), Dean
PhD (Tsinghua University), China
Discipline: Civil Engineering
Specialization: Transportation Engineering

Dr Waseem Irshad Ul Haq Kayani, Head of Department
PhD (Massouri University of Science & Technology), USA
Discipline: Civil Engineering
Specialization: Transportation Engineering

Dr Muhammad Irfan
PhD (Purdue University), USA
Discipline: Civil Engineering
Specialization: Transportation Engineering

Dr Muhammad Bilal Khurshid
PhD (Purdue University), USA
Discipline: Civil Engineering
Specialization: Transportation Engineering

Dr Muhammad Jawed Iqbal
PhD (Mehran University of Engineering and Technology, Karachi), Pakistan
Discipline: Civil Engineering
Specialization: Transportation Engineering

Dr Anwaar Ahmed
PhD (Purdue University), USA
Discipline: Civil Engineering
Specialization: Transportation Engineering

Dr Inam Ullah
PhD (Southwest Jiaotong University), China
Discipline: Civil Engineering
Specialization: Transportation Engineering

Students Support Facilities

Different student societies have been formed which cover varied interests such as creativity, sports and intellectual pursuits. The main societies of the College include:

» Sports Club
» Media Club
» Adventure Club
» Dramatic & Fine Arts Club
» Community Services Club
» Cyber & Science Society
» Debating & Literary Society

In-line with its commitment to support all student initiatives, the College facilitates club activities. Some of the activities that are organized on a regular basis include:

» Movies on weekend
» Telecasting cricket matches on large screen
» Food stalls offering barbecue, Chinese cuisine and sunday brunch etc

Safety and Security

By virtue of its location inside the cantonment, the College has an elaborate security system. There is an internal security system for each hostel; a guard is deputed for each hostel to ensure the safety of students and their belongings throughout the day. Mobile patrolling is carried out for augmenting security.

Sports Center

The College has both indoor and outdoor sports facilities including a Sports Complex. Apart from routine games, competitions are held in all the sports on a regular basis in order to inculcate sportsmanship amongst students. These competitions include inter-college and inter-university championship.

Indoor Sports

Indoor facilities are available for table tennis, badminton, billiard, squash, body weight training and functional fitness etc. Recently, International standard squash courts have been constructed to provide best possible facilities to the students.

Outdoor Sports

For outdoor sports, i.e. tennis, basket ball, volleyball courts and hockey, football and cricket grounds are available.

Gymnasium

Our gymnasium provides a combination of top of the line functional fitness, cardio and resistance equipment. Well-stocked free-weight area provides exercise programmes for beginners and advanced individuals alike. Professionals are available to encourage and advise students.

Swimming Pool

An international standard swimming pool is being maintained at the College so that students can participate in healthy and competitive swimming galas, besides using the pool as a recreational facility. A swimming gala is organized every summer for students. They can get membership at a nominal fee for an entire season.

Student Counseling Service

A professional and confidential counseling service is available to all students. During counseling sessions, both personal and social issues like loneliness, family issues and worries pertaining to studies are discussed. Counseling is offered both in groups and on an individual basis. The College has established a special counseling cell, which is headed by an Officer. The cell undertakes the following responsibilities:

» It helps students make decisions regarding their study plans and provides relevant information on subjects offered in various semesters and their pre-requisites.
» It seeks to help students address and overcome their weaknesses in various subjects.
» The services of C^{3}A Directorate are also solicited when required.

Parental Information/Counselling Services

MCE always endeavours to keep the parents fully abreast with the academic and discipline growth of their children. MCE has set procedures to communicate with the parents. On requirement basis, results are also shared with the parents for mentoring and effective learning.

Academic Evaluation Services

MCE has set procedures to evaluate the academic curriculum and monitor students' performance and provide proper mentoring to the students. Faculty, HoDs, Dean and Commandant are fully involved in this process.

Academic Learning Support

The academic tutor and course officer, under the supervision of the Chief Instructor or Dean, analyses and finds viable solutions for problems of the students. The service aims at the following:

Do You Know?

Military College of Engineering, Risalpur, holds the unique honour of being the oldest institution amongst NUST constituent Colleges. It was established in 1948, in Sialkot, and was later shifted to Risaipur in 1952.

- Helping students maximize their academic potential.
- Helping students in their individual and collective academic tasks. In this regard, workshops are arranged which focus on a wide range of activities including; developing academic writing skills, revision techniques, understanding learning styles and time management.
- Helping students in providing extra tutoring individually and / or collectively on requirement basis.

IT Services

IT services are available to all students and staff. A local area network has been established at the College. A Computer Center has also been set up to keep pace with modern trends and research in the engineering field. Students are provided with internet facilities at the Computer Center, the library and the residence. The Computer Center offers the following facilities to the students.

- A dedicated internet hall provides internet surfing facilities.
- 2 networking halls with 25 computers each, provide computer training facilities to students.
- The software engineering laboratory offers the latest professional civil engineering software in the market.

Health Service

The College Health Service operates through a doctor hired by NUST for all students. The Nursing Advisor can advise on minor illnesses and injuries. In case of serious illness or detailed investigation, the services of the Combined Military Hospital, Risalpur are also available. This hospital has a medical ward, a surgical ward, an intensive-care unit and an eye-care service. A medical officer is available round-the-clock and in case of emergency, all specialists are on call. Moreover, lectures on health-related issues are regularly delivered to students by qualified physicians.

Library Services

All students are granted library membership for the duration of their programmes and they get course books free of cost. The library comprises:

- Over 40,000 books
- An audio-visual section comprising TV's, VCR's, VCD's and tape recorders
- Training and technical video cassettes/CD's
- Scanning and printing services

Laboratories

The College is equipped with the most sophisticated laboratory equipment for civil engineering. MCE testing facilities are well known for reliability and accuracy. It possesses the most modern equipment, which is calibrated regularly through certified calibrating firms. Quality, precision and accuracy are the hallmarks of MCE laboratories. The main laboratories are:

- Concrete Materials laboratory
- Geotechnical Engineering Laboratory
- Transportation Laboratory
- Strength of Materials Laboratory
- Public Health Technology Laboratory
- Geology Laboratory
- Hydraulics Laboratory
- Electrical Technology Laboratory
- Mechanical Technology Laboratory
- Electric Project Management Lab
- Civil Engineering Display Hall
- BIM Laboratory

Accommodation

Accommodation at MCE is secure and comfortable. Through the support of NUST, the College has invested in new and refurbished halls of residence with modern study rooms and communal living spaces where students can relax and feel at home. The social aspect of life at the College is overwhelming as it offers great opportunities to meet new people and provides an intellectual student body which is varied in its interests. Students are provided with transport facilities from their accommodation to halls of study and back.

The College provides excellent messing facilities to its students. Each hostel has a well-furnished mess with the following facilities:

- Dining hall
- TV lounge
- Visitors lounge
- Indoor games

Note: Female students are not admitted at MCE due to non-availability of hostel facilities.

Achievements

- Dr Mazhar Iqbal Arshad organized one day seminar on “Design of Axially Loaded Piles/ Drilled Shafts” on 15 March 2018.
- Dr Rai Waqas Azfar Khan organized one day workshop on “Fundamentals of Supply Chain Management” on 03 May 2018.
- Dr Naeem Shahzad organized one day workshop on “National Disaster Response Force Framework” on 12 May 2018.
- Dr Sarfraz Ali organized one day workshop on “Towards Sustainable Development of CPEC: Prevention & Remediation of Goemechanical Hazards along KKH” on 12 May 2018.
- MCE is the Winner of Inter NUST Hockey Championship 2017-18 held from 19-21 February 2018 at CAE, Risalpur.
- More than forty research papers have been published in the current years by MCE faculty in various national and international research journal and conferences.

Guest Speakers

The College makes an endeavour to keep its students abreast with the latest knowledge and developments in the field of civil engineering and other fields. It invites a number of renowned engineers, scholars, and professionals who deliver lectures on various topics, share their ideas and abreast the students with the latest research and development. Some of the distinguished guest speakers of 2018 include:

Guest Speaker	Title of Talk
Mr Vaqas Arshad	Etiquette and Manners
Dr Shaukat Ali Khan	Earthquake Risk Assessment
Ms Hira Hashmi	Coordination Mechanism in Disaster Management
Dr Abdul Waheed	Sustainable Urban Development in Pakistan
Ms Atiya Zulfiqar	Resume Writing
Dr Nasir Khan	Religious Moderation
Dr Atta Ur Rehman	International and Regional Organization Involved in Disaster Management
Syed Hasan Javed	China-Pakistan Economic Corridor (CPEC)
Anhyan Mumtaz	Innovative Insulating Materials
Dr Muhammad Usman Rashid	Sustainable and Optimized Utilization of Water Resources: A Way Forward

Academic Programmes

Bachelors in Civil Engineering

The degree programme is designed to meet the huge unsatisfied demand for professional Civil Engineers with special emphasis on basic civil engineering theory dovetailed with practical training. Particular attention is paid to the overgrowing fields of Structural Engineering, Transportation Engineering, Geotechnical Engineering and Water Resources Engineering. BE Civil Engineering syllabus has been revised in line with HEC's Uniform Frame Work of Engineering (UFEE) and accredited by PEC. The curriculum is designed to provide undergraduates with a solid foundation on fundamental principles of basic sciences including Mathematics, Management Sciences, Engineering Mechanics, Strength of Materials, Theory of Structures, Survey, Architecture, Computer Sciences, Fluid Mechanics, Hydraulics, Soil Mechanics, Concrete Technology, Transportation Engineering, Public Health Engineering and then use this knowledge to solve practical Civil Engineering problems.

Programme Code: 101

Scheme of Studies

Semester 1

Course Code	Course Title	Credits
HU–100	English	2-0
CS–114	Fundamentals of Programming	2-1
HU–107	Pakistan Studies	2-0
MATH–101	Calculus and Analytical Geometry	3-0
PHY–102	Applied Physics	2-1
ME–106	Engineering Mechanics	2.5-0.5
ME–105	Workshop Practice	0-1
	Total	**17**

Semester-II

Course Code	Course Title	Credits
*CE 121	Engineering Geology	3-0
HU–101	Islamic Studies	2-0
MATH 121	Linear Algebra & ODE	3-0
ME –104	Engineering Drawing	0-2
HU-109	Communication Skills	2-0
*CE 102	Civil Engg Materials	3-0
Total		**15**

Semester-III

Course Code	Course Title	Credits
CE-203	Mechanics of Solids-I	2-1
CE-241	Transportation Engineering-I	3-0
CE-251	Fluid Mechanics-I	2-1
CE-182	Surveying-I	2-1
CE-222	Soil Mechanics-I	2-1
MATH-352	Numerical Methods	2-1
	Total	**18**

Semester-IV

Course Code	Course Title	Credits
CE-206	Structural Analysis-I	3-0
CE-205	Mechanics of Solids-II	2-1
CE-252	Fluid Mechanics-II	2-1
CE-286	Surveying-II	1-2
CE-342	Transportation Engineering-II	2-1
MATH-361	Probability & Statistics	3-0
	Total	**18**

Semester-V

Course Code	Course Title	Credits
CE-307	Structural Analysis-II	4-0
CE-308	Plain & Reinforced Concrete-I	3-1
CE-324	Soil Mechanics-II	2-1
CE-354	Engineering Hydrology	1.5-0.5
CE-371	Construction Project Management	2-1
CE-372	Quantity Surveying and Cost Estimation	3-0
	Total	**19**

Semester-VI

Course Code	Course Title	Credits
CE-309	Structural Analysis-III	3-0
CE-310	Plain & Reinforced Concrete-II	3-1
CE-389	Computer Aided Civil Engg Design & Graphics	0-2
CE-497	Project-I	0-1
CE-287	Geo-Informatics	2-1
CE -00	Elective - I	3-0
	Total	**16**

Semester-VII

Course Code	Course Title	Credits
ARCH-305	Architecture & Town Planning	2-0
CE-375	Construction Engineering	3-0
CE-411	Steel Structures	3-0
CE-498	Project-II	0-2
ECO-130	Engineering Economics	2-0
HU-212	Technical & Business Writing	2-0
CE -00	Elective - II	3-0
	Total	**19**

Semester-VIII

Course Code	Course Title	Credits
CE-458	Irrigation Engineering	2.5-0.5
CE-499	Project-III	0-3
HU-222	Professional Ethics	2-0
MGT-271	Entrepreneurship	2-0
XX-00	Elective - III	3-0
Total		**13**
Total Credits		**133**

* Students will have the option to register for an elective course from the list of approved courses covering variety of disciplines i.e. structural, geotechnical, transportation, construction and environmental engineering and water resources. Elective course will be offered depending upon the availability of instructor.

Elective Courses

Structures		
CE-412	Design of Concrete Structures	3-0
CE-413	Design of Steel Structures	3-0
CE-414	Bridge Engineering	3-0
CE-415	Special Application Structures	3-0
CE-416	Earthquake Engineering	3-0
Geotech		
CE-425	Introduction to Rock Mechanics	3-0
CE-426	Slope Stability	3-0
CE-427	Soil and Site Improvement	3-0
CE-428	Design & Construction of Earthen Dams	3-0
CE-429	Introduction to Geotechnical Earthquake Engineering	3-0
CE-430	Applied Soil Mechanics	3-0
CE-431	Investigation and Instrumentation in Earthquake Engineering	3-0
Water Resources		
CE-459	Hydraulic Engineering	
CE-460	Computational Hydraulics	3-0
CE-461	Open Channel Flow	3-0
CE-462	River Engineering	3-0
CE-355	Public Health Engineering (Water Supply and Sanitary Engineering)	2-1
Construction Management		3-0
ENE-433	Environment Management & Impact Assessment	3-0
CE-474	Construction Project Scheduling	3-0
HRM-443	Human Resource Management in Construction	3-0
CE-476	Construction Contract Management	3-0

Transportation

CE-443	Pavement Design & Rehabilitation	3-0
CE-444	Traffic Engineering & Safety	3-0
CE-445	Road Construction, Materials & Practices	3-0
CE-446	Geometric Design	3-0

Postgraduate Programmes

Presently MCE is offering MS in five Disciplines; namely Disaster Management, Construction Engineering Management, Structural Engineering, Transportation Engineering and Geotechnical engineering. All five Postgraduate programmes cover a wide array of courses as listed below. Students have to take 4-6 core and 2-4 elective courses depending on the programme requirement followed. by 6 credits research thesis.

MS Disaster Management

The course is designed to prepare potential industry leaders, capable of implementing the best engineering and management practices and technologies in construction industry.

Why join this program?

In Construction Engineering and Management, civil engineers manage and direct physical construction of a project from start to finish. This field is also known as construction management. Construction engineers apply the knowledge of construction methods and equipment along with principles of financing, scheduling, planning, organization, and coordination to convert paper designs into completed usable facilities. They maintain a continuous record of personnel, time, materials, and costs and prepare periodic reports depicting the project's progress to completion.

Scheme of Studies

Programme Code:157

Core Courses		
Course Code	**Course Title**	**Credits**
DME-801	Fundamentals of Disaster Management	3
DM-801	Policies, Planning and Strategies for Disaster Management	3
DM-802	Disaster Risk and Vulnerabilities Assessment	3
DM-803	Disaster Risk Reduction and Preparedness	3
DM-804	Disaster Response and Recovery	3
DM-899	**MS Thesis**	**6**
	Total	**15**
Elective Courses (Any Three)		
DME-802	GIS and Remote Sensing for Disaster Mapping and Management	3
DME-832	Climate Forecasting and Early Warning System	3
DM-811	Community Based Disaster Risk Management	3
DM-812	Environmental Framework on Disasters	3
DM-821	Earthquake Disaster Assessment and Mitigation	3
DM-831	Flood Hazard Assessment and Remediation	3
DM-832	Complex Humanitarian Emergency Management	3
DM-833	Public and Mental Health Aspects of Disaster Management, Psychotrauma Consequent to Disasters	3

MS Structural Engineering

The course focuses on solution of problems in structural engineering by enlarging and deepening students' knowledge so that they have a good grasp of new design concepts and technologies. The course contents encompass advance techniques for structural analysis, structural dynamics, reinforced concrete structures, and analysis and design of pre-stressed concrete structures.

Why join this program?

Structural engineers combine science and art to design and build infrastructure that will resist natural and manmade forces. Buildings, bridges, stadiums and other civil facilities define the traditional core focus of structural engineers. At the periphery of the field, structural engineering extends more broadly to share common interests with mechanical, aerospace and naval engineering for the design of often large, complex systems including power plants, pipelines, aerospace vehicles and ships-submarines.

MS Coursework

Programme Code-156

Core Courses

Course Code	Course Title	Credits
CE-801	Advanced Structural Mechanics	3
CE-802	Matrix Structural Analysis	3
CE-803	Concrete Materials and Technology	3
CE-804	Pre-stressed Concrete Structures	3
CE-805	Advanced Concrete Design	3
CE-899	**MS Thesis**	**6**

Elective Courses (Any three)

Course Code	Course Title	Credits
Earthquake Focused		
CE-815	Seismic Design of Reinforced Concrete Structures	3
CE-804	Structural Dynamics	3
CE-819	Seismic Design of Masonry Structures	3
CE-810	Earthquake Seismology and Earthquake Hazard	3
CE-816	Geotechnical Earthquake Engineering	3
CE-811	Disaster Risk Evaluation and Retrofitting of Existing Structures	3
Flood Focused		
CE-812	Flood Hazard Modeling and Flood Forecasting	3
CE-813	Climate Forecasting and Early Warning System	3
CE-817	GIS and Remote Sensing in Disaster Mapping & Disaster Management	3
Other Disasters and Advance/Miscellaneous Courses		
CE-820	Landslide Analysis and Mitigation	3
CE-814	Structural Fire Engineering	3
CE-822	Disaster Risk Assessment and Mitigation	3
CE-882	Deep Foundation	3
CE-818	Coastal Engineering	3
STAT-835	Probability and Statistics	3
CE-836	Construction Management	3
CE-808	Finite Element Method	3
CE-807	Steel Structures	3
CE-806	Reinforced Concrete Members	3
GIS-802	GIS & Remote Sensing Application for Civil Engineering	3

MS Construction Engineering & Management

The course is designed to prepare potential industry leaders, capable of implementing the best engineering and management practices and technologies in construction industry.

Why join this program?

In Construction Engineering and Management, civil engineers manage and direct physical construction of a project from start to finish. This field is also known as construction management. Construction engineers apply the knowledge of construction methods and equipment along with principles of financing, scheduling, planning, organisation, and coordination to convert paper designs into completed usable facilities. They maintain a continuous record of personnel, time, materials, and costs and prepare periodic reports depicting the project's progress to completion.

MS Coursework

Programme Code-155

Core Courses

Course Code	Course Title	Credits	Course Code	Course Title	Credits
CEM-801	Construction Project Administration	3	CEM-805	Safety Management in Construction	3
CEM-802	Construction Planning, Scheduling and Control	3	STAT-835	Probability and Statistic	3
CEM-882	Economic Decision Analysis in Construction	3	**CE-899**	**MS Thesis**	**6**
CEM-804	Construction Cost Estimating and Control	3			

Elective Courses (Any three)

Course Code	Course Title	Credits	Course Code	Course Title	Credits
CEM-806	Construction Equipment Management	3	WRE-882	Environmental Impact Assessment	3
CEM-807	Risk Management in Construction	3	CE-829	Geotechnical Site Investigation	3
CE-852	Concrete Materials and Technology	3	CE-803	Pavement Materials Engineering	3
WRE-877	Water Supply and Wastewater Engineering	3	CE-846	Water Recourses, Economics, Planning and Management	3
			CE-897	Special Topics in Civil Engineering	3

MS/PhD Transportation Engineering

MS Coursework

Programme Code-158

Core Courses

Course Code	Course Title	Credits	Course Code	Course Title	Credits
CE-860	Pavement Design and Analysis	3	CE-861	Pavement Rehabilitation and Management	3
CE-862	Pavement Materials Engineering	3	CE-867	Urban Transportation System Evaluation	3
CE-863	Transportation Planning	3	CE-836	Construction Management	3
CE-864	Geometric Design of Highways/ Freeways	3	**Economics & Logistics**		
CE-865	Traffic Engineering	3	CE-870	Transportation Economics	3
CE-899	**MS Thesis**	**6**	CE-873	Logistics and Supply Chain Management	3

Elective Courses (any three)

			Miscellaneous Courses		
Planning & Management			STAT-835	Probability and Statistics	3
CE-868	Public Mass Transportation	3	GIS-802	GIS & Remote Sensing Application for Civil Engineering	3
CE-869	Advanced Traffic Control & Management System	3	CE-845	Airport Engineering	3

MS Geotechnical Engineering

Core Courses

Course Code	Course Title	Credits
CE-821	Soil and Site Improvement	3
CE-828	Advanced Geotechnical Design	3
CE-829	Geotechnical Site Investigation	3
CE-837	Design & Construction of Earthen Dams	3
CE-899	**MS Thesis**	**6**

Elective Courses (Any Four)

Course Code	Course Title	Credits
CE-803	Concrete Materials & Technology	3
CE-804	Pre-stressed Concrete Structures	3
CE-806	Reinforced Concrete Members	3
CE-808	Finite Element Method	3
CE-818	Coastal Engineering	3
CE-830	Rock Mechanics-II	3
CE-824	Mechanical Properties of Soil	3
CE-835	Water Supply and Wastewater Engg	3
CE-823	Slope Stability	3
CE-831	Advanced Soil Mechanics	3
CE-836	Construction Management	3
CE-841	Earth Structures	3
CE-844	Hydropower Engineering	3
CE-860	Pavement Design and Analysis	3
CE-861	Pavement Rehabilitation & Management	3
CE-862	Pavement Materials Engineering	3
CE-872	Applied Hydrology	3
CE-873	River Engineering	3
CE-875	Computational Hydraulics	3
CE-876	Sediment Transport	3
CE-881	Soil Dynamics	3
CE-884	Rock Mechanics-I	3
CE-880	Groundwater Hydrology	3
CE-885	Groundwater Exploration	3
CE-886	Water Resources Economics, Planning & Management	3
CE-888	Watershed Management	3

Course Code	Course Title	Credits
CE-889	Irrigation & Drainage Engineering	3
CE-890	Ground Water Modeling	3
CE-897	Special Topics in Civil Engineering	3
CE-898	Contract Management	3
STAT-835	Probability & Statistics	3
CEM-802	Construction Planning, Scheduling and Control	3
CEM-806	Construction Equipment Management	3
CEM-807	Risk Management in Construction	3
URP-904	Urban Mass Transit	3
GIS-802	GIS & RS and Its Application for Civil Engg	3
GIS-807	Theory of GIS	3
GIS-815	Engineering Aspects of RS	3
GIS-833	Soil Geomorphology and Classification	3
GIS-842	Natural Hazards and Disaster Management	3
ENE-822	Solid & Hazardous Waste Management	3
ENE-921	Contaminated Site Remediation	3
ENV-848	Environmental Geology	3
RM-898	Research Methodology (additional Course)	2

PhD in Geotechnical Engineering

MCE is also offering PhD in Geotechnical engineering. PhD programme curriculum is as per NUST rules in vouge (PG Hand Book , Chapter 5, Section 55 and 59) which are 18 CHs of Course work and 30 CHs of Thesis, making a total of 48 CHs. To complete the coursework, a student should take 4 courses, from the prescribed PhD coursework (listed below). On the recommendation of GEC, he / she may take 2 relevant courses offered by other institutions of NUST.

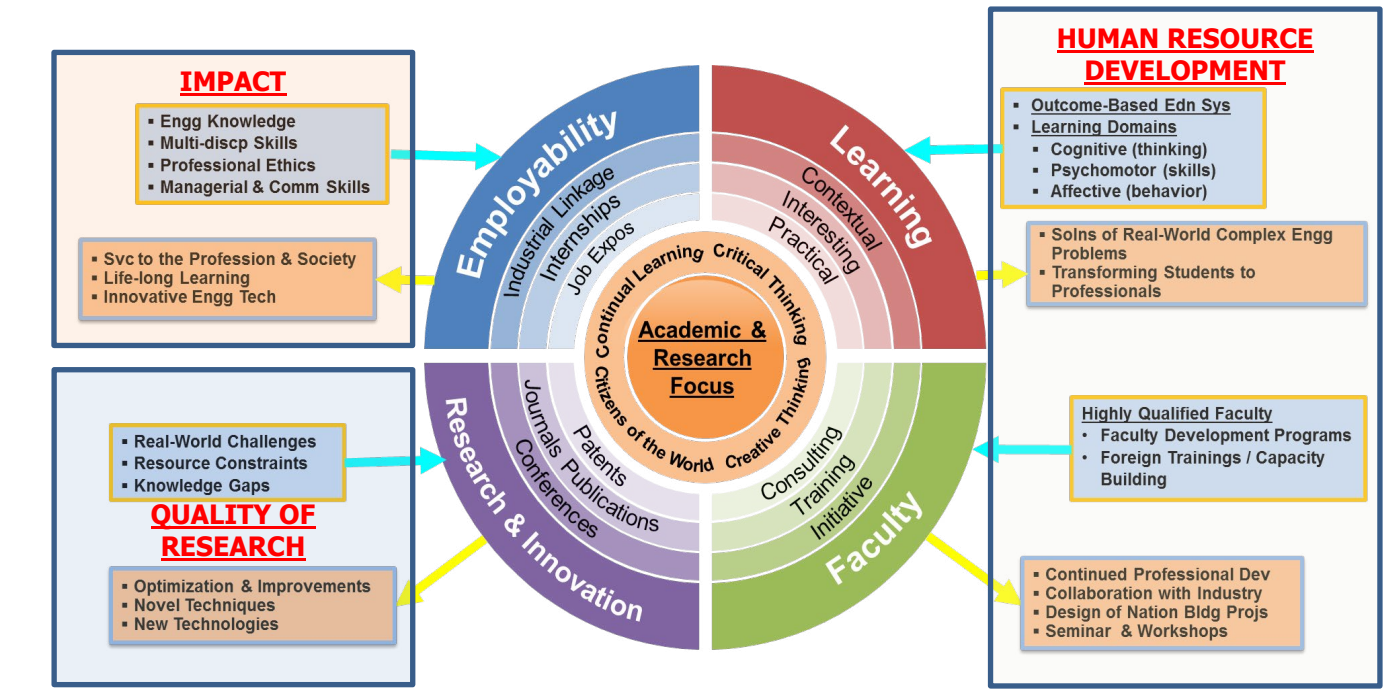
Core Courses

Course Code	Course Title	Credits
CE-821	Soil and Site Improvement	3
CE-828	Advanced Geotechnical Design	3
CE-829	Geotechnical Site Investigation	3
CE-837	Design & Construction of Earthen Dams	3
CE-803	Concrete Materials & Technology	3
CE-804	Pre-stressed Concrete Structures	3
CE-806	Reinforced Concrete Members	3
CE-808	Finite Element Method	3
CE-818	Coastal Engineering	3
CE-830	Rock Mechanics-II	3
CE-824	Mechanical Properties of Soil	3
CE-835	Water Supply and Wastewater Engg	3
CE-823	Slope Stability	3
CE-831	Advanced Soil Mechanics	3
CE-836	Construction Management	3
CE-841	Earth Structures	3
CE-844	Hydropower Engineering	3
CE-860	Pavement Design and Analysis	3
CE-861	Pavement Rehabilitation & Management	3
CE-862	Pavement Materials Engineering	3
CE-872	Applied Hydrology	3
CE-873	River Engineering	3
CE-875	Computational Hydraulics	3
CE-876	Sediment Transport	3
CE-881	Soil Dynamics	3

Course Code	Course Title	Credits
CE-884	Rock Mechanics-I	3
CE-880	Groundwater Hydrology	3
CE-885	Groundwater Exploration	3
CE-886	Water Resources Economics, Planning & Management	3
CE-888	Watershed Management	3
CE-889	Irrigation & Drainage Engineering	3
CE-890	Ground Water Modeling	3
CE-897	Special Topics in Civil Engineering	3
CE-898	Contract Management	3
STAT-835	Probability & Statistics	3
CEM-802	Construction Planning, Scheduling and Control	3
CEM-806	Construction Equipment Management	3
CEM-807	Risk Management in Construction	3
URP-904	Urban Mass Transit	3
GIS-802	GIS & RS and Its Application for Civil Engg	3
GIS-807	Theory of GIS	3
GIS-815	Engineering Aspects of RS	3
GIS-833	Soil Geomorphology and Classification	3
GIS-842	Natural Hazards and Disaster Management	3
CE-999	**PhD Thesis**	**30**

MCE Research Strategy

Research is the focal point of university education all over the world. Universities significantly contribute towards creation of new knowledge and discovery of new frontiers of creativity and innovation. In order to develop MCE into a true Centre of excellence, it is imperative that apart from maintaining high standards in teaching, research is rigorously pursued and suitably rewarded. The research output of an institute must be in line with national needs and contribute towards socio-economic growth of the country. At MCE, a strategy is developed for the short- and long-term research goals/ objectives that asserts an adaptable framework through which it can sustain and add value to the academic excellence, thereby discharging the responsibilities to the Army in particular and nation in general. A research strategy defines a series of mechanisms through which researchers can, individually and collectively, fulfil their potential. There exist an effective and flexible mechanism at departmental, faculty and institutional level to anticipate and respond to the rapidly and continually changing external environment. For the individual researcher – and to those contemplating becoming a researcher at MCE – this strategy seeks to define a nurturing environment in which: your research leadership is encouraged, cherished and sustained; your expertise can be creatively linked with and enhanced by that of other disciplines; impediments to you reaching across traditional boundaries are minimized; and the consequences of your work are amplified. We encourage all researchers – and professional staff to make the most of its potential as a force for public good.



Initiatives/ Achievement

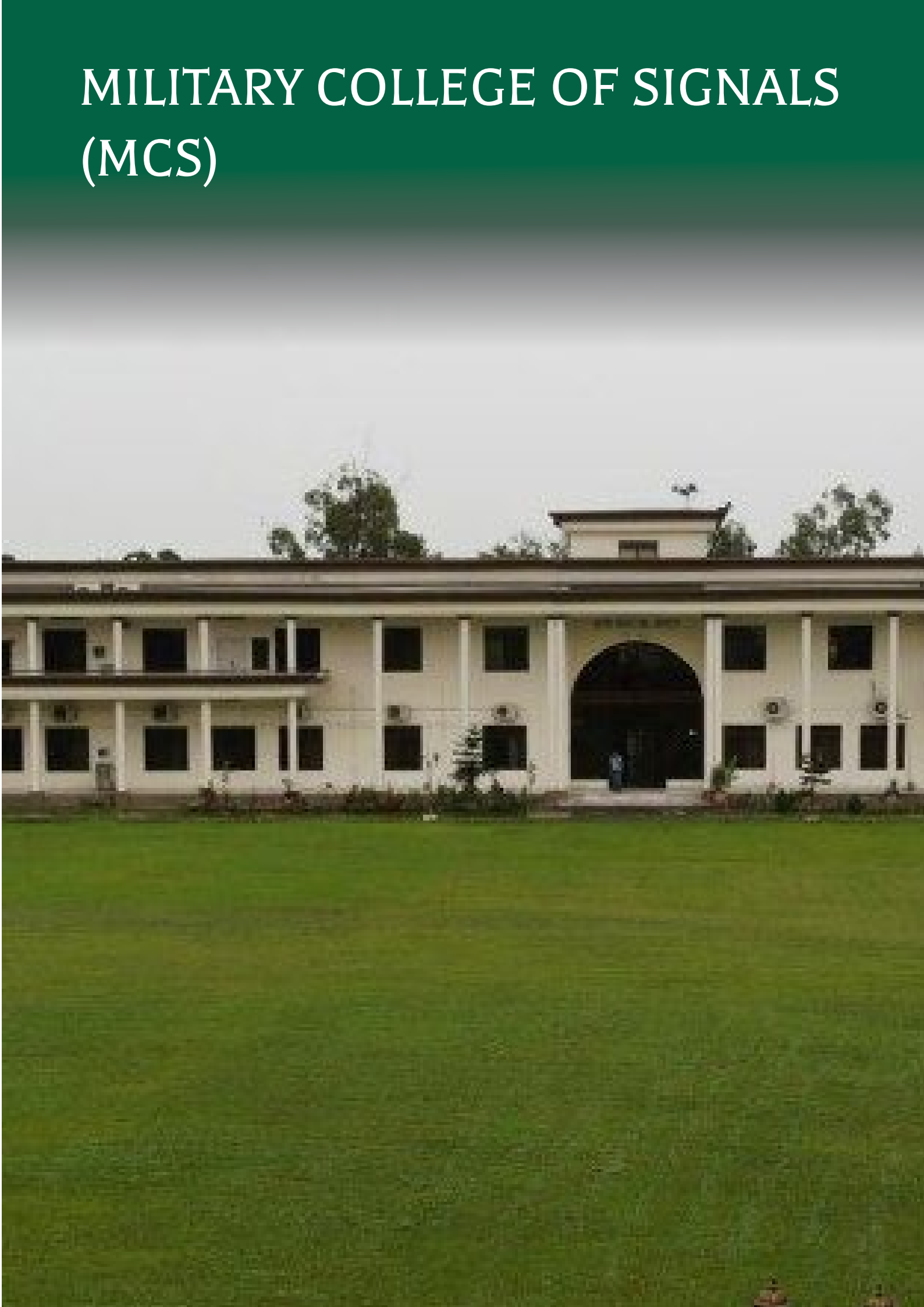
INITIATIVES

- **Proactive Industry–Academia Linkage**
- **International Collaborations/ MoUs**
- **Developing state-of-the-art laboratories to undertake cutting-edge research**
- **Acquiring advanced numerical codes and simulation software**

ACHIEVEMENTS

- **Capacity building for design and consultancy**
- **Scholarships/ Funding Opportunities**
- **Expanding Postgraduate Programs**

MILITARY COLLEGE OF SIGNALS (MCS)



Military College of Signals

Military College of Signals (MCS) i s a premier institution of the Pakistan Army and has established itself as a centre of professional excellence. MCS was established in 1947 as School of Signals. In order to fulfill Pakistan Army's requirement for telecom engineers, the College was affiliated with Royal School of Signals in 1960. In 1977, it got affiliated with University of Engineering and Technology, Lahore, for award of telecommunication degree and thus upgraded as Military College of Signals. After becoming the pioneer constituent college of NUST in 1991, the College started undergraduate, MS and PhD programmes in Software Engineering and Master programme in Telecommunication an d Information Security under NUST. Postgraduate programme in system engineering was started in 2014. College started its PhD programme in year 2001 and to date 24 PhDs have graduated and 48 are pursuing their PhD degree. The College has a unique honor of being the pioneer i n the country for offering these disciplines. At present, the College is producing over 300 graduates every year.

Faculty Profile

Engr Omer Qureshi, Commandant
MSc (National Defense University) Pakistan
Discipline: War Study and Defence Management

Dr Asif Masood, Dean
PhD (UET Lahore)Pakistan
Discipline: Computer Science
Specialisation: Computer Graphics, Image Processing

Dr Imran Rashid, Chief Instructor
PhD (University of Manchester) UK
Discipline: Telecomm Engineering
Specialization: Wireless MIMO Systems

Engr Muhammad Imran, Staff Officer (Acad)
MS NUST Pakistan
Discipline: Electrical Engineering
Specialization: Electrical Engineering

Engr Syed Shoukat Hussain Shah, Staff Officer (Coord)
MS NUST Pakistan
Discipline: Information Security
Specialization: Information Security

Department of Electrical Engineering

Dr Adil Masood Siddiqui (Head of Department)
PhD (UET Lahore) Pakistan
Discipline: Electrical (Telecom) Engineering
Specialization: Digital Signal, Image and Video Processing

Dr Hasnat Khurshid
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Telecommunication

Dr Muhammad Zeeshan Zahid
PhD (Hanyang University) South Korea
Discipline: Electronics Engineering
Specialization: Antenna Design for Mobile Devices

Dr Mir Yasir Umair
PhD (Beijing University, Beijing) China
Discipline: Electrical Engineering
Specialization: Wireless Communication

Dr Abdul Wakeel
PhD (Jacobs University Bremen) Germany
Discipline: Electrical Engineering
Specialization: Wireless Communication

Dr Farooq Ahmad Bhatti
PhD (Shanghai University) China
Discipline: RF Electronics
Specialisation: Microwave Circuit Design

Dr Farooq Ahmad Bhatti
PhD (Shanghai University) China
Discipline: RF Electronics
Specialization: Microwave and Millimeter Waves Circuit Design

Dr Attiq Ahmad
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Image / Signal processing

Dr Imran Touqeer
PhD (UET Lahore) Pakistan
Discipline: Electrical Engineering
Specialization: Digital Image Processing

Engr Ajlaan Bin Mamoon
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Telecommunication Engineering

Engr Syed Javed Hussain
MS (Michigan State University) USA
Discipline: Electrical Engineering
Specialization: Electronic / VLSI Design, Telecom Systems

Engr Abu Baker
BE (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Telecomm Engineering

Engr Muhammad Hammad
BE (UET Peshawar) Pakistan
Discipline: Computer Systems Engineering
Specialization: Computer Systems

Dr Alina Mirza
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: DSP and Communication Systems

-Engr Raja Iqbal (Manager I&P)
MS (Wayne State University) USA
Discipline: Computer Engineering, Telecomm Engineering
Specialization: Computer & Telecomm Engineering

Engr Aimen Aakif
MS (NUST) Pakistan
Discipline: Software Engineering
Specialization: Software Engineering

Engr Danish Ilyas
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Telecomm Engineering

Engr Amal Haider
MS (University of Salford) UK
Discipline: Electrical Engineering
Specialization: Data Telecommunication Networks

Engr Maryam Rasool
MS (COMSATS) Pakistan
Discipline: Electrical Engineering
Specialization: Telecomm Engineering

Mrs Atiya Obaid
MSc (QAU) Pakistan
Discipline: Computer Science
Specialization: Computer Science (Database)

Engr Sara Jamil
BE (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Telecomm Engineering

Engr Amara Umar
MS (COMSATS) Pakistan
Discipline: Electrical Engineering
Specialization: Telecomm & Networking

Engr Amir Ali
MS (Bahria University) Pakistan
Discipline: Electrical Engineering
Specialization: Telecommunication

Engr Zohaib Naqvi
BE (UET Peshawar) Pakistan
Discipline: Electrical Engineering
Specialization: Electrical Engineering

Engr Nasir Baig
MS (NUST) Pakistan
Discipline: Computer Sciences Engineering
Specialization: Computer Engineering

Engr Muhammad Haroon Siddiqui
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Telecommunication Engineering

Engr Muhammad Imran Javaid
MS (NUST) Pakistan
Discipline: Information Security
Specialization: Information Security

Engr Ubaid ur Rehman
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Telecommunication Engineering

Dr Shibli Nisar
PhD (FAST) Pakistan
Discipline: Electrical Engineering
Specialization: Signal and Speech Processing

Dr Ayesha Habib
PhD (UET), Pakistan
Discipline: Electrical Engineering
Specialization: Telecomm

Department of Computer Software Engineering

Dr Adnan Ahmed Khan (Head of Department)
PhD (UET Taxila), Pakistan
Discipline: Computer Engineering
Specialisation: Wireless Communications

Dr Hammad Afzal
PhD (University of Manchester) UK
Discipline: Software Engineering
Specialisation: Computational Linguistics

Dr Tauseef Ahmed Rana
PhD (University of Manchester) UK
Discipline: Software Engineering
Specialisation: ComponentBased Development

Mr Bilal Rauf
MS (Umea University) Sweden
Discipline: Computer Science
Specialisation: Wireless Networking

Engr Usman Mehmood Malik
MS ,MCS (NUST)
Discipline: System Engineering
Specialization: System Engineering

Dr Ahmed Muqeem Sheri (on Post doc)
PhD (Gwangju Institute of Science and Technology) South Korea
Discipline: Computer Science
Specialisation: Neural Networks

Engr Mobeena Shahzad
MS (NUST) Pakistan
Discipline: Information Technology
Specialisation: ObjectOriented Technologies

Mr Bashir Bilal Siddiqui
MS (Preston University) Pakistan
Discipline: Software Engineering
Specialisation: Object Oriented Programming

Dr Naveed Iqbal
PhD (Tsinghua University) China
Discipline: Computer Engineering
Specialisation: Computer Vision

Dr Naima Iltaf
PhD (NUST) Pakistan
Discipline: Software Engineering
Specialisation: Distributed/ Pervasive Computing

Dr Ayesha Maqbool
PhD (University of Sheffield), UK
Discipline: Computer Science
Specialization: Control and System Engineering

Dr Yawar Abbas
PhD (University of Science & Technology) China
Discipline: Computer Science
Specialisation: Software Defined Networks

Engr Mohammad Saleem
MS (NUST) Pakistan
Discipline: Software Engineering
Specialisation: Computer Networking

Engr Ather Mohsin Zaidi
MS (NUST) Pakistan
Discipline: Computer Science
Specialisation: Software Engineering

Dr Zaki Murtaza
PhD (USC) USA
Discipline: Computer Science
Specialisation: Parallel Computing

Engr Ayesha Naseer
MS (UET Lahore) Pakistan
Discipline: Computer Science
Specialisation: Database

Engr Marium Hida
MS (NUST), Pakistan
Discipline: Software Engineering

Engr Maemoona Farooq Kiyani
MS (NUST), Pakistan
Discipline: Software Engineering

Engr Amna Mehfooz
BS (NUST) Pakistan
Discipline: Software Engineering

Engr Kabeer Ahmed
MS (Iqra Uni Islamabad) Pakistan
Discipline: Computer Science
Specialisation: Telecommunication & Networks

Engr Muhammad Asif
MIT (NUML) Pakistan
Discipline: Information Technology
Specialisation: Java Programming

Dr Zaki Murtaza
Post Doc NTNU Trondhelm, Norway
Discipline: Computer Science
Specialization: Parallel Computing, Artificial Intelligence

Dr Saddaf Rubab
PhD Universiti Teknologi PETRONAS Malaysia
Discipline: Computer Science
Specialization: Distributed Computing, Data Science

Dr Abdul Waheed Khan
PhD Universiti Teknologi Malaysia
Discipline: Computer Science
Specialization: Routing in Wireless Sensor Networks

Engr Muhammad Imran
BE Electrical Engineering (NUST), Pak
Discipline: Electrical Engineering
Specialization: Electrical Engineering

Engr Moonis Ali
BE Electrical Engineering (NUST), Pak
Discipline: Electrical Engineering
Specializstion: Electrical Engineering

Engr Usman Shafiq
BE (NUST), Pak
Discipline: Software Engineering
Specialization: Software Engineering

Department of Information Security

Dr Syed Amer Ahsan Gilani (Head of Department)
PhD (University of Surrey) UK
Discipline: Satellite Systems
Specialization: Nonlinear Dynamical System

Dr Rabia Latif
PhD (NUST) Pakistan
Discipline: Information Security
Specialisation: InformationSecurity

Engr Muhammad Sohaib Khan
MS (NUST) Pakistan
Discipline: Information Security
Specialisation: Information Security

Dr Haider Abbas
PhD (KTH) Sweden
Discipline: IT Security, Cloud Security
Specialisation: Information Security

Narmeen Shafqat
MS (NUST) Pakistan
Discipline: Information Security
Specialisation: Information Security

Ahmed Raza Cheema
MSc (University of Bradford) UK
Discipline: Information Security
Specialisation: Internet, Computer and System Security

Shahzaib Tahir
MS (NUST) Pakistan
Discipline: Information Security
Specialisation: Cryptography/Information Security

Waleed Bin Shahid
MS (NUST) Pakistan
Discipline: Information Security
Specialisation: Malware Analysis, Smartphone Security

Mian Muhammad Waseem Iqbal
MS (NUST) Pakistan
Discipline: Information Security
Specialisation: Computer/Network Security, Digital Forensic

Dr Shahzaib Tahir
PhD (University of London) UK
Discipline: Information Engineering
Specialization: Cyber Security

Dr Fawad Khan
PhD (Xi'an, Shaanxi) China
Discipline: Information Security
Specialization: Cryptography and Information

Engr Muhammad Asif
MS (Computer Science), Preston University, Islamabad
Discipline: Computer Science
Specialization: Programming, Networks

Dr Muhammad Faisal Amjad
PhD (University of Central Florida) USA
Discipline: Computer Science
Specialization: Cognitive Radio Networks, Information Security

Department of Humanities and Basic Sciences

Dr Muhammad Ashiq, HoD
Ph D (Quaid-i-Azam University) Pakistan
Discipline: Mathematics
Specialisation: Group Generalization

Dr Abdul Hameed Hamrahi (HoD Research)
PhD (National Uni of Lahore), Pakistan
Discipline: Mathematics
Specialisation: Algebra Number Theory

Dr Farkhanda Afzal
PhD (Beihang University) China
Discipline: Mathematics
Discipline: Applied Mathematics

Ms Alia Razia Malik
MSc (Quaid-i-Azam University) Pakistan
M Phil (Fatima Jinnah Women University) Pakistan
Discipline: English
Specialisation: Linguistics

Short Courses/Seminars/Workshops

Dr Saeed Murtaza
PhD (Birmingham University) UK
Discipline: Physics
Specialisation: Mathematical Modeling and Simulation

Dr Safia Akram
Ph D (Quaid-i-Azam University) Pakistan
Discipline: Mathematics
Specialisation: Fluid Mechanics

Uzma Ehsan
MA (NUML) Pakistan
Discipline: English
Specialisation: English Linguistics and Literature

Mr Muhammad Zafar
M Phil (UET), Lahore
Discipline: Mathematics

Research and Development

Military College of Signals is engaged in providing meaningful education in engineering while conducting original research of the highest standard. R&D cell provides a focal point in the College to coordinate R&D activities between various departments, faculty members and various research institutions. It is now making concerted efforts to align academia in accordance with R&D to focus with the national goal of achieving technological selfreliance. The research groups are involved in hitech R & D projects in solving Information & Communication Technology related problems and solutions.

- Research Paper Writing Using Latex Software on 28-Mar-18
- Netlogo Multi Agent Programming on 4-5 Apr 18
- How to Write Technical Research Paper on 18-Apr-18
- Current Research in Nanotechnology on 24-Oct-18
- Ethical Hacking 29-Oct-18
- Role of Engineers in Green Living on 7-Nov-18
- 5G and Beyond on 28-Nov-18
- Cyber Security: Staying safe on the Internet, Social Media and Mobile Phones on 5-Dec-18
- SDR Waveform Development on 12-Dec-18

Students Support Facilities

The College has excellent lab facilities to facilitate students in their academic pursuits. Some the labs include:

Labs

- Lego Kit Laboratory
- Image Processing Centre Laboratory
- Satellite Communication Research Laboratory
- Next Generation Network Laboratory
- Communication System Laboratory
- Communication Research Laboratory
- RF & Microwave Laboratory
- Electronic Laboratories (2)
- Electrical Machine Laboratory
- Fiber Optics Research Laboratory
- Final Year Project Laboratories
- Modeling and Simulation Laboratory
- DSP & FPGA Laboratory
- Wireless and SDR Research Laboratory
- Virtual Reality Laboratory
- Broadband NW and Research Laboratory
- Computer Networks Laboratory
- Operating System Laboratory
- Database Systems Laboratory
- Digital Design Laboratory
- Information Security Laboratory
- Computer Laboratories (2)
- Applied Physics Laboratory
- Communication Equipment Design and
- Evaluation Laboratory
- Computer Security Incident Response Laboratory
- Control System Laboratory
- Microwave Communication Laboratory
- Communication Skills Laboratory

Library

MCS library is fully computerized, provides excellent services and facilities to fulfill the information needs of faculty members as well as students. It has a collection of over 35,000 volumes. It also provides a wide range of services that include issuance of books on loan, online information searching, reference services, interlibrary loan, document delivery, photocopying, access to virtual collections and digital resources like CDROMs and up-todate collection of online IEEE research papers. The library is efficiently maintained by qualified and experienced staff

Internet

MCS fully realizes the importance of providing roundtheclock

Guest Speakers	Symposia Titles
Dr Amir Qayyum	Software Define Networks (SDN)
Maj Gen Muhammad Salim	Lec on “Stress Management”
GOC 34 LID (SSD)	CPEC Infrastructure, Security, Current Development and Future Prospect
Dr Hafiz Tahir Islam Askari, AIOU, Islamabad	Seerat Un Nabi and Our Cultural Behavioral Patterns
Prof Dr Talib Hussain Sial, International Islamic University, Islamabad	Iqbal’s Concept of Khudi (Ego)
Dr Abdul Karim Usman, IIU, Islamabad	Personality Grooming and Social Responsibilities
Prof Dr Riaz, QAU, Islamabad	Quaid-i-Azam and Pakistan Narrative

internet access to students and faculty members in order to facilitate them in their academic and research pursuits. An optical fiber network has been laid to provide fast and reliable internet bandwidth. WiFi Internet connectivity of 44 Mbps is available to all students and faculty at the offices, hostels and residences.

Fact file

MCS, a premier college of telecommunication engineering, has been functioning since Pakistan's independence in 1947. The College is built around a rich heritage of nineteenth century buildings. Lt Col CWM Young, a British Army Officer of the Royal Corps of Signals, was the first Commandant of MCS, then known as the School of Signals. MCS has the honor of imparting education in Telecommunication since 1947. The College instituted a postgraduate programme (MS leading to PhD in Information Security) and PhD programme in 1997 and 2001, respectively. The later programme is one-of-its-kind in Pakistan.

Counseling

Student counseling services are geared to provide students with an avenue to discuss their personal and academic concerns with competent counselors, without vacillation. Counseling is provided by qualified faculty members of the College. A competent faculty member is appointed as Course Advisor to every new batch. Every Course Advisor is given weekly student teacher interaction classes to interact with the students. Every student is free to schedule meetings with the Course Advisor as and when required.

Hostels

Hostel accommodation is available for both male and female students. Accommodation is allotted on a first-come, first-served basis. Dining facility is available and the boarders enjoy the tranquillity and fine meals of the mess. Three blocks (1 for girls and 2 boys) are operational. Furnished rooms are available for students. Each hostel block offers a friendly and secure environment to its residents, and is equipped with a wide range of facilities including laundry, Kitchen, TV lounges, and easy access to dining facilities. Dedicated hostel staff is accessible to student for help at all time, and emergency services including transport facilities are available. Maximum outstation students are facilitated with hostel accommodation. However, the University cannot assure accommodation to all applicants. Fresh student are given priority whereas juniors and seniors are offered on-campus accommodation depending on availability.

Contact Us

Website www.mcs.nust.edu.pk		
Telephone and Email	**Contact no**	**Email**
Chief Instructor, Engineering Wing	+92-51-9272102	irashid@mcs.edu.pk
Dean, MCS	+92-51-5564048	dean@mcs.edu.pk
Head of Department of Computer Software Engineering	+92-51-9270284	adnankhan@mcs.edu.pk
Head of Department Electrical Engineering	+92-51-9272948	dradil@mcs.edu.pk
Head of Department of Information Security	+92-51-9240952	gilani.amer@mcs.edu.pk
Cadet Wing	+92-51-5582120	coordoffr.cadets@mcs.edu.pk
Staff Officer (NUST Affairs)	+92-51-9272097	sonust@mcs.edu.pk
MCS Hostel (Jinnah Company)	+92-322-4536492	warden.cadetmess@mcs.edu.pk
Postal Address	Military College of Signals, Humayun Road, Rawalpindi Cantt, 46000	

Bachelors in Electrical Engineering

Programme Description

This programme seeks to impart a strong foundation in telecommunication engineering in line with the growing importance of digital and wireless networks. It covers vast areas such as satellite communications, signal and image processing, optical fiber, mobile communications, data networks, software systems, micro-electronic devices and systems, data coding, compression, encryption and transmission, and real-time embedded systems.

Associated Careers

Telecommunications is a rapidly developing and dynamic field of engineering. The demand for graduates in telecommunications is growing as technology is advancing and broadening its scope of applications. Our close links with employers and professional bodies ensure that our students are equipped with skills that are in demand. Therefore, MCS continues to be the College of choice for employers seeking high-caliber graduates. All of our graduates get employed, start their own ventures or opt for higher studies/ professional trainings on completing their degrees. Our graduates normally find employment with major service providers and large private industrial groups. In addition, there are a number of highly specialized and technologically advanced opportunities available with smaller service and technology providers.

Scheme of Studies

Programme Code: 201

Semester-I

Course Code	Course Title	Credits
HU–100	English	2-0
CS–114	Fundamentals of Programming	2-1
HU–107	Pakistan Studies	2-0
MATH–101	Calculus and Analytical Geometry	3-0
ME–105	Workshop Practice	0-1
PHY–102	Applied Physics	2-1
*EE–111	Linear Circuit Analysis	3-1
	Total	**18**

Semester-II

Course Code	Course Title	Credits
*CS– 212	Object Oriented Programming (OOP)	3-1
HU–101	Islamic Studies	2-0
MATH–121	Linear Algebra and ODEs	3-0
ME –104	Engineering Drawing	0-2
HU-109	Communication Skills	2-0
*EE–211	Electrical Network Analysis	3-1
	Total	**17**

Semester-III

Course Code	Course Title	Credits
MATH–232	Complex Variables and Transforms	3-0
ME-102	Thermodynamics	2-0
EE–221	Digital Logic Design	3-1
EE–215	Electronic Devices and Circuits	3-1
ME–100	Engineering Mechanics	3-0
	Total	**16**

Semester-IV

Course Code	Course Title	Credits
EE–232	Signals and Systems	3-1
MATH–243	Vector Calculus	3-0
EE–241	Electromagnetic Field Theory	3-0
EE–222	Microprocessor Systems	3-1
EE–313	Electronic Circuit Design	3-1
	Total	**18**

Semester-V

Course Code	Course Title	Credits
EE-330	Digital Signal Processing	3-1
EE–260	Electrical Machines	3-1
MATH–361	Probability & Statistics	3-0
HU–212	Technical & Business Writing	2-0
EE–351	Communication Systems	3-1
	Total	**17**

Semester-VI

Course Code	Course Title	Credits
MATH–351	Numerical Methods	3-0
EE–371	Linear Control Systems	3-1
EE – 383	Instrumentation and Measurements	3-1
EC/EE – XXX	Elective-I	3-x
EC/EE – XXX	Elective-II	3-x
	Total	**17+X**

Semester-VII

Course Code	Course Title	Credits
OTM–455	Engineering Project Management	2-0
ECO–130	Engineering Economics	2-0
EE–498	Senior Design Project-I	0-2
EC/EE – XXX	Elective – III	3-x
EC/EE – XXX	Elective-IV	3-x
	Total	**12+X**

Semester-VIII

Course Code	Course Title	Credits
HU–222	Professional Ethics	2-0
EE–499	Senior Design Project-II	0-4
XX–XXX	University Elective	3-x
EC/EE – XXX	Elective-V	3-x
MGT-271	Entrepreneurship	2-0
	Total	**14+X**
	Overall Total	**105-24+x**

Inter Disciplinary (ID) Electives

Course Code	Course Title	Credits
CS-220	Database Systems	3-1
CS-250	Data Structures & Algorithms	3-1
CS-330	Operating Systems	3-1
CS-370	Artificial Intelligence	3-1
CS-381	Network Security	3-1
EC-320	Computer Organization and Architecture	3-1
EE-417	VLSI Design	3-1
EE-423	Embedded System Design	3-1
MSE-312	Fundamentals of Glass Science and Technology	3-1

Major Based Core (MBC) Depth Electives

Course Code	Course Title	Credits
EC-412	Digital Image Processing	3-0
EC-418	Digital System Design	2-1
EE-358	Mobile Communication Systems	2-1
EE-359	Satellite Communication Systems	2-1
EE-386	Communication Planning	3-0
EE-387	Telecommunication Management	3-0
EE-388	Multimedia Communication	3-0
EE-435	Data Encryption and Network Security	2-1
EE-443	Electromagnetic Compatibility	3-0
EE-445	Microwave Devices	3-0
EE-450	Telecom Policies and Protocols	3-0
EE-451	Mobile Communication Systems	3-0
EE-452	Satellite Communication Systems	3-0
EE-453	Telecom Traffic Engineering	3-0
EE-454	Spread Spectrum Communications	3-0
EE-455	Optical Fibre Communication	3-0
EE-456	Line and Optical Communication Systems	2-1
EE-457	Narrowband Communication Systems	2-1
EE-459	Next Generation Networks	2-1
EE-460	Multi-Channel Communication Systems	2-1
EE-492	Radar Systems	3-0
EE-494	Radar and Television Engineering	3-0

MS and PhD in Electrical (Telecommunication) Engineering

Programme Description

The postgraduate programme in Telecommunication is offered at different levels, i.e. MS and PhD. All these programmes allow the students to explore their subjects of interest in detail under the guidance of qualified faculty. This postgraduate programme is suited for professionals who are looking to advance their level of expertise for further career development. The programme specially designed and scheduled to make it convenient for working engineers to enhance their qualification and expertise.

Research

The programme has been designed to cater for the following key areas of research:

- Satellite Communications
- Signal and Image Processing
- Optical Fibres and Mobile Communications
- Data Networks
- Data Coding, Compression, Encryption and Transmission
- Software Define Radio

Associated Careers

Our close links with employers and professional bodies ensure that our students are equipped with skills that are in demand, therefore the college continues to be the choice for employers seeking high calibre graduates. A hundred percent of our College graduates go into employment or higher studies/professional trainings, immediately after the completion of their degrees. Our graduates normally find employment with major service providers and large private industrial groups or a host of smaller service and technology providers.

MS Coursework

Programme Code: 250

Core Courses

Subject Code	Subject Title	Credits
EE-851	Advanced Digital Communication Systems	3
EE-852	Information & Coding Theory	3
EE-831	Advanced Digital Signal Processing	3
EE-891	Stochastic Systems	3
EE -899	**MS Thesis**	**6**

Elective Courses (Any four)

Subject Code	Subject Title	Credits
EE-857	Adv Satellite Communication Sys	3
EE-882	Cognitive Radio Networks	3
EE-854	Optical Communication Systems	3
EE-888	Adv Computer Network Design & System Security	3
IS-820	Computer Security	3
EE-886	Advanced Wireless Networks	3
EE-948	Advanced Electromagnetic Fields	3
EE-848	Radiating Systems and Antennas	3
EE-949	Selected Topics in Microwave Engineering	3
EE-836	Advanced Digital Image Processing	3
EE-855	Error Control Coding	3
EE-933	Time Frequency Analysis	3
EE-832	Pattern Recognition	3
EE-834	Applied Signal Processing	3
CSE-842	Communication Systems & Networks	3
EE-853	Advanced Wireless Communication	3
EE-950	Advanced Data Communication Systems	3
EE-942	Microwave Integrated Circuit Design	3
EE-856	Software Define Radio	3
EE-875	Discrete Time Control System	3
EE-959	Selected Topics in Communication Systems	3
SE-828	Network Security	3

Bachelors in Software Engineering

Programme Description

Software is central to our lives. We interact daily with software systems; at home through computer games, at the office through online services and in the car through embedded control systems. Software Engineering applies both, computer science and engineering principles and best practices to the design, implementation, testing, maintenance, and evolution of software. Our Software Engineering programme covers not only the technical aspects of building software systems, but also management issues. This programme is an amalgamation of strong applied science knowledge, applications of engineering practice and an ability to understand the impact of technology. We endeavour to help students carry out both theoretical and experimental research in software engineering and to disseminate the results in the form of publications, patents and technology transfer to industry. MCS also has a set of specialized courses for Network & Information Security domain. Students can specialize in these areas by registering these courses from 5th semester onwards.

Associated Careers

The software industry has grown exponentially over the years; mechanical and electronic devices in automobiles, aeroplanes, entertainment and communication equipment and manufacturing are being replaced by software components because software is more adaptable, and can provide greater functionality. The ubiquity of software applications has created a multitude of career prospects for our graduates. Our graduates normally find employment with major service providers and large private industrial groups. There are a number of opportunities available within smaller service and technology providers, some of which are highly specialized and technologically advanced.

Scheme of Studies

Programme Code-202

Semester – I

Course Code	Course Title	Credits
HU–100	English	2-0
CS–114	Fundamentals of Programming	2-1
HU–107	Pakistan Studies	2-0
MATH–101	Calculus and Analytical Geometry	3-0
ME–105	Workshop Practice	0-1
PHY–102	Applied Physics	2-1
MATH-161	Discrete Mathematics	3-0
	Total	**17**

Semester – II

Course Code	Course Title	Credits
CS– 212	Object Oriented Programming (OOP)	3-1
HU–101	Islamic Studies	2-0
MATH–121	Linear Algebra and ODEs	3-0
ME –104	Engineering Drawing	0-2
HU-109	Communication Skills	2-0
EE-221	Digital Logic Design	3-1
	Total	**17**

Semester – III

Course Code	Course Title	Credits
CS-220	Database Systems	3-1
SE-200	Software Engineering	3-0
CS-250	Data Structures & Algorithms	3-1
MATH-361	Probability and Statistics	3-0
	Supporting Science Elective-1	3-0
	Gen Edu Elective-I	3-0
	Total	**20**

Semester – IV

Course Code	Course Title	Credits
EE-321	Computer Architecture and Organization	3-1
SE-311	Software Requirements Engineering	3-0
EE-353	Computer Networks	3-1
	SE Elective-I	3-0
	Supporting Science Elective-II	3-x
	Total	**17+X**

Semester – V

Course Code	Course Title	Credits
CS-330	Operating Systems	3-1
SE-210	Software Design and Architecture	3-1
HU-223	Gen Edu Elective – II Professional Ethics	3-0
HU-210	Technical Writing	3-0
	SE Elective –II	3-1
	Total	**18**

Semester – VI

Course Code	Course Title	Credits
CS-370	Software Construction	3-1
SE-352	Formal Methods	3-0
SE-321	Software Quality Engineering	3-0
MGT-271	Entrepreneurship	2-0
	SE Elective –III	3-1
	Supporting Science Elective –III	3-0
	Total	**19**

Semester – VII

Course Code	Course Title	Credits
SE-430	Software Project Management	3-0
SE-499	Senior Project	0-2
	SE Elective – V	3-1
	SE Elective – IV	3-x
	Gen Edu Elective III	3-0
	Total	**15+X**

Semester – VIII

Course Code	Course Title	Credits
SE-499	Senior Project	0-4
	SE Elective VI	2+X - 1
	Gen Edu Elective IV	3-0
CSL-401	Community Service	1-1
	Total	**10+X**
	Overall Total	**133+X**

Computing/SE Elective Courses

Code	Course Title	Credits
BIO-215	Bioinformatics	3-0
BIO-317	Computational Biology	3-0
CS-213	Advanced Programming	3-1
CS-321	Advanced Database Systems	3-0
CS-322	RDBMS Using Oracle	2-1
CS-331	System Programming	2-1
CS-332	Distributed Computing	3-1
CS-334	Open Source Systems	3-1
CS-340	Web Technologies-I	2-1
CS-342	Mobile Computing	3-0
CS-344	Web Engineering	3-1
CS-352	Theory of Automata and Formal Languages	3-0
CS-361	Computer Graphics	3-1
CS-362	Multimedia Systems and Design	2-1
CS-380	Introduction to Computer Security	3-0
CS-381	Network Security	3-1
CS-414	Advanced Java with emphasis on Internet Applications	3-1
CS-423	Data Warehousing and Data Mining	3-1
CS-424	Information Retrieval	3-0
CS-425	Management Information Systems	3-0
CS-433	Applied Parallel Computing	2-1
CS-441	Web Technologies-II	3-1
CS-443	E-Commerce and Solutions	3-0
CS-453	Programming Languages	3-0
CS-471	Machine Learning	3-1
CS-472	Natural Language Processing	3-0
CS-473	Theory of Intelligent Systems	3-1
CS-481	Computer Forensics	3-1
CS-482	System Incident Handling	3-0
CS-490	Advanced Topics in Computing	3-0
EE-232	Signals and Systems	3-1
EE-322	Wireless Networks	3-0
EE-330	Digital Signal Processing	3-1
EE-350	Data Communication	3-0
EE-430	Telecommunication Systems	3-0
EE-433	Digital Image Processing	3-1
MATH-352	Numerical Methods	2-1
SE-301	Object Oriented Software Engineering	3-0
SE-313	Design Patterns	2-1
SE-422	Software Testing	3-0
SE-423	Software Metrics	3-0
SE-431	Software Engineering Economics	3-0
SE-440	Business Process Automation	3-0
SE-490	Advanced Topics in Software Engineering	3-0
CS-251	Design and Analysis of Algorithms	3-0
CS-370	Artificial Intelligence	3-1
CS-483	Information Security Management	3-0
EE-989	Selected Topics in Networks	3-0
CSE-820	Advanced Computer Network	3-0
EE-871	Linear Control System	3-0
EE-939	Selected Topics in Signal Processing	3-0
EE-844	Antenna and Wave Propagation	3-0
EE-946	Advanced Antenna Theory and Design	3-0

General Education Electives

Course Code	Course Title	Credits
CS-309	Computing and Society	3-0
ECO-130	Engineering Economics	2-0
FIN-100	Principles of Accounting	3-0
HRM-240	Organizational Behaviour	2-0
HRM-441	Human Resource Management	2-0
HU-102	Psychology	3-0
HU-103	Principles of Sociology	3-0
HU-104	English Literature	3-0
MGT-164	Introduction to Management	2-0
MGT-175	Intellectual Property Rights	3-0

Supporting Science Electives

Course Code	Course Title	Credits
CH-101	Applied Chemistry	2-1
CS-271	Computational Logic	3-0
CS-382	Fundamentals of Cryptography	3-0
EE-102	Basic Electrical Engineering	3-1
EE-201	Engineering Mechanics	3-0
EE-212	Basic Electronics	2-1
EE-215	Electronic Devices and Circuits	3-1
EE-414	Digital Electronics	3-1
EE-477	Analogue and Digital Communications	3-1
MATH-112	Calculus II	3-0
MATH-133	Engineering Mathematics	3-0
MATH-221	Number Theory	3-0
MATH-232	Complex Variables and Transforms	3-0
MATH-234	Multivariable Calculus	3-0
MATH-351	Numerical Methods	3-0
OTM-455	Engineering Project Management	2-0
PHY-401	Advanced Physics	2-1

MS and PhD in Software Engineering

Programme Description

The postgraduate programme in Software Engineering is offered at different divisions, i.e. MS and PhD. All these programmes allow the students to explore their subjects of interest in detail under the guidance of qualified faculty. This postgraduate programme is suited for professionals, who are looking to advance their level of expertise for further career development, as it is offered in the evening.

Research

Research is conducted in the following areas:

- Web Engineering
- Computer Vision and Image Processing
- Software System Design and Architecture
- Software Requirement Engineering
- Software Project Management
- Data Text Mining

Associated Careers

The software industry has grown manifold over the years; areas like mechanical and electronic devices in automobiles, aero planes, entertainment and communication equipment and manufacturing are being replaced by software components as software is more adaptable, reliable and accurate. Software is used in medical, transportation and financial systems to automate critical tasks. Scientists and business researchers use software to sift through data warehouses and identify pertinent facts and trends. Banking, insurance, and other businesses use software to automate and personalize the services they offer to their customers. This proliferation of software applications has increased the demand for software professionals in Pakistan and all over the world. A hundred percent of our graduates get employed or opt for higher studies/professional trainings after the completion of their degrees. Our graduates normally find employment with major service providers and large private industrial groups.

MS Coursework

Programme Code: 251

Course Code	Course Title	Credits
Core Courses		
SE-860	Advanced Software Engineering	3
SE-861	Software System Design & Architecture	3
SE-862	Software Requirement Engineering	3
SE-863	Software Quality Engineering	3
SE-899	**MS Thesis**	**6**
Electives (Any Four)		
SE-803	Computer Vision	3
SE-865	Human Computer Interface	3
SE-867	Formal Methods	3
SE-805	Advanced Artificial Intelligence	3
SE-807	Machine Learning	3
SE-880	Advanced Database Systems	3
SE-813	Design of Parallel & Distributed Systems	3
SE-869	Model Driven Software Engineering	3
SE-826	Advanced Computer Network Design & Security System	3
SE-868	Software Project Management	3
SE-876	Web-Engineering	3
SE-877	Software Development for Web	3
SE-850	Digital Image Processing	3
SE-(900-919)	Selected topics in relevant Area	3
SE-896	Research Methodologies	3
SE-899	**MS Thesis**	**6**

Note: Students will choose four elective courses in addition to four core courses to complete 24 credit hours. PhD students will complete the requirements of 800/900 level coursework (18 credits) to be decided by the Doctoral Guidance and Examination Committee (GEC).

MS and PhD in Information Security

Programme Description

Cyber threats to federal information systems and cyber-based critical infrastructures are evolving and growing. These threats can be unintentional and intentional, targeted or non-targeted, and can come from a variety of sources, such as foreign nations engaged in espionage and information warfare, criminals, hackers, virus writers, disgruntled employees and contractors working within an organization. As government, private sector, and personal activities continue to move to networked operations; digital systems add more capabilities; wireless systems become more ubiquitous and as the design, manufacture, and service of information technology have moved overseas, the threat will continue to grow. In the absence of robust security programmes, agencies have experienced a wide range of incidents involving data loss or theft, computer intrusions and privacy breaches; underscoring the need for improved security practices.

Information Security Center of Excellence

This setup is aimed at reducing the vulnerabilities faced by the national information infrastructure and cyber-space, by produciwng more qualified graduates and researchers in the various disciplines of Information Security, as well as indigenously designing and delivering technological solutions. The research and technical solutions designed at the proposed Information Security Center of Excellence will provide important substitute and enhanced level of trust.

Associated Careers

The programme is focused to produce professionals competent enough to offer solution for Information Security problems in the market. Graduates of this programme will be able to address information security related issues in present and future era of Information Technology. The need of Information Security has grown dramatically over the last few years. Like the Industrial Revolution, the Information Technology Boom, which started in the 1990's and is still present today, has dramatically changed commerce around the world. This is mostly due to advancement of technology in computers, telecommunications equipment, and networking standards, leading to the development and widespread use of the Internet. This propagation of information security has led to an urgent and growing demand for information security professionals in Pakistan and all over the world. A hundred percent of our graduates go into employment or higher studies/professional trainings immediately after completion of their degrees. Our graduates normally pursue careers in major service providers such as PTCL, Warid, Mobilink, Zong, Ufone, Telenor and Special Communication Organization (SCO); large private industrial groups such as Microsoft, NetSol, Ericsson, and Cisco; and a host of smaller service and technology providers.

MS Coursework

Programme Code: 252

Core Courses

Course Code	Course Title	Credits
IS-820	Computer Security	3
IS-821	Network Security	3
IS-830	Information Security Management	3
IS-842	Advanced Cryptography-1	3
IS-899	**MS Thesis**	**6**

Electives (Cryptology)

IS-843	Advanced Cryptography – II	3
IS-844	Cryptanalysis	3
IS845	Quantum Cryptography	3
IS-846	Formal Method for Information Security	3
IS-891	Advanced Topics in Cryptology	3

Electives (System/Network Security)

IS-822	Wireless Network Security	3
IS-825	Vulnerability Exploitation and Defense	3
IS-827	Electronic Warfare – Principles and Techniques	**3**
IS-851	Secure Communications	**3**
IS-852	Data Communication Networks & Security	**3**
IS-853	Cloud Computing Security	**3**
IS-854	Advanced Web Security	**3**
IS-861	Secure Electronic Commerce	**3**
IS-863	Cellular and Mobile Network Security	**3**
IS-859	Information Security Engineering	**3**
IS-893	Advanced Topics in Systems Security	**3**

Electives (Information Security Management)

IS-831	Information Security Project Management	3
IS-833	IT Security Evaluation & Auditing	3
IS-832	Legal Aspects of Information Security	3
IS-834	Security Planning and Incident Management	3
IS-835	Security Risk Analysis and Management	3
IS-836	Auditing Networks, Perimeters and Systems	3
IS-837	Security and Privacy of Information and Information Systems	3
IS-894	Advanced Topics in Information Security Management	3

Electives (Digital Forensics and Incident Response)

IS-823	Computer Forensics	3
IS-855	Information Hiding	3
IS-870	Network Forensics	3
IS-871	OS & File System Forensics	3
IS-872	Forensics Incident Response	3
IS-873	Malware Analysis and Reverse Engineering	3
IS-874	Intrusion Detection	**3**
IS-895	Advanced Topics in Digital Forensics and Incident Response	**3**

Electives : General

IS-810	Secure Coding	**3**
IS-824	Biometrics	**3**
IS-826	Cyber Warfare	**3**
IS-856	Access Control and Database Security	**3**
IS-890	Advanced Topics in Information Security	**3**
IS-838	Advanced Simulation and Modeling	**3**
CE-838	Analysis of Stochastic Systems	3
SE-802	Pattern Recognition	3
SE-805	Advance Artificial Intelligence	3

Note: Out of the eight academic subjects, **FOUR** will be core courses, and remaining **FOUR** will be elective courses. The elective courses have been further grouped into **FOUR** streams and each student must select at least **TWO** elective courses from any specific stream in which student is pursuing Specialization.

MS in Systems Engineering

Programme Description

Systems engineering applies to everything from large power plants to computer hardware and software. It's a big-picture view that considers every aspect of a project, from costs and environmental impact, to time lines and life expectancy of equipment. The systems engineering process coordinates and oversees the translation of an operational need into a system designed to meet that need. It integrates the inputs of all the required technical disciplines into a coordinated effort that meets established performance, cost, and schedule goals. Systems engineers provide the leadership and coordination of the planning, development, and engineering of technical systems, including hardware and software components. Systems Engineering programme serves to provide a broad common framework for students coming from a wide variety of undergraduate backgrounds, including engineering, sciences, mathematics, management, business, or computer science. MS programme in Systems Engineering at MCS is an interdisciplinary programme with focused streams on communication systems and networks, software system engineering, information security and C4I to provide professionals with an in-depth knowledge and technical skills in understanding systems of systems in their respective areas.

MS Coursework

Programme Code: 643

Core Courses

Course Code	Course Title	Credits
SYSE-801	System Engineering Principles	3
SYSE-803	System Integration and Validations	3
SYSE-804	Modeling, Simulation & Optimization	3
SYSE-805	System Engineering Project Management	3
SYSE-899	MS Thesis	6

Communication Systems & Networks (CS&N)

CSE-843	Performance Analysis of Comm. Systems	3
CSE-844	Performance Analysis of Networks	3
CSE-864	Network Programming	3
EE-851	Advanced Digital Comm. Systems	3
EE-831	Advanced Digital Signal Processing	3
IT-877	Advanced Computer Networks	3
CSE-842	Comm. Systems & Networks	3
SYSE-831	Introduction to Information Security	3
SYSE-832	Network and System Level Security	3

Autonomous Aerospace Systems

SYSE-821	Unmanned Aircraft Systems	3
SYSE-822	Applied Aerodynamics	3
SYSE-823	Performance Analysis of Fixed and Rotary Wing Aircraft	3
SYSE-812	Human Factors Engineering	3

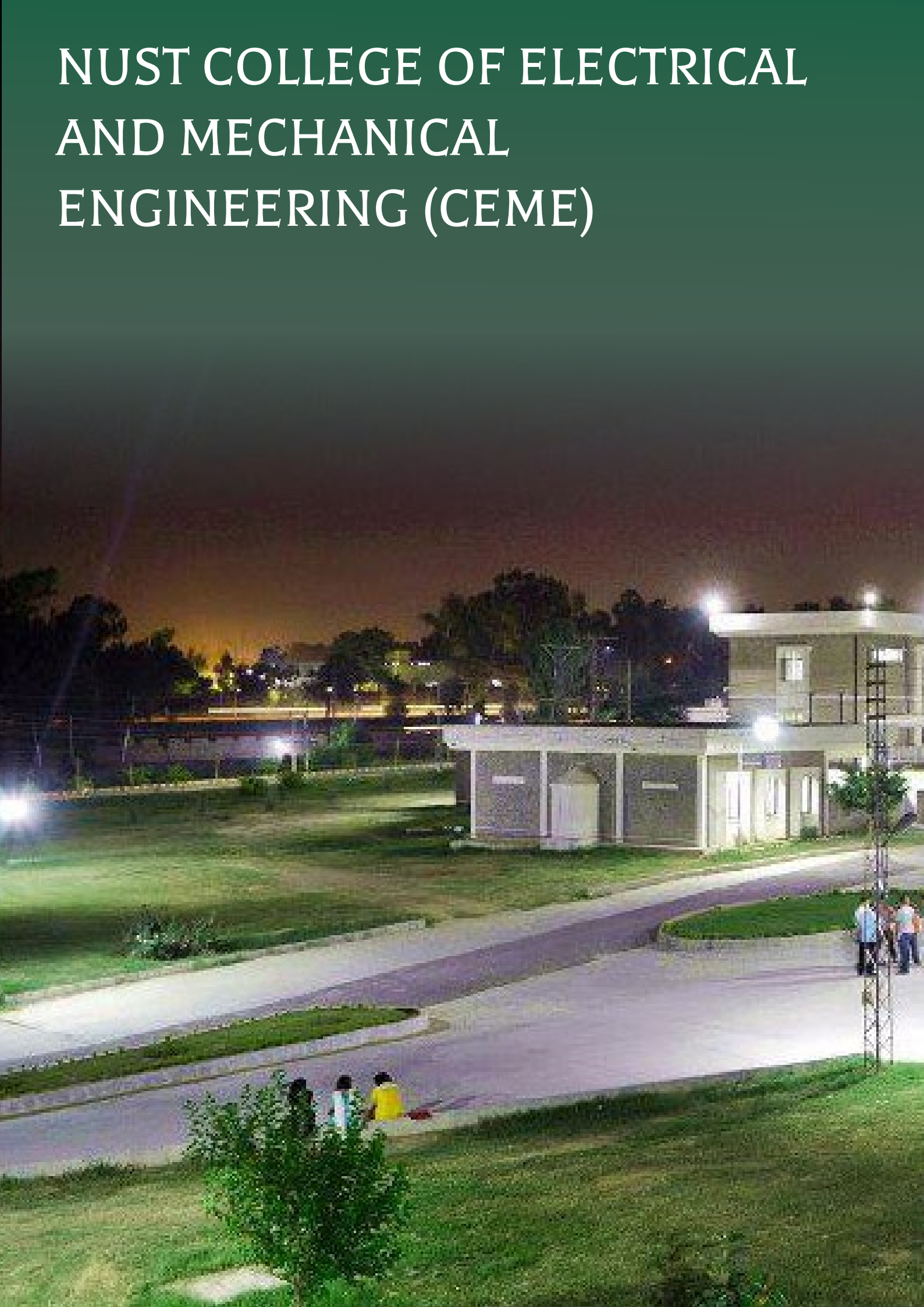
Real-Time Systems

CSE-870	Petri Nets	3
CSE-952	Advanced Model Checking	3
CSE-869	Real-time Systems	3
CSE-815	Graph Theory & Algorithms	3
CSE-867	Virtual Reality	3
CSE-865	3D Geometric Modeling and Reconstruction	3
CSE-868	Human-Computer Interaction	3

Cognitive Systems

PSY-823	Psychology of Learning & Cognition	3
SYSE-812	Human Factors Engineering	3
SYSE-813	Interaction Design	3
SYSE-814	Human Supervisory Control	3
SYSE-817	Design and Analysis of Experiments	3
CSE-883	Data Analysis & Statistics	3
CSE-870	Petri-Nets	3
CSE -867	Virtual Reality	3
CSE -865	3D Geometric Modeling and Reconstruction	3
CSE -868	Human-Computer Interaction	3

NUST COLLEGE OF ELECTRICAL AND MECHANICAL ENGINEERING (CEME)



NUST College of Electrical and Mechanical Engineering

The College of Electrical and Mechanical Engineering was established in 1957 as a polytechnic institute at Quetta. The College was moved to its present campus in 1984. With the establishment of NUST in 1991, the College became one of its constituent colleges. The College is situated on the Grand Trunk Road at the Rawalpindi-Islamabad junction. Its open landscape makes it an ideal place for an academic campus. A fascinating locale and congenial environment are indeed the hallmarks of the College. It is the largest College of NUST in terms of PhD faculty, student enrolment, diversity of academic programmes, research activities, space, infrastructure and facilities. The College attained ISO-9001 certification in 1999, ISO 9001-2000 certification in 2003 and ISO 9001-2008 in May 2009. It has earned accolades in quality assurance from Pakistan Engineering Council (PEC) in accreditation evaluation. The College offers degree programmes in diverse undergraduate and postgraduate programmes, mainly in the disciplines of Electrical, Mechanical, Computer and Mechatronics Engineering, and postgraduate programme in Engineering Management.
The College lays great emphasis on indigenous research. As a result, quantum research material is produced annually. The faculty mostly comprises eminent research scholars who regularly participate in conferences and seminars, both at home and abroad. A state-of-the-art spacious library, stocked with around 95,197 books, an e-library section and a good number of computers with wireless internet connectivity facilitate students and faculty in their research.

Faculty Profile

The College of E&ME is staffed with highly qualified faculty that offers the most dynamic, up-to-date and highly challenging academic programmes. Currently, there are 49 PhD faculty members; most of them are foreign qualified.

Dr Javaid Iqbal, Dean
PhD (University of New South Wales) Australia
Discipline: Mechatronics Engineering
Specialisation: Artificial Intelligence/Mobile Robots

Electrical Engineering

Dr Shahzad Amin Sheikh, HoD
PhD (Southwest Jiaotong University) China
Discipline: Information Systems &CommEngg
Specialization: Signal Processing & Communication

Dr Mojeeb Bin Ihsan
PhD (Drexel University) USA
Discipline: Electrical Engineering
Specialisation: Microwave Engineering, Solid State Electronics

Dr Syed M Tahir Zaidi
PhD (Georgia Institute of Tech) USA
Discipline: Electrical Engineering
Specialization: Semiconductor Devices, Digital Signal Processing

Dr Fahad Mumtaz Malik
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Control Systems

Dr Mashhood Ahmad
PhD (Quaid-i-Azam University) Pakistan
Discipline: Electronics
Specialization: Quantum Optics

Dr Muwahida Liaquat
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Digital Signal Processing, Control Systems

Dr Usman Ali
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Embedded System Design, Computer Vision

Dr Muhammad Zeeshan
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Communication Systems

Dr Qasim Umar Khan
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Microwave Engineering, Antenna Design, Communication

Dr SaifUllah Awan
PhD (Quaid-i-Azam University Islamabad) Pakistan
Discipline: Physics
Specialization: Solid State Physics Semiconductors

Dr Azhar UlHaq
PhD (University of L'aquila) Italy
Discipline: Electrical Engineering
Specialization: Power Systems

Dr Shahzor Ahmad
PhD (National University of Singapore)Singapore
Discipline: Electrical & Computer Engg
Specialization: Computer Vision

Engr Atif Qayyum
MS (Beijing Institute of Tech) China
Discipline: Control Science &Engg
Specialization: Control System

Kamran Aziz Bhatti
MPhil (Quaid-i-Azam University) Pakistan
Discipline: Electronics
Specialization: Electronics

Engr Zubair Ahmed
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Antenna Design, Microwave Engineering

Engr Sobia Hayee
MS (IOWA State University) USA
Discipline: Electrical Engineering
Specialization: Antenna Design, Microwave Engineering

Engr Faiza Nawaz
MS (North China Electric Power University) China
Discipline: Electrical Engineering
Specialization: Power Systems

Engr Muhammad Anis Chaudhry
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Microwave Circuits and Systems

Engr Salman Qadir
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Control Systems

Engr Aamir Javed
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Microwave Engineering

Engr Furqan Haider Qureshi
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Communication Systems

Engr Sufyan Hafeez Khan
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Control Systems

Engr Sarmad Majeed Malik
MS (North China Electric Power University) China
Discipline: Electrical Engineering
Specialization: Power Systems

Engr Muhammad Kamran Bodla
MS (North China Electric Power University) China
Discipline: Electrical Engineering
Specialization: Electric Power Systems and Automation

Engr Taosif Iqbal
MS (Ivanovo State University) Russia
Discipline: Electrical Engineering
Specialization: Automation & Control

Dr Muhammad Abbas
PhD : University of Manchester ,UK
Discipline : Software Engineering
Specialization : Information System.

Mechanical Engineering

Dr Raja Amer Azim, HoD
PhD (NUST) Pakistan
Discipline: Mechanical Engineering
Specialization: Vehicle Dynamics & Controls

Dr Khalid Mahmood
PhD (Univ of Manchester) UK
Discipline: Mechanical Engineering
Specialization: Laser Deposition, Laser Cladding of Corrosion & Wear Resistance Layers

Dr Imran Shafi
PhD (UET Taxila) Pakistan.
Discipline: Computer Engineering
Specialization: Networks, Neural Networks & Digital Signal Processing.

Dr Hasan Aftab Saeed
PhD (Univ of Tokyo) Japan
Discipline: Mechanical Engineering
Specialization: Solid Mechanics, Dislocation Nucleation, Modeling & Simulation

Dr Tariq Talha
PhD (Univ. of Warwick) UK
Discipline: Mechanical Engineering
Specialization: Computational Fluid Dynamics, Active Flow Control

Dr Sajid Ullah Butt
PhD (ParisTech Univ) France
Discipline: Mechanical Engineering
Specialization: Fixture design, Workpiece repositioning, System Kinematics

Dr Raja Amer Azim
PhD (NUST) Pakistan
Discipline: Mechanical Engineering
Specialization: Vehicle Dynamics & Controls

Dr Naveed A. Din
PhD (University of Manchester) UK
Discipline: Mechanical Engineering
Specialization: Structural Dynamics

Engr Saif Ullah Khalid
MS (NUST) Pakistan
Discipline: Mechanical Engineering
Specialization: Modeling & Simulation, CFD Analysis

Engr Saheeb Kiyani
MS (NUST) Pakistan
Discipline: Mechanical Engineering
Specialization: Modeling & Simulation

Engr Rehan Ahmed Khan
MS (UMIST) UK
Discipline: Mechanical Engineering
Specialization: Non-traditional Manufacturing Processes, CAD/CAM

Engr Yasser Riaz Awan
MS (HUST) China
Discipline: Mechanical Engineering
Specialization: Reverse Logistics

Engr Muhammad Haider
MS (NUST) Pakistan
Discipline: Mechanical Engineering
Specialization: Dynamics and System Modeling

Engr Usman Zia
MS (Rochester Institute of Technology) USA
Discipline: Mechanical Engineering
Specialization: Materials

Engr Muhammad Umair Akhtar
MS (PIEAS) Pakistan
Discipline: Mechanical Engineering
Specialization: Structural Mechanics

Dr Faisal Ahmed
PhD (Sungkyunkwan University), South Korea
Discipline: Mechanical Engineering.
Specialization: Nanomaterial, Power Dissipation.

Dr Bilal Anjum Ahmed
PhD (King Fahd University of Petroleum and Mineral), KSA
Discipline: Mechanical Engineering
Specialization: Ceramic Materials, Powder Metallurgy

Engr.Saida Riaz
MS (Mechanical) Pakistan
Discipline: Mechanical Engineering.
Specialization: Navigation of Control

Engr Najum Us Saher
MS (UET Taxila) Pakistan
Discipline: Mechanical Engineering
Specialization: Engg Mgmt

Engr Usama Bin Perwez
MS (NUST) Pakistan
Discipline: Mechanical Engineering.
Specialization: Energy Systems

Engr. Jawad Haider Syed
MS (Michigan Tech) USA
Discipline: Mechanical Engineering
Specialization: Automotive Engineering

Engr. Syed Haris Iftikher
MS (King fahd University of Petroleum and Minerals) Saudia Arabia
Discipline: Mechanical Engineering
Specialization: Multiracial fatigue

Bushra Majeed
Phd (NUST), Pakistan
Discipline: Mathematics
Specialization: Mathematical Physics

Computer & Software Engineering

Dr Shoab Ahmad Khan, HoD
PhD (Georgia Tech University) USA
Discipline: Electrical & Computer Engineering
Specialization: Digital Signal Processing

Dr Usman Qamar
PhD (University of Manchester) UK
Discipline: Computer Sciences
Specialization: Data Engineering

Dr Muhammad Usman Akram
PhD (National University of Sciences & Technology) Pakistan
Discipline: Computer Engineering
Specialization: Digital Image Processing

Dr Saad Rehman
PhD (University of Sussex) UK
Discipline: computer science
Specialization: Digital Signal Design, Image Processing

Dr Arslan Shaukat
PhD (The University of Manchester) UK
Discipline: Computer Science/Informatics
Specialization: Machine Learning

Dr Nazar Abbas Saqib
PhD (Center for Research and Advanced Studies of the National Polytechnic Institute - CINVESTAV-IPN) Mexico
Discipline: Electrical Engineering
Specialization: Embedded System Design, Field Programmable Gate Array, Information Security

Dr Ali Hassan
PhD (University of Southampton) UK
Discipline: Electrical engineering
Specialization: Machine Learning and Biomedical Signal Processing

Dr Farhan Riaz
PhD, (University of Porto) Portugal
Discipline: Computer Engineering
Specialization: Digital Image Processing

Dr Qaiser Mahmood Chaudry
PhD (Georgia Tech University) USA
Discipline: Electrical Engineering
Specialization: Bio Medical Engineering

Dr Wasi Haider Butt
PhD (National University of Sciences and Technology) Pakistan
Discipline: Computer Software Engineering
Specialization: Database Engineering

Dr Aimal Khan
PhD (University of Rostock) Germany
Discipline: Communications Engineering
Specialization: Wireless Communications, Wireless Cooperative Relay Networks, Algorithms Design

Dr Muhammad Umar Farooq
PhD (University Politehnica of Bucharest) Romania
Discipline: Computer Science
Specialization: Mobile Ad hoc Networks

Dr Farhan Hussain
PhD (Hanyang University) South Korea
Discipline: Electronics & Computer Engineering
Specialization: Artificial Neural Networks, Machine Learning, Video Compression, NAND Flash Memory

Dr Sajid Gul Khawaja
PhD (National University of Sciences and Technology) Pakistan
Discipline: Computer Engineering
Specialization: Digital Image Processing

Dr Urooj Fatima
PhD (Norwegian University of Science and Technology - NTNU) Norway
Discipline: Telematics
Specialization: Systems Modelling and Analysis

Jahan Zeb
MS (National University of Sciences and Technology) Pakistan
Discipline: Computer Software Engineering
Specialization: Digital Image Processing

Anum Abdul Salam
MS (University of Engineering & Technology) Pakistan
Discipline: Computer Engineering
Specialization: Signal and Image Processing

Ali Saeed
MS (National University of Sciences and Technology) Pakistan
Discipline: Computer Software Engineering
Specialization: Signal and Image Processing

Dr Mohisn Islam Tiwana
Phd (University of New South Wales) Australia
Discipline: Mechatronics Engineering
Specialization: Bio Medical Engineering.

Dr Muhammad Mubasher Saleem
PhD (Politecnico di Torino) Italy
Discipline: Mechanical Engineering
Specialization: Microelectromechanical Systems (MEMs)

Dr Waqar Shahid Qureshi
PhD (Asia Institute of Technology) Thailand
Discipline: Mechatronics Engineering
Specialization: Machine Vision

Dr Nasir Rashid
MS (NUST) Pakistan
Discipline: Mechatronics Engineering
Specialisation: Robotics

Dr Nauman Razzaq
MS (Electrical Engineering) Pakistan
Discipline: Mechatronics Engineering
Specialization: Biomedical Engineering

Engr Kanwal Naveed
MS (NUST), Pakistan
Discipline: Electrical Engineering
Specialization: Control Systems

Engr Usman Asad
MS (Rochester Institute of Technology), USA
Discipline: Mechanical Engineering
Specialization: Vibrational Analysis

Engr Aqeela Mir
MS (NUST), Pakistan
Discipline: Mechatronics Engineering
Specialization: Robotics

Engr Muhammad Aneequz Zaman
MS (UIUC) USA
Discipline: Mechanical Engineering,
Specialization: Control systems

Mechatronics Engineering

Dr Javaid Iqbal, Dean
PhD (University of New South Wales) Australia
Discipline: Mechatronics Engineering
Specialisation: Artificial Intelligence/Mobile Robots

Dr Umar Shahbaz Khan HoD
PhD (University of Liverpool) UK
Discipline: Mechatronics Engineering
Specialisation: Embedded Systems/ Image Processing

Dr Mahmood Anwar Khan
PhD (University of Salford) UK
Discipline: Mechanical Engineering
Specialisation: Robotics

Muhammad Qasim
MSc (Quaid-i-Azam University) Pakistan
Discipline: Electronics
Specialisation: Microcontroller based systems

Dr Hamid Jabbar
Ph.D. Hanyang University, Seoul, South Korea
Discipline: Electrical Engineering
Specialization: Low-power energy harvesting, piezoelectric material applications

Dr Amir Hamza
PhD (King Fahad University of Petroleum and Minerals)
Discipline: Mechatronics Engineering
Specialization: Engineering Materials

Dr Danish Hussain
PhD (Harbin Institute of Technology) P.R China
Discipline: Mechatronics Engineering

Specialization: Mechatronics

Mr Abdullah Al Hussain
MSc (Riphah International University) Pakistan.
Discipline: Mathematics

Engr. Ayesha Zeb
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Digital Signal Processing and Communication Systems

Engr. RabiaJamshaid
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Micro Electro Mechanical System (MEMS), Biomedical Devices, Thin Film Technology

Engr. HasanHabib
MS (Tempere University), Finland
Discipline: Electrical Engineering
Specialization: Control System

Engr. MuneebMasood Raja
MS (Wright State University), USA
Discipline: Electrical Engineering
Specialization: Control Systems

Engr. SereenAtif
MS (Air University Islamabad) Pakistan
Discipline: Mechatronics Engineering
Specialization: Control Systems

Department of Engineering Management

Dr Masood Raza, HoD
PhD (Cranfield University) UK
Discipline: Engineering Management
Specialization: Operation Research Modeling & Simulation

Dr Syed Tasweer Hussain Shah
PhD (NUML) Pakistan
Discipline: Management
Specialisation: Service Quality, Entrepreneurship, HR, Project Mgmt, Strategic Mgmt

Dr Faheem Qaisar Jamal
PhD (UET Taxila) Pakistan
Discipline: Engineering Management
Specialisation: Organizational Behaviour, Organizational Change, Organizational Psychology, Human Resource Management, Supply Chain Management, Project Management

Dr Yasir Ahmad
PhD (UET Taxila) Pakistan
Discipline: Engineering Management
Specialisation: Engineering Management, Strategic Management and Technology Management

Dr Syed Muhammad Ali
PhD (Management Science & Business Administration), USTC China.
Discipline: Engineering Management
Specialisation: Employees Behavior, Knowledge Management & HRM

Engr Afshan Naseem
MS (UET, Taxila) Pakistan
Discipline: Engineering Management
Specialisation: Engg & Technology Management

Engr Ali Salman
MS (University of Surrey) UK
Discipline: Engineering Management
Specialisation: Manufacturing Management

Basic Sciences & Humanities

Dr Asim Aziz (HOD)
PhD (Glasgow Caledonian University), UK
Discipline: Mathematics
Specialization: Mathematical Biology

Dr Yasir Ali
PhD (NUST), Pakistan
Discipline: Mathematics
Specialization: Optimization Theory

Dr Muhammad Hanif
PhD (Quaid-i-Azam University), Pakistan
Discipline: Physics
Specialization: Laser Spectroscopy

Dr Hina Sadaf
PhD (Quaid-i-Azam University), Pakistan
Discipline: Mathematics
Specialization: Applied Mathematics

Dr Anwar Hussain
PhD (Quaid-i-Azam University), Pakistan
Discipline: Mathematics
Specialization: Fluid Mechanics

Dr Tayyab Hussain Shah
PhD (Quaid-i-Azam University), Pakistan
Discipline: Mathematics
Specialization: Fluid Mechanics

Dr Muhammad Umar Farooq
PhD (NUST), Pakistan
Discipline: Mathematics
Specialization: Symmetry Methods , General Relativity

Mr Syed Hussain Shah
MPhil (NUST University), Pakistan
Discipline: Physics
Specialization: Solar Thermal Applications

Dr Noreen Sher Akbar
PhD (Quaid-i-Azam University), Pakistan
Discipline: Mathematics
Specialization: Fluid Dynamics

Ms Shahnaz Fatima
MPhil (Quaid-i-Azam University), Pakistan
Discipline: Electronics
Specialization: Microwave Theory

Dr Safia Taj
PhD (NUST), Pakistan
Discipline: Mathematics
Specialization: Black Hole Thermodynamics

Ms Samreen Sheriff
MPhil (NUST University), Pakistan
Discipline: Mathematics
Specialization: Fluid Dynamics

Dr Faizullah
PhD (Ocean University), China
Discipline: Mathematics
Specialization: Stochastic Differential Equations, Stochastic Analysis, Non-linear Ordinary Differential Equations

Ms Rukaiza Khan
MPhil (Air University), Pakistan
Discipline: English
Specialization: Linguistics

Ms Pakeeza Tabassum
MPhil (International Islamic University), Pakistan
Discipline: Islamic Studies
Specialization: Comparative Religions, Sharia Law

Ms Sabeen Malik
MPhil (Quaid-i-Azam University), Pakistan
Discipline: Electronics
Specialization: Electronics

Ms Aaminah Hassan
MPhil (Bahauddin Zakariya University) Pakistan
Discipline: English Linguistics and Literature
Specialization: English Linguistics and Literature

Ms Saher Rabia Mirza
MA (Kingston University London), UK
Discipline: English
Specialization: Applied linguistics

Mr Agha Hussain Shah
M. Phil (Hazara University), Pakistan
Discipline: English
Specialization: Applied linguistics

Student Support Facilities

Laboratories

Department of Electrical Engineering

Teaching Labs

- Electronics Lab
- Embedded Systems Lab
- Control & Communication Systems Lab
- Electrical Machines Lab
- Antenna and Microwave Lab

Research Labs

- Microwave Engineering Research Lab
- Agriculture Robotics Lab, MEMS Design Lab
- Postgraduate Research Lab

Department of Mechanical Engineering

Teaching Labs

- Strength of Materials Laboratory
- Fluid Mechanics Laboratory
- Steam Laboratory
- Dynamics & Controls Laboratory
- Heat Transfer Lab
- Computer Aided Engineering (CAE) Laboratory
- Automotive Laboratory
- Drawing Hall
- Engineering Workshops
  - Wood Working Shop
  - Foundry Shop
  - Tin copper smith shop
  - Machine Shop
  - Fitter Shop
  - Welding Shop

Research Labs

- Mechanarium Research Lab

Department of Computer & Software Engineering

Teaching Labs

- Embedded System Laboratory
- Computer Networks Laboratory
- Computing Laboratory
- DSP/DSD Laboratory
- Image Processing Laboratory
- Electronics Laboratory

Research Labs

- Emerging Technologies Laboratory
- Project Laboratory

Department of Mechatronics Engineering

Teaching Labs

- Industrial Automation Laboratory
- Robotics and Control Laboratory
- Circuit Design Laboratory
- Machine Vision and Embedded Systems Laboratory
- CAD Laboratory

Research Labs

- UAV Laboratory
- UGV Laboratory
- Prosthesis Laboratory

Industrial Collaboration Labs

- FAIZ Programmable Logic Controller (PLC) Laboratory

Department of Engineering Management

- Decision Support System Laboratory

Library

The computerized College library has a collection of 80,000 printed and digital books. It provides a range of services that include loans, online information searching, reference services, inter-library loan, document delivery, photocopying, access to virtual collection & digital resources and CD-ROM's. The College library is fully wired to the internet through high-speed DSL and Wi-Fi networks.

Cafeterias

Inexpensive hygienic food is available in cafes. The food quality is closely monitored by the campus doctor. Besides, utility shops have been set up on the campus to fulfill students' day-to-day needs.

Accommodation

Hostel / accommodation facilities are available for both male and female NUST Cadets as well as Paying Cadets. Well-furnished rooms are available on "First Come, First Serve" basis. Detailed procedure for applying for hostel accommodation at College of E&ME and other rules and regulations can be seen at **http://www.nust.edu.pk/INSTITUTIONS/Colleges/CEME/Campus-Life/Pages/CEME-Hostel-information.aspx**

Alumni Directory

An updated database of alumni is maintained by the general body. Calls are made regularly to the alumni members to send their updated data to the association. The information gathered during reunion registration is also used to append/update the database.

Wireless Network

Wireless LAN Facility is being provided to the students in various hostels using 802.11b technology operating at 11 Mbps. College is obtaining a total bandwidth of 7 Mbps (4 MB CIR from M/S Skynet (Pvt) Ltd) and additional 3 Mbps (Shared) through PERN project. This bandwidth is also available to the students through Wi-Fi network Wireless LAN facility is available at the entire premises of the College.

Sports Facility

The campus also facilitates different games and sports. Regular tournaments are held within the campus to encourage extra-curricular activities for the students. College has been actively participating in various Inter NUST Sports Competitions and representing NUST in Inter-University and Zonal Championships. The College provides following sports facilities:-

Outdoor

- Cricket.
- Football
- Hockey.
- Basketball
- Lawn Tennis
- Volleyball
- Handball
- Baseball

» Firing
» Riding Club
» Roller Skating
» Archery
» Athletics

Indoor

Sports Complex. A state-of-the-art Sports Complex is established inside the campus which provides almost all indoor sports facilities including

» Badminton.
» Basketball
» Volleyball
» Table Tennis
» Swimming Pool
» Billiard
» Snooker
» Hand Ball
» Judo
» Squash
» Gymnasium (Ladies and Gents)

Tennis Courts

College has three tennis courts of international standard. One hard and two clay courts are provided for youth events as well as inter-company competitions.

Basketball Courts

A cemented basketball court is established inside college sports complex

Gymnasium

Three state of the art and well equipped fitness centers / gymnasiums have been established in the sports complex, two for male and one for female students.

Stadium

The College has a beautiful stadium of international standards.

Athletics Ground

The College has a beautiful athletics ground of international standards.

Events

The College of E&ME regularly holds educational events on its campus to stimulate the minds of its students. Some events have been briefly mentioned below:

National Engineering Robotics Contest

The idea of National Engineering Robotics Contest (NERC) was initiated in the department of Mechatronics. The aim of this contest is to provide a platform to the engineering students and their teachers/ supervisors from all over Pakistan to participate in a contest of a multi-disciplinary field of Robotics with a view to expand the knowledge of this field and its applications in Pakistan. The theme of the competition is to build an Autonomous Mobile Robot, which should be able to move in a specified arena and complete some specified and predefined task. The task is uploaded on the NERC website one year prior to the next year's competition. This competition was started back in the year 2003. The Contest has now become one of the mega events in the annual calendar of the NUST College of EME. It is well on its way to expand beyond the geographical boundaries to become an international contest.

International Conference on Robotics and Artificial Intelligence

The Department of Mechatronics Engineering hosts an International Conference on Robotics and Artificial Intelligence. The second conference of this series held on 1st November 2016. Within this conference, International keynote speakers gave enlightened talks on the latest trends of robotics and artificial intelligence. The conference attracted various high quality local and international articles and had an acceptance ratio of 34%. The international keynote speakers appreciated the quality of work presented in the conference and in particular, praised the research and development of Mechatronics Engineering department.

Open House

Annual Event of Open House & Job Fair is organized by department of Electrical Engineering at College E & ME. The objective of this event is to provide an opportunity to both, potential employers and the graduating students of the College, to come closer and share their mutual interests and strengthen the already existing links with the Industry. Students exhibit Final Year Projects in the areas of Electrical, Mechanical, Computer and Mechatronics Engineering, focusing on practical solutions of engineering problems during. Various delegates from prestigious companies participate in this event to conduct interviews and Entry tests.

Computer Project Exhibition & Competition (COMPPEC)

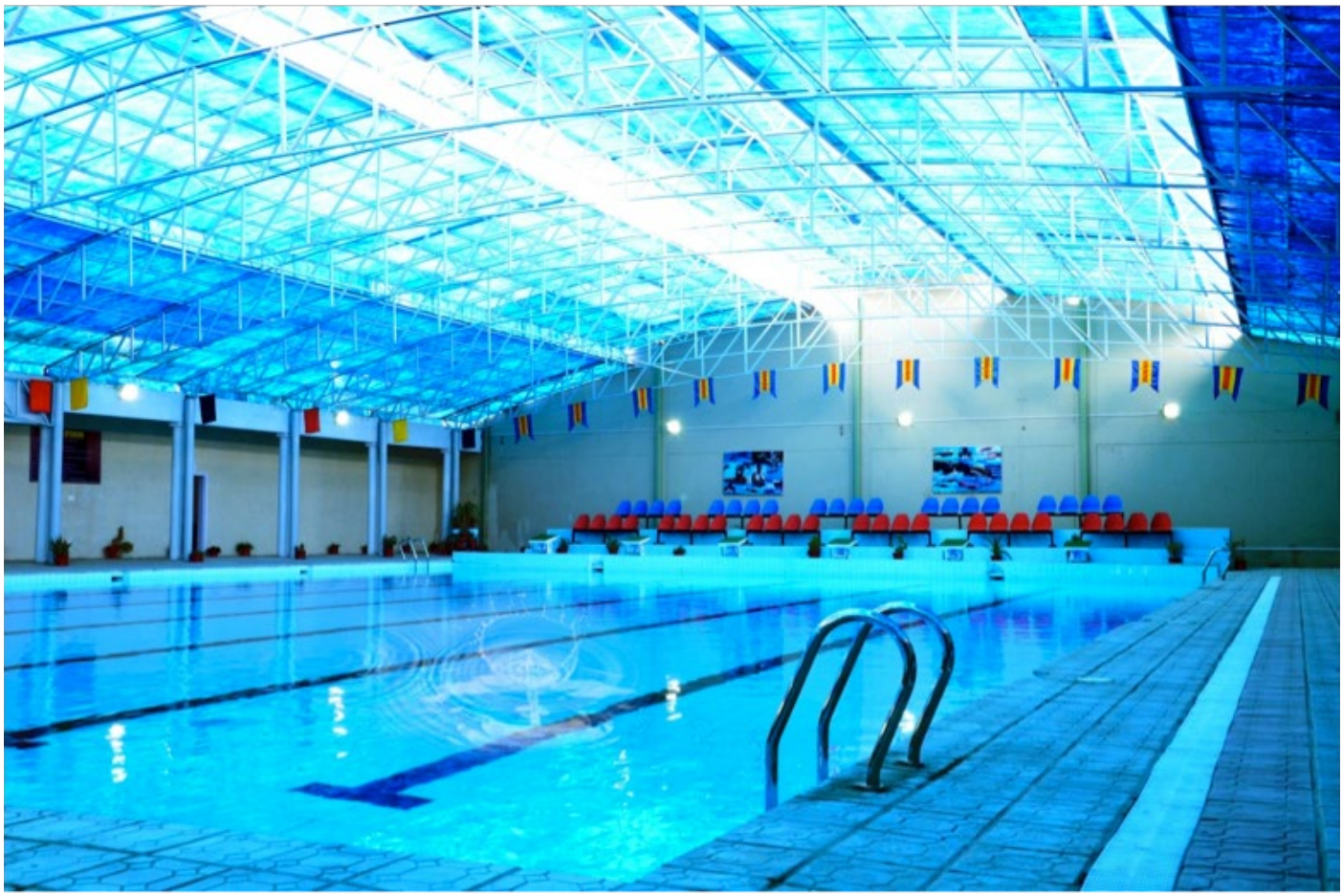
All Pakistan Inter College/ University Software Exhibition and Competition COMPPEC is organized by Department of Computer Engineering. The Department of Computer Engineering of this college has the honor to successfully host COMPPEC for the last fifteen years. COMPPEC provides a platform that facilitates the exchange of the state-of-the-art technologies, innovative ideas, new trends, technical skills and modern programming tools in the field of engineering sciences and information technology.

Inauguration of NCRA National Centre of Robotics and Automation

The Inauguration ceremony of National Center of Robotics and Automation was held on May 23, 2018 at NUST College of E&ME. Federal Minister for Interior and Minister for Planning, Development and Reform Professor AhsanIqbal graced the event as the Chief Guest. The center is a consortium of 11 labs over 13 Universities. This centre will go a long way in harmonizing itself with Innovation Centre EME and Project Manufacturing Lab to provide Opportunities to students from all over Pakistan to innovate and implement ideas and generate successful startups.

The following labs are part of the NCRA, and have been selected through competitive evaluation and rigorous selection process carried out by HEC and Planning Commission of Pakistan:

- Robot Maker Lab under NUST College of E&ME
- Robot Design and Development Lab at NUST College of E&ME
- Human Centered Robotics Lab at UET Lahore and UCP Lahore
- Industrial Monitoring and Automation Lab at ITU Lahore
- MEMs Sensor Design and Testing Lab at Air University
- Agricultural Robotics Lab at LUMS
- UAV Dependability Lab at FAST NU
- Swarm Robotics Lab at UET Taxila
- Haptics, Human-Robotics and Condition Monitoring Lab at NED Karachi and MUET
- Control Automotive and Robotics Lab at BUITEM and MUST
- Advanced Robotics and Automation Lab at UET Peshawar



Seminars/Workshops

To introduce new advances in research and innovation to the Industry and Academia, the college conducts various seminars/ workshops on the wide ranging topics.

Alumni Reunion

EME Alumni reunion is an annual event arranged for the graduate of this College. This is an event that brings the graduates of this college starting from the youngest most graduates to the oldest ones together on a same forum to share their memories and relive the golden times spent in the corridors and lawns. It is an event that brings a lot of joy and memories to the graduates and family members.

Olympiad

NUST EME Olympiad is organized by three foremost professional societies, the IEEE Student Chapter, Sports and Adventure Society (SAS) and Society for Promotion of Arts and Literature (SPAL) to promote the cause of charity. Students from different National-wide Universities, Colleges and Schools participate and contribute to the appeal of charity for flood affected people of Pakistan.

Contacts

Website

www.ceme.nust.edu.pk

Position	Contact Info
Commandant	+92-51-9247540
Dean	+92-51-9247547
HoD CE&SE	+92-51-2229564
HoD EE	+92-51-9247539
HoD ME	+92-51-9247546
HoD Mts	+92-51-9247544
HoD BS&H	+92-51-9247541
HoD EM	+92-51-9247542
HOD DMTs	+92-51-54444400

Helpline

+92-51-9247550

Fax

+92-51-9247548

Academic Programmes

Bachelors in Electrical Engineering

Department of Electrical Engineering is committed to provide high quality engineering education in Pakistan, second to none. The Department offers postgraduate and undergraduate programmes in electrical engineering. The undergraduate programme of the department is well reputed, organized and is built on the standard that enables our graduates to fulfill the national needs. On the other hand, the postgraduate programme of our department strengthens the research requirements of the country by offering blend of control, communication, microwave and electronics streams at master and PhD level. Various commercial valued national projects are being completed by this department in collaboration with commercial and defense organizations.

Associated Careers

Electrical engineering graduates are in demand in a number of industries such as communication (including broadcast communications, mobile communications), integrated circuit design, instrumentation, bio-medical engineering, avionics, consumer electronics and computer networking, to name a few. Graduates can also pursue research, as MS & PhD students, or join industrial laboratories.

Scheme of Studies

Programme Code: 604

Semester-I

Course Code	Course Title	Credits
MATH-101	Calculus & Analytical Geometry	3-0
HU-100	English	2-0
HU-107	Pakistan Studies	2-0
CH-109	Applied Chemistry	2-0
PHY-102	Applied Physics	2-1
CS-114	Fundamentals of Programming	2-1
ME-105	Workshop Practice	0-1
	Total	**13-3=16**

Semester-II

Course Code	Course Title	Credits
MATH-121	Linear Algebra & ODEs	3-0
ME-221	Engineering Materials	3-0
ME-113	Engineering Mechanics-I: Statics	3-0
HU-101	Islamic Studies	2-0
HU-109	Communication Skills	2-0
ME-109	Engineering Drawing	0-2
	Total	**13+2=15**

Semester-III

Course Code	Course Title	Credits
MATH-232	Complex Variables and Transforms	3-0
ME-230	Fluid Mechanics-I	3-0
ME-130	Thermodynamics-I	
ME-114	Engineering Mechanics-II: Dynamics	3-0
EE-103	Electrical Engineering	2-1
ME-223	Advanced Workshop Practice	1-1
ME-211	Computer Aided Drawing	0-1
ME-115	Engineering Mechanics Lab	0-1
	Total	**15+4=19**

Semester-IV

Course Code	Course Title	Credits
MATH-351	Numerical Methods	3-0
ME-210	Mechanics of Materials-I	3-0
ME-330	Fluid Mechanics-II	3-0
ME-231	Thermodynamics-II	3-0
EE-227	Electronics Engineering	2-1
HU-212	Technical and Business Writing	2-0
ME-337	Fluid Mechanics Lab	0-1
ME-232	Thermodynamics Lab	0-1
	Total	**16+3=19**

Semester – V

Course Code	Course Title	Credits
ME-218	Machine Design-I	3-0
ME-212	Mechanics of Materials-II	3-0
ME-331	Heat & Mass Transfer	3-0
ME-322	Manufacturing Processes	3-1
ME-325	Engineering Economics	2-0
ME-216	Mechanics of Materials Lab	0-1

Semester – VI

Course Code	Course Title	Credits
ME-310	Mechanics of Machines	3-0
ME-327	Instrumentation and Measurement	2-1
ME-320	Machine Design-II	2-0
MATH-361	Probability & Statistics	3-0
XXX-000	Technical Elective-1	2-0
ME-326	Heating, Ventilating and Air Conditioning	3-0

ME-339	Control Engineering	2-1	ME-332	Heat Transfer and HVAC Lab	0-1
	Total	**16+3=19**	CSL-401	Community Service Learning	0-2*
				Total	**15+2= 17+2***

Semester – VII

Course Code	Course Title	Credits
MGT-271	Entrepreneurship	2-0
ME-411	Introduction to Finite Element Analysis	2-1
ME-421	Mechanical Vibrations	3-0
ME-433	Mechanisms and Mechanical Vibrations Lab	0-1
XXX-000	Technical Elective-2	2-0
ME-430	Power Plants	3-0
ME-499	Final Year Project-1	0-3
	Total	**12+5=17**

Semester – VIII

Course Code	Course Title	Credits
HU-222	Professional Ethics	2-0
ME-420	Project Management (Management Elective)	2-0
ME-424	Health, Safety and Environment	1-0
XXX-000	Technical Elective-3	2-0
ME-439	Internal Combustion Engines	3-0
ME-431	IC Engines & Power Plants Lab	0-1
ME-498	Internship (Pass/Fail basis)	-
ME-499	Final Year Project-II	0-3
	Total	**10+4=14**
	Grand Total	**136+2***

* The labs and other courses should be offered in such a way that the total number of credit hours should remain in between 130-136 as per PEC requirements

Electives

Course Code	Course Title	Credits
ME-401	Fundamentals of Aerodynamics	2-0
ME-408	Applied Heat Transfer	2-0
ME-409	Applied Thermodynamics	2-0
ME-412	Automotive Technology	2-0
ME-413	Basic Naval Architecture	2-0
ME-414	Computational Fluid Dynamics	2-0
ME-415	Computer Aided Engineering	1-1
ME-416	Computer Aided Thermal System Design	1-1
ME-424	Introduction to Oil and Natural Gas Engineering	2-0
ME-429	Laser & its applications	2-0
ME-438	Mechanical Engineering Design	2-0
ME-470	Marine Environment Issues	2-0
ME-471	Optimization Techniques	2-0
ME-473	Power Generation and Distribution	2-0
ME-474	Electrical Machines	2-0
ME-475	Energy Conversion and Power Electronics	2-0
ME-476	Engine Tribology	2-0
ME-477	FEM applications in Automobile	2-0
ME-478	Finite Element Methods	2-0
ME-479	Gas Dynamics	2-0
ME-484	Gas Turbines	2-0
ME-485	Fuel Cell Technology	2-0
ME-486	Power Plant Engineering	2-0
ME-487	Power System Analysis	2-0
ME-488	Renewable Energy Technologies	2-0
ME-489	Robotics and Automation	2-0
ME-490	Ship Propulsion Engineering	2-0
ME-491	Solar Energy Systems	2-0
ME-492	Vehicle Design Performance	2-0
ME-493	Production Tooling & Automation	2-0
ME-496	Vehicle Dynamics	2-0
ME-497	Advanced Engineering Design	2-0
ME-498	Power Train Systems	2-0
DME-480	Automotive Manufacturing Systems	2-0
DME-481	Computer Applications in Automobile Manufacturing	2-0
DME-482	Computer Applications in Manufacturing Systems	2-0
DME-483	Industrial Maintenance Management	2-0

DME-484	Logic Design & Micro-processors	2-0
DME-485	Logistics and Inventory Management	2-0
DME-486	Ergonomics, Work Study and Methods Engineering	2-0
DME-487	FEM applications in Manufacturing	2-0
M&S-402	Introduction to Modeling and Simulation	1-1
RIME-222	Introduction to Mechatronics Design Fundamentals	2-0

Management Electives

ME-384	Operations Management	2-0
ME-427	Operations Research	2-0
ME-425	Total Quality Management	2-0
ME-428	Engineering Law	2-0

MS and PhD in Electrical Engineering (Evening)

The Department of Electrical Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees. Graduate study in the department is organized into following streams:

- Control Systems
- Signal Processing
- Communication Systems
- Solid State Electronics & Circuits
- RF & Microwave MS

MS Electrical Engineering Degree Requirements:

The student must complete a total of 30 credits and meet the requirements specified below:

- MS students are required to take at least 3 core courses (9 Cr Hrs) out of the pool of core courses. Selection of core courses will be based on their relevance to the stream the student has been admitted to, and will be subject to prior approval of concerned Head of Department.
- In addition to the core courses an MS Student must complete a minimum of 3 courses (9 Cr Hrs) from the list of approved EE courses, of the approved streams.
- Furthermore, a Student will be allowed to take a maximum of 2 courses (6 Cr Hrs) from all the approved courses of other engineering and basic sciences disciplines of NUST Schools / Institutes / Colleges with prior approval of HOD.
- However a student may, in addition to completing 6 courses(18 Cr Hrs), to fulfill the requirements specified in para (a) and (b) above, and in lieu of courses defined in para (c) above, may choose to complete the remaining 2 courses (6 Cr Hrs), by studying approved EE courses from any of the streams.

List of core courses:

Course Code	Course Title	Credits
EE 849	Electromagnetic Field Analysis	3
EE 847	Microwave Networks and Passive Components	3
E831	Advanced Digital Signal Processing	3
CE 866	Advanced Digital Signal Processing	3
EE 891	Stochastic Systems	3
EE 851	Advanced Digital Communication Systems	3
EE 852	Information and Coding Theory	3
EE 871	Linear Control Systems	3
EE 801	Semiconductor Device Physics	3
EE 802	Quantum Mechanics	3
EE 803	Physical Electronics	3
EE 823	Advanced Digital System Design	
CE 825	Advanced Digital System Design	3
EE 826	Advanced VLSI Design	3
EE 863	Power Systems Analysis	3
EE 862	Power System Operation and Control	3

List of Electives:

Solid State Electronics and Circuits

Course Code	Course Title	Credits
EE 804	Photonic Devices	3
EE 805	Semiconductor Processing	3
EE 806	Thin Film Processing	3
EE 807	Thin Film Characterization	3
EE 808	Digital Integrated Circuit Design	3
EE 809	Analog Integrated Circuit Design	3
EE 900	Optoelectronic Devices & Materials	3
EE 901	Power Electronics & Electric Drives	3
EE 902	Nano-Electronics	3
EE 903	Advanced Semiconductor Device Theory	3
EE 904	Microchip Fabrication Technology	3
EE 905	Advanced Power Electronics	3
EE 906	Solid State Electronics	3
EE 907	Micro & Nano Fabrication	3
EE 908	Ultra High Speed Nanoelectronic Devices	3
EE 909	Selected Topics in Electronics	3
EE 898	Nanotechnology	3
EE 818	Micro-Electro-Mechanical Systems	3
EE 893	Data Acquisition & Mixed Signal Design	3

Signal Processing

Course Code	Course Title	Credits
EE 832	Pattern Recognition	3
EE 833	DSP Hardware System Design	3
EE 834	Applied Signal Processing	3
EE 835	Multirate Systems & Filter Banks	3
EE 836	Advanced Digital Image Processing	3
EE 837	Advanced Topics in Computer Vision & Image Processing	3
EE 838	Filtering & Tracking	3
EE 839	Adaptive Filters	3
EE 930	Spatial Array Processing	3
EE 931	DSP Software System Design	3
EE 932	Speech Processing	3
EE 933	Time Frequency Analysis	3
EE 939	Selected Topics in Signal Processing	3
EE 867	Computer Vision	3

RF & Microwave

Course Code	Course Title	Credits
EE 840	RF MEMS: Theory and Applications	3
EE 841	Electromagnetic Theory	3
EE 842	Microwave Communication System Design	3
EE 843	Microwave Transmission Lines & Waveguides	3
EE 844	Antennas & Wave Propagation	3
EE 845	EMC/EMI	3
EE 846	Microwave Photonics	3
EE 848	Radiating Systems & Antennas	3
EE 940	Advanced RF Measurements	3
EE 941	RF Transceiver Design	3
EE 942	Microwave Integrated Circuit Design	3
EE 943	Microwave Devices I	3
EE 944	Microwave Devices II	3
EE 945	Computational Electromagnetics	3
EE 946	Advanced Antenna Theory and Design	3
EE 947	Microwave Devices & Systems	3
EE 948	Advance Electromagnetic Fields	3
EE 949	Selected Topics in Microwave Engineering	3
EE 896	Electrodynamics of Plasmas	3
EE 895	Analysis of Measurement Environment	3

Telecommunication / Communication Systems

Course Code	Course Title	Credits
EE 853	Advanced Wireless Communication	3
EE 854	Optical Communication Systems	3
EE 855	Error Control Coding	3
EE 856	Software Defined Radio	3
EE 857	Advanced Satellite Communication Systems	3
EE 858	Communication Project Management	3
EE 859	Performance Analysis of Communication Networks	3
EE 950	Advanced Data Communication Systems	3
EE 951	Radar Systems	3
EE 959	Selected Topics in Communication Systems	3
EE 897	Detection & Estimation	3
CSE 812	RF Communication System Design	3
EE 881	Advanced Communication Networks	3
EE 882	Cognitive Radio Networks	3
EE 883	Wireless Sensor & Mesh Networks	3
EE 884	Photonic Networks	3
EE 885	Broadband Networks	3
EE 886	Advanced Wireless Networks	3
EE 887	Network Switching & Routing	3
EE 888	Advanced Computer Network Design & System Security	3
CSE 889	Network and Service Management and Control	3
CSE 989	Selected Topics in Networks	3
EE 820	Advanced Computer Networks	3
EE 879	Network Performance Analysis	3

Control Systems

Course Code	Course Title	Credits
EE 872	Optimal Control	3
EE 873	Fuzzy Control	3
EE 874	Adaptive Control	3
EE 875	Discrete Time Control Systems	3
EE 876	Probabilistic Robotics	3
EE 877	Mobile Robotics	3
EE 878	System Identification	3
EE 879	Robust Control	3
EE 970	Advanced Robotics	3
EE 971	Modeling & Simulation of Dynamic Systems	3
EE 972	Advanced Digital Control Systems	3
EE 973	Control System Optimization	3
EE 974	Networked & Embedded Control Systems	3
EE 975	Robust & Multivariable Control	3
EE 976	Optimal & Multivariable Control	3
EE 977	Nonlinear Control Systems	3
EE 979	Selected Topics in Control Systems	3
EE 894	Cognitive Robotics	3
EE 892	Instrumentation & Systems	3
EM 800	Robotics - 1	3
EM 805	Robotics - 2	3
MTS 800	Advanced Robotics I	3
MTS 801	Advanced Robotics II	3
MTS 840	Data Acquisition and Control	3
ME 837	Nonlinear Dynamics	3

Note:

1. Offering of Elective Courses in all the specialization streams is subject to the availability of faculty and class strength.
2. PhD students will complete additional requirement of 800/900 level coursework (18 credit hours) other than the courses studied during their Masters Program as recommended by the doctoral Guidance and Examination Committee. They would also carryout original and independent research work to produce PhD thesis (EE-999 PhD Thesis) which is a mandatory requirement for award of PhD degree.

Department of Mechanical Engineering

The Department faculty possesses an impressive competence in their respective areas of specialty through their academic and industrial experiences. All faculty members in the Department are committed to the development and teaching of the programme in additions to maintaining continuity and academic standards.
The Department is actively engaged in research in the areas of Thermofluids and Manufacturing Engineering Systems. Manufacturing Research Group is committed to advanced industrial capability in a globally competitive marketplace by control of manufacturing processes, precision manufacturing, nano/micromolding, rapid prototyping and manufacturing. The research activities of the Thermofluids Research Group cover application areas such as Thermodynamics, Fluid Mechanics, CFD, Turbo-machinery, Micro-fluidics, Refrigeration and Air Conditioning, and Environmental Fluid Mechanics with a strong emphasis on computational modeling.

Bachelors in Mechanical Engineering

The Programme is designed to inculcate a comprehensive understanding of theory and practice related to structural mechanics, thermofluids, and manufacturing. It is a unique blend of engineering sciences with well-balanced laboratory work, design project and manufacturing processes with extensive usage of computers and latest software packages.

Scheme of Studies

Programme Code: 302

Semester-I

Course Code	Course Title	Credits
EE-106	Introduction to Engineering	1-0
HU-100	English	2-0
CS-114	Fundamentals of Programming	2-1
MATH-101	Calculus & Analytical Geometry	3-0
HPHY-102	Applied Physics	2-1
HU-107	Pakistan Studies	2-0
ME-113	Engineering Mechanics-I: Statics	3-0
ME-105	Workshop Practice	0-1*
	Total	**19**

Semester-II

Course Code	Course Title	Credits
HU-101	Islamic Studies	2-0
HU-109	Communication Skills	2-0
CH-109	Applied Chemistry	2-0
ME-109	Engineering Drawing	0-2
ME-114	Engineering Mechanics-II: Dynamics	3-0
ME-115	Engineering Mechanics Lab	0-1
MATH-121	Linear Algebra & ODEs	3-0
ME-130	Thermodynamics-I	3-0
	Total	**18**

* EGR-100 (1-0) is not counted towards GPA calculation

Semester-III

Course Code	Course Title	Credits
EE-103	Electrical Engineering	2-1
HU-122	Technical Report Writing & Presentation Skills	1-1
ME-210	Mechanics of Materials-I	3-0
ME-211	Computer Aided Drawing	3-0
ME-223	Advanced Workshop Practice	1-1
ME-231	Thermodynamics-II	3-0
ME0232	Thermodynamics Lab	0-1
MATH-232	Complex Variables & Transforms	3-0
CSL-401	Community Service & Learning	0-2*
	Total	**13-5+2***

Semester-IV

Course Code	Course Title	Credits
ME-212	Mechanics of Materials-II	3-0
ME-216	Mechanics of Materials-Lab	0-1
ME-221	Engineering Materials	3-0
ME-218	Machine Design-I	3-0
ME-230	Fluid Mechanics-I	3-0
MATH-334	Numerical Analysis	2-1
XXX-000	Foreign Language	2-0*
	Total	**14-2 +2***

Semester-V

Course Code	Course Title	Credits
EE-227	Electronics Engineering	2-1
ME-320	Machine Design-II	2-0
ME-327	Instrumentation & Measurement	2-1
ME-330	Fluid Mechanics-II	3-0
ME-337	Fluid Mechanics Lab	0-1
ME-331	Heat & Mass Transfer	3-0

Semester-VI

Course Code	Course Title	Credits
ME-310	Mechanics of Machines	3-0
ME-339	Control Engineering	2-1
ME-325	Engineering Economics	2-0
ME-326	Heating, Ventilation & Airconditioning	3-0
ME-332	Heat Transfer & HVAC Lab	0-1
MATH-361	Probability & Statistics	3-0

ME-332	Manufacturing Processes	2-0	XX-XXX	Technical Elective-I	2-0
		18			
	Total	**15-4**		**Total**	**15-2**

Semester-VII

Course Code	Course Title	Credits
MGT-270	Entrepreneurship	1-0
ME-411	Introduction to Finite Element Analysis	2-1
ME-421	Mechanical Vibrations	3-0
ME-433	Mechanisms & Mechanical Vibrations Lab	0-1
ME-430	Power Plants	3-0
XX-XXX	Technical Elective-II	2-0
ME-499	Final Year Project-I	0-3
	Total	**11-5**

Semester-VIII

Course Code	Course Title	Credits
HU-222	Professional Ethics	2-0
ME-420	Project Management	2-0
ME-424	Health, Safety and Environment	1-0
ME-439	Internal Combustion Engines	3-0
ME-431	I.C. Engines & Power Plants Lab	0-1
XX-XXX	Technical Elective-III	2-0
ME-499	Final Year Project-II	0-3
ME-498	Internship	-
	Total	10-4

* Community Service & Learning (2 CH) and Foreign Language (2 CH) courses are not counted towards CGPA

Electives

Course Code	Course Title	Credits
ME-401	Fundamentals of Aerodynamics	2-0
ME-408	Applied Heat Transfer	2-0
ME-409	Applied Thermodynamics	2-0
ME-412	Automotive Technology	2-0
ME-413	Basic Naval Architecture	2-0
ME-414	Computational Fluid Dynamics	2-0
ME-415	Computer Aided Engineering	1-1
ME-416	Computer Aided Thermal System Design	1-1
ME-424	Introduction to Oil and Natural Gas Engineering	2-0
ME-429	Laser & its applications	2-0
ME-438	Mechanical Engineering Design	2-0
ME-470	Marine Environment Issues	2-0
ME-471	Optimization Techniques	2-0
ME-473	Power Generation and Distribution	2-0
ME-474	Electrical Machines	2-0
ME-475	Energy Conversion and Power Electronics	2-0
ME-476	Engine Tribology	2-0
ME-477	FEM applications in Automobile	2-0
ME-478	Finite Element Methods	2-0
ME-479	Gas Dynamics	2-0
ME-484	Gas Turbines	2-0
ME-485	Fuel Cell Technology	2-0
ME-384	Operations Management	2-0
ME-427	Operations Research	2-0
ME-487	Power System Analysis	3-0
ME-466	Ship Propulsion Engineering	2-0
ME-488	Renewable Energy Technologies	2-0
ME-489	Robotics and Automation	2-0
ME-490	Ship Propulsion Engineering	2-0
ME-491	Solar Energy Systems	2-0
ME-492	Vehicle Design Performance	2-0
ME-493	Production Tooling & Automation	2-0
ME-496	Vehicle Dynamics	2-0
ME-497	Advanced Engineering Design	2-0
ME-498	Power Train Systems	2-0
DME-480	Automotive Manufacturing Systems	2-0
DME-481	Computer Applications in Automobile Manufacturing	2-0
DME-482	Computer Applications in Manufacturing Systems	2-0
DME-483	Industrial Maintenance Management	2-0
DME-484	Logic Design & Micro-processors	2-0
DME-485	Logistics and Inventory Management	2-0
DME-486	Ergonomics, Work Study and Methods Engineering	2-0
DME-487	FEM applications in Manufacturing	2-0
M&S-402	Introduction to Modeling and Simulation	1-1
RIME-222	Introduction to Mechatronics Design Fundamentals	2-0
ME-425	Total Quality Management	2-0
ME-483	Power Train Systems	2-0
ME-428	Engineering Law	2-0

MS and PhD in Mechanical Engineering (Evening)

Focus Areas: Dynamics & Control/Computational Mechanics/Product & Manufacturing Systems Design/Thermofluids

The curriculum of the programme has been developed to build upon the foundation of their mechanical engineering and technical skills learnt in their bachelor's course. A blend of coursework and research tailored to the needs of industry and students will equip the student to carry out R&D in industry or pursue a career in academia.

Why join this program?

Mechanical engineering is the backbone for technical development of any country. The demand for competent mechanical engineers is never satiated. This programme will enable the student to improve his knowledge as well as inculcate in him research capabilities, as well as communication skills. The faculty members are professional engineers and scientists, each actively engaged in research work in his chosen field.

MS/PhD Coursework

Programme Code: 351

Core Courses (Common to all the four Specializations)

Course Code	Course Title	Credits
MATH-812	Advanced Engineering Mathematics	3
ME-801	Optimization of Engineering Systems	3
ME-802	Finite Element Methods	3
ME-803	Continuum Mechanics	3
ME-899	MS Thesis	6

Stream 1: Dynamics & Control		
Course Code	**Course Title**	**Credits**
ME-812	Advanced Control Systems-I	3
ME-813	Advanced Control Systems-II	3
ME-814	Digital Control Systems	3
ME-815	Advanced Modeling & Simulation	3
EE-977	Nonlinear Control Systems	3
ME-854	Computer Integrated Manufacturing	3
ME-816	Modeling & Simulation of Dynamic Systems	3
ME-817	Advanced Theory of Vibrations	3
ME-837	Nonlinear Dynamics	3
ME-818	Kinematics & Rigid Body Dynamics	3
Stream 2: Computational Mechanics		
MATH-850	Advanced Numerical Analysis	3
ME-831	Computational Fluid Dynamics-I	3
ME-881	Advanced Fluid Mechanics	3
ME-817	Advanced Theory of Vibrations	3
ME-833	Computational Fluid Dynamics-II	3
ME-836	Theory of Elasticity	3
ME-839	Advanced Finite Element Analysis	3
ME-859	Mechanics of Fibre Reinforced Composites (FRC Materials)	3
ME-861	Theory of Plasticity	3
ME-874	Reliability Based Design	3

Stream 3: Product & Manufacturing System Design		
Course Code	**Course Title**	**Credits**
ME-851	Advanced Manufacturing Processes	3
ME-842	Additive Manufacturing	3
ME-853	Manufacturing System Design & Management	3
ME-854	Computer Integrated Manufacturing	3
ME-834	Fracture Mechanics	3
ME-835	Advanced Mechanics of Materials	3
ME-855	Material Selection & Design	3
ME-857	Product Design Fundamentals	3
ME-858	Laser Material Processing	3
ME-868	Operations Management	3
Stream 4:Thermofluids		
ME-831	Computational Fluid Dynamics-I	3
ME-881	Advanced Fluid Mechanics	3
ME-882	Heat & Mass Transfer	3
ME-883	Gas Dynamics	3
ME-885	Thermal System Design	3
ME-886	Power Plant Engineering	3
ME-887	Sustainable Energy Systems	3
ME-890	Advanced Turbo Machinery	3
ME-840	Computational Fluid Dynamics and Heat transfer	3
ME-894	Advanced Refrigeration and Air-conditioning	3

Note:

1. Offering of Elective Courses in all the specialization streams is subject to the availability of faculty and class strength.
2. Students to take a minimum of two courses from the corresponding stream, and maximum two courses from any other NUST approved school/college.
3. For all the specialization streams, course(s) from other departments/constituent colleges, schools or institutions of NUST, may be recommended, if considered necessary by Department of Mechanical Engineering, NUST College of E&ME.
4. PhD students will complete additional requirement of 800/900 level coursework (18 credit hours) other than the courses studied during their Masters Programme as recommended by the doctoral Guidance and Examination Committee. They would also carryout original and independent research work to produce PhD thesis (ME-999 PhD Thesis) which is a mandatory requirement for award of PhD degree.


TRIAC - F
DELL

Department of Computer & Software Engineering

Bachelors in Computer Engineering

The programme provides high quality engineering education with a sound theoretical foundation and hands-on practice of developing and designing computer hardware as well as software systems and products to prepare them for leadership in industry, business, academia and government departments.

Scheme of Studies

Programme Code: 303

Semester-I

Course Code	Course Title	Credits
HU–100	English	2-0
CS–114	Fundamentals of Programming	2-1
HU–107	Pakistan Studies	2-0
PHY-102	Applied Physics	2-1
MATH–101	Calculus and Analytical Geometry	3-0
ME–105	Workshop Practice	0-1
*EE–111	Linear Circuit Analysis	3-1
	Total	**18**

Semester-II

Course Code	Course Title	Credits
*EC 120	Computer Organization	2-1
HU–101	Islamic Studies	2-0
MATH 121	Linear Algebra & ODE	3-0
ME –104	Engineering Drawing	0-2
HU-109	Communication Skills	2-0
*EE 211	Electrical Network Analysis	3-1
	Total	**16**

Semester-III

MATH 161	Discrete Mathematics	3-0
CS-212	Object Oriented Programming	3-1
EC-210	Logic and Sequential Circuit Design	3-1
EE–215	Electronic Devices and Circuits	3-1
EC 301	Computer Graphics	2-1
	Total	**18**

Semester-IV

EC 220	Computer System Architecture	3-1
EC 200	Data Structures	3-1
MATH- 232	Complex Variables and Transforms	3-0
EC 221	Operating Systems	3-0
EC 103	Computer Application in Engg Design	2-1
HU 212	Technical and Business Writing	2-1
	Total	**20**

Semester-V

Course Code	Course Title	Credits
EC-310	Microprocessor and Microcontroller Based Design	3-1
EC-330	Computer Networks	3-1
MATH-351	Numerical Methods	3-0
EE-232	Signals & Systems	3-1
ME-100	Engineering Mechanics	3-0
	Total	**18**

Semester-VI

Course Code	Course Title	Credits
EC-313	Digital Signal Processing (CE Depth Elective-I)	3-1
EE–371	Linear Control Systems	3-1
EC 312	Digital Image Processing	2-1
HU 222	Professional Ethics	2-0
MATH 361	TProbability and Statistics	3-0
CSL 401	Community Service Learning	1-1
	Total	**18**

Semester-VII

Course Code	Course Title	Credits
EC-350	AI and Decision Support System	3-1
EC 431	Digital Communication	2-1
OTM 455	Engineering Project Management	2-0
EC-410	Digital System Design (CE Depth Elective-II)	3-1
EC-240	Database Engineering	3-1
EC 499	Final Year Project - I	0-2
	Total	**18**

Semester-VIII

Course Code	Course Title	Credits
MGT-271	Entrepreneurship	2-0
ECO-130	Engineering Economics	2-0
EC 430	Mobile Networks (CE Depth Elective-III)	2-1
EC 499	Final Year Project-II	0-4
EC-360	Software Engineering (CE Depth Elective-IV)	3-0
	Total	**10**
	Grand Total	**136**

Electives

Course Code	Course Title	Credits
EC-360	Software Engineering	3-0
EC-313	Digital Signal Processing	3-1
EC-301	Computer Graphics	2-1
EC-303	Mobile Application Development for SME's	2-1
EC-430	Mobile Networks	2-1
EC-410	Digital System Design	3-1
EC 460	Software Design & Testing	2-1
EC-432	Wireless Communication	2-1
EM-430	Introduction to Robotics	3-0
EM-440	Industrial Automation	2-1
EE-473	Fuzzy Control	3-0
EC-411	Digital Instrumentation and Systems	2-1
EC-433	Integrated Services over Packet Networks	2-1
EE-216	Electrical Machines	2-1
EE-439	Laser and its Applications	2-0
EE-416	Energy Conversion & Power Electronics	3-1
EC-434	Cloud Computing	2-1

** EGR-100 and CSL-401 are not counted towards GPA Calculation

MS and PhD in Computer Engineering

The objective of this programme is to train students to contribute towards advanced Computer Engineering technology research and to apply emerging research results for development of computer systems. Graduates will have advanced knowledge and skills to perform more effectively in the application, evaluation, design and technical competence in the foundation areas of computer systems engineering. The subjects with modular course structure are taught by leading researchers. The courses focus on coherent computer systems in engineering themes, providing a balance, coordinated and application-oriented coverage of up-to-date topics.

Why join this program?

The programme prepares students to gain advanced knowledge and skills to meet present-day challenges. The faculty is PhD qualified from renowned universities of the world.

Scheme of Studies

Programme Code: 352

Core courses

Course Code	Course Title	Credits
CE-825	Advanced Digital Systems Design	3
CE-820	Advanced Computer Architecture	3
CE-866	Advanced Digital Signal Processing	3
CE-899	MS Thesis	6

Computer Engineering (Any Five)

Course Code	Course Title	Credits
CE-812	Advanced Operating System	3
CE-835	Digital Image Processing	3
CE-880	Advanced Software Engineering	3
MATH-851	Numerical Analysis	3
CE-822	Parallel Processing Computer Systems	3
CE-833	Pattern Recognition and Analysis	3
CE-830	Adaptive Control	3
CE-863	Analysis of Stochastic Systems	3
CE-847	Digital Communication	3
CE-848	Wireless Communication	3
CE-803	Computer Vision	3
CE-910	Selected Topics in Computer Networks and Distributed Systems	3

MS and PhD in Software Engineering

The objective of computer software engineering programme is to prepare students for a variety of rewarding careers. Innovation and creativity is the major focus of the program. A range of subjects help students in acquiring skills and qualities needed to contribute to this very attractive discipline. Knowledge gained through this programme prepares students for professional competence of software applications in the field of computing, communication and information systems.

Why join this program?

Software engineering programme prepares students to gain advanced knowledge and to meet present-day challenges. The curriculum has been designed to match the skills and aspiration of the students and to keep pace with rapid advancement to meet growing needs of software and computing technologies. The faculty teaching the courses is PhD qualified from renowned universities of the world.

Scheme of Studies

Programme Code: 354

Semester- I

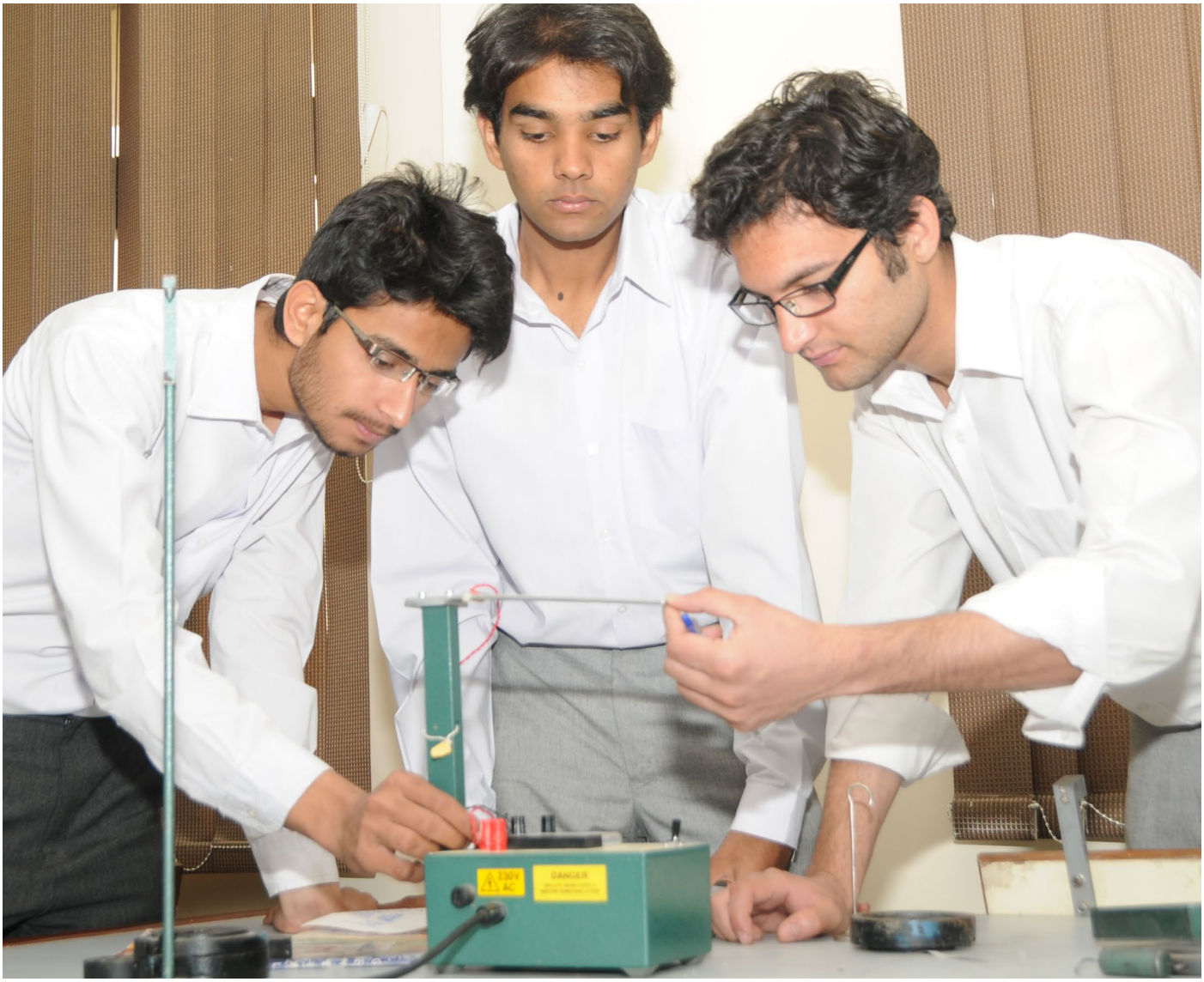
Core courses
(Common to all the Specializations)

Course Code	Course Title	Credits
SE-860	Advanced Software Engineering	3
SE-861	Software System Design and Architecture	3
SE-862	Software Requirement Engineering	3
SE-863	Software Quality Engineering	3
SE-899	MS Thesis	6

List of Electives (Any Four)

SE-812	Advanced Operating Systems	3
SE-850	Digital Image Processing	3
SE-896	Research Methodologies	3
SE-802	Pattern Recognition	3
SE-825	Advanced Computer Networks	3
SE-813	Design of Parallel and Distributed Systems	3
SE-807	Machine Learning	3
SE-808	Bio Informatics Systems	3
SE-810	Data Engineering	3
SE-805	Advanced Artificial Intelligence	3
SE-876	Web Engineering	3
SE-830	Advanced Algorithm Analysis	3
SE-864	Team based Software Development	3
SE-835	Advanced Algorithmic Graph Theory	3
SE-828	Network Security	3
SE-827	Wireless Communication	3
SE-826	Advanced Computer Network Design and System Security	3
SE-868	Software Project Management	3
SE-803	Computer Vision	3
SE-865	Human Computer Interface	3
SE-801	Artificial Neural Networks	3
SE-877	Software Development for Web	3
SE-871	Business Process Reengineering	3
SE-820	Advanced Computer Architecture	3
SE-851	Wavelet Compression	3
SE-910	Selected Topics in Relevant Area	3


MTS



Department of Mechatronics Engineering

Bachelors in Mechatronics Engineering

Mechatronics refers to a flexible, multi-technological approach for integration of mechanical engineering, computer engineering, electronics and information sciences. Mechatronics is essential in the design of intelligent products. It allows engineers to transform their virtual concepts into real life applications. It is a relatively new concept relating to the design of systems, devices and products aimed at achieving an optimal balance between basic mechanical structure and its overall control. The programme involves research and coursework that will push the frontiers of technology in intelligent product design and development. The research activities involve design and control of intelligent robotic systems and automated machines.

Why join this program?

Modern state-of-the-art industries have changed rapidly from pure mechanical-, manufacturing-, and process-controlled type to electro-mechanical, fully automated and computerised. It has become the requirement for people working on those processes and production lines to have knowledge of all the related systems.

Associated Careers

Graduates will have strong command on engineering principles as well as sound capability of converting concepts to reality. They could find themselves in industry engaged with maintenance and operation of plant equipment such as boilers, compressors, turbines, instrumentation, automation and control of advanced industrial processes using such tools as PLC and microcontroller-based control systems, process simulation for plant modifications, defence and R&D applications, engineering management, or a variety of similar areas.

Many of our alumni have gone on to pursue further studies in renowned institutions of the world, in a variety of fields, such as Control Engineering, Digital Signal Processing, Power Electronics, Robotics, Artificial Intelligence, Mobile Robotics, Machine Vision and Distributed Robotics.

Scheme of Studies

Programme Code: 304

Semester-I

Course Code	Course Title	Credits
HU-100	English	2-0
CS-114	Fundamentals of Programming	2-1
HU-107	Pakistan Studies	2-0
MATH-101	Calculus and Analytical Geometry	3-0
ME-105	Workshop Practice	0-1
ME-109	Engineering Drawing	0-2
EE-116	Electric Circuits Analysis	3-1
	Total	**12+5=17**

Semester-II

Course Code	Course Title	Credits
ME-112	Engineering Statics	3-0
HU-101	Islamic Studies	2-0
MATH-121	Linear Algebra & ODEs	3-0
PHY-102	Applied Physics	2-1
HU-109	Communication Skills	2-0
EE-215	Electronic Devices and Circuits	3-1
	Total	**15+2=17**

Semester-III

Course Code	Course Title	Credits
MATH-243	Vector calculus	3-0
EE-313	Electronics Circuit Design	3-1
HU-212	Technical & Business Writing	2-0
ME-210	Engineering Dynamics	3-0
EE-223	Digital Logic Design	2-1
EC-204	Data Structures and Object Oriented Programming	3-1
	Total	**16+3**

Semester-IV

Course Code	Course Title	Credits
MATH-232	Complex Variables and Transforms	3-0
ME-204	Thermodynamics	3-1
MTS-220	Solid Modeling	0-1
ME-206	Mechanics of Materials	2-1
MTS-226	Materials and Manufacturing Processes	3-0
MTS-231	Actuating Systems	3-1
	Total	**14+4**

Semester-V

Course Code	Course Title	Credits
MATH-361	Probability & Statistics	3-0
MTS-311	Microcontroller and Embedded Systems	2-2

Semester-VI

Course Code	Course Title	Credits
MATH-351	Numerical Methods	3-0
XX-XX	Engineering Elective I	3-0

MTS-322	Design of Machine Elements	3-0	MTS-315	Mechatronics System Design	2-2
MTS-336	Instrumentation and Measurements	3-1	ME-319	Theory of Machines	2-0
EE-231	Signals and Systems	3-0	OTM-455	Engineering Project Management	2-0
ECO-130	Engineering Economics	2-0	M&S-321	Modeling and Simulation	2-1
	Total	**16+3**		**Total**	**14+3**

Semester-VII

Course Code	Course Title	Credits
MTS-417	Introduction to Robotics	3-1
XX-XX	Engineering Elective II	3-0
EE-379	Linear Control Systems	3-1
MGT-271	Entrepreneurship	2-0
MTS-499	Senior Design Project I	0-2
HU-222	Professional Ethics	2-0
	Total	**13+4**

Semester-VIII

Course Code	Course Title	Credits
XX-XX	Elective III	3-0
ME-407	Fluid Mechanics	2-1
MTS-499	Senior Design Project II	0-4
MTS-419	Manufacturing Automation	2-1
	Total	**107+30=137**

* ENGR-100 (1-0) and CSL-401 (0-2) are not counted towards CGPA calculation.

List of Electives

Course Code	Course Title	Credits
EE-484	Elect Instrumentation	3-0
EE-370	Digital Control Systems	3-0
EE-470	Fuzzy Logic	3-0
MTS-418	Applied Robotics	3-0
ME-450	Laser and its Applications	3-0
MGT-174	Elements of Business	3-0
MTS-337	Industrial Electronics	2-1
EE-333	Digital Image Processing	3-0
ME-464	Renewable Energy Technologies	3-0
ME-446	Computer Aided Engineering	1-2
EC-335	Digital Signal Processing	3-0
MTS-415	Special Topics in Mechatronics	3-0
ME-439	Internal Combustion Engine	3-0
ME-443	Automotive Technology	2-1
MTS-444	Mechatronics Modeling for Automotive Systems	3-0
ME-483	Power Train Systems	3-0
ME-421	Mechanical Vibrations	3-0
EE-418	Electro Optics and IR	3-0
ME-462	Power Plant Engineering	3-0

MS and PhD in Mechatronics Engineering

Mechatronics engineering blends the disciplines of mechanical, electrical and software engineering around the principles of control systems and automation. Mechatronics engineers create and work with systems that have various degrees of automation, which are increasingly becoming common such as robots and automobiles. The Masters / PhD programme in the department combines in-depth technical knowledge required to work in this fast-changing discipline with broader aspects of engineering. The programme is strongly influenced by industrial perspectives and has state-of-the-art facilities, which includes equipment related to Robotics, Manufacturing, Machine Vision, Embedded Systems Labs, Brain Controlled Interface and Prosthetics.

Although the discipline of Mechatronics Engineering is relatively new in Pakistan, yet it has been able to successfully integrate with the demands of major main stream industry. In the industrial sector employers are looking for specialized skill set and their perception of these expertise are directly gauged from the courses that are studied by a particular applicant in his Master's degree. Moreover, majority of mechatronics related indigenous as well as international jobs are available under the umbrella of Robotics, Automation, Smart Systems, Autonomous Systems, Bio-Medical/Bio-Engineering, Machine Vision and Instrumentation. Therefore, in order to allow the student to align his/her interest with the industry the department has introduced number of relevant specializations/streams which include:

» **Robotics and Industrial Automation:** Robotics and Industrial Automation are the hallmark areas of specialization for mechatronics engineers. Whether operating a small company or a big business, there are a number of robotic component solutions available for performing a large number of different functions and the industry in Pakistan is now beginning to take cognizance of this fact. In addition, presently there are a number of highly specialized companies that are fully geared up to provide complete end to end automation solutions to major local industries (e.g., the Oil & Gas industry, Cement Industry, Sports Goods Industry, etc.).

» **Smart ElectroMechanical Systems:** Smart Electromechanical Systems is the technology of the future. It encompasses systems and devices that collect information over sensors, make independent decisions based upon this information, then act upon it in a suitable manner. Security aspects, reliability, miniaturization, energy consumption and intelligent data processing, all play a critical role in smart systems. To find successful solutions, it is therefore necessary to consider the smart system and its environment as an entire strategy. Therefore the field of smart systems is essential in the industry since it allows systems to make independent decisions regarding maintenance and make intelligent reactions to sensor data which is the focus of research in most industrially developed nations.

» **Biomechatronics:** Biomechatronics is an applied interdisciplinary science that aims to integrate mechanical elements, electronics with parts of biological organisms. Biomechatronics includes the aspects of biology, mechanics, and electronics. It enhances the fields of robotics and neuroscience towards prosthetics, brain-controlled devices and human machine interaction. Industrial applications of the technology include the development of improved prosthesis, bio-sensors and artificial muscles, which represents technologies of the future.

Why join this program?

This programme enables graduates to acquire training in the theory and practice of a broad range of industrially relevant topics within the fields of Mechatronics Engineering. It is designed specifically to meet the needs of the modern engineer both in industry and in research or education establishments. One of the foremost and most popular programme of studies, offered by almost all leading universities in the world, is specialization in the field of robotics and automation. Another widely accepted and dominant area of industrial research is the field of Smart Electromechanical Systems, which is used in a very wide cross-section of industrial systems in different domains. Finally, Biomechatronics is the latest emerging technology that is based on the principles of mechatronics engineering.The department of Mechatronics Engineering has taken cognizance of the latest trends and after completion of the MS programme our students will be able to make substantial contributions in all the above mentioned focus areas in the academic as well as industrial sector.

MS/PhD Coursework

Students will be required to take a total of eight courses in each stream. Out of these eight courses the students will have to take the specified four core courses (same for all streams) and chose four elective courses that will be offered in each semester. The scheme of studies including the Core and Elective courses with credit hours for each specialization is given below:

Core Courses (Common for all Streams)

Course Code	Course Title	Credits
MTS-800	Advanced Robotics I	3
MTS-840	Data Acquisition and Control	3
MTS-811	Image Processing for Intelligent Systems	3
MTS-841	Advanced Embedded Systems	3
MTS-899	**MS Thesis**	**6**

Elective Courses MS

Robotics and Industrial Automation

MTS-804	Motion Planning for Mobile Robots	3
MTS-820	Advanced Manufacturing Design Techniques	3
MTS-812	Machine Vision	3
MTS-801	Advanced Robotics II	3
CE-804	Machine Learning	3
MTS-851	Precision Manufacturing Systems	3
ME-801	Optimization of Engineering Systems	3
MTS-857	Micro-Manufacturing Systems and Technology	3
MTS-822	Industrial Control Technology	3
EE-873	Fuzzy Control	3
EE-872	Optimal Control	3
MTS-805	Kinematics of Mobile Robotic Systems	3
MTS-809	Cognitive Robotics	3
MTS-817	Computational Geometry	3
EE-871	Linear Control Systems	3
MTS-852	Advanced Measurement Techniques	3
ME-853	Manufacturing System Design	3
ME-854	Computer Integrated Manufacturing	3
EE-879	Robust Control	3
EE-874	Adaptive Control	3
EE-875	Discrete Time Control Systems	3
DME-827	Special Topics in Manufacturing Engineering	3
DME-823	Advanced Manufacturing Technologies	3
EE-818	Micro-Electro Mechanical Systems	3
ME-858	Laser Material Processing	3
ME-852	Rapid Prototyping, Tooling and Automation	3
RIME-852	Digital Control Systems	3
EE-877	Mobile Robotics	3
EE-838	Filtering & Tracking	3
SE-896	Research Methodologies	3
EM-843	Advanced Research Methods	3
ME-831	Computational Fluid Dynamics – I	3
BMES-813	Biomedical Instrumentation	3

Smart Electromechanical Systems

Course Code	Course Title	Credits
MTS-810	Artificial Intelligence	3
MTS-813	Paradigms of Artificial Intelligence	3
EE-871	Linear Control Systems	3
EE-818	Micro-Electro Mechanical Systems	3
ME-815	Advanced Modelling and Simulation	3
MTS-843	Sensor and Sensing Technology	3
MTS-845	Real Time Systems	3
MTS-842	Programming of Embedded Systems	3
CSE-801	Artificial Neural Networks	3
BMES-813	Bio Medical Instrumentation	3
EC-802	Pattern Recognition and Analysis	3
MTS-863	Optomechatronic Systems	3
MTS-846	Fuzzy Logic Hybrid Systems	3
MTS-818	Natural Language Processing	3
MTS-858	Smart Materials and Structures	3
EE-891	Stochastic Systems	3
EE-808	Digital Integrated Circuit Design	3
SE-896	Research Methodologies	3
EM-843	Advanced Research Methods	3
ME-831	Computational Fluid Dynamics – I	3
BMES-813	Biomedical Instrumentation	3

Biomechatronics

BMES-813	Bio Medical Instrumentation	3
MTS-862	Biomedical Clinical Information Systems	3
SE-808	Bio-Informatics Systems	3
BMES-811	Signals and Images in Medicine	3
BMES-832	Biomechanics	3
BME-833	Prosthetics and Rehabilitation	3
BMES-815	Biosensors and instrumentation	3
BME-822	Selected Topics in Biomedical Engineering	3
BMES-812	Medical Devices Design and Standards	3
EE-871	Linear Control Systems	3

SE-804	Machine Learning	3
MTS-860	Human Machine Interaction	3
BMES-812	Advance Bio Materials	3
ME-802	Finite Element Methods	3
CSE-805	Introduction to Modelling and Analysis	3
CE-866	Advanced Digital Signal Processing	3

PhD Courses

MTS-951	Micro and Nano Fabrication	3
MTS-961	Photonic Devices	3
EE-902	Nano-Electronics	3
EE-970	Advanced Robotics	3
EE-991	Detection and Estimation	3
EE-977	Non-Linear Control Systems	3
EE-979	Selected Topics in Control Systems	3
DME-931	Advances in Manufacturing Technologies	3
DME-932	Rapid Prototyping and Manufacturing	3
DME-934	Advanced Information Systems for Manufacturing	3
BMES-932	Image and Vision Computing in Medicine	3
BMES-934	Advanced Bio-signal Processing	3
BMES-941	Advances in Biomedical Materials	3
BMES-951	BioNanotechnology	3
CSE-888	Computational Modelling of Physiological Systems	3
SE-896	Research Methodologies	3
EM-843	Advanced Research Methods	3
ME-831	Computational Fluid Dynamics – I	3
BMES-813	Biomedical Instrumentation	3
Additional Course		
RM-898	Research Methodology	2

BMES-813	Biomedical Instrumentation	3
RIME-922	Microfluidics and BioMEMS	3
RIME-913	Robotic Manipulation	3
RIME-914	Robot Motion Planning	3
RIME-916	Special Topics for PhD programme (Robotics)	3
RIME-923	Special Topics for PhD programme (Mechatronics)	3
RIME-934	Special Topics for PhD programme (Artificial Intelligence)	3
RIME-943	Special Topics for PhD program(Machine Vision)	3
RIME-955	Special Topics for PhD programme (Control Systems)	3
PhD Thesis		
MTS-999	**PhD Thesis**	**30**

*All the level-8 approved courses of MS in Mechatronics Engineering may also be opted during PhD in Mechatronics Engineering Program.


TORSION TESTING

MS and PhD in Engineering Management

Engineering graduates of any discipline have to be adequately prepared to shoulder the responsibilities of technical leadership positions in today's technology driven organizations. The engineers, so prepared, are the ultimate candidates for the positions of Chief Executive Officer (CEO), Chief Operating Officers (COOs), Chief Technical Officers (CTOs), and other Technical Management positions in technically oriented industrial and service organizations. Their services are utilized by national public enterprise and defense organizations along with international firms to conduct their functions efficiently and effectively.

Today's fast moving technical organizations in industrial and service sectors require technical personnel having knowledge of hard core engineering disciplines as well as management skills necessary to steer the organization to success.

Department of Engineering Management at the College of E&ME provide an opportunity to graduate engineers to prepare themselves with latest principles and techniques of management of a technical enterprise through MS and PhD programmes.

Why join this program?

This programme enables graduates to acquire management skills in the fundamentals of their chosen engineering branch. It is designed specially to meet the needs of modern engineer both in industry and academic establishment with research projects. It is an interdisciplinary and flexible programme with a focus on application, global awareness, and the engineering/management experience. After completion of this course, the students will be able to analyze and plan various engineering projects in more efficient and cost-effective ways.

MS Coursework

Programme Code: 356

Core Courses

Course Code	Course Title	Credits
EM-801	Project Management	3
EM-811	Quality Engineering	3
EM-812	Design, Patents, Contract and Legal Engineering	3
EM-821	Engineering Ergonomic and Work Study	3
EM-822	Production System Design and Analysis	3
EM-823	Facility Planning and Layout	3
EM-899	**MS Thesis**	**6**

Elective Courses (Any Two)

Course Code	Course Title	Credits
EM-802	Operation Management	3
EM-803	Advanced Practices in Engineering Management	3
EM-804	Technology Management	3
EM-824	Production Planning and Control	3
EM-831	Environmental and Safety Management	3
EM-841	Simulation Modeling	3
EM-842	Industrial Costing Management	3
EM-843	Advanced Research Methods	3
EM-809	Management of Technical Organizations	3
EM-806	Operational Research	3
EM-807	Problem Solving and Decision Making in Engineering Organizations	3
EM-813	Contract Management	3
EM-814	Human Resource Management	3
EM-815	Financial Management	3
EM-816	Strategic Management	3

Course Code	Course Title	Credits
EM-825	Productivity Management	3
EM-826	Supply Chain Management	3
EM-827	Innovation & New Product Management	3
EM-828	Time Management	3
EM-829	Maintenance Management	3
EM-832	Risk and Crisis Management	3
EM-833	Energy Resources Management	3
EM-834	Waste Management	3
EM-844	Marketing of Technology and Industrial Products	3
EM-845	Engineering Optimization Management	3
EM-846	Probability & Statistics for Engineers	3
EM-847	e–Management	3
EM-999	**PhD Thesis**	**30**

Additional Course

RM-898	Research Methodology	2

Faculty Profiles

Dr Masood Raza, Head of Department
Cranfield University, UK
Discipline: Engineering Management
Specialization: AI, Operation Research, Modeling & Simulation

Dr Syed Tasweer Hussain Shah, Associate Head of Department
PhD (NUML) Pakistan
Discipline: Management
Specialisation: Service Quality, Entrepreneurship, HR, Project Mgmt, Strategic Mgmt

Dr Faheem Qaisar Jamal
PhD (UET Taxila) Pakistan
Discipline: Engineering Management
Specialisation: Organizational Behaviour, Organizational Change, Organizational Psychology, Human Resource Management, Supply Chain Management, Project Management

Dr Yasir Ahmad
PhD (UET Taxila) Pakistan
Discipline: Engineering Management
Specialisation: Engineering Management, Strategic Management and Technology Management

Dr Syed Muhammad Ali
PhD (Management Science & Business Administration), USTC China
Discipline: Engineering Management
Specialisation : Employees Behavior, Knowledge Management & HRM

Dr Afshan Naseem
PhD (UET, Taxila) Pakistan
Discipline: Engineering Management
Specialisation: Engg & Technology Management

Engr. Ali Salman
MS (University of Surrey), UK
Discipline: Engineering Management
Specialisation: Manufacturing Management

PAKISTAN NAVY ENGINEERING COLLEGE (PNEC) KARACHI

Pakistan Navy Engineering College

Pakistan Navy Engineering College (PNEC) is the only constituent college of National University of Sciences & Technology (NUST) at Karachi. The history of PNEC is more than five decades old. Initially in 1962 it was established as Officer Training School at PNS KARSAZ. it became part of NUST in 1996.Since then PNEC-NUST is making all out efforts to provide best engineering education to its students in different disciplines.

The mission of the college is to pursue excellence in education and lifelong learning through highly qualified faculty and dynamic curriculum. PNEC is committed to prepare student's professional as well as ethical values for a career with wide ranging opportunities in production, R&D, management and solutions related to the future technological challenges.

Programmes

Undergraduate

- Mechanical Engineering (with option to choose electives from industrial & Manufacturing Engineering)
- Electrical Engineering
- BS (Management Information Systems) For Service Officers only

MS

- Mechanical Engineering (with specialization in Thermal Power and Fluids Engineering and Computational Mechanics)
- Electrical Engineering (with specialization in Control and Communication).
- Manufacturing Engineering & Management
- Naval Architecture

PhD

- Electrical Engineering
- Mechanical Engineering
- Manufacturing Engineering & Management

Fact file

It is the only constituent College of NUST in the southern region. All army officers of the Corps of Mechanical and Electrical engineers studied in PNEC till late eighties.

Faculty Profile

Electronic & Power Engineering

Dr Attaullah Memon (HoD)
PhD (Michigan State University) USA
Discipline: Electrical Engineering
Specialization: Non Linear Systems, Control and Automation

Dr Tariq Mairaj Rasool Khan
PhD (Michigan State University) USA
Discipline: Electrical Engineering
Specialization: Non- Destructive Testing

Dr Syed Sajjad Haider Zaidi
PhD (Michigan State University) USA
Discipline: Electrical Engineering
Specialization: Power Engineering

Dr Adeel Yusuf
PhD (Georgia Institute of Technology) USA
Discipline: Electrical Engineering
Specialization: Machine Learning

Dr Hammad Raza
PhD (Michjgan state university) USA
Discipline: Computer Engineering
Specialization: Computer Vision

Dr Aleem Mushtaq
PhD (Georgia Institute of Technology) USA
Discipline: Electrical Engineering
Specialization: Signal Processing

Dr Ali Hanzala Khan
Post-doctoral: Software Engineering
PhD (Software Engineering) Finland
Discipline: Computer Engineering
Specialization: Software Engineering

Dr Arshad Aziz
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Information Security, Configurable Computing

Dr Khawaja Bilal Ahmed Mahmood
PhD (University of Bristol) UK
Discipline: Electrical Engineering
Specialization: Optical RF & Telecom

Dr Bilal Muhammad Khan
PhD (University of Suxxes) UK
Discipline: Electrical Engineering
Specialization: Wireless Sensor Networks

Dr Naeem Abbas
PhD (Ecole Normale Superieure) France
Discipline: Electrical Engineering
Specialization: Informatics

Dr Syed Nazeer Alam
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Wireless Communication/ Ionosphere communication

Dr Dur-e-Shahwar
PhD (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Cryptography/FPGA

Engr Lubna Moin
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Control Engineering

Engr Riaz Mahmud
MS (Naval Postgraduate School) USA
Discipline: Electrical Engineering
Specialization: Communication Engineering

Engr Ashraf Yahya
MS (NED University) Pakistan
Discipline: Electrical Engineering
Specialization: Power Engineering

Mr Abdul Samiah
MS (PAF-KIET) Pakistan
Discipline: Computer Science
Specialization: Computer Networking

Amir Bader Shah
BE (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: System Engg Managment

Engr Ikram Rasool Qureshi
MS (University of Revada Reno) USA
Discipline: Electronic Engineering
Specialization: Digital Electronic Systems

Engr M Farhan Khan
MS (NED University) Pakistan
Discipline: Electrical Engineering
Specialization: Communication Engineering

Engr Najeeb Iqbal
MS (Hamdard University) Pakistan
Discipline: Electronic Engineering
Specialization: Digital Electronic Systems

Engr Nawshad Aziz
MS (NED University) Pakistan
Discipline: Electrical Engineering
Specialization: Telecom. Engineering

Engr Muhammad Usman
MS (Nottingham Trent University) UK
Discipline: Electrical Engineering
Specialization: Engineering Management

Muhammad Samiullah Awan
MS (Iqra University) Pakistan
Discipline: Computer Science
Specialization: Artificial Intelligence

Engr Sajid Saleem
MS (KTH Sweden)
Discipline: Computer Engineering
Specialization: Information Security

Engr Rashida Ali Memon
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Communication

Engr Ahsan Ashfaq
MS (North China Electric Power University)
Discipline: Electrical Engineering
Specialization: Power System Automation

Muhammad Mustaqeem
MS (PAF KIET), Pakistan
Discipline: Electronic Engineering
Specialization: Telecom and Networks

Engr M Armoghan Khan
MS (North China Electric Power University) China
Discipline: Electrical Engineering
Specialization: Power

Mr Mukhtar Ahmed
MS (Indus University) Pakistan
Discipline: Electrical Engineering
Specialization: Power Distribution

Mr Muhammad Afzal
MS (Indus University) Pakistan
Discipline: Electrical Engineering
Specialization: Power Distribution

Mubashir Tariq
MS (University of Sunder Land) UK
Discipline: Electrical Engineering
Specialization: Computer Networks

Engr Zeeshan Ahmed
BE,GCE University Faisalabad
Discipline: Electrical
Specialization: Telecom

Engr Nusrat Hussain
MS (NED University) Pakistan
Discipline: Electrical Engineering
Specialization: Electrical Power System

Furqan Shafi
MS (NUST) Pakistan

Discipline: Electrical Engineering
Specialization: Control Engineering

Engr Akif Nadeem
MS (North China Electic Power University) China
Discipline: Electrical Engineering
Specialization: Electical Power System

Mr Liaquat Ali Khan
MCS (NUST) Pakistan
Discipline: Computer Systems
Specialization: Computer Systems

Engr Sajid Mehmood
MS (Bahria University) Pakistan
Discipline: Electrical Engineering
Specialization: Power System

Mechanical Engineering

Engr Yasir Ikram (HoD)
MS (WoU) Australia
Discipline: Mechanical Engineering
Specialization: Engineering Practices

Engr Tauqeer Ahmed Khawaja TI(M)
MS (NUST) Pakistan
Discipline: Mechanical Engineering
Specialization: Thermo Fluid

Dr Asif Mansoor
MS (NUST University) Pakistan
Discipline: Computational Mathematics
Specialization: CFD / Predictive Model & Optimization

Dr Khurram Kamal
PhD (Longhorogh University) UK
Discipline: Mechanical Engineering
Specialization: Artificial Intelligence/ML, Intelligent Machines, Embedded information. Health Monitoring / Machine Vis

Dr Tahir Ratlamwala
PhD (University of Ontario Institute of Technology) Canada
Discipline: Mechanical Engineering
Specialization: Renewable Energy
Desalination Absorption Coating / Heating

Engr Muhammad Shakeel
MS (NED University) Pakistan
Discipline: Mechanical Engineering
Specialization: Applied Mechanics

Engr Khurram Jamal Hashmi
MS (University of Minnesota) USA
Discipline: Mechanical Engineering
Specialization: Applied Thermodynamics

Engr Saeed Ahmed
MS Design & Manuf (Concordia University) Canada
MS Metallurgy (NED University) Karachi
Discipline: Mechanical Engineering
Specialization: Metallurgy, Design & Manufacturing

Engr Syed Muhammad Tayyab
MS (NUST University) Pakistan
Discipline: Mechanical Engineering
Specialization: Thermal Power & Fluid Engineering

Engr Syed Javed Hassan Bukhari
MS (Massachusetts Intitute of Technology)
Discipline: Mechanical Engineering
Specialization: Thermal System Design and Optimization

Engr Zia uddin Siddiqi
MS (NED University) Pakistan
Discipline: Mechanical Engineering
Specialization: Nuclear Power

Engr Naeem Raza
MS (NUST University) Pakistan
Discipline: Mechanical Engineering
Specialization: Thermal Fluids

Engr Talish Mahmood
BE (UET University Lahore) Pakistan
Discipline: Mechanical Engineering
Specialization: Mechanical Engineering

Engr Sidra Zahid
MS, (NUST), Karachi
Discipline: Mechanical Engineering
Specialization: Adv. Fluid Mechanics

Engr Abdul Wahab
MS Newcastle, UK
Discipline: Mechanical Engineering
Specialization: Renewable Energy

Engr Verdah Abid Hussain
BE (NED), Karachi
Discipline: Mechanical Engineering
Specialization: Mechanical Engineering

Engr Qaisar Khan
MS (NUST) Pakistan
Discipline: Mechanical Engineering
Specialization: Manufacturing & Engineering Management

Engr Iftikhar Ahmad
BE (NUST) Pakistan
Discipline: Mechanical Engineering
Specialization: Mechanical Engineering

Engr Verdah Abid Hussain
BE (NED University) Pakistan
Discipline: Mechanical Engineering
Specialization: Mechanical Engineering

Engr Muhmmad Sufiyan
ME (NED University) Pakistan
Discipline: Mechanical Engineering
Specialization: Design Engineering

Engr Arif Hussain
BE (Balochistan University of Engineering & Technology, Khuzdar) Pakistan
Discipline: Mechanical Engineering
Specialization: Mechanical Engineering

Engr Hassan Raza
BE (MUET,SZAB Campus Khairpur Mir's) Pakistan
Discipline: Mechanical Engineering
Specialization: Mechanical Engineering

Management Information Systems

Dr Muhammad Junaid SI(M)
PhD (NUST) Pakistan
Discipline: Information Security
Specialization: Information Security

Dr Akbar Ali Awan HoD
PhD (University of Karachi) Pakistan
Discipline: Management & Administrative Sciences
Specialization: HRM

Uzma Khalid
MCS from National Institute of Information Technology (NIIT) Islamabad
Discipline: Computer Science
Specialization: Software

Ayesha Saleem
MBA (Bahauddin Zakiriya University) Multan
Discipline: Management Sciences
Specialization: Finance

Waqas Ahmad Hayat
BE (NUST-PNEC) Pakistan
Discipline: Computer Science
Specialization: Networking

Mr Ubiadullah Saleem
MS (University of Hertfordshire)
Discipline: Electronic Engineering
Specialization: Telecom ,IT

Mr Syed Muhammad Adil
MBA (Virtual University)
Discipline: Management Sciences
Specialization: IHRM Marketing

Amena Zafar
BS (SW Engg) (Bahria University) Pakistan
Discipline: Computer Science
Specialization: Software

Dr Zeeshan Riaz
PhD (University College London) UK
Discipline: Naval Architecture
Specialization: Marine Hydrodynamics

Nabila Hassan
M.Phil (Iqra University, Karachi) Pakistan
Discipline: Management Sciences
Specialization: Marketing

Dr Aqueel Shah
PhD (UET Lahore) Pakistan
Discipline: Manufacturing
Specialization: Non-Traditional Machining (WEMD)

Dr Novera Ansar
PhD (University of Karachi) Pakistan
Discipline: Management Sciences
Specialization: Management

Industrial & Manufacturing Engineering

Dr M Saeed Khalid SI(M) (HOD)
PhD (University of Michigan (UOM))USA
Discipline: Naval Architecture & Marine Engineering
Specialization: Hydrodynamic and rigid body dynamic

Dr Salman Nisar
PhD (The University of Manchester) UK
Discipline: Manufacturing Engineering
Specialization: Laser Processing of Materials

Dr Asim Ali Khawaja
PhD (National University) Australia
Discipline: Computer Science & Engineering
Specialization: Computer Vision

Engr Syed Ali Hassan
MS: (NUS) Singapore
Discipline: Industrial & Systems Engineering Specialization: Industrial & Systems Engineering

Engr Nosheen Khushnood
MS (NED University) Pakistan
Discipline: Industrial & Manufacturing Engineering
Specialization: Manufacturing Engineering

Engr Eylia Abbas Jaffri
MS (NED University) Pakistan
Discipline: Industrial & Manufacturing Engineering
Specialization: Quality Management

Basic Sciences & Humanities

Mr Abdul Rehman TI(M) (HoD)
MSc (Peshawar University) Pakistan
Discipline: Mathematics
Specialization: Mathematics

Dr Gul e Hina Aslam
PhD (NUST) Pakistan
Discipline: Mathematics
Specialization: Pure Mathematics

Mr Tariq Abbas Shah
MA Linguistic (University of Karachi), Literature (Uni of Punjab)
Discipline: English
Specialization: Literature and Linguistics

Mr Muhammad Saeed
M. Phil Physics (Karachi University) Pakistan
Discipline: Physics
Specialization: Solid state Physics & Group theory (Discrete)

Ms Hina Irum
M.Sc (GC University) Lahore
Discipline: Mathematics
Specialization: Applied Mathematics

Ms Nadia Masroor
M.Sc (Govt Postgraduate College) Karachi
Discipline: Mathematics
Specialization: Applied Mathematics

Mr Tariq Abbas Shah
M.A English (Punjab University) Pakistan
Discipline: English
Specialization: Literature& Linguistics

Mr Zafar Ali
M Sc (University of Karachi) Pakistan
Discipline: Statistics
Specialization: Statistics

Ms Madiha Aziz
MSc (Bahauddin Zakariya University) Pakistan
Discipline: Statistics
Specialization: Statistics

Ms Somia Aslam
MA (National University of Modern Languages) Islamabad
Discipline: English
Specialization: Language and Literature

Humera Sabir
M.Sc (University of Karachi) Pakistan
Discipline: Physics
Specialization: Electronics

Ms Madiha Aziz
MSc (Bahauddin Zakariya University) Pakistan
Discipline: Statistics
Specialization: Statistic

Mr M Absar Ahmed
M Phil (Karachi University) Pakistan
Discipline: Mathematics
Specialization: Applied Mathematics

Ms Syeda Nabeela Hussain
M Phil (Iqra University, Karachi) Pakistan
Discipline: Management Sciences
Specialization: Service Marketing

Mr M Saqib Nauman
M Sc (Karachi University) Pakistan
Discipline: Mathematics
Specialization: Pure Mathematics

Research and Development

Research and Development Department of PNEC aims to perform quality research using a combination of metrics focused on researchers, research outputs, Industrial collaboration, and applied measures. PNEC has the honor of achieving approval of maximum research proposals sent to different national and international funding agencies. A few ongoing research projects are listed below:

- Structural health monitoring of bridge structures using wireless sensor networks funded by HEC
- Development of health monitoring systems for distribution of transformer using non-intrusive and intrusive methods funded by HEC
- Advanced Metering Infrastructure and customer side system (AMICS) funded by National ICT R&D Fund
- Prediction of remaining useful life (RUL) of Aerial Bundled Cables (ABCs) funded by IGNITE

Researchers are conducting world-class research across a broad range of fields, including such diverse areas as underwater research facility, robotics, non-destructive testing etc. Lists of major Research laboratories at PNEC include.

- Robotics and Dynamic Systems Research Lab
- Non-Destructive Testing Lab
- Advance Video Analytics Lab
- Power Research Lab
- Embedded System Research Lab
- Wind Tunnel Lab
- Intelligent System Lab

Student Support Facilities

Laboratories and Workshops

- Applied Mechanics Laboratory
- Fluid Mechanics Laboratory
- Control Engineering – PLCs Laboratory
- Thermodynamics Laboratory
- Composite Materials Laboratory
- Electrical Engineering Laboratory
- Radar and Microwave Engineering Laboratory
- Microprocessor Laboratory
- Power Electronics Laboratory
- Communication Engineering Laboratory
- Computer Integrated Manufacturing Laboratory
- Robotics and Automation Laboratory
- Advance CAD Laboratory
- Materials Testing Laboratory
- Heat Treatment Laboratory
- Innovative Product Development Laboratory
- Work and Methods Study Lab
- CADAM Center
- Machine Shop
- Boiler shop
- Welding shop
- Applied Chemistry Laboratory
- Applied Physics Laboratory
- High Performance Computing Laboratory
- Digital Signal Processing Laboratory
- Electronics – DSP – IC Laboratory
- PCB Design and Development Laboratory
- Material Science & Engineering Laboratory
- Fitting Shop
- UG Research Laboratory

Internet

Internet is available round-the-clock, in all labs and offices, through a comprehensive Local Area Network with a fiber optics backbone link for fast connectivity. The entire College is networked with a common internet facility of 135 MB bandwidth. The internet facility is also available to students' hostel.

Video Conferencing

The College has hi-tech video conferencing technology through PERN Video conferencing setup thus facilitating the students to attend live delivery of lectures by eminent scholars worldwide.

Library

The college library remains open round-the clock prier one month of exams. PNEC library is also connected to Pakistan Education and Research Network (PERN).From this facility library members can access thousands of research papers, research articles, E-books, E-journals and all, E-Recourses available in HEC Digital library. NUST-PNEC Library has 30000 books in the field of engineering, computer science, Applied Science and Humanities, The library book is catalogue are arranged through KOHA (ILS) Library software since 2014 and all circulation (checkout and check in) of books is done by barcode reader and also online public access catalogue (OPAC) is also available for PNEC Library users. In addition 21000 E-Books, 734 project reports, 359 MS thesis, 1851 CDs/DVDs, 450 HEC Digital Library articles (softcopies) and 12 local and international magazines are available in NUST-PNEC Library.

Text books are available in Book Bank section, which are issued the under graduate student for the whole semester. Continues acquisition of the latest editions of books in various engineering disciplines is made to meet the teaching and research needs of students and faculty members

Transport

Pick and drop services to students is provided.

Cafeterias

The College cafeteria provides hygienic food and operate throughout the day from where students can purchase refreshments.

Counselling

PNEC students are divided into small groups of approximately 35 students in each group. Each group is supervised by a Course Officer (faculty member). These officers liaise with each other to guide and counsel students. They also update parents about their wards performances regularly. In addition, a team

of Center for Career Counselling and Advisory (C3A) from NUST Islamabad regularly visit & guide the student for Career Counselling

Accommodation & Allied Facilities

Separate hostel accommodation is available for male and female students within the College premises. These hostels are capacious and can accommodate a large number of male and female students.

These hostels have dedicated dining facilities. Besides, the College has a vast range of indoor and outdoor sports facilities, a students' cafeteria, a mosque, and a dispensary, which provides medical services round-the-clock with a permanently posted medical officer and the necessary paramedical staff.

Employability

PNEC has a Directorate of NUST Student Affairs (DNSA) which looks after the employability with up-to-date data. PNEC alumni, acting as its ambassadors, contributing in different leading engineering firms and organizations such as:

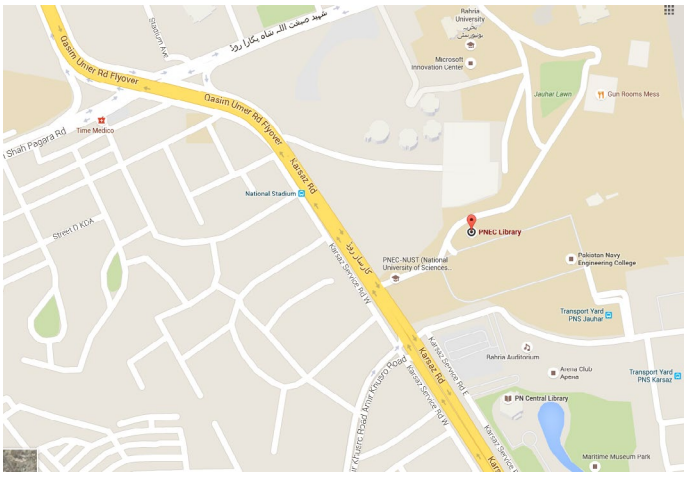
- SUPARCO
- SHELL
- ENGRO
- LOTTE Chemical Pvt Ltd
- POWER CHINA
- PTCL
- K-ELECTRIC
- HINOPAK MOTORS LTD
- ATLAS Honda

The active member list is continuously increasing, with members contributing positively and constructively by helping out through internships and placements.

Contact Us

The College is located on Habib Ibrahim Rehmatullah Road, off Shahra-e-Faisal, in Karachi. It is approximately seven kilometers away from the City Center and Quaid-e-Azam International Airport.

Location Map



Contacts

Commandant	commandant@pnec.nust.edu.pk	+92-21-99240152 / +92-21-48503001
Deputy Commandant	dc@pnec.nust.edu.pk	+92-21-48503021
Registrar	registrar@pnec.nust.edu.pk	+92-21-48503215
Dean Electronics and Power Engineering	depe@pnec.nust.edu.pk	+92-21-99245093 / +92-21-48503024
Dean Engineering Sciences	des@pnec.nust.edu.pk	+92-21-99245084 / +92-21-48503023
Dean Industrial & Manufacturing Engineering	dime@pnec.nust.edu.pk	+92-21-992400751 / +92-21-48503039
Dean Management Information Systems	dmis@pnec.nust.edu.pk	+92-21-48503216
Dean Applied Sciences	das@pnec.nust.edu.pk	+92-21.99245095 / +92-21-48503022
Training Commander	trgcdr@pnec.nust.edu.pk	+92-21-48503253
Staff Officer NUST Affairs	sona@pnec.nust.edu.pk	+92-21-99240113 / +92-21-48503043
Director Student Affairs (DSA)	dir-sa@pnec.nust.edu.pk	+92-21-48503029 / +92-21-48503096
Director Quality Assurance (DQA)	qmd@pnec.nust.edu.pk	+92-21-48503035
Fax	+92-21 99240112	
Website	www.pnec.nust.edu.pk	

PNEC AUTOMOBILE CLUB

"TEAM PNEC NUST RAISES GREEN FLAG AMONGST 120 TEAMS FROM ASIA"

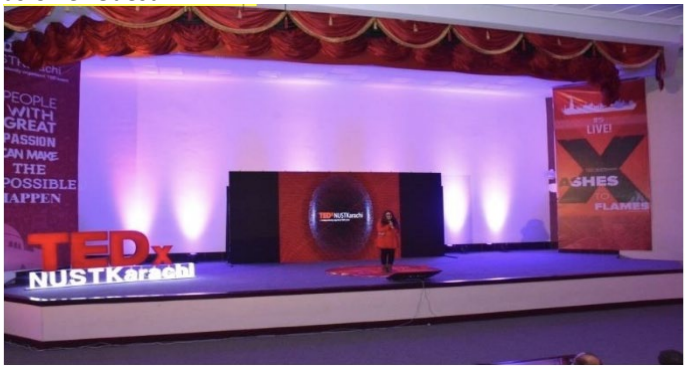
PNEC Automobile Club is a vibrant and dynamic body three major steam automobiles are being developed in the campus, Shell Eco Marathon, NUST Formula Racing and FERN.

Shell Eco Marathon Asia (SEMA) is a unique competition that challenges students around the world to design, build and drive the most energy efficient cars. This unique platform not only endows the student to groom their engineering skills but also develops understanding for present and future fuel efficiency solutions for the automobiles. Team NUST-PNEC has regularly been participating in this event since 2009 and has received accolades for their engineering acumen and skills. It is worth highlighting that this year Team NUST-PNEC manufactured the 1st ever vehicle from Pakistan in CNG category.

NUST-PNEC team participated in Shell Eco Marathon Asia-2017 (SEMA-2017) held in Singapore from 15 to 20 March 2017 with 02x cars in 'URBAN (Fuel) and PROTO Type (CNG)' categories. A total of 120 cars from different countries of Asia participated in the event, NUST-PNEC team won Communication Award amongst 120 cars in the competition carrying prize money of USD 3000.00. It is worth highlighting that this was the only award won by any participating Pakistani team in the competition.

TEDx NUST Karachi

TEDx NUST Karachi is an initiative of students at PNEC-NUST. TEDx celebrates locally-driven ideas and elevates them to a global platform. Built on the belief that ideas are uniquely powerful in shaping our future, TED has grown to support those world-changing ideas with many initiatives. Hence, the intellectual environment at every TEDx event is truly inspiring, ensuring a rich and stimulating exchange of ideas. Dr Ismail Shah, Chairman Pakistan Telecom Authority graced the occasion as Chief Guest.



PNEC WINS GLOBAL CLEANTECH COMPETITION ON NATIONAL LEVEL

Beating the competitions is what we inculcate in our students at NUST PNEC. NUST PNEC, PhD student, Mr Umar Talha won UNIDO GEF, Global Cleantech Innovation Programme - Pakistan with start-up idea Gen.Ro.CT= Generic Radiation Optimized CT (Computed Tomography) based on his PhD thesis with a prize money of 20000 USD and 15 days training in Silicon Valley, USA. Mr Umar Talha is doing his PhD Thesis under Assistant Professor Dr Tariq Mairaj Rasool Khan at NUST PNEC, Karachi. Along with this, undergraduate students from Electrical Engineering Department at NUST PNEC - Mr Saad Abdullah, Ms Maria Fatima Haris, Mr Shaharyar Shafiq and Mr Ali Sheikh, added the pride in the institution's name by competing at global competition organized by United Nations partnering with Silicon Valley, with the objective to foster innovations in Renewable Energy, Energy Efficiency, Water Efficiency, Waste to Energy and Green Building called "Global Cleantech Innovation Competition" with their project "Infinity Light – A Clean Renewable Free Lighting Solution" which made to the top 10 teams from a pool of more than 500 teams with a prize money of Rs 0.16M.

GREEN COMPETITION 2017

Green Competition is ASHRAE PNEC, NUST Student Branch's signature event. The fourth edition of the event was conducted on Saturday 25 February 2017 at Jauhar Auditorium, NUST PNEC Karachi. Teams from all over Karachi took part in the event. The event was divided into two categories: Green Building and Green Innovation.

Green Building Competition required participants to plan and design a structure following ASHRAE standards. It was a tough task but team Evergreen emerged victorious.

Green Innovation Competition dealt with new, inventive ideas that promoted eco-friendliness. The project is based mainly on the principles of toner ablation using the science of electrostatics and lasers.
The event was judged by Mr Khalid Iqbal (Head, Student Activities), Mr Mahmood ul Haq (Secretary and BOG member), and Mr Akbar Zaheer (Elected President and BOG member) from ASHRAE Pakistan and Dr Nazeer Alam, Dr Durr-e- shehwar, Mr Abdul Wahab and Mr Faran Razi from the faculty of NUST-PNEC, Karachi.

PNEC Students Stood Regional Finalists at Hult Prize in China

The Hult Prize Foundation is a start-up accelerator for budding young social entrepreneurs emerging from the world's universities. With a different theme every year, in 2017 with the theme of helping refugees was held in Shanghai, China from 03-05 March 2017. PNEC Student team comprising of 04 students competed against world class teams and stood Regional Finalists for presenting the idea of vertical farming to the refugees in Turkish Region.

NUST PNEC Projects Winning at FICS

Since 2013, Finding Innovative & Creative Solutions for Society (FICS) has been established as a platform where NUST students can serve communities around them by applying their technical knowledge. It is designed to encourage NUST students to get actively involved in social problem identification, and think innovatively to devise technology-based solutions. The aim of this initiative is to instill a spirit of social entrepreneurship amongst students, encouraging them to convert their creative ideas into value-adding solutions and thereby benefit themselves and society.

This year 205 ideas were submitted from 13 NUST Schools, Colleges and Institutions out of which – 52 teams were selected to participate in Final Stage on May 25, 2017.
From NUST PNEC, 04 teams made to Final Stage out of which 02 teams made to top 10 teams.

- Wis-Vis (1st Runner Up)
- Automatic Load Balancing (Top 10 Teams)
- Battery Health Monitoring
- Smart Meter

NUST PNEC team "WIs-vis" stood the runner up along with prize money of Rs. 100,000/-.

Education and Community Service Society NUST PNEC Spends A Day with the Elders at Dar ul Sukoon

Education and Community Service Society (ECSS-PNEC) has always tried to bring forth the social issues and work for the welfare of the society. Continuing the legacy, on 26th August 2017 ECSS organized a visit to Dar ul Sakoon which is a home for elderly who are living away from their families in Karachi. A team of 25 enthusiastic students from NUST PNEC departed for the old home with high spirits to spend their day with elders. On their special request (Old Home Elders), team brought along their favorite Korma and naan. After serving the lunch students spent some quality time, seeking guidance and learning from their experiences. Several activities were carried out including games, playing piano, singing, painting and story-telling. With many joyous and beautiful memories, it was time to head back. The main objective of this trip was to interact with people and spend time with them as a family.

NUST PNEC 19th Open House and Projects Exhibition 2017

NUST PNEC Career Development Centre along with team members from various departments and student society IMechE organized the 19th NUST PNEC Open House and Projects Exhibition 2017 on Thursday May 18, 2017 in which 51 Final Year Projects by graduating students from Mechanical, Electrical and Industrial and Manufacturing Engineering were displayed. The objective of the event was to provide an opportunity for the industrial experts to interact first hand with our graduates from different disciplines in order to facilitate the hiring process. Various participating leading companies from multiple industries including FMCG, engineering, education, engineering institutions, development sector and information and technology, from all over Pakistan were provided an effective platform for industry-university interaction along with that the industry representatives were provided with an opportunity to acquaint themselves with the academic environment provided to the students of NUST PNEC.
This event provided an excellent platform for networking and

a vast range of career opportunities for NUST PNEC students as well as a recruitment station for employers to both market their company and select prospective candidates. The event was a huge success with an overwhelmingly positive feedback received from both the recruiters and the students themselves.

Innovation Edge

Innovation EDGE (Explore, Develop, Grow and Engage) was a two-day organized from 21-22 October 2017 by "Alumni and Industrial Relations (AIR)" society which covered various aspects of internship training exercises. This included interactive workshops and seminars by well-reputed trainers and NUST Alumni, along with innovation challenge competitions.

TECHFEST 2017

IEEE NUST PNEC Student Branch organized Techfest'17 from 18-19 February 2017- A programming contest to bring together talented Engineering students from throughout Karachi to compete in a spirit of knowledge. The contest tested their programming skills and problem solving abilities.

NUST PNEC High Achievers Ceremony

NUST PNEC is committed to excellence, not only on producing highly intellectuals in terms of education but also encourages and supports students in co-curricular and extra-curricular activities that serves as a catalyst for students' success in a rigorous learning environment that make our students display dynamic literary, creative, innovative and artistic abilities and aptitude for attaining goals and distinctions in co-curricular activities as a priority alongside, academic excellence.

NUST PNEC High Achievers Award Ceremony was held on Friday, January 13, 2017, at Jauhar Auditorium, NUST PNEC. Lt Gen (Retd) Naveed Zaman HI(M), Rector NUST, graced the occasion as chief guest.

29th Convocation PNEC

To commemorate the academic accomplishments of students, 29th Convocation of the Pakistan Navy Engineering College (PNEC), a constituent college of National University of Sciences and Technology (NUST) was held on 29 November 2017 at Bahria Auditorium Karachi. Admiral Zafar Mahmood Abbasi NI(M), Chief of the Naval Staff was the Chief Guest. 342 undergraduates and post graduates were awarded degrees in their respective disciplines. A total of 26 medals were awarded to the high performers in various categories. Moreover, certificates to faculty for Best Researcher and Best Teacher
were also awarded as per following details:

-**Best Researcher** Dr Bilal Muhammad Khan
-**Best Teacher** Capt Dr Syed Sajjad Haider Zaidi PN
-**Best in Academics** 10 President Gold Medals
-**Best Graduating Officer of Course** 03 CNS Gold Medals
-**2nd Best Graduating Officer** 07 Chancellor Silver Medals
-**Best Projects (Discipline-wise)** 06 Rector Gold Medals

33rd IEEEP Student Seminar

PNEC Team secured Gold Medal Position at 33rd IEEEP Student Seminar held on 08 February 2018, for the research paper and project titled 'Development and Designing of Algorithm for Intrusive fault analysis of Electrical Machines using FPGA'. The project was led by Capt Dr Sajjad Haider Zaidi PN and the group members included Sheikh Talha, Shahyan Adil, Shariq Waqar and M.TalhaJavaid.

ECSS Blood Drive 2018- 22 Nov 2018

Education and Community Service Society (ECSS) of PNEC has always focused on contributing to the society and in making the world a better place. ECSS conducted the Blood Drive in collaboration with The Indus Hospital Blood Centre twice in the College premises. More than 150 NUST students put their best foot forward and donated blood for the noble cause. The participants included NUST civilian students, Naval officers, Allied officers and university staff. The blood collected was used to aid cancer patients.

Visit to Edhi Orphanage House

The ECSS visited the children at Edhi Orphanage House on 26 October 2018 where the team interacted with the youngster and took part in recreational activities. Keeping the goal of society in mind, children were entertained and involved in a variety of indoor and outdoor sports. The day was spent in spreading smiles and sharing many lights moments with the charming kids.

Formula Electric Racing - NUST PNEC 2018

The Formula Electric Racing Car 2018 was unveiled by Rector NUST Lieutenant General Naweed Zaman, HI (M), (R)

HILTI IT

PNEC students from Electrical Engineering– Mr Danish Ahmad, Mr Muhammad Mughal and Ms Zenab Junaid represented Pakistan in Malaysia by competing in 'HILTI IT Competition 2018' as team "The Automatons" held from 26-29 March 2018. Team presented an industrial model application of Project "Sensorless Machine Control" and made it to the top finalists of the completion. The team has been offered internships leading to a permanent placement within the company.

Competition Participation Report

IMechE UAS Challenge

NUST Air Works is a formidable assemblage of Mechanical, Electrical and Manufacturing engineering students. Originally a concise team of four freshmen has now proliferated in number, due to its immense success in domestic events since its inception in 2016.

The following are the team's local achievements:

- 1st Position National Engineering Robotics Competition (NERC) 2017 (Game of Drones).
- 2Grand Champions Propellair 2017
- Best Aircraft in Electrical category Propellair 2016
- Runners Up in Aerial Escapade 2017

About the Competition:

The IMechE UAS challenge is an annual event hosted by Institution of Mechanical Engineers, where students from undergraduate to post graduate level engage in design, construction, development and demonstration of an autonomous Unmanned Aerial System (UAS) from different universities across the globe. This year, the competition gave the students a real world scenario where their drone had to perform disaster relief activities in a flooded area. The drone was required to be operated fully autonomously and was required to drop maximum number of food packages accurately in the first mission.

In the second mission, the drone was again required to be fully autonomous, but this time the drone had to survey a pre-defined area to look for distress signals. The distress signals were placed as small targets on the ground and the drone had to find the coordinates of those signals and send it back to the ground station using Image detection.

Team NUST Air Works Participation:

The following students from the team participated in the event:

- Ahsan Ahmed Khan, Semester VI, Mechanical Engineering.
- Muhammad Rashad Reyaz, Semester V, Mechanical Engineering.
- Muhammad Faizan Khan, Semester V, Mechanical Engineering.
- Syed Hassan Danish, Semester VI, Industrial & Manufacturing Engineering.
- Minhaj Haider, Semester VI, Electrical Engineering.
- Abdul Samad, Semester VI, Electrical Engineering.
- Zain-ul-Mustafa, Semester VI, Electrical Engineering.
- Fahad Iftikhar, Semester VI, Electrical Engineering.
- Eraj Navaid, Semester VI, Electrical Engineering.
- Munnaza Iqbal, Semester VI, Electrical Engineering.

About the Drone:

The team named their drone "Halcyon". The following are the specification and capabilities of halcyon:

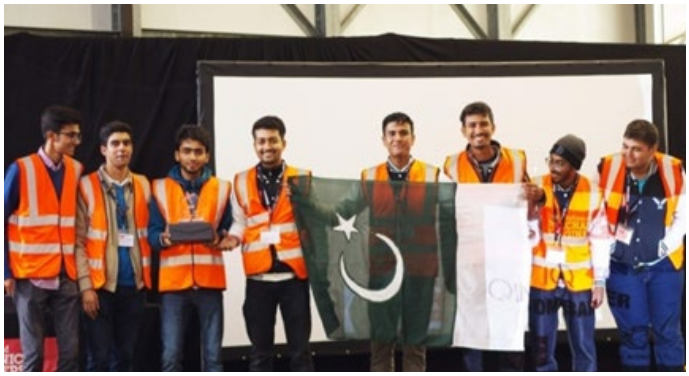
- Ribbed Wooden Structure with carbon fiber core and landing gear
- Wingspan of almost 8ft (2.5m)
- Payload Capacity of 2 kg
- Flight time up to 1 hour (if payload is exchanged with additional batteries)
- Weather proof (tested in sandy , dry, cold and rainy conditions)
- Reconnaissance capabilities
- Wireless transmission of GPS coordinates back to the ground station if life signs are detected

Achievements:

Team NUST Air Works was able to clear the technical inspection on the first day and was one of the only two teams which were able to test their Drone in rough weather.

The following are the achievements of the team:

- Highest Placed New Entrant Award: The team secured the highest position among the new entrants of the competition and was placed higher than many other previous participants.
- Media Engagement Award: The team partnered with Mc Donald's Pakistan for making a motivational and awareness video about drones and the team's journey which got 0.85 million views and also engaged with different schools for drone workshop.
- Most Professional Flight Readiness Video: NUST Air Works made the best flight readiness video highlighting the features of the aircraft in the technical report submission.
- Special Mention in Award Ceremony for Modular Design: The team was able to carry the drone in their checked in Luggage and their design was appreciated by the judges.



NUST CAREER FAIR 2018

NUST Career Fair 2018 was organized on 20 April 2018 at Pakistan Navy Engineering College (PNEC) – NUST Karachi Campus; an event for all 18 NUST schools and colleges to engage the industry extensively in Karachi – an industrial hub of the country. In order to strengthen NUST and industry terms in the areas of jobs and internships for the NUST graduates and students respectively.

The event was attended by leading industries and academia in Karachi. Lt General Naweed Zaman HI(M) graced the occasion as Chief Guest and start the ceremony with the inauguration ceremony of Pakistan's first Formula Electric Racing Car, designed and manufactured by PNEC students.

PNEC 20th OPEN HOUSE & PROJECTS DISPLAY 2018 HELD ON 10 MAY 2018

PNEC annually organizes Open House/Projects Display at the end of spring semester to display the projects of engineering deliberation conceived by students as their Final Year Projects (FYP) under the mentoring of faculty members and industry advisors. The event is a platform to strengthen the industry and university relation through providing a forum of common interest to both the industries as well as University. GM (Engg) Karachi Port Trust, Rear Admiral Sajid Wazir Khan HI(M) graced the event as Chief Guest. A total 67 projects were displayed from Mechanical, Electrical, Industrial & Manufacturing Engineering and Management Information System Departments. The event was attended by 45 different industries/organizations in Karachi.

PNEC Sports Olympiad 2018

NUST Career Fair 2018 was organized on 20 April 2018 at Pakistan Navy Engineering College (PNEC) – NUST Karachi Campus; an event for all 18 NUST schools and colleges to engage the industry extensively in Karachi – an industrial hub of the country. In order to strengthen NUST and industry terms in the areas of jobs and internships for the NUST graduates and students respectively.

The event was attended by leading industries and academia in Karachi. Lt General Naweed Zaman HI(M) graced the occasion as Chief Guest and start the ceremony with the inauguration ceremony of Pakistan's first Formula Electric Racing Car, designed and manufactured by PNEC students.

NUST PNEC TEAM – SEMA 2018

PNEC Team participated in SEMA-2018 in Singapore and secured overall 1st position in three Communications Challenges held prior to the event amongst 130 teams. Team PNEC NUST also secured 2nd position in Technical Innovation. Moreover its prototype battery electric car successfully secured 12th position amongst 130 teams with a mileage of 103 Km/KWh.

This year Team PNEC-NUST participated in Prototype Electric & Urban ICE Categories as well.

Prototype Battery Electric Category

A total of 26 teams participated in this category, however, only 16 cars managed to perform on track including 02 from Pakistan. It is pertinent to mention that Team NUST-PNEC was the Best Mileage Car from Pakistan in any category with a mileage of 103 Km/kWh. Moreover, the car secured 1st position in Proto Electric Category from Pakistan and had an overall ranking of 12th in Asia. It is further highlighted that it was the1st car to clear the safety and technical inspection from Pakistan in the 1st attempt.

Urban ICE

A total of 37 teams participated, however, 29 teams cleared the technical inspection including 03 from Pakistan i.e NUST-PNEC, NUSTAG and Team DHA Suffa. The team won the Commendation Award for Technical Innovation at SEMA-2018 and was the only car selected as official flag bearer of Pakistan in this year's event.

SPACE GIRLS, SPACE WOMEN: SPACE THROUGH THE EYES OF THE WOMEN

Consulate of Italy in Karachi in collaboration with Pakistan Navy Engineering College (PNEC) – NUST Karachi Campus and ASI (AgenziaSpazialeItaliana) organized an international photographic exhibition "Space Girls, Space Women; Space through the eyes of the women" to meet the girls who have their heads in the stars, female students passionate about space, and women who are today at the heart of the space adventure. The event was hosted for the very first time in Pakistan.

The event showcased the broad range of opportunities in the space sector with portraits of females who have been contributing to the space adventure with their daily work. Along with this, Pakistan Space Science Education Centre (PSSEC) set up Space Science Exhibition where students were engaged in space related activities like simulated surface of Mars, rovers, virtual reality (VR) experience of surface of moon, rocket launching experiments, and making of balloon cars.

TechFest'18

IEEE NUST PNEC Student Branch organized TechFest'18 on 24th and 25th of November 2018. A programming contest to bring together talented Engineering students from throughout Karachi to compete in a spirit of Knowledge.TechFest'18 was divided into 4 modules, Speed Programming, Robotics, E Gaming and Circuit Designing to test the programming skills and problem solving abilities of contest. The event was a resounding success.

NUST- PNEC TEAM PARTICIPATION IN 9TH ANNUAL HULT PRIZE REGIONAL FINAL – LONDON

Hult Prize is largest social entrepreneurship competition which provides an excellent platform to all college and university students to present their ideas that can potentially address some of the most pressing global issues such as food, security, water access, energy, and education. This year, teams were challenged to "harness the power of energy to transform the lives of 10 million people by 2025". Furthermore, this competition provides an opportunity to the participants to win 1 M million USD to launch their start-up.

In the first stage of competition, a team of 04 x undergraduate students from PNEC presented their idea "Wheelo", an electric powered wheel at the campus finals at NUST H-12 on 18 Dec 17. Wheelo is a detachable and easy-to-replace model E-bike module for a bicycle. It serves to revolutionize the mode of transportation for general public who use motorbikes for their daily life routine. It provides a greener and sustainable substitute to reduce the carbon footprint of our world. The team Wheelo was crowned the winner among 183 teams from all over Pakistan.

For the next stage, the PNEC Team "Wheelo" travelled to London to participate in the 9th Annual Hult Prize Regional Finals held on 9th – 10th March 2018. The first day of the competition featured a networking session which allowed teams to interact with each other and discuss their ideas. Wheelo's idea was very well received and highly complemented by other teams. It also featured a mentoring session with highly accomplished entrepreneurs which provided some valuable advice to teams from their decades of experience. On the second day of the competition, after some final words of motivation from the CEO of Hult Prize, Ahmad Ashkar, the pitching commenced at the Hult International Business School. A total of 50 teams present for the competition were divided into 6 rooms where they pitched their ideas in front panels of highly esteemed judges from various industrial sectors such as DorotheeD'Herde from McKinsey & Company and Steven Andrews from NewLight Africa. The best team from each room was selected for the next round which was conducted at the Christ Church Spitalfields where the top 6 teams were asked to take the stage once more and pitch their startup in front of the entire panel of judges and participants. Wheelo had the honor of being named one of the top 6 teams, the only team in the list from all over Asia. Wheelo's idea once again received high praise from the judges with special emphasis on the team's technical proficiency.
At the conclusion of the event, teams from University of Oxford and University College London were crowned the co-champions and qualified for the next round. Wheelo had the privilege of being ranked third. Despite not being able to win the competition, the team holds great pride in the fact that it managed to triumph over teams from most of the top universities from all over the world. The competition has proven to be an instrumental learning experience for the team.

UNILEVER TALENT HUNT – ACHIEVEMENT OF NUST-PNEC STUDENTS

Unilever Talent Hunt is a case-based marketing competition organized annually in Pakistan to give University students exposure to real-world industry problems of some of the world's largest brands. This exposure is bolstered as the winning team represents Unilever Pakistan globally at Future Leader's League, held in London, thereby connecting with young leaders from around the world and the individuals leading Unilever globally.

This year, 1300+ students from various institutes across Pakistan participated in the contest where they presented their marketing ideas matched with their respective cases. A total of 13 teams were shortlisted via a rigorous screening procedure for the semi-finals which took place in Karachi. The semi-finalists were further judged on the basis of their big idea, presentation skills and practicality in approach, selecting only 6 teams as finalists.

The Finale which took place in Avari Towers, Karachi on January 31, 2018 hosted teams from NUST Islamabad (NBS), NUST Karachi (PNEC), LUMS, IBA and LSE. A team of Mechanical Engineers namely Farrukh Aqil, Ali Asher Kazmi and Usama Noor from NUST-PNEC won the competition with their business idea of "Ready to eat Knorr noodles". The team has been granted fast track entry to the Discovery Centre round of Unilever Future Leader Programme. Team-PNEC participated in the the Future Leaders' League Global Finals, London hosted by Unilever held from 18 to 20 April 2018.

Academic Programmes

Bachelors in Electrical Engineering

Programme Description

The programme is designed to meet the dictates of modern trends in the field of electrical technology, encompassing a wider technological perspective. The programme includes basic sciences and humanities courses, electrical and microwave technology, electronics, signal processing, control systems, communications, microprocessor and computer courses, with the final semester specifically emphasising power generation, transmission, distribution and protection. The element of electrical power enables the graduate engineer to effectively take on his/her job in the power generation and distribution sector. With a significant design element of 6 credit hours for project work, students are able to apply their theoretical knowledge in research and developmental activities.

Associated Careers

Electrical Engineering at NUST opens up numerous career paths for graduates. Students holding this degree have access to various opportunities to commence their careers as design engineers, production managers, plant engineers, and quality engineers for various private/government engineering organisations.

Scheme of Studies

Programme Code: 401

Semester-I

Course Code	Course Title	Credits
MATH-101	Calculus & Analytical Geometry	3-0
HU-100	English	2-0
HU-107	Pakistan Studies	2-0
CH-109	Applied Chemistry	2-0
PHY-102	Applied Physics	2-1
CS-114	Fundamentals of Programming	2-1
ME-105	Workshop Practice	0-1
ME-105	Workshop Practice	0-1
	Total	**13+3=16**

Semester-II

Course Code	Course Title	Credits
MATH-121	Linear Algebra & ODEs	3-0
ME-221	Engineering Materials	3-0
ME-113	Engineering Mechanics-I: Statics	3-0
HU-101	Islamic Studies	2-0
HU-109	Communication Skills	2-0
ME-109	Engineering Drawing	0-2
MATH-121	Linear Algebra & ODEs	3-0
ME-130	**Thermodynamics-I**	**3-0**
	Total	**15+2=15**

Semester-III

Course Code	Course Title	Credits
MATH-232	Complex Variables and Transforms	3-0
ME-230	Fluid Mechanics-I	3-0
ME-130	Thermodynamics-I	3-0
ME-114	Engineering Mechanics-II: Dynamics	3-0
EE-103	Electrical Engineering	2-1
ME-223	Advanced Workshop Practice	**1-1**
ME-211	Computer Aided Drawing	**0-1**
ME-115	Engineering Mechanics Lab	**0-1**
CSL-401	Community Service Learning	**0-2***
	Total:	**15+4=19**

Semester-IV

Course Code	Course Title	Credits
MATH-351	Numerical Methods	3-0
ME-210	Mechanics of Materials-I	3-0
ME-330	Fluid Mechanics-II	3-0
ME-231	Thermodynamics-II	3-0
EE-227	Electronics Engineering	2-1
HU-212	Technical and Business Writing	2-0
ME-337	Fluid Mechanics Lab	0-1
ME-232	**Thermodynamics Lab**	**0-1**
	Total:	**16+3=19**

Semester – V

Course Code	Course Title	Credits
ME-218	Machine Design-I	3-0
ME-212	Mechanics of Materials-II	3-0
ME-331	Heat & Mass Transfer	3-0

Semester – VI

Course Code	Course Title	Credits
ME-310	Mechanics of Machines	3-0
ME-327	Instrumentation and Measurement	2-1
ME-320	Machine Design-II	2-0

ME-322	Manufacturing Processes	3-1	MATH-361	Probability & Statistics	3-0
ME-325	Engineering Economics	2-0	XXX-000	Technical Elective-1	2-0
ME-216	Mechanics of Materials Lab	0-1	ME-326	Heating, Ventilating and Air Conditioning	**3-0**
ME-339	Control Engineering	2-1	ME-332	Heat Transfer and HVAC Lab	**0-1**
	Total	**16+3=19**	CSL-401	Community Service Learning	0-2*
				Total	**15-2=17+2***

Semester – VII

Course Code	Course Title	Credits
MGT-271	Entrepreneurship	2-0
ME-411	Introduction to Finite Element Analysis	2-1
ME-421	Mechanical Vibrations	3-0
ME-433	Mechanisms and Mechanical Vibrations Lab	0-1
XXX-000	Technical Elective-2	2-0
ME-430	Power Plants	3-0
ME-499	Final Year Project-1	0-3
	Total	**12+5=17**

Semester – VIII

Course Code	Course Title	Credits
HU-222	Professional Ethics	2-0
ME-420	Project Management (Management Elective)	2-0
ME-424	Health, Safety and Environment	1-0
XXX-000	Technical Elective-3	2-0
ME-439	Internal Combustion Engines	3-0
ME-431	IC Engines & Power Plants Lab	0-1
ME-498	Internship (Pass/Fail basis)	-
ME-499	Final Year Project-II	0-3
	Total	**10+4=14**
	Grand Total	**136+2***

Electives

Course Code	Course Title	Credits
ME-401	Fundamentals of Aerodynamics	2-0
ME-408	Applied Heat Transfer	2-0
ME-409	Applied Thermodynamics	2-0
ME-412	Automotive Technology	2-0
ME-413	Basic Naval Architecture	2-0
ME-414	Computational Fluid Dynamics	2-0
ME-415	Computer Aided Engineering	1-1
ME-416	Computer Aided Thermal System Design	1-1
ME-424	Introduction to Oil and Natural Gas Engineering	2-0
ME-429	Laser & its applications	2-0
ME-438	Mechanical Engineering Design	2-0
ME-470	Marine Environment Issues	2-0
ME-471	Optimization Techniques	2-0
ME-473	Power Generation and Distribution	2-0
ME-474	Electrical Machines	2-0
ME-475	Energy Conversion and Power Electronics	2-0
ME-476	Engine Tribology	2-0
ME-477	FEM applications in Automobile	2-0
ME-478	Finite Element Methods	2-0
ME-479	Gas Dynamics	2-0
ME-484	Gas Turbines	2-0
ME-485	Fuel Cell Technology	2-0
ME-486	Power Plant Engineering	2-0
ME-487	Power System Analysis	2-0
ME-488	Renewable Energy Technologies	2-0
ME-489	Robotics and Automation	2-0
ME-490	Ship Propulsion Engineering	2-0
ME-491	Solar Energy Systems	2-0
ME-492	Vehicle Design Performance	2-0
ME-493	Production Tooling & Automation	2-0
ME-496	Vehicle Dynamics	2-0
ME-497	Advanced Engineering Design	2-0
ME-498	Power Train Systems	2-0
DME-480	Automotive Manufacturing Systems	2-0
DME-481	Computer Applications in Automobile Manufacturing	2-0
DME-482	Computer Applications in Manufacturing Systems	2-0
DME-483	Industrial Maintenance Management	2-0
DME-484	Logic Design & Micro-processors	2-0
DME-485	Logistics and Inventory Management	2-0
DME-486	Ergonomics, Work Study and Methods Engineering	2-0
DME-487	FEM applications in Manufacturing	2-0

M&S-402	Introduction to Modeling and Simulation	1-1
RIME-222	Introduction to Mechatronics Design Fundamentals	2-0
Management Electives		
ME-384	Operations Management	2-0
ME-427	Operations Research	2-0
ME-425	Total Quality Management	2-0
ME-428	Engineering Law	2-0

University Electives

Any course from any discipline can be opted by the student

MS and PhD in Electrical Engineering
(Specialization: Control Systems)

Specialisation Description

The aim of this advanced level programme is to develop a fundamental understanding of the advanced aspects of control engineering including modelling and analysis of dynamic system, studying stability and control aspects of linear and nonlinear dynamic systems and investigating the optimality and robustness of control algorithms applied to various engineering applications..

Associated Careers

The programme offers the opportunity for employment in the leading engineering industries of the world. Students successfully completing this postgraduate course may find employment as control engineers, design engineers, systems engineers or research and development engineers in leading research organizations and multi-national engineering firms based in Pakistan and abroad.

MS Coursework

Programme Code: 450

Semester – I

Core Courses

Course Code	Course Title	Credits
EE-871	Linear Control Systems	3
EE-831	Advanced Digital Signal Processing	3
EE-891	Stochastic Systems	3

Semester – II (Select any three courses)

Course Code	Course Title	Credits
EE-977	Nonliner Control Systems	3
EE-975	Robust & Multivariable Control	3
EE-972	Advanced Digital Control Systems	3
EE-829	Digital Data Acquisition & Control	3
EE-905	Advanced Electronics	3
EE-974	Networked & Embedded Control Systems	3
EE 832	Pattern Recognition	3
EE-855	Error Control Coding	3
RM-898	Research Methodology	2
EE-821	Advanced Embedded Systems Design	3
Total		**9**

Semester – III (Select any two elective courses)

EE- 823	Advanced Digital System Design	3
EE- 973	Control System Optimization	3
EE-979	Selected Topics in Control Systems	3
SE-807	Machine Learning	3
CS-867, CE-803	Computer Vision	3
EE-887	Network Switching & Routing	3
EE-833	DSP Hardware System Design	3
Total		**6**

Semester – IV

EE-899	MS Thesis	6
	Grand Total	**30**

MS and PhD in Electrical Engineering
(Specialisation: Communications)

Specialisation Description

The principle aim of this advanced level specialization is to develop a fundamental understanding of the advanced aspects of communications engineering, including modelling and analysis of communication systems, studying aspects of efficient and reliable transmission of data in communication networks and developing insight into evolution and challenges of next generation communication networks.

Associated Careers

This specialization offers the opportunity with leading telecommunication industries around the globe, intending to deploy and maintain different types of communication networks. Students successfully completing this postgraduate course may find employment as design engineers, system engineers or research and development engineers in any of the leading telecommunications companies in Pakistan or abroad.

Semester – I

Core Courses

Course Code	Course Title	Credits
EE- 831	Advanced Digital Signal Processing	3
EE- 891	Stochastic Systems	3
EE- 852	Information and Coding Theory	3
	Total	9

Semester – III (Select any two elective courses)

Course Code	Course Title	Credits
EE- 823	Advanced Digital System Design	3
EE- 853	Advanced Wireless Communication	3
EE- 846	RF Circuit Design	3
EE- 888	Advanced Computer Network Design & System Security	3
EE- 821	Advanced Embedded System Design	3
EE- 836	Advanced Digital Image Processing	3
EE- 851	Advanced Digital Communication Systems	3
CSE- 812	RF Communication System Design	3
EE-959	Selected Topics in Communication System	3
CS-867, CE-803	Computer Vision	3
EE-949	Selected Topics in Microwave Engineering	3
EE- 930	Spatial Array Processing	3
	Total	6

Semester – II (Select any three elective courses)

Course Code	Course Title	Credits
EE- 859	Performance Analysis of Communication Networks	3
EE- 837	Advanced Topics in Computer Vision and Image Processing	3
EE- 951	Radar Systems	3
EE-833	DSP Hardware System Design	3
EE-841	Electromagnetic Theory	3
EE 847	Microwave Networks & Passive Components	3
EE-946	Advance Antenna Theory and Design	3
EE-832	Pattern Recognition	3
EE-883	Wireless Sensor and Mesh Networks	3
EE-902	Nano-electronics	3
EE-898	Nanotechnology	3
RM-898	Research Methodology	2
	Total	**9**

Semester – IV

Course Code	Course Title	Credit Hours
EE- 899	MS Thesis	6
	Grand Total	**30**

Note: PhD students will complete additional requirements of 800/900 level coursework (18 credit hours) beyond their Masters degree, as recommended by the doctoral Guidance and Examination Committee.

PhD in Electrical Engineering
(Specialisation: Control Engineering)

Programme Description

The aim of this advanced level programme is to develop a fundamental understanding of the advanced aspects of control engineering including modeling and analysis of dynamic system, studying stability and control aspects of linear and nonlinear dynamic systems and investigating the optimality and robustness of control algorithms applied to various engineering applications.

Associated Careers

The programme offers the opportunity for employment in the leading engineering industries of the world. Students successfully completing this postgraduate course may find employment as control engineers, design engineers, systems engineers or research and development engineers in leading research organizations and multi-national engineering firms based in Pakistan and abroad.

PhD Course Details (Control Systems)

(any 06 courses be selected)		
Course Code	**Course Title**	**Credits**
EE-871	Linear Control Systems	3
EE-831	Advanced Digital Signal Processing	3
EE-891	Stochastic Systems	3
EE- 823	Advanced Digital System Design	3
EE-977	Nonlinear Control Systems	3
EE-875	Discreet Time Control System	
EE- 874	Adaptive Control	3
EE-873	Fuzzy Control	3
EE- 973	Control System Optimization	3
EE-974	Networked & Embedded Control Systems	3
	Total	**18**
EE-999	**PhD Thesis**	**30**

PhD in Electrical Engineering
(Specialisation: B: Communications)

Specialisation Description

The principle aim of this advanced level specialization is to develop a fundamental understanding of the advanced aspects of communications engineering, including modeling and analysis of communication systems, studying aspects of efficient and reliable transmission of data in communication networks and developing insight into evolution and challenges of next generation communication networks.

Important Courses

Analysis of Stochastic systems, Advanced Digital Signal Processing, Information Theory and Coding, Advanced Communication Networks, Advanced Digital System Design, Wireless Communication Network, Advanced Digital System Design, Wireless Communications, Wavelet based Image and Signal Processing, Optical Communication Systems, Advanced Topics in Communications and Signal Processing, RF/Miro-wave and Antennae Design, RF circuit design and Radar Systems.

Associated Careers

This specialization offers the opportunity with leading telecommunication industries around the globe, intending to deploy and maintain different types of communication networks. Students successfully completing this postgraduate course may find employment as design engineers, system engineers or research and development engineers in any of the leading telecommunications companies in Pakistan or abroad.

PhD Course Details (Communications)

(any 06 courses be selected)		
Course Code	**Course Title**	**Credits**
EE- 831	Advanced Digital Signal Processing	3
EE- 891	Stochastic Systems	3
EE- 852	Information and Coding Theory	3
CSE - 879	Network Performance Analysis	3
EE 883	Wireless Sensor and Mesh Networks	3
EE 847	Microwave Networls & Passive Components	3
EE 832	Pattern Recognition	3
EE-841	Electromagnetic Theory	3
EE- 823	Advanced Digital System Design	3
EE- 837	Advanced Topics in Computer Vision and Image Processing	3
EE- 853	Advance Wireless Communication	3
EE- 846	Microwave Photonics	3
EE- 888	Advanced Computer Network Design & System Security	3
EE- 821	Advanced Embedded System Design	3
EE- 851	Advanced Digital Communication Systems	3
CSE- 812	RF Communication System Design	3
EE- 930	Spatial Array Processing	3
	Total	**18**
EE-999	**PhD Thesis**	**30**

Bachelors in Mechanical Engineering

Programme Description

The undergraduate programme is designed to inculcate a comprehensive understanding of the fundamentals of design and analysis of structural mechanics, thermodynamics, fluid mechanics and properties of materials. It attempts to provide students with broad intellectual tools and skills, essential for professional practice as well as for continuing studies in all engineering specialties. This discipline largely includes concepts of metallurgy, heat treatments and welding/cutting/other Forms of workability on materials. In a nut-shell, it is the science of taking material from market and processing it to form useful items.

Associated Careers

Given the fact that mechanical engineering plays a vital role in almost all industries, career options are manifold. Graduates may seek careers as design engineers, production managers, plant engineers and quality engineers for various private or government engineering companies, consultancies and R&D organisations. Pakistan can benefit from this discipline, as manufacturing of spares is a regular activity at almost all of its repair and maintenance operations. This aspect also enhances the career outcomes for graduates of this program. What further adds to its appeal is the fact that it is one of the highest paid professions in developed economies of the world.

Scheme of Studies

Programme Code: 402

Semester-I

Course Code	Course Title	Credits
PHY-102	Applied Physics	2-1
MATH-105	Calculus & Vector Algebra	3-0
EC-102	Computer Systems & Programming	1-2
HU-100	English	2-0
ME-110	Engineering Drawing & Graphics	1-1
HU-101	Islamic Studies	2-0
	Total	**11-4**

Semester-II

Course Code	Course Title	Credits
MATH-121	Linear Algebra & ODEs	3-0
CH-101	Applied Chemistry	2-1
HU-107	Pakistan Studies	2-0
ME-111	Computer Aided Design	1-1
ME-121	Workshop Practice	1-2
ME-130	Thermodynamics-I	3-0
	Total	**12-4**

Semester-III

Course Code	Course Title	Credits
MATH-241	Vector Calculus & PDEs	3-0
HU-109	Communication Skills	2-0
ME-112	Engineering Statics	3-0
ME-220	Engineering Materials	3-0
ME-230	Fluid Mechanics – I	3-0
ME-236	Thermodynamics- II	3-1
	Total	**17-1**

Semester-IV

Course Code	Course Title	Credits
MATH-231	Fourier & Complex Analysis	3-0
EE-103	Electrical Engineering	2-1
ME-211	Mechanics of Materials-I	3-0
ME-233	Fluid Mechanics-II	3-1
ME-210	Engineering Dynamics	3-1
	Total	**14-3**

Semester-V

Course Code	Course Title	Credits
MATH-361	Probability & Statistics	3-0
ME-221	Manufacturing Processes	3-0
ME-310	Mechanics of Materials-II	3-1
ME-312	Measurement & Instrumentation	2-0
ME-323	Manufacturing Processes & Instrumentation Lab	0-1
EE-212	Basic Electronics	2-1
ME-324	Engineering Economics	2-0
	Total	**15-3**

Semester-VI

Course Code	Course Title	Credits
MATH-351	Numerical Methods	3-0
ME-420	Project Management	2-0
HU-212	Technical & Business Writing	2-0
ME-311	Machine Design	3-0
ME-313	Mechanics of Machines	2-1
ME-330	Heat & Mass Transfer	3-0
ME-331	Refrigeration & Air Conditioning	3-0
ME-332	Heat Transfer & HVAC Lab	0-1
	Total	**18-2**

Semester-VII

Course Code	Course Title	Credits
ME-314	Control Systems	3-0
ME-421	Mechanical Vibrations	3-0
ME-410	Vibrations & Controls Lab	0-1
ME-448	Internal Combustion Engines	2-1
XX-4XX	Elective – I	3-0
XX-4XX	Elective – II	3-0
ME-499	Final Year Project I	0-2
CSL-401	Community Service Learning (Satisfactory/Participated basis)	0-2*
	Total	**14-4**

Semester-VIII

Course Code	Course Title	Credits
MGT-271	Entrepreneurship	2-0
HU-222	Professional Ethics	2-0
XX-4XX	Elective –III	3-0
XX-4XX	Elective – IV	3-0
ME-499	Final Year Project II	0-4
ME-498	Internship (Pass/Fail basis)	
	Total	**10-4**

*CSL-401 (0-2) is not counted towards CGPA calculation.

Electives

Course Code	Course Title	Credits
ME-440	Fundamentals of Aerodynamics	3-0
ME-441	Applied Heat Transfer	2-1
ME-442	Applied Thermodynamics	3-0
ME-443	Automotive Technology	2-1
ME-444	Basic Naval Architecture	3-0
ME-445	Computational Fluid Dynamics	3-0
ME-446	Computer Aided Engineering	1-2
ME-447	Computer Aided Thermal System Design	2-1
ME-449	Introduction to Oil and Natural Gas Engineering	3-0
ME-450	Laser & its applications	3-0
ME-451	Marine Environment Issues	3-0
ME-452	Optimization Techniques	3-0
ME-453	Power Generation and Distribution	3-0
ME-454	Electrical Machines	3-0
ME-455	Energy Conversion and Power Electronics	3-0
ME-456	Engine Tribology	3-0
ME-457	FEM applications in Automobile	3-0
ME-458	Finite Element Methods	3-0
ME-459	Gas Dynamics	3-0
ME-460	Gas Turbines	3-0
ME-461	Fuel Cell Technology	3-0
ME-462	Power Plant Engineering	3-0
ME-463	Power System Analysis	3-0
ME-464	Renewable Energy Technologies	3-0
ME-465	Robotics and Automation	3-0
ME-466	Ship Propulsion Engineering	3-0
ME-467	Solar Energy Systems	3-0
ME-468	Vehicle Design Performance	3-0
ME-469	Production Tooling & Automation	2-1
M&S-401	Introduction to Modeling and Simulation	2-1
RIME-221	Introduction to Mechatronics Design Fundamentals	2-1
DME-470	Automotive Manufacturing Systems	3-0
DME-471	Computer Applications in Automobile Manufacturing	3-0
DME-472	Computer Applications in Manufacturing Systems	3-0
DME-473	Industrial Maintenance Management	3-0
DME-474	Logic Design & Micro-processors	2-1
DME-475	Logistics and Inventory Management	3-0
DME-476	Ergonomics, Work Study and Methods Engineering	3-0
DME-477	FEM applications in Manufacturing	3-0
CHN-101	Chinese Language Course	3-0

MS and PhD in Mechanical Engineering (Evening)

Programme Description

This programme offers two specializations, namely; thermal power engineering and thermo fluids engineering. Thermo fluid specialization is better suited to the students who are keen in pursuing research and academic careers. The curriculum is designed to ensure that graduates will develop analytical, computational and experimental methods to analyze heat and fluid flow systems for research applications. Thermal power specialization is designed specifically to meet the needs of the modern engineer in industry and educational institutions. This specialization will enable graduates to acquire knowledge of a broad range of industrially relevant topics within the fields of thermodynamics and fluid mechanics.

Associated Careers

Completion of this programme results in comprehensive knowledge of thermal power and thermo fluids engineering. They will enjoy strong adaptability in R&D organizations, industries and other establishments. Graduates can apply for career in academia and research in higher education schools, HVAC and thermal design companies/consulting firms, power plants, and many other establishments.

Programme Code: 451

MS Mechanical (Thermal Power & Fluid Engineering)

Semester – I

Core Courses

Course Code	Course Title	Credits
ME-882	Heat & Mass Transfer	3
ME-881	Advanced Fluid Mechanics	3
MATH-812	Advanced Engineering Mathematics	3
	Total	**9**

Semester – II

Select any Three elective courses

Course Code	Course Title	Credits
ME-831	Computational Fluid Dynamics-I	3
ME-885	Thermal Systems Design	3
ME-886	Power Plant Engineering	3
ME-887	Sustainable Energy Systems	3
ME-888	Radiation Heat Transfer	3
ME-889	Conduction Heat Transfer	3
	Total	**9**

Semester – III

Select any Two elective courses

Course Code	Course Title	Credits
ME-819	Instrumentation & Data Acquisition Systems	3
ME-802	Finite Element Methods	3
ME-890	Advanced Turbo Machinery	3
MEA-801	Fundamentals of Maintenance	3
MEA-803	Failure Analysis & Condition Based Maintenance	3
EM-843	Advanced Research Methods	3
	Total	**6**

Semester – IV

Course Code	Course Title	Credits
ME-899	MS Thesis	6
	Grand Total	30

MS Mechanical (Computational Mechanics)

Semester – I

Core Courses

Course Code	Course Title	Credits
MATH-812	Advanced Engineering Mathematics	3
ME-802	Finite Element Methods	3
ME-803	Continuum Mechanics	3
	Total	9

Semester – III

Select any Two elective courses

Course Code	Course Title	Credits
ME-836	Theory of Elasticity	3
ME-837	Nonlinear Dynamics	3
ME-820	Advanced Instrumentation and Experimental Methods	3
EM-843	Advanced Research Methods	3
ME-840	Computational Fluid Dynamics and Heat Transfer	3
ME-898	Special Topics	3
ME-841	Finite Element Analysis of Composite	3
	Total	6

Semester – II

Select any Three elective courses

Course Code	Course Title	Credits
ME-831	Computational Fluid Dynamics-I	3
ME-881	Advanced Fluid Mechanics	3
ME-817	Advanced Theory of Vibrations	3
ME-833	Computational Fluid Dynamics-II	3
ME-834	Fracture Mechanics	3
ME-835	Advanced Mechanics of Materials	3
ME-882	Heat & Mass Transfer	3
	Total	9

Semester – IV

Course Code	Course Title	Credits
ME-899	MS Thesis	6
	Grand Total	30

PhD in Mechanical Engineering
(Specialisation: Thermal Power and Fluid Engineering)

Programme Description

This programme offers two specializations, namely; thermal power engineering and thermo fluids engineering. Thermo fluid specialization is better suited to the students who are keen in pursuing research and academic careers. The curriculum is designed to ensure that graduates will develop analytical, computational and experimental methods to analyze heat and fluid flow systems for research applications. Thermal power specialization is designed specifically to meet the needs of the modern engineer in industry and educational institutions. This specialization will enable graduates to acquire knowledge of a broad range of industrially relevant topics within the fields of thermodynamics and fluid mechanics.

Important Courses

Advanced Head Transfer, Advanced Fluid Mechanics, Instrumentation, Measurements and Data Acquisition System, Computational Fluid Dynamics and Heat Transfer, Advanced Numerical Analysis, Thermal System Design, Advanced Refrigeration and Air Conditioning, Power Plant Engineering, Thermal System Design, Advanced Turbo Machinery, Internal Combustion Engines, Finite Element Method, Advanced Numerical Analysis, Fundamentals of Maintenance, Maintenance Planning and Control, Failure Analysis and Condition Based Maintenance, Computer Integrated Manufacturing, Quality and Reliability Management, Sustainable Energy Systems, Project Managements. In addition, apart from these courses other departments/university can also be selected with consent of PhD Supervisor.

Associated Careers

Completion of this programme results in comprehensive knowledge of thermal power and thermo fluids engineering. They will enjoy strong adaptability in R&D organizations, industries and other establishments. Graduates can apply for career in academia and research in higher education schools, HVAC and thermal design companies/consulting firms, power plants, and many other establishments.

PhD Course Details (Thermal Power and Fluid Engineering)

(any 06 courses be selected)		
Course Code	**Course Title**	**Credits**
ME-884	Convection Heat Transfer	3
ME-881	Advance Fluid Mechanics	3
MATH-812	Advance Engineering Mathematics	3
ME-831	Computational Fluid Dynamics-I	3
ME-885	Thermal Systems Design	3
ME-886	Power Plant Engineering	3
ME-887	Sustainable Energy Systems	3
ME-888	Radiation Heat Transfer	3
ME-889	Conduction Heat Transfer	3
ME-819	Instrumentation & Data Acquisition Systems	3
ME-802	Finite Element Methods	3
ME-890	Advance Turbo Machinery	3
MEA-801	Fundamentals of Maintenance	3
MEA-803	Failure Analysis & Condition Based Maintenance	3
ME-898	Special Topics	3
	Total	**18**
ME-999	**PhD Thesis**	**30**

PhD in Mechanical Engineering
(Specialisation: Computational Mechanics)

Programme Description

This course offers specializations in Computational Mechanics. Computational Mechanics specialization is better suited to the students who are keen in pursuing research and academic careers. The curriculum is designed to ensure that graduates will develop analytical, computational and experimental methods to analyse fluid flow systems for research applications. Computational Mechanics specialisation is designed specifically to meet the needs of the modern engineer in industry and educational institutions. This specialization will enable graduates to acquire knowledge of a broad range of industrially relevant topics within the fields of thermodynamics and fluid mechanics.

Important Courses

Advanced Engineering Mathematics, Finite Element Methods, Continuum Mechanics and Advanced Fluid Mechanics, Computational Fluid Dynamics and Heat Transfer, Advanced Numerical Analysis and Thermal System Design.

Associated Careers

Completion of this programme results in comprehensive knowledge of thermal power and thermo fluids engineering. They will enjoy strong adaptability in R&D organizations, industries and other establishments. Graduates can apply for career in academia and research in higher education schools and many other establishments.

PhD Course Details (Computational Mechanics)

(any 06 courses be selected)		
Course Code	**Course Title**	**Credits**
MATH-812	Advance Engineering Mathematics	3
ME-802	Finite Element Methods	3
ME-803	Continuum Mechanics	3
ME-831	Computational Fluid Dynamics-I	3
ME-881	Advanced Fluid Mechanics	3
ME-817	Advanced Theory of Vibrations	3
ME-833	Computational Fluid Dynamics-II	3
ME-834	Fracture Mechanics	3
ME-835	Advanced Mechanics of Materials	3
ME-882	Heat and Mass Transfer	3
ME-836	Theory of Elasticity	3
ME-837	Nonlinear Dynamics	3
ME-839	Advanced Finite Elements Analysis	3
ME-820	Advanced Instrumentation and Experimental Methods	3
EM-843	Advanced Research Methods	3
ME-840	Computational Fluid Dynamics and Heat Transfer	3
ME-898	Special Topics	3
	Total	**18**
ME-999	**PhD Thesis**	**30**

MS and PhD in Manufacturing Engineering and Management

Programme Description

This programme is designated to equip engineers with latest development, along with developing their managerial acumen. This is an applied programme with state-of-art manufacturing laboratories available for the students. The programme has been tailored keeping industry requirement in view.

Associated Careers

The programme has a management perspective, thus it offers broad career opportunities for students. With the high ranking NUST enjoys in the country and around the world, this programme is an ideal launching pad for an engineer's career. This market-driven course opens a multitude of opportunities for engineers besides the canonical jobs. The development of managerial strengths in graduates enables them to meet tough market demands and provides them with stronger and more realistic growth opportunities in their professional careers.

Coursework

Programme Code: 454

Core Courses

Course Code	Course Title	Credits
MEM-802	Production and Manufacturing Processes	3
MEM-803	Productional and Operations Management	3
MEM-804	Computer Integrated Manufacturing	3
MEM-899	**MS Thesis**	**6**

Elective Courses Stream wise

Manufacturing Engineering

Course Code	Course Title	Credits
MEM-800	Manufacturing Strategies and Technologies	3
MEM-805	Product Development Management and Economics	3
MEM-811	Advanced Manufacturing Processes	3
MEM-812	Advanced Materials Engineering	3
MEM-813	Surface Engineering	3
MEM-814	Special Topics in Manufacturing Engineering (Introduction to Nondestructive Testing)	3
MEM-821	Manufacturing Systems Design and Management	3

Industrial and Engineering Management

MEM-801	Project Management	3
MEM-806	Quality and Reliability Management	3
MEM-822	Supply Chain Management	3
MEM-823	Financial Management	3
MEM-824	Leadership and Entrepreneurship	3
MEM-825	Operation Research	3
MEM-826	Special Topics in Industrial / Engineering Management	3

General Electives

EM-843	Advanced Research Methods	3
MEM-831	Principles of CAD	3
MEM-832	Finite Element Methods	3
MEM-833	Advanced Numerical Methods	3

Additional Courses

RM-898	Research Methodology	2
SEM/WKSP-897	Seminar / Workshop (for MS)	1
SEM/WKSP-997	Seminar / Workshop (for PhD)	1

PhD Courses

Course Code	Course Title	Credits
MEM-911	High Performance Machining	3
MEM-912	Advanced Metal Forming	3
MEM-913	Recent Advances in Machining Technology	3
MEM-914	Advanced Coating Technology	3
MEM-915	Rapid prototyping and Manufacturing	3
MEM-921	Design and Analysis of Allocation Mechanism	3
MEM-922	Advanced-Topics in System Engineering	3
MEM-923	System Safety Engineering and Management	3
MEM-924	Engineering Ethics	3
MEM-925	Facility Planning and Layout	3
MEM-926	Production Planning and Control	3
MEM-927	Production Scheduling Techniques	3
MEM-928	Service Engineering	3
MEM-929	Advanced Topics in Quality Management	3
MEM-916	Advanced Materials for Engineering Components	3
MEM-917	Laser Materials Processing	2
MEM-918	Adv Maintenance Engineering & Process Improvement	3
MEM-919	Tribology & Advanced Surface Engineering	3
MEM-931	Non-linear Finite Element Methods	3
MEM-932	Modelling of Machining Operations	3
MEM-933	Modelling of Metal Forming Operations	3
MEM-981	Special topics for PhD programme (Any subject on the research interests of the faculty available)	3
MEM-999	**PhD Thesis**	**30**

Programme Description

The programme is designed to train HR capital in Naval Architecture and Marine Engineering with speclization in Design of Marine Structures, Marine Mechanical Engineering or Marine Electrical Engineering streams.The first stream focuses on deisgn of marine platforms, especially surface ships both naval and merchant (container Ships, Tankers etc). Marine Mechanical Engineering stream focuses on design and diagnosis of marine mechanical systems including Gas Turbines, Diesel Engines and Marine Auxillary systems. Marine Electrical Engineeering stream focuses on design of marine electronic systems both Naval (RADAR, SONAR, Command & Control, Communication, Weapon systems etc) and Commercial (Navigation, Communication systems etc).

Associated Careers

This programme is aimed to help meet the HR requirements of Ports and Shipping sectors besides defence sector of Pakistan in the fields of ship design and marine engineering. It is designed to prepare a pool of professionals in Pakistan to serve local as well as international marine industry and maritime institutions.

Core Courses

Course Code	Course Title	Credits
MATH-812	Advanced Engineering Mathematics	3
MATH-830	Applied Numerical Analysis	3
NAE-840	Advanced Marine Dynamics	3
NAE- 870	Advanced Marine Design	3
NAE- 899	MS Thesis	6

Elective Courses

Course Code	Course Title	Credits
NAE-842	Marine Hydrodynamics	3
NAE-845	Advanced Fluid Mechanics and Marine Applications	3
NAE-846	Computational Fluid Dynamics and Marine Applications	3
NAE-850	Marine Structural Mechanics	3
NAE-851	Finite Element Methods and Applications in Marine Structures	3
NAE-855	Advanced Marine Materials	3
NAE-856	Advanced Marine Fabrication Methods	3
NAE-860	International Maritime Rules and Certifications	3
MME-810	Marine Propulsion and Auxiliary Machinery Systems	3
MME-812	Ship Main Engines and Diagnostic Techniques	3
MME-830	Energy Efficiency in Ships	3
MEE-810	Modern Control Theory and Applications in Marine Systems	3
MEE-812	Electrical Machines and Power Electronic Systems	3
MEE-815	Marine Electrical Systems and Electrical Propulsion	3

MS in Naval Architecture

Programme Description

The programme is designed to provide the required knowledge and skills in Naval Architecture theory, analysis and design procedures applicable to both Naval and merchant ships. Aim is to equip students with the knowledge of core Naval Architecture subjects of marine hydrodynamics, marine dynamics and marine structure alongside a complete cycle of early stage ship designing using state of the art software, thus enabling them to get integrated into industrial ship design teams. Research skills are honed through project work undertaken in the above core specialized fields.

Associated Careers

This programme is aimed to help meet the HR requirements of Ports and Shipping sectors besides defence sector of Pakistan in the fields of ship design and marine engineering. It is designed to prepare a pool of professionals in Pakistan to serve local as well as international marine industry and maritime institutions.

Core Courses

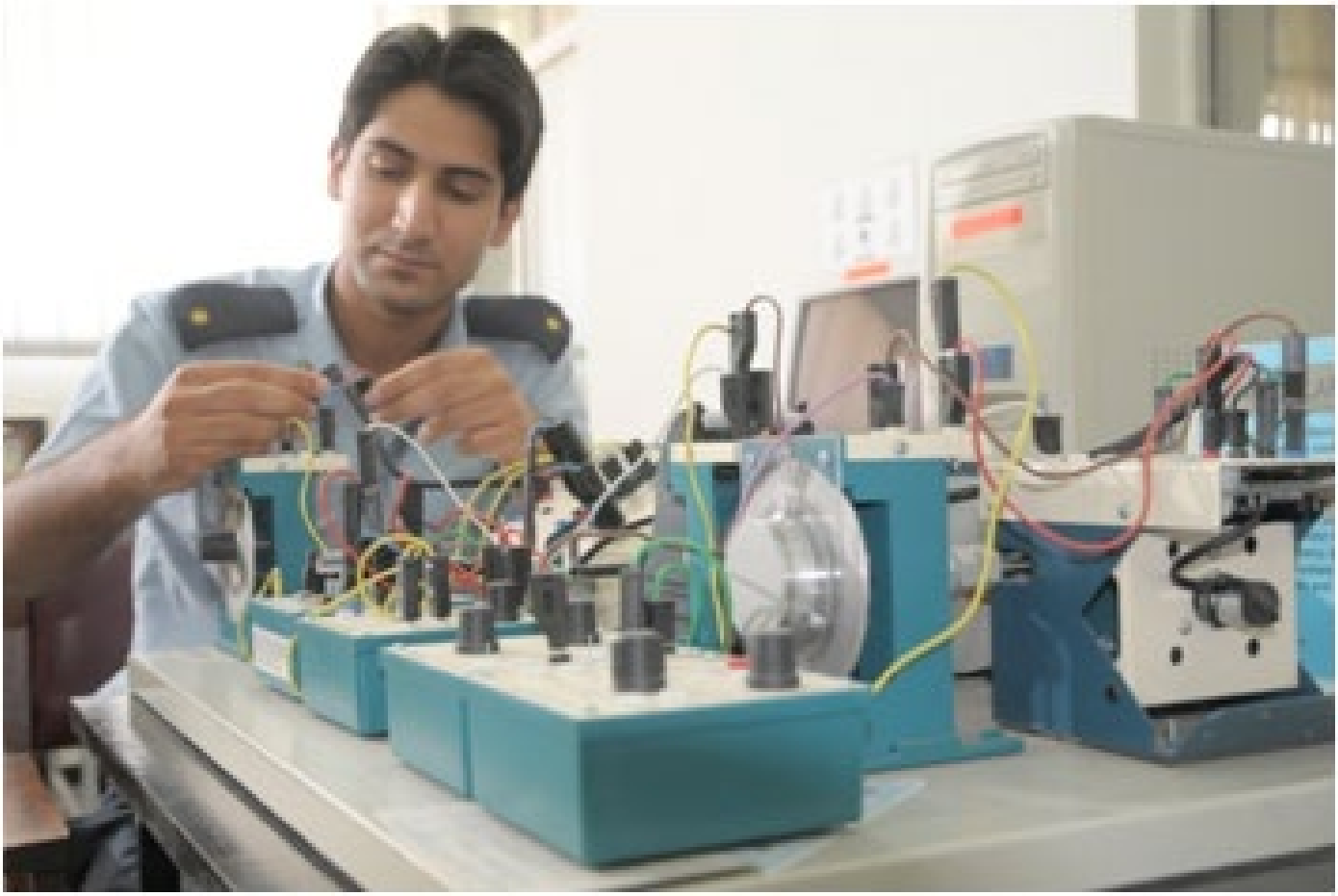
Course Code	Course Title	Credits
NAE-842	Marine Hydrodynamics-I	3
NAE-850	Marine Structures-I	3
NAE-840	Advanced Marine Dynamics	3
NAE-843	Marine Hydrodynamics-II	3
NAE-899	MS Thesis	6

Electives (Any Four)

Course Code	Course Title	Credits
NAE-845	Advanced Fluid Mechanics and Marine Applications	3
NAE-846	Computational Fluid Dynamics and Marine Applications	3
NAE-851	Marine Structures-II	3
NAE-855	Advanced Marine Materials	3
NAE-856	Advanced Marine Fabrication Methods	3
NAE-860	International Maritime Rules and Certifications	3
NAE-862	Green Ship: Principles and Technologies	3
NAE-866	Advanced Marine Vehicles	3
NAE-864	Naval Ship Conversion Design	3
NAE-875	Submarine and Submersible Design	3
NAE-868	Design of Small Craft	3
NAE-870	Ship Design	3

Additional Course

RM-898	Research Methodology	2
SEM/WKSP-897	Seminar / Workshop	1



COLLEGE OF AERONAUTICAL ENGINEERING (CAE)


UTICAL ENGINEERING

College of Aeronautical Engineering

During the early years of Pakistan Air Force (PAF), aeronautical and electronics engineers were trained abroad as the service had no such technical training facilities and no engineering university in Pakistan offered curricula in the requisite fields. The initiative to establish facilities for educating PAF engineers to the level of at least a Bachelor's Degree had to be taken by the PAF either in collaboration with one of the existing engineering institutions or by establishing its own engineering college. PAF set its own college at Korangi Creek, Karachi in 1965. For a concrete foundation and functioning of the College, the United States Air Force lent the services of three qualified and experienced officers for the posts of the Principal and the Heads of the Department of Aerospace and Avionics Engineering. Colonel John H. Blakelock from USAF Institute of Technology arrived on July 7, 1965 to be the first Principal. The first batch of students arrived at the College on 24 July, 1965 and instructions for the course started on 29 July, 1965. Graduation ceremony of the first-degree course was held on 9 November, 1968. Two USAF officers continued to serve in the faculty of the College till June, 1978. The College was initially affiliated with the University of Karachi. Later on, with the establishment of NED University of Engineering & Technology in March 1977, affiliation of the College was transferred to NED University. In May 1986, CAE was shifted to Risalpur and since then it is an integral part of the PAF Academy. In December 1994, the College became one of the constituent colleges of National University of Sciences and Technology (NUST), Islamabad. In 1997, MS programmes in Aerospace and Avionics Engineering commenced at CAE. To keep pace with the international quality standards and requirements, ISO 9000 certification was successfully achieved for engineering programmes of CAE in 1999. Outcome Based Education (OBE) programme was started at CAE in 2014 after PEC became a provisional signatory of the Washington Accord (WA) of International Engineering Alliance (IEA). BE degree programmes of CAE were successfully accredited on the basis of OBE in May, 2016.

Academic Departments

The college has five academic departments:

- Humanities & Sciences Department
- Aerospace Engineering Department
- Avionics Engineering Department
- Industrial Engineering Department
- Professional Continuing Education Department

All the departments have highly qualified faculty with rich academic, research and field experience. Most of them have acquired higher education from reputed institutions of USA, Europe, Australia and China. The research undertaken by the faculty and students comprises areas related to aerospace structures, computational fluid dynamics, communication, control, digital signal processing, microwave engineering, project management and optimisation.

QUALITY POLICY

Commitment to make College of Aeronautical Engineering a center of excellence for quality education in the field of aeronautical engineering through an enabling environment, adaptive academic mechanisms and competent faculty.

Faculty Profile

Engr Asad Amir Pirzada, Commandent
PhD (University of Western), Australia
Discipline: computer Science & Software Engineering
Specialization: Network & Information Security

Professor Dr Muhammad Ajmal, Dean
PhD (Michigan State University) USA
Discipline: Enhanced Raman Spectroscopy (SERS)
Specialization: Nan wire Synthesis & Characterization

Dr Muhammad Ashraf , HoD PGS & Research
PhD (Middle East Technical University), Ankara Turkey
Discipline: Cryptology

Tahir Ayub, Director IT & Networking
MS (University of Peshawar), Pakistan
Discipline: Computer Science
Specialization: IT & Networking

Engr Muhammad Ayaz Ahmad, SO NUST Affairs
MS (Air University) Pakistan
Discipline: Aerospace Engineering
Specialization: Aerodynamics

Ms Saadia Salam, Dir KS
MA (London Met University) UK
Discipline: English
Specialization: International English language teaching & applied language studies

Atiq Ur Rehman, Registrar
MA (University of Peshawar) Pakistan
Discipline: Islamiat
Specialization: Arabic

Zahoor Akhtar Butt, Dy Registrar
MA (University of Punjab) Pakistan
Discipline: History
Specilialization: Indo-Pak History

Department of Aerospace Engineering

Dr Syed Irteza Ali Shah, Head of Department
PhD (Georgia University of Technology) USA
Discipline: Aerospace Engineering
Specialization: Flight Mechanics, Control and Aerial Robotics

Dr Aamer Shehzad
PhD (University of New South Wales) AUS
Discipline: Aerospace Engineering
Specialization: Fluid Structure Interaction

Dr Asad Hameed
PhD (Oxford University) UK
Discipline: Aerospace Engineering
Specialization: Material Sciences

Dr Ali Javed
PhD (University of Southampton) UK
Discipline: Aerospace Engineering
Specialization: Fluid Structure Interaction

Dr Mohtashim Mansoor
PhD (Air University) Pakistan
Discipline: Aerospace Engineering
Specialization: MEMS

Engr Fareed Ahmad
MS (Institute of Material Sciences & Research) Pakistan
Discipline: Mechanical Engineering
Specialization: Material Sciences

Engr Hassan Tarar, Director LQEC
MS (Air University) Pakistan
Discipline: Aerospace Engineering
Specialization: Structures

Engr Nadeem Hussain
MS (Air University) Pakistan
Discipline: Aerospace Engineering
Specialization: Fluid Dynamics

Engr Luqman Ahmad
MS (Air University) Pakistan
Discipline: Aerospace Engineering
Specialization: Fluid Dynamics

Engr Fayaz Ahmed
MSc (Cranfield University) UK
Discipline: Thermal Power
Specialization: Aerospace Propulsion

Engr Zahid Ahmad
MS (NUST CAE) Pakistan
Discipline: Aerospace Engineering
Specialization: Structures

Engr Farrukh Mazhr
MS (Air University) Pakistan
Discipline: Aerospace Engineering
Specialization: Structure & Solid Mechanics

Engr Taimur Ali Shams
MS (Air University) Pakistan
Discipline: Aerospace Engineering
Specialization: Aero Dynamics / Fluid Dynamics

Engr Zahid Mahmood
MS (Air University) Pakistan
Discipline: Aerospace Engineering
Specialization: Material Science

Engr M Yasir Javed
MS (NUST CAE) Pakistan
Discipline: Aerospace Engineering
Specialization: Aerodynamics

Engr Syed Nabeel Amjad
MS (NUST CAE) Pakistan
Discipline: Aerospace Engineering
Specialization: Structures

Engr Shahzeb Irfan
MS (NUST CAE) Pakistan
Discipline: Aerospace Engineering
Specialization: Structures

Engr Muhammad Jamil
MS (NUST CAE) Pakistan
Discipline: Aerospace Engineering
Specialization: Aerodynamics

Engr Muneeb Ahmed
MS (Air University) Pakistan
Discipline: Aerospace Engineering
Specialization: Aerodynamics

Adjunct Faculty

Dr Shuaib Salamat
PhD (Purdue University) USA
Discipline: Micro-electronics and Nanotechnology
Specialisation: Modeling and Simulation of Thermo-electric and Nano-Electric devices

Dr Messam Abbas
PhD (Georgia University of Technology) USA
Discipline: Aerospace Engineering
Specialization: Aircraft Design

Dr Faisal Siddiqui
PhD (Georgia Institute Technology) USA Discipline: Aerospace Engineering
Specialization: structures

Department of Avionics Engineering

Dr Liaqat Ali Khan, HoD
PhD (NUST), Pakistan
Discipline: Information Security
Specialization: Cryptography/Network Security

Dr Nauman Javed
PhD (University of Massachusetts Amberst) USA
Discipline: Electrical and Computer Engineering
Specialization: Distributed Computing Systems

Dr Hammad Munawar
PhD (Sabancı University) Turkey
Discipline: Control Systems
Specialization: Force Control

Dr Mujahid Mohsin
PhD (NUST) Pakistan
Discipline: Computer and Communication Security
Specialization: Embedded Systems, IoT Security

Engr Shafqat Ul Mulk
MS (University of Southampton) UK
Discipline: Electrical Engineering
Specialization: Digital Design

Engr Farrukh Pervez
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Communication & Networks

Engr Abdul Samad
MS (Air University) Pakistan
Discipline: Avionics Engineering
Specialization: Signal & Image Processing

Engr Mohsin Khalil
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Communication & Networks

Engr M Atif Shehzad
MS (Air University) Pakistan
Discipline: Avionics Engineering
Specialization: Signal & Image Processing

Engr Imran Aziz
MS (Air University) Pakistan
Discipline: Avionics Engineering
Specialization: Signal Processing/ELINT Systems

Engr Adeel Ahmed
MS(Sir Syed University of Engineering & Technology) Pakistan
Discipline: Electronics Engineering
Specialization: Telecommunication

Engr Syed Ali Imran
MS (CAE NUST) Pakistan
Discipline: Avionics Engineering
Specialization: Microwave Engineering

Dr Zahid Pervaiz
PhD (Purdue University) USA
Discipline: Electrical & Computer Engineering
Specialization: Information Security

Engr Awais Munawar
MS (Air University) Pakistan
Discipline: Avionics Engineering
Specialization: Communication

Engr Muhammad Saqib
MS (CAE NUST) Pakistan
Discipline: Avionics Engineering
Specialization: Microwave

Engr Muhammad Yahya
MS (Air University) Pakistan
Discipline: Avionics Engineering
Specialization: Telecommunication

Engr Amjad Sultan
MS (CAE NUST) Pakistan
Discipline: Avionics Engineering
Specialization: Artificial Intelligence & Neuromorphic Computing

Engr Majid Khan
MS (CAE NUST) Pakistan
Discipline: Avionics Engineering
Specialization: Digital Signal Processing

Dr Muhammad Muaz
PhD (Hong Kong)
Discipline: Electronics & Information Engineering
Specialization: Statistical Signal Processing

Lab Engr Faryal Gula
BE (UET Peshawar) Pakistan
Discipline: Mechatronics

Department of Industrial Engineering

Dr Ali Sarosh, Head of Department
PhD (BUAA) China
Discipline: Astronautics
Specialization: Space Vehicle Design

Asst Prof Ahmed Waqar Tehami
MS (NUST) Pakistan
Discipline: Mechanical Engineering
Specialization: Computational Structural Analysis

Engr Muhammad Umair
MS (NUST) Pakistan
Discipline: Systems Engineering
Specialization: Real time Systems

Engr M Ahmad Khan
M S (NED University) Pakistan
Discipline: Industrial & Manufacturing Engineering
Specialization: Manufacturing, Surface & Heat Treatment

Engr Muhammad Arsalan
MS (CAE NUST) Pakistan
Discipline: Material & Surface Engineering
Specialization: Nano Thin Films

Ms Naeem Fatima
M S (Air University) Pakistan
Discipline: English Linguistics and Literature
Specialization: Systemic Functional Linguistics

Engr Usman Naseer
MS (Air University) Pakistan
Discipline: MS Aerospace Engineering
Specialization: Fluid Dynamics

Department of Professional Continuing Education

Engr M Irfan Aziz, HoD
MS (NUST) Pakistan
PhD (under progress)
Discipline: Electrical and Computer Engineering
Specialization: Communication

Yasir Arafat
MA (IIU) Pakistan
Discipline: English
Specialization: Language and Literature

Department of Humanities & Sciences

Hamid M Khan, Head of Department
M Phil (University of Salford) UK
Discipline: Physics
Specialization: Aerodynamics

Muhammad Amjad
M Phil (University of Leicester) UK
Discipline: Mathematics
Specialization : Mathematical Biology

Elizbeth Bibi Hina
MSc (University of Peshawar) Pakistan
Discipline: Physics
Specialization: Nuclear Physics

Ali Akbar
MSc (University of Punjab) Pakistan
Discipline: Mathematics
Specialization: Pure Mathematics

Arshad Khan
MSc (University of Peshawar) Pakistan
Discipline: Mathematics
Specialization: Applied Mathematics

Naveed ur Rehman
MSc (BZU Multan) Pakistan
Discipline: Chemistry
Specialization: Physical Chemistry

Khawar Sultan
M.A (NUML) Pakistan
Discipline: English
Specialization: English Literature

Waqas Ahmad
MCS (QUA Islamabad) Pakistan
Discipline: Computer Science
Specialization: Wireless Networks

Khalid Saeed
M Phil (NUST) Pakistan
Disciplin : Mathematics
Specialization : Applied Mathematics

Khair Ur Rehman
M Phil (QAU Islamabad) Pakistan
Discipline: Physics
Specialization: Plasma Physics

Anwar Ul Haq
M Phil (Abdul Wali Khan University) Pakistan
Discipline: Islamic Studies
Specialization: Tafseer-o-Quran

Dr Faisal Shahzad
PhD (Quaid e Azam University) Pakistan
Discipline: Mathematics
Specialization: Fluid Mechanics

Yazeed ul Hassan Afridi
MSc (University of Peshawar) Pakistan
Discipline: Chemistry
Specialization: Applied Chemistry

Muhammad Zubair
MSc (University of Sargodha) Pakistan
Discipline: Mathematics
Specialization: Applied Mathematics

Student Support Facilities

Laboratories

Aerospace Department

- Structures Lab
- Materials Science Lab
- Fiber Reinforced Composites Lab
- Modeling and Simulation Lab
- Numerical Analysis Lab
- Propulsion Lab
- Heat Transfer Lab
- Thermodynamics Lab
- Aerospace Vehicle Design Lab
- Flow Visualization Lab
- Fluid Mechanics Lab
- Aerodynamics Lab
- Subsonic Wind Tunnel Lab
- Supersonic Wind Tunnel Lab

Avionics Department

- Radar Lab
- Communications Lab
- Controls Lab
- Avionics Systems Design Lab
- Basic Circuits Lab
- Electrical Machines Lab
- Antenna Lab
- Microwave Lab
- Aerospace Vehicle Design Lab
- Digital and Embedded Systems Lab
- PCB Prototyping Lab
- Digital Signals Processing Lab
- Project Lab
- Advanced Design System Lab
- Thermal Imaging Lab

Contacts

Campus Address:

College of Aeronautical Engineering,
PAF Academy, Risalpur, Pakistan

Commandant:	+92-51-9280513
	+92-923-631391-7 Ext 7601
Dean:	+92-923-631391-7 Ext 7607
Web Site:	http://www.nust.edu.pk
Email:	cae@nust.edu.pk
SO NUST Affairs:	+92-923-631391-7, Ext 7613
	+92-923-631498
Fax:	+92-937-873294

Counselling

A tutor is appointed from the faculty for each student who acts as the local guardian and academic counselor of the student. The tutor monitors his ward's academic progress and provides him with assistance in dealing with personal issues that may be hampering his progress. He develops a close relationship with the student through frequent contacts in both formal and informal settings.

Research and Development

Students and faculty of CAE regularly undertake projects related to Aeronautical Engineering. Our students recently completed about 100 projects with the collaboration of national organizations and local industry. CAE students regularly participate in various International / National competitions and bring laurels to the institution by achieving top positions. CAE student team was judged as first amongst the international teams in the Future Flight Design competition which was organized by the Turkish Air Force.

Accommodation

Administrative and Support Facilities

CAE is a fully residential institution where all students are provided accommodation. The conducive living environment enables the students to pursue their studies with single-mindedness. Well- furnished hostel accommodation is available in the close vicinity of the College which provides facilities for messing, accommodation, recreation and social activities. All resident members avail dining facilities where food is served as per a common menu decided by students' mess committee. Hostel also has a barber shop and a small gymnasium.

Sport fields and Swimming pool

CAE offers opportunities to students to actively participate in sports. There are well maintained sport fields i.e. football, basketball, tennis, hockey and athletics. Moreover, facility of swimming pool is also available to students. Regular sport competitions are held at college and college teams also participate in National level competitions

Bachelors in Avionics Engineering (Electronics Engineering for Aviation)

Career Opportunities

Bachelor of Avionics degree holders may seek careers as avionics, electrical or communication engineers, in the airline industry, defence-related R&D organisations or any other public or private sector organisations.

Course Description

The Avionics Engineering programme is also inter-disciplinary in nature wherein 47% credit hours pertain to subjects related to Avionics Engineering while 29% to Humanities & Sciences, 11.5% to Aerospace, 11% to Industrial Engineering and 1.5% to Military Sciences.
The avionics Engineering Programme is designed with an objective to instil in students the knowledge and perspective appropriate both for a professional career and for pursuit of advanced degrees in the fields that rely on fundamental principles of electrical engineering. Such principles and practices include rigorous quantitative reasoning and robust engineering design. This is accomplished by ensuring that students achieve both depth and breadth of knowledge in their studies and by maintaining a high degree of flexibility in the curriculum.
This programme also seeks to provide a good preparation for life, including an ability to communicate in written and oral forms, and a desire to continue learning throughout life.

A total of 134 Credit hours of academic work are completed that include an independent project in the final semester.

Scheme of Studies

Programme Code: 501

Semester-I

Course Code	Course Title	Credits
MATH-101	Calculus & Analytical Geometry	3-0
PHY-108	Engineering Physics	3-1
HU-107	Pakistan Studies	2-0
IR-101	International Relationship	1-0
HU-114	Functional English	3-0
CH-110	Engineering Chemistry	1-1
IE-103	Workshop Technology	1-1
	Total	**17**

Semester-II

Course Code	Course Title	Credits
MATH-121	Linear Algebra & Ordinary Differential Equations	3-0
MATH-232	Complex Variables & Transform	3-0
HU-101	Islamic Studeis	2-0
AV-102	Engineering Circuit Analysis - DC Circuits	2-1
MECH-101	Engineering Statics	3-0
DWG-102	Computer Aided Design	1-1
AE-101	Introduction to Aerospace	2-0
	Total	**18**

Semester-III

Course Code	Course Title	Credits
MATH-243	Vector Calculus	3-0
MATH-361	Probability & Statistics	3-0
MECH-202	Engineering Dynamics	3-0
ME-203	Thermodynamics-I	2-0
AERO-212	Fluid Mechanics & Applied Aerodynamics	3-1
CS-201	Introduction to Computer Programming	1-1
AV-202	Engineering Circuit Analysis-AC Circuits	2-0.5
AV-211	Digital Systems-Logic Design & Devices	3-0.5
	Total	**17**

Semester-IV

Course Code	Course Title	Credits
ME-207	Thermodynamics- II	3-0
AERO-221	High Speed Aerodynamics	3-0
MECH-204	Materials Science & Engineering	2-0
STR-202	Mechanics of Material	3-0
MATH-352	Numerical Methods	2-1
IE-211	Engineering Economy	2-0
AV-204	Electrical Circuits and Machines	1-1
	Total	**18**

Semester-V

Course Code	Course Title	Credits
ME-305	Heat Transfer	3-1
AERO-321	Aircraft Performance	3-0
AERO-314	Intro to Rotorcraft Dynamics	2-0
STR-305	Aircraft Loading and Structural Analysis	3-1
IE-321	Comuter Aided Instrumentation	1-1
AV-356	Feedback Control Systems	2-1
AERO-301	Applied Aerodynamics-I	1-0.5
	Total	**18**

Semester-VI

Course Code	Course Title	Credits
ME-306	Propulsion & Turbomachinery	3-1
AERO-322	Aircraft Stability and Control	3-0
AERO-331	Wind Tunnel Testing	0-1
STR-303	Structural Vibrations & Aero-elasticity	3-0
STR-306	Computational Structural Analysis	3-1
IE-303	Manufacturing Processes & CNC Machines	0-1
HU-304	Technical Report Writing	2-0
	Total	**18**

Semester-VII

Course Code	Course Title	Credits
AE-492	Project-I	0-2
AE-432	Introduction to CFD	1-1
AERO-441	Aerospace Vehicle Design	2-2
STR-441	Structure & Machine Design	3-0
IE-441	Engineering Management	2-0
HU-405	Communication Skills	2-1
AE-413	Astrodynamics	1-0
CBL-401	Character Building & Leadership	1-0
	Total	**18**

Semester-VIII

Course Code	Course Title	Credits
AE-499	Project-II	0-4
AE-482	Emerging Aerospace Technologies	1-0
HU-222	Professional Ethics	2-0
IE-452	Product Design & Development	2-0
CBL-402	Decision Making and Time Management	1-0
	Total	**10**
	Grand Total	**134**

Master in Avionics Engineering

Career Opportunities

PAF being the parent organization for CAE requires its engineers to remain abreast with the rapidly changing and fast growing technology. PAF is continually pursuing for excellence through up gradation of its fleet based on modern technology. By conducting MS at CAE, PAF can undertake indigenization through R&D projects of better quality, wider scope and classified nature. The curriculum of MS programme at CAE caters for specific defense and aviation related requirements maintaining prime focus on national interest.

Course Description

The MS programme is leading to PhD in five specialties subject to adequate student enrolment and faculty availability, comprising of 24 credits hours of course work and 6 credit hours of thesis research. It includes 4 core courses and 4 elective courses. Each course is a 3.0 credit hour course. Typical Course Plan is presented below. Students are also required to take a leadership and/or community service seminar.

Research Areas

The main focus of research is to benefit the areas of national interest. Research areas, relevant to Pakistan Air Force, Pakistan Aeronautical Complex, NESCOM, Defence, aviation and many industries around the country for indigenous product development and design include (but not limited to):

- Radar signal processing systems
- Phased array antenna
- Airborne and ground Radar
- Flight control systems of aircraft
- Guidance & Navigation
- Aerial Robotics
- High Energy Materials
- Image processing
- Software Defined Radio
- Cognitive Radio
- Cryptographic Systems
- Microwave Devices
- Diagnostics and Prognostics

Scheme of Studies

Programme Code: 654

Core Courses

Course Code	Course Title	Credits
AV-814	Flight Dynamics and Control	3
AV-820	Radar Signal Processing	3
MATH-844	Advanced Engineering Math	3
AV-843	Microwave Engineering	3
AV-899	MS Thesis	6

Elective Courses

General Electives

Course Code	Course Title	Credits
AV-801	Random Processes	3
AV-802	Detection and Estimation	3
AV-803	Instrumentation and Measurement for Aerospace Applications	3
AV-804	Neural Networks	3
AV-805	Avionics System Integration	3

Guidance, Navigation, and Controls

Course Code	Course Title	Credits
AV-810	Linear Systems	3
AV-811	Optimal Control	3
AV-812	Non-Linear Control	3
AV-813	Advanced Flight Control	3
AV-815	Aircraft System Identification	3
AV-816	Navigation Systems	3
AV-911	Advanced Topics in Control Engineering	3

Signal Processing

Course Code	Course Title	Credits
AV-821	Electronic Warfare	3
AV-822	Radar Tracking	3
AV-823	Missile Guidance	3
AV-824	Information Theory	3
AV-921	Advanced Topics in Signal Processing	3

Communications

Course Code	Course Title	Credits
AV-831	Design and Analysis of Algorithms	3
AV-832	Optimization	3
AV-833	Introduction to Chaos	3
AV-931	Advanced Topics in Communications	3

RF & Microwave

Course Code	Course Title	Credits
AV-841	Electromagnetic Waves and Propagation	3
AV-842	Advanced Antenna Engineering	3
AV-844	Advanced Electromagnetic Theory	3
AV-845	Electro-Optics and IR Systems	3
AV-846	EMI/EMC	3
AV-940	Computational Electromagnetics	3
AV-941	Advanced Topics in Microwave Engineering	3

Additional Courses

Course Code	Course Title	Credits
RM-898	Research Methodology	2
SEM/WKSP -897	Seminar / Workshop	1

PhD in Avionics Engineering

Course Description

PhD at CAE (Avionics Dept) is a 3-8 year program. The students are required to undertake 18 credit hours coursework of 800/900 level in addition to the pre-requisite specified for the program. In addition to the coursework, all doctoral students must register for at least 30 credits of doctoral research. These 18 credit hours are the courses which have not been counted towards any other degree. The GEC may specify additional subjects to be taken by the PhD student, if considered essential. These shall be notified as "Additional Courses" and shall not be counted towards calculation of CGPA. Minimum cumulative GPA of 3.5 out of 4.0 is required in the 18 credit hours of 800/900 level courses which are counted towards PhD. Coursework with required CGPA should be completed preferably within one year of enrolment for PhD. Maximum allowable time to complete the coursework is 18 months.

PhD Qualifying Examination

After successful completion of 800/900 level courses (to be counted towards his PhD) with a minimum cumulative GPA of 3.5 out of 4.0, the student takes a qualifying/ comprehensive examination in the subjects specified by the GEC. The qualifying examination is conducted as soon as possible after completion of the coursework but, in any case, it is not delayed for more than 4 months. Each student must pass a PhD qualifying exam.

Research Areas

Following are the broader areas of specialization:

- Radar Signal Processing
- Air Borne and Ground Radar
- Guidance and Navigation
- Image Processing
- RF MEMS
- High Performance Computing Systems
- Software Defined Radios
- Microwave devices
- High Energy Materials
- Phased Array Antenna
- Flight Control Systems
- Aerial Robotics
- Computer Vision
- Computer Architecture
- Artificial Intelligence
- Cognitive Radio
- Diagnostics and Prognostics

Scheme of studies

PhD Courses		
Course Code	**Course Title**	**Credits**
AV-881	Machine Vision	3
AV-980	Advanced Topics in Machine/Computer Vision	3
AV-950	Advanced Topics in Radar Engineering	3
AV-960	Advanced Topics in Micro-Electronics	3
AV-970	Advanced Topics in Micro and Nano Systems	3
AV-999	PhD Thesis	30
Additional Course		
SEM/WKSP -997	Seminar / Workshop	1

Academic Programmes

Bachelors in Aerospace Engineering (Mechanical Engineering for Aviation)

Course Description

The Aerospace Engineering programme is inter-disciplinary in nature wherein 51% credit hours pertain to subjects related to Aerospace Engineering while 28.5% to Humanities & Sciences, 11% to Industrial Engineering, 8% to Avionics and 1.5% to Military Sciences. This inter-disciplinary composition of the degree programmes at CAE add to the stature and distinction of these programmes.

Career Opportunities

Bachelor of Aerospace degree holders may seek careers as aerospace, mechanical or design engineers, in airline industry, defence-related R&D organisations or any other public or private sector organisations.

Scheme of Studies

Programme Code: 502

Semester-I

Course Code	Course Title	Credits
MATH-101	Calculus & Analytical Geometry	3-0
PHY-108	Engineering Physics	3-1
HU-107	Pakistan Studies	2-0
IR-101	International Relationship	1-0
HU-114	Functional English	3-0
CH-110	Engineering Chemistry	1-1
IE-103	Workshop Technology	1-1
	Total	14-3

Semester-II

Course Code	Course Title	Credits
MATH-121	Linear Algebra & Ordinary Differential Equations	3-0
MATH-232	Complex Variables & Transform	3-0
HU-101	Islamic Studies	2-0
AV-102	Engineering Circuit Analysis - DC Circuits	2-1
MECH-101	Engineering Staticsl	3-0
DWG-102	Computer Aided Design	1-1
AE-101	Introduction to Aerospace	2-0
	Total	**16-2**

Semester-III

Course Code	Course Title	Credits
MATH-243	Vector Calculus	3-0
MATH-361	Probability and Statistics	3-0
MATH-361	Probability & Statistics	3-0
MECH-202	Engineering Dynamics	3-0
AV-203	Engineering Circuit Analysis - AC Circuits	2-1
AV-213	Digital System Logic Design	2-1
CS-201	Introduction to Computer Programming	1-1
IE-222	Industrial Instrumentation	0-1
	Total	**14-4**

Semester-IV

Course Code	Course Title	Credits
AV-232	Electromagnetic Field Theory	2-0
AV-243	Electronic Devices & Basic Circuits	3-0
AV-262	Signal & Systems	2-0
AV-223	Introduction to Algorithm & Data Structures	1-1
AV-214	Computer System Architecture	2-0
MATH-352	Numerical Methods	2-1
IE-211	Engineering Economy	2-0
AERO-201	Applied Aerodynamics	2-0
	Total	**16-2**

Semester-V

Course Code	Course Title	Credits
AV-313	Digital Signal Processing	2-1
AV-354	Analysis & Design of Control Systems	2-1
AV-335	Transmission & Waveguides	2-1
AV-342	Electonics - Integrated Circuits and Op Amp	3-1
AV-303	Electro Mechanical Systems	2-1
AV-323	Operating Systems	2-0
	Total	**13-5**

Semester-VI

Course Code	Course Title	Credits
AV-336	Antenna Engineering	2-0
AV-355	Modern Control Systems	2-1
AV-314	Embedded Systems	2-1
AV-362	Analog & Digital Communication	3-1
AV-337	Microwave Devices	2-1
HU-304	Technical Report Writing	2-0
IE-303	Manufacturing Process and CNC Machines	0-1
	Total	**13-4**

Semester-VII

Course Code	Course Title	Credits
AV-492	Project-I	0-2
AV-464	Data Communication Satellite & Networks	2-1
AV-475	Radar Systems	2-1
AV-474	Avionics System Design	2-1
IE-441	Engineering Management	2-0
HU-405	Communication Skills	2-1
AE-413	Astrodynamics	1-0
CBL-401	Character Building & Leadership	1-0
IE-421	Computer Aided Instrumentation	1-1
	Total	**12-7**

Semester-VIII

Course Code	Course Title	Credits
AV-499	Project-II	0-4
AV-482	Emerging Aviation Technologies	1-0
HU-222	Professional Ethics	2-0
IE-452	Product Design & Development	2-0
CBL-402	Decision Making and Time Management	1-0
	Total	**6-4**
	Grand Total	**104-30**

Master in Aerospace Engineering

Career Opportunities

PAF being the parent organization for CAE requires its engineers to remain abreast with the rapidly changing and fast growing technology. PAF is continually pursuing for excellence through up gradation of its fleet based on modern technology. By conducting MS at CAE, PAF can undertake indigenization R&D projects of better quality, wider scope and classified nature. The curricula of MS programme at CAE would cater for specific defense and aviation related requirements maintaining prime focus on national interest.

Course Description

The MS programme is leading to PhD in initially two specialties (Solid Mechanics/ Structural Design & Analysis & Fluid Dynamics/ Aerodynamics), extendable to four specialties subject to adequate student enrolment and faculty availability. The programme constitutes 24 credits hours of course work and 6 credit hours of thesis research. It will include 4 core courses and 4 elective courses. Each course is a 3.0 credit hour course. The courses of each of the four streams are presented as follows. Students will also be required to take a leadership and/or community service seminar.

Research Areas

The main focus of research will be the areas of national interest. Research areas, relevant to Pakistan Air Force, Pakistan Aeronautical Complex, NESCOM, Defence, aviation and other industries in the country for indigenous product development and design, which includes, but not limited to following areas:-

- Aircraft Aerodynamics Design
- Methods & Analysis of Structures
- Computational Fluid Dynamics
- Compressible & Incompressible Aerodynamics
- FEA Design & Analysis
- Solid Mechanics
- Advanced Composites
- Aerospace Materials
- Mechanical Behaviour of Materials
- Fluid-Structure Interactions
- Flight Stability and Controls
- Aircraft Propulsion
- Turbo Machinery
- Aero-acoustics
- Alternate Energy
- Heat Transfer
- Advanced Vibrations

Scheme of Studies

Programme Code: 653

Core Courses

Course Code	Course Title	Credits
AE-821	Advanced Aerodynamics – I : Incompressible Flows	3
CSE-802	Turbo Machinery	3
MATH-812	Advanced Engineering Mathematics	3
ME-817	Advanced Theory of Vibrations	3
AE-899	MS Thesis	6

Elective Courses

Solid Mechanics Structure

Course Code	Course Title	Credits
AE-810	Advanced Topics in Aerospace Structures	3
AE-811	Advanced Mechanics of Composites	3
AE-812	Advanced / Experimental Stress Analysis	3
AE-813	Design and Analysis of Aerospace Structures	3

Fluid Dynamics / Aerodynamics

Course Code	Course Title	Credits
AE-820	Advanced Topics in Aerodynamics / Fluid Dynamics	3
AE-822	Advanced Aerodynamics – II : Compressible Flows	3
AE-823	Viscous Flow	3
AE-824	Turbulent Fluid Flow	3

Thermodynamics / Propulsion

Course Code	Course Title	Credits
AE-831	Rocket Propulsion	3
AE-832	Advanced Aerothermodynamics	3
AE-833	Advanced Topics in Aerospace Propulsion	3

Mechanics / Flight Dynamics

Course Code	Course Title	Credits
AE-841	Advanced Flight Dynamics & Control	3
AE-842	Guidance and Navigation of Aerospace Vehicles	3
AE-843	Aerospace Vehicle Dynamics and Control	3
AE-844	Optimal Control	3
AE-845	Inertial and Integrated Navigation System	3
AE-846	Modern Feedback Control Theory	3
AE-847	Advanced Topics in Flight Dynamics & Control	3

Design / Optimization

Course Code	Course Title	Credits
AE-850	Advanced Topics in Aerospace Design	
AE-851	Aerospace Vehicle Design	
AE-852	Multidisciplinary Design Optimization for Aerospace Vehicles	

Mechanics of Materials

Course Code	Course Title	Credits
AE-860	Advanced Topics in Aerospace Materials	3
AE-861	Mechanical Behaviour of Materials	3
AE-862	Advanced Topics in Aerospace Manufacturing	3

MEMS

Course Code	Course Title	Credits
AE-891	Micro-Electro-Mechanical-Systems (MEMS) for Aerospace Applications	3

General Electives

Course Code	Course Title	Credits
MATH-813	Data Analytics (Advanced Numerical Techniques)	3
IE-801	Industrial Management & System Engineering	3
ME-810	Principles of Control Systems	3
CE-801	Advanced Structural Mechanics	3
CE-809	Structural Dynamics	3
CSE-831	Finite Element Methods	3
CSE-834	Theory of Elasticity	3
CSE-903	Advanced Heat Transfer	3
EM-806	Operations Research	3
MATH-850	Advanced Numerical Analysis	3
ME-803	Continuum Mechanics	3
ME-815	Advanced Mechanics of Materials	3
ME-819	Instrumentation & Data Acquisition Systems	3
ME-820	Advanced Instrumentation and Experimental Methods	3
ME-831	Computational Fluid Dynamics – I	3
ME-833	Computational Fluid Dynamics – II	3

Course Code	Course Title	Credits
ME-834	Fracture Mechanics	3
ME-839	Advanced Finite Element Analysis	3
ME-840	Computational Fluid Dynamics and Heat Transfer	3
ME-854	Computer Integrated Manufacturing	3
ME-861	Theory of Plasticity	3
ME-867	Quality & Reliability Management	3
ME-869	Project Management	3
ME-875	Computer Aided Engineering Design	3
ME-881	Advanced Fluid Mechanics	3
ME-882	Heat & Mass Transfer	3
ME-884	Convection Heat Transfer	3
ME-888	Radiation Heat Transfer	3
ME-889	Conduction Heat Transfer	3
ME-892	Advanced Propulsion	3
ME-893	Advanced Combustion	3
MTS-858	Smart Materials & Structures	3

Additional Courses

Course Code	Course Title	Credits
RM-898	Research Methodology	2
SEM/WKSP-897	Seminar / Workshop	1

PhD in Aerospace Engineering

Course Description

PhD at CAE (Aerospace Dept) is a 3-8 year program. The students are required to undertake 18 credit hours coursework of 800/900 level in addition to the pre-requisite specified for the program. In addition to the coursework, all doctoral students must register for at least 30 credits of doctoral research. These 18 credit hours are the courses which have not been counted towards any other degree. The GEC may specify additional subjects to be taken by the PhD student, if considered essential. These shall be notified as"Additional Courses"and shall not be counted towards calculation of CGPA. Minimum cumulative GPA of 3.5 out of 4.0 is required in the 18 credit hours of 800/900 level courses which are counted towards PhD. The coursework with required CGPA should be completed preferably within one year of enrolment for PhD. Maximum allowable time to complete the coursework is 18 months.

PhD Qualifying Examination

After successful completion of 800/900 level courses (to be counted towards his PhD) with a minimum cumulative GPA of 3.5 out of 4.0, the student takes a qualifying/ comprehensive examination in the subjects specified by the GEC. The qualifying examination is conducted as soon as possible after completion of the coursework but, in any case, it is not delayed for more than 4 months. Each student must pass a PhD qualifying exam.

Research Areas

Following are the broader areas of specialization:

- Fluid dynamics/Aerodynamics
- Thermo fluids / propulsion
- Aerospace vehicle design
- Aerospace sensing and instrumentation
- Advanced Vibrations
- Nano Technology / Nano materials for Aviation
- Alternate Energy
- Multi-Disciplinary Design Optimization
- Computational Fluid Dynamics
- Heat Transfer
- CAD / CAM / Mechanical Design
- Micro / Nano Electro Mechanical Systems
- Space Technologies
- Solid mechanics / Structural Design and Analysis
- Flight dynamics and control
- Aerospace materials
- Advanced Composites
- Turbo-Machinery
- FEA Design and Analysis
- Aircraft Aerodynamics Design
- Aircraft Flight Stability and Control
- Thermo Fluids
- Cryogenics
- Aircraft Structure Design
- Materials Science

Scheme of studies

PhD Courses

Course Code	Course Title	Credits
AE-815	Aero-Mechanical Integration	3
AE-814	Aero-Elasticity	3
AE-863	Advanced Materials	3
AE-864	Energetic Materials	3
AE-881	Orbital Mechanics	3
AE-882	Spacecraft System Design	3
AE-930	Advanced Topics in Aerospace Propulsion	3
AE-940	Advanced Topics in Flight Dynamics and Controls	3
AE-980	Advanced Topics in Space Technology	3
AE-999	**PhD Thesis**	**30**

Additional Courses

Course Code	Course Title	Credits
SEM/WKSP-997	Seminar / Workshop	1

Library

CAE library is fully computerized and provides excellent services and facilities to fulfill the information needs of faculty members as well as students. It has a collection of over 100,000 books including Textbooks and General/Reference books. It also provides a wide range of services that include automated issuance of books, online information searching, e-books and access to online database through HEC. The library is efficiently maintained by qualified and experienced staff.

SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE (SEECS), ISLAMABAD

School of Electrical Engineering and Computer Science

About the School

School of Electrical Engineering and Computer Science (formerly NIIT) chronicles an incredible tale of what focused efforts with a clear vision, singular commitment and a passionate quest for excellence are capable of achieving within a span of less than two decades. From its inception in 1999, as a tiny IT wing of NUST, this School has blossomed into one of the finest seats of higher education, of which not only NUST but the entire nation can be legitimately proud of. The philosophy of education at SEECS puts due premium on an essential blending of engineering and computing education with a sound orientation of social and humanitarian interests of the society. With the relocation of SEECS to H-12 campus, this school is striving to set a new pace for wholesome growth of its students.

Academics

SEECS is known for its exclusive academic environment and dynamism to embody the best in engineering and computing education. All its undergraduate and graduate programmes have evolved as a result of pragmatic research so as to educate and groom the students in the best possible manner in their respective disciplines. The ultimate goal has always been to prepare sound professionals with a progressive vision, committed to pursuit of excellence. This is ensured through well-formulated academic programme with appropriate co-curricular activities. The format of academic training nurtures a passion for hard work so vitally needed for socio-economic development. Equal emphasis is laid on developing students' ability to think creatively, and analyze and solve practical problems.

Research Environment

An active and potent research culture pertains at NUST-SEECS since the beginning. Since its inception, relentless efforts have been made to build a research environment of International stature. Here at NUST-SEECS, we place a high premium on quality research as a gateway to new horizons of scientific knowledge and discovery.

We are focusing on multi-disciplinary research and in that context research in SEECS has been broadly divided into seven Signature Research Clusters. These clusters include: Internet of Things, Wireless and Photonic Networks, Cyber Security, Smart Grid, Cloud Computing and Big Data Analytics and Artificial Intelligence & Machine learning. These research clusters work in close collaboration with national and international academics and industry partners.

As of Dec 2018, NUST-SEECS active research grants are worth PKR 290 M. These include funding from national and international bodies/agencies as well as industry. SEECS has established Pakistan's First EEG Lab in collaboration with Germany. Huawei Technologies and NUST-SEECS have jointly setup an IoT and Machine Learning Lab. Deep Learning Lab has been awarded to NUST-SEECS, with funding worth PKR 70 Million. The lab is part of the National Centre of Artificial Intelligence that is being established at NUST.

NUST-SEECS enjoys extensive collaborations with some of the elite centers of excellence all over the globe including high profile universities and research nodes in USA, UK, Germany, Australia,

Canada, UAE, Austria, Turkey, Saudi Arabia, Qatar, Russia, New Zealand, Italy, Spain, Cyprus, Malaysia, Sweden, Singapore, Portugal, Estonia, and China. Faculty has 52 active academic collaborations in 21 countries and 25 Industrial/ Institutional Collaborations.

Our faculty is working on cutting edge research areas and is producing high-quality research publications. For year 2018, our research output amounted to 127 Journal Publications, 90 conference Publications and out of which 112 were Joint International Publications.

Recently, SEECS has signed a MoU with School of Cyber Science and Technology, Beihang University (BUAA), China for the Establishment of Cyber Security Research Center at NUST-SEECS.

culture. In the very short period of time since its inception, it has made relentless efforts to build a research environment of international stature. To this end, the school has significantly expanded its faculty and student intake, raised considerable research funding, established high-tech research labs and a dedicated research complex developed active linkages with the industry, filed indigenous patents, and produced high-quality research publications. Research aptitude and capacity are the main criterion for evaluation and selection of faculty. Researchers are provided maximum logistical support to set up labs and are also introduced to relevant industry people as well as premier international research institutions so that they are able to work on research problems of national and international significance.

Fact file

Promoting Innovation and Entrepreneurship, Entrepreneurial activities are one of the hallmarks of academic culture at NUST-SEECS. Students are encouraged, guided and inspired through innovative and creative programs to become future business leaders with a dynamic vision. Students and faculty are encouraged and supported alike to engage in entrepreneurial ventures. Currently, 14 startups incubated at NUST Technology Incubation Center are founded and/or co-founded by NUST-SEECS students, former students and faculty.

Faculty Profile

Dr Syed Muhammad Hassan Zaidi, Principal and Dean
PhD (University of South Florida) USA
Discipline: Electrical Engineering
Specialisation: Computer Network

Department of Electrical Engineering

Dr Osman Hasan Senior Head of Department
PhD (Concordia University) Canada
Discipline: Electrical Engineering
Specialization: Formal Methods

Engr Dr Shahid Baqar Head of Department, IAEC
PhD (Cranfield University, Shrivenham) England
Discipline: Electrical Engineering
Specialization: Electro-Optics/ Infra-Red Modelling and Simulation

Dr Ahmad Salman
PhD (University of Manchester) UK
Discipline: Electrical Engineering
Specialization: Signal Processing, Speech Processing, Machine Learning

Dr M Shahzad Younis
PhD (University Technology Petronas) Malaysia
Discipline: Electrical Engineering
Specialization: Signal and Image Processing

Dr Hassan Aqeel Khan
PhD (Michigan State University) USA
Discipline: Electrical Engineering
Specialization: Machine Learning

Dr Wajahat Hussain
PhD (University of de Zaragoza) Spain
Discipline: Electrical Engineering
Specialization: Robotics

Dr Rehan Ahmed
PhD (The University of British Columbia) Canada
Discipline: Electrical and Computer Engineering

Dr Usman Zabit
PhD (University of Toulouse) France
Discipline: Opto-electronics, INPT

Engr Nasir Mahmood
MS (BUAA) China
Discipline: Electrical Engineering
Specialization: Embedded Systems, System on Chip (SOC) Design and Verification

Engr Arshad Nazir
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Telecommunication

Muhammad Imran Abeel
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Digital Systems and Signal Processing

Maryam Saeed
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Digital Systems and Signal Processing

Engr. Dr Hassaan Khaliq Qureshi, HoD IoT
PhD (City University London) England
Discipline: Electrical Engineering
Specialization: Wireless Communication and Networks, Internet of Things (IoTs), Energy Proficiency Issues

Dr Saad Qaisar
PhD (Michigan State University) USA
Discipline: Electrical Engineering
Specialization: Wireless & video Communication

Dr Syed Ali Hassan
PhD (Georgia Institute of Technology) USA
Discipline: Electrical Engineering
Specialization: Wireless Communications, Signal Processing

Dr Rizwan Ahmed
PhD (Victoria University) Australia
Discipline: Communication Engineering
Specialization: Wireless Communications

Dr Salman Abdul Ghafoor
PhD (University of Southampton) UK
Discipline: Electrical Engineering
Specialization: Fiber Optic Communications, Radio Over Fiber Systems, Millimeter Wave Communication

Dr Fahd Ahmed Khan
PhD (KAUST) SA
Discipline: Electrical Engineering
Specialization: Wireless Communication

Dr Sajjad Hussain
PhD Electronics Engineering, Dublin City University, Ireland
Discipline: Electrical Engineering
Specialization: Wireless Communications

Dr Huma Ghafoor
PhD From Multimedia Communication System Laboratory (MCSL) School of Electrical Engineering University of Ulsan (UOU) South Korea
Discipline: Electrical Engineering

Specialization: Communication Systems

Dr Syed Taha Ali
PhD (University of New South Wales) Australia
Discipline: Electrical Engineering
Specialization: Network Security, Internet of Things

Engr Yasir Iqbal
MS (University of Gavle) Sweden
Discipline: Electrical Engineering
Specialization: Microwave Engineering

Dr Farid Gul, HoD, EPC
PhD (BUAA) China
Discipline: Electrical Engineering
Specialization: Navigation Systems Integration

Engr Habeel Ahmad
MS (Michigan State University) USA
Discipline: Electrical Engineering
Specialization: Digital & Embedded Systems

Dr Ammar Hassan
PhD (Imperial College London) UK
Discipline: Electrical Engineering
Specialization: Control Systems

Dr Iftikhar Ahmed Rana
PhD (University of Versailles) France
Discipline: Electrical Engineering
Specialization: Non Linear Control Systems and Automation

Engr Mansoor Shaukat
MS (University of Southampton) UK
Discipline: Electronics Engineering
Specialization: Computer Systems, Pattern Recognition

Engr Muhammad Ramzan
MS (UNSW) Austrelia
Discipline: Electrical Engineering
Specialization: Communication and DSP

Dr M Latif Anjum
PhD (Politecnico di Torino) Italy
Discipline: Electrical Engineering
Specialization: Computer Vision and Robotics

Engr Shakeel Alvi
MS (GWU) USA
Discipline: Electrical Engineering
Specialization: Telecommunication and Computers

Engr Neelma Naz
MS (NUST) Pakistan
Discipline: Electrical Engineering
Specialization: Control Systems

Engr Mansoor Asif
MS (NCEPU) China
Discipline: Electrical Engineering
Specialization: Power Systems

Engr Muhammad Tahir Rasheed
MS (NCEPU) China
Discipline: Electrical Engineering
Specialization: Power Systems

Dr Usman Ali
Ph.D Electrical and Computer Engineering,
Georgia Institute of Technology, Atlanta GA, USA

Dr Usman Khan
PhD (Electrical Engineering)
University of Rome “Tor Vergata” (Italy)

Dr Zubair Rehman
PhD (Electrical Engineering)
School of Engineering and Advanced Technology Massey University, Palmerston North, New Zealand

Dr Hasan Arshad Nasir
PhD (Electrical Engineering)
Post Doc – University of Melbourne, Australia

Department of Computing

Dr Muazzam A. Khan Khattak Senior Head of Department
PhD International Islamic University Pakistan
Post Doc University of Missouri, USA
Discipline: Computer Science
Specialization: Wireless Sensor Networks, IoT, Data and Network Security, Localization

Software Engineering

Dr Omar Arif , HoD
PhD (Georgia Institute of Technology), USA
Discipline: Software Engineering
Specialization: Computer Vision, Machine Learning

Dr Nadeem Ahmed
PhD (UNSW), Australia
Discipline: Software Engineering
Specialization: Wireless Sensor Networks, Mobile Ad hoc Networks, Software Defined Networking

Dr Muhammad Moazam Fraz
PhD (Kingston University), UK
Discipline: Software Engineering
Specialization: Image Processing, Medical Image Analysis, Computer Vision and Pattern Recognition

Dr Faisal Shafait
PhD (TUKL), Germany
Discipline: Software Engineering
Specialization: Machine Learning and Pattern Recognition

Dr Muhammad Muneeb Ullah
PhD (INRIA & University of Rennes 1), France
Discipline: Software Engineering
Specialization: Computer Vision

Dr Shahzad Saleem
PhD (Stockholm University), Sweden
Discipline: Software Engineering
Specialization: Digital Forensics

Dr Muhammad Ali Tahir
PhD (RWTH Aachen University), Germany
Discipline: Software Engineering
Specialization: Automatic Speech Recognition, Pattern Recognition, Image Processing

Dr Imran Mahmood Qureshi
PhD (Royal Institute of Technology), Sweden
Discipline: Software Engineering
Specialization: Electronic & Computer Systems

Dr Muhammad Shahzad
Technical University of Munich (TUM), Germany
Discipline: Software Engineering
Specialization: Radar Remote Sensing, Point cloud Processing, 3D Computer Vision & Image Analysis

Engr Shamyl Bin Mansoor
MS (Seoul National University), South Korea
Discipline: Software Engineering
Specialization: Computer Vision & EECS

Engr Ayesha Kanwal
MS (NUST), Pakistan
Discipline: Software Engineering
Specialization: Information Security, Cloud Computing Security

Hirra Anwar
MS (NUST), Pakistan
Discipline: Software Engineering
Specialization: Information Security

Engr Taufique Ur Rehman
MS (NUST), Pakistan
Discipline: Software Engineering
Specialization: E-Commerce Application Development

Haleemah Zia
MS (NUST), Pakistan
Discipline: Software Engineering
Specialization: Information Security

Dr Hasan Tahir
PhD University of Essex
Discipline: Electronics and Computing Systems
Specialization: Cyber Security, IoT Security, Group Security

Dr Seemab Latif
PhD University of Manchester UK
Discipline: Computer Science
Specialization: Artificial Intelligence, Natural Language Processing (NLP)

Engr Dr Rafia Mumtaz
PhD University of Surrey, UK
Discipline: Computer Science
Specialization: Image Processing, Satellite Remote Sensing, GIS, Machine Learning, Computer Vision, IoT

Computer Science

Dr Aziz ur Rahim
PhD Dalian University of Technology, Dalian, China
Specialization: Mobile Computing

Dr Fahad Javed
PhD SBA School of Science and Engineering LUMS, Pakistan
Specialization: Autonomic Computing

Dr Sharifullah Khan
PhD (University of Leeds), UK
Discipline: Computer Science
Specialization: Databases, Information Retrieval

Dr Safdar Abbas Khan
PhD (University of Paris), France
Discipline: Computer Science
Specialization: Localization in Wireless Sensor Networks; Soft Computing Techniques

Dr Pakeeza Akram
PhD University of Delaware, USA
Specialization: Applied Machine Learning

Dr Abdul Wahid
PhD Kyungpook National University, Daegu, Rep of Korea
Specialization: Under water Sensor Networks

Dr Arsalan Ahmad
PhD (Politecnico di Torino), Italy
Discipline: Computer Science
Specialization: Energy Efficiency in Telecommunication Networks, Optical Network Optimization

Dr Imran Malik
PhD (Universty of Kaiserslautrn), Germany
Discipline: Computer Science
Specialization: Artificial Intelligence

Dr Qaiser Riaz
PhD, University of Bonn, Germany
Discipline: Computer Science
Specialization: Human motion analysis using inertial data, Motion reconstruction and Synthesis, Motion capturing and Character Animation

Dr Muazzam A. Khan
PhD International Islamic University Pakistan
Discipline: Computer Science
Specialisation: Wireless Sensor Networks, IoT, Data and Network Security, Localization

Dr Asad Ali Shah
PhD - Computer Science, Malaysia
Discipline: Computer Science
Specialization: Question Answering, Credibility Assessment, Information Retrieval, Information Processing, Semantic Web

Dr Muhammad Zeeshan
PhD (NUST), Pakistan
Discipline: Computer Science
Specialization: Wireless Networks

Maajid Maqbool
MBA (University of Windsor), Canada
Discipline: Computer Science
Specialization: Internet Technologies

Sana Khalique
MS (NUST), Pakistan
Discipline: Computer Science
Specialization: Distributed Computing

Dr Seema Jehan
PhD TU Graz, Austria
Discipline: Computer Science
Specialization: Automated Software Testing &Debugging

Dr Sidra Sultana
PhD (Military College of Signals), NUST
Discipline: Software Engineering
Specialization: Software Modeling & Verification

Dr Muhammad Asif Ali Rajput
PhD (TU Berlin), Germany
Discipline: Electrical Engineering
Specialization: Computer Vision

Dr Muhammad khuram Shahzad
PhD (Sungkyunkwan University),South Korea
Discipline: ComputerEngineering
Specialization: Artificial Intelligence, Wireless Sensor Networks

Innovative Technologies in Learning

Dr Sohail Iqbal (HoD ITL)
PhD (University of Paris-Est), France
Specialization: Surgical Robotics

Jaudat Mamoon
MSc (TUM, Munich), Germany
Discipline: Electrical Engineering
Specialization: Communications Engineering

Farzana Ahmed
MS (University of Sunderland), UK
Discipline: Education
Specialization: Teaching and Learning with Technology

Dr Muhammad Muddassir Malik
PhD (Vienna University of Technology), Austria
Specialization: Scientific and Information Visualization, Comparative Visualization, Industrial CT

Infromation Security

Dr Shahzad Saleem HoD Information Security (IS)
PhD (Stockholm University), Sweden
Discipline: Software Engineering
Specialization: Digital Forensics

Dr Hasan Tahir
PhD University of Essex
Discipline: Electronics and Computing Systems
Specialization: Cyber Security, IoT Security, Group Security

Dr Mehdi Hussain
PhD University of Malaya
Discipline: Computer Science
Specialization: Information Hiding

Dr Abdul Ghafoor Abbasi
PhD The Royal Institute of Technology, Sweden
Discipline: Network Security
Specialization: Security Protocols, Blockchain Applications, Secure VANET, Cloud Computing Security

Engr Ayesha Kanwal
MS (NUST), Pakistan
Discipline: Software Engineering
Specialization: Information Security, Cloud Computing Security

Ms Hirra Anwar
MS (NUST), Pakistan
Discipline: Software Engineering
Specialization: Information Security

Ms Haleemah Zia
MS (NUST), Pakistan
Discipline: Software Engineering
Specialization: Information Security

Faculty of Basic Sciences and Humanities

Moin-ud-Din
M.Sc (Punjab University) Pakistan
Discipline: Statistics
MCS (SZABIST) Pakistan
Discipline: Software Engineering

Dr Sajid Ali
PhD (NUST) Pakistan.
Discipline: Mathematics
Specialization: Mathematical Physics

Dr Ibrar Hussain
PhD (NUST) Pakistan.
Discipline: Mathematics
Specialization: General Relativity

Dr Quanita Kiran
PhD (NUST) Pakistan
Discipline: Mathematics
Specialization: Fixed Point Theory/ Functional Analysis

Dr Adnan Aslam
PhD (NUST) Pakistan
Discipline: Mathematics
Specialization: Partial Differential Equations

Dr Naila Amir
PhD (NUST) Pakistan
Discipline: Mathematics
Specialization: Mathematical Physics

Dr Muhammad Imran Malik
PhD (Beihang University) China
Discipline: Condensed Matter Physics

Dr Rai Sajjad Saif
PhD International Islamic University, Islamabad, Pakistan
Specialization: Fluid Dynamics

Saeed Afzal
M.Phil (International Islamic University) Pakistan
Discipline: Applied Mathematics

Ansar Shahzadi
M.Phil (Quaid-e-Azam University) Pakistan
Discipline: Statistics

Atifa Kanwal
M.Phil (Quaid-i-Azam University) Pakistan
Discipline: Mathematics

Muhammad Yousaf
M. Phil (International Islamic University) Pakistan
Discipline: Economics
Specialization: International & Monetary Economics

Usman Khawar
M.A (Punjab University) Pakistan
Discipline: English
Specialization: English Language & Literature

Komal Malik
M. Phil (International Islamic University) Pakistan
Discipline: Linguistics
Specialization: Linguistics

Dr Hina Munir Dutt
PhD NUST, Pakistan
Specialization: Differential Equations

Ammar Ahmed
M. Phil (International Islamic University) Pakistan
Discipline: Islamic Studies
Specialization: Hadith & Its Sciences

National and International Linkages

Industry Linkages

On the domestic front, SEECS has been quite successful, as one of the pioneers, in knitting industry and academia into a meaningful partnership and working in tandem on several practical ideas for the mutual benefit. This has helped them jointly propel the dormant conditions of our technology and engineering education centers. SEECS is engaged in various industrial projects through Corporate Advisory Council (CAC). SEECS has always actively participated in CAC telecom forum. This has greatly facilitated the two sides to share valuable inputs from each other and devise improved strategies to achieve the goals of academia-industry partnership. SEECS industry linkages have recently been extended overseas and a handful of projects have already completed in collaboration with US companies. Purpose of these linkages is to expose students to practical work experience in the industry and to familiarize them with the opportunities that exist for careers in Electrical Engineering and Computer Science. Some very well renowned companies including Trgtech, TechAccess, Bentley Systems, Buraaq Integrated Solutions, BrightSpyre and Personforce offer summer projects and provide professional and outstanding environment that offers hands-on career experience.

Industrial Collaboration & Professional Training Centers

SEECS professional credibility and its image as a catalyst to paradigm shifts in higher education, marked with an increasing emphasis on creativity and innovation has attracted to its premises some of the world class research laboratories, as the coveted gifts from leading companies. The Cisco Networking Academy Programme (CNAP) is a comprehensive e-learning programme that provides students with the Internet technology skills essential in a global economy. The Academy delivers online assessment, hands-on labs, instructor lead training and preparation for industry standard certifications. Microsoft Imagine Academy and Certiport Testing Centre provide the facility to help equip students with 21st century skills for academic and professional success.

Students Support Facilities

Library

NUST SEECS houses a state-of-the-art library with rich collection of books in the areas of Electrical engineering and Computer science. It has established its repute in the student community by providing excellent services and research facilities to fulfill information needs of its readers. It is equipped with the latest computers to access the digital library of more than 23,000 research journals (http://www.digitallibrary.edu.pk) and 130,000 online books (http://site.ebrary.com)

The library also subscribes three journals and twelve magazines for its readers. It has a collection of 15,000 books in the area of databases, networking, e-commerce, object-oriented programming, data communications, circuit analysis, antennas, digital signal processing, microwave engineering, wireless communications, satellite communications, fiber optic communications, mobile communications, digital design, control systems, mathematics, physics, chemistry, management, Islam, Urdu and English fiction, etc. Virtual University lectures CDs on different subjects have been provided for students and more than 1000 thesis in printed form are available for reference purpose. A dedicated desk, with a qualified staff has been established to provide reference services from the HEC digital library for SEECS researchers

All the library services are computerized and the Online Public Access Catalogue (library.seecs.nust.edu.pk) has been launched to help the faculty and students to check the library resources from anywhere

Lab Facilities

SEECS houses well equipped laboratories facilitating training and research activities. The systems and apparatus are maintained and kept updated by highly qualified lab staff. All labs are kept opened from 9am till 9pm to facilitate/encourage maximum learning and research activities.

Teaching and Research Facilities in Electrical Engineering

Following teaching labs have been established that play a vital role in training undergraduate students with the state-of-the-art electrical and computer design and analysis techniques

- Digital and Embedded Systems Lab
- Electromechanical and Power Systems Lab
- Basic Electronics Lab
- Control Systems Lab
- Advanced Electronics Lab
- Microwave Devices and Antenna Lab
- Digital Signal Processing Lab
- Communication Systems Lab

Besides the teaching lab following are the research labs managed by electrical engineering department

- Centre of Excellence for FPGA/ASIC Research (CEFAR)
- System Analysis and Verification (SAVe)
- Wireless, Sensor and Secure Network (WISNET Lab)
- Signal Processing & Machine Learning Lab (Sigma Lab)
- The Core Communications and Networks Laboratory (CoNNekT) Lab
- Electronics Systems Design Automation (ESDA) Lab
- Information Processing Transmission Lab
- Electroencephalogram (EEG) Research Lab
- GSM Lab
- Mobile Robotics Lab

Teaching and Research Facilities in Computing

Research facilities at Department of Computing include:

- HPC (High Performance Scientific Computing) Lab
- CERP (Centre for Education, Research and Practice) Lab
- TUKL-NUST R&D Center
- Centre for Research in Modelling, Simulation & Vision (CRIMSON) Lab

- KTH-AIS (Applied Information Security) Lab
- EMC (Centre of Excellence for Mobile Computing) Lab
- KBS (Knowledge Based Systems) Lab
- EMC Lab
- CRIMSON Lab
- IBM Linux Competency Center

Besides these research-oriented labs, teaching and skill labs have also been established which play a vital role in training and development of students. These include:

- Computing Lab #1
- Computing Lab #2
- Computing Lab #3
- Computing Lab #4
- Computing Lab #5
- Computing Lab # 6
- General Purpose Lab

Professional trainings related to IBM and Open Source technologies are conducted in the IBM Competency Center.

Student Bodies

Being a progressive and modern university, NUST attaches considerable importance to the grooming of young entrants as the leaders and managers of tomorrow. They are offered sufficient opportunities at SEECS to attain and polish various social and professional skills. For this purpose, following vibrant societies and clubs exists at SEECS. These societies support students enrich their life experience and broaden their outlook on important social and professional issues by engaging them in a wide range of wholesome social, cultural and intellectual activities throughout their stay at school.in a wide range of wholesome social, cultural and intellectual activities throughout their stay at SEECS.

- International Association for the Exchange of Students for Technical Experience – Islamabad
- One World Youth Project – Islamabad
- NUST Entrepreneur Club
- ACM Student Chapter
- IEEE Student Branch
- IEEE Women In Engineering
- IEEE Robotics & Automation Society
- Computer Society of Pakistan
- Youth Entrepreneur Society

Transport

The school provides transport facility to its students, faculty and staff. In the beginning of semester, the requirements for availing this facility are shared with prospective commuters and routes are determined according to the demand and the timely availability of transport is top priority of the school.

NUST SEECS Alumni

Syed Hassaan Tauqeer (BSCS-3)
Looking back at my four years in SEECS-NUST, I see the development of an educational institution unlike any other in Pakistan. With its roots anchored deep in research and entrepreneurship, SEECS has a culture of nurturing ideas and promoting its inhabitants on both national and foreign forums. The university proudly and actively indulges undergraduate students in international collaborative research projects to help them grow professionally. It also encourages them to appreciate and participate in the propagation of art and culture through clubs, societies and student organized conferences and festivals. The most important part of this university, however, is the integration of the diverse flavours that are represented by the people that come here from all over Pakistan. The opportunities that I was offered at SEECS helped me forge valuable connections from the world over and strengthened my technical capabilities while giving me the most amazing memories that I shall remember for a lifetime.

Laraib Shakeel (BESE-4)

During my stay at NUST, I got a chance to find my interests and polish my skills. Being a part of one of NUST's most prestigious schools was a great experience. The faculty and staff at SEECS are very encouraging and helpful. They helped me grow not only in academics but also as a human being. I learnt to balance my social life and work. SEECS taught me how to be productive under stress. It also taught me to not worry about things too much because everything happens for a reason. NUST gives you a hard time but it's all worth it in the end.

Khurram Javed (BESE-5)
When I joined NUST, I wasn't too sure of my decision. Many of my peers were going to the top universities all over the world, and I feared that I wouldn't have as many opportunities as they do. However, with-in a short time, all my doubts were cleared. Not only was I taught by extremely passionate and talented instructors, but I was also mentored to conduct quality research. NUST, then, provided me with funded international and national internships and helped me build a solid resume. Even before graduating, I had multiple funded offers for masters and PhD from reputed international universities. To summarize, NUST is a diverse place with a plethora of opportunities, and one only has to be willing to benefit from them.

Career Development Office

SEECS provides students sound academic foundation, with a focus on practical applications of knowledge and research. This makes them action-oriented, with diverse interests and backgrounds to meet the demands of their prospective employers.
The objective of setting up a Career Development Office (CDO) is to facilitate placements and internships of the graduates of the Master's and Undergraduate programmes. CDO offers counseling and placement services and undertakes a wide range of activities including company presentations, on-campus jobs, open house, job fairs, workshops on resume writing and interviewing skills, job search strategies etc. This helps the students and the companies to evaluate options and make the right choice matching with their respective needs.

Department of Computing

Department of Computing (DoC) is the first department established at SEECS. Within a decade, DoC has become one of the leading seats of learning in Computing. Students are prepared for the industry with emphasis on conceptual learning application of knowledge. DoC collaborates with international and national institutes of repute and at the same time maintains a vibrant relationship with the industry. Internship opportunities in industry and research groups are provided so that students get opportunity to work on real-life projects. Graduates from our department have gone on to work for national and international organisations of repute such as Oracle, Microsoft, IBM, etc.

Bachelors in Software Engineering

The BESE programme is designed to train students to become software engineers that are equipped to handle all phases of the software development process. The core courses include Software Engineering, Requirements Engineering, Software Quality Engineering, Software Project Management, etc.

Why join this program?

The aim of the Bachelors in Software Engineering degree is to produce well-rounded software engineers who can fulfil the demand for software researchers, academics and developers in Pakistan. While the study of software engineering has a lot in common with computer science, software engineers learn much more about creating high-quality software in a systematic, controlled, and efficient manner.

Associated Careers

With software permeating virtually all aspects of our work, a Software Engineering graduate has the option to work in many different sectors such as software industry, telecommunication, finance, healthcare, transport, etc. Other engineering areas like aeronautical, automotive, etc. also have increasing needs for software engineering. In addition, the SE programme develops a strong background for pursuing higher education and research. Graduates from our programmes are studying and doing research at some of the best universities and institutes around the world.

Scheme of Studies

Programme Code-605

Semester – I

Course Code	Course Title	Credits
HU–100	English	2-0
CS–114	Fundamentals of Programming	2-1
HU–107	Pakistan Studies	2-0
MATH–101	Calculus and Analytical Geometry	3-0
ME–105	Workshop Practice	0-1
PHY–102	Applied Physics	2-1
*MATH-161	Discrete Mathematics	3-0
	Total	**14-3**

Semester – II

Course Code	Course Title	Credits
*CS– 212	Object Oriented Programming (OOP)	3-1
HU–101	Islamic Studies	2-0
MATH–121	Linear Algebra and ODEs	3-0
ME –104	Engineering Drawing	0-2
HU-109	Communication Skills	2-0
*EE-221	Digital Logic Design	3-1
	Total	**13-4**

Semester – III

Course Code	Course Title	Credits
CS-220	Database Systems	3-1
SE-200	Software Engineering	3-0
CS-250	Data Structures & Algorithms	3-1
MATH-361	Probability and Statistics	3-0
	Supporting Science Elective-1	**3-0**
	General Education Elective-I	**3-0**
	Total	**18-2**

Semester – IV

Course Code	Course Title	Credits
EE-321	Computer Architecture and Organization	3-1
SE-311	Software Requirements Engineering	3-0
EE-353	Computer Networks	3-1
	SE Elective-I	3-0
	Supporting Science Elective-II	3-X
	Total	**17+X**

Semester – V

Course Code	Course Title	Credits
CS-330	Operating Systems	3-1
SE-210	Software Design and Architecture	3-1
	General Education Elective – II Professional Ethics	3-0

Semester – VI

Course Code	Course Title	Credits
SE-312	Software Construction	3-1
SE-320	Formal Methods	3-0
SE-321	Software Quality Engineering	3-0
MGT-271	Entrepreneurship	2-0

HU-210	Technical Writing	3-0
	Total	**19**

	SE Elective –III	3-1
	Supporting Science Elective –III	3-0
	Total	**19**

Semester – VII

Course Code	Course Title	Credits
SE-430	Software Project Management	3-0
SE-499	Final Year Project-I	0-3
	SE Elective – V	3-1
	SE Elective – IV	3-X
	General Education Elective- III	3-0
	Total	**16+X**

Semester – VIII

Course Code	Course Title	Credits
SE-499	Senior Project	0-4
	SE Elective VI	2+X-1
	General Education Elective- IV	3-0
CSL-401	Community Service Learning	0*-*2
	Total	**9+X**
	Grand Total	**133+X[1]**

Notes:

1. The labs and elective courses will be offered in such a way that the total number of credit hours should remain in between 133 - 137.
2. The Elective course in particular category may not be offered, if the minimum credit hours requirement is already met.
3. The order of offering of General Education/Supporting Science core courses can be changed depending on availability of resources.
4. * Community Service is a non-credit course.

SE Elective Courses

Note: No limit on number of courses, minimum 21Credit Hours

Code	Course Title	Credits
BIO-215	Bioinformatics	3(3-0)
BIO-317	Computational Biology	3(3-0)
CS-213	Advanced Programming	4(3-1)
CS-251	Design and Analysis of Algorithms	3(3-0)
CS-321	Advanced Database Systems	3(3-0)
CS-322	RDBMS Using Oracle	3(2-1)
CS-331	System Programming	3(2-1)
CS-332	Distributed Computing	4(3-1)
CS-334	Open Source Systems	4(3-1)
CS-340	Web Technologies I	3(2-1)
CS-342	Mobile Computing	3(3-0)
CS-344	Web Engineering	4(3-1)
CS-352	Theory of Automata and Formal Languages	3(3-0)
CS-361	Computer Graphics	4(3-1)
CS-362	Multimedia Systems and Design	3(2-1)
CS-363	Visualization	3(2-1)
CS-364	Game Programming	3(2-1)
CS-370	Artificial Intelligence	4(3-1)
CS-380	Introduction to Computer Security	3(3-0)
CS-381	Network Security	4(3-1)
CS-382	Fundamentals of Cryptography	3(3-0)
CS-414	Advanced Java with emphasis on Internet Applications	4(3-1)
CS4-23	Data warehousing and Data mining	4(3-1)
CS-424	Information Retrieval	3(3-0)
CS-425	Management Information systems	3(3-0)
CS-433	Applied parallel Computing	3(2-1)
CS-441	Web Technologies-II	4(3-1)
CS-443	E-Commerce and Solutions	3(3-0)
CS-453	Programming Languages	3(3-0)
CS-471	Machine Learning	4(3-1)
CS-472	Natural Language Processing	3(3-0)
CS-473	Theory of Intelligent Systems	4(3-1)
CS-474	Computer Vision	3(2-1)
CS-476	Speech and Image Processing	4(3-1)
CS-481	Computer Forensics	4(3-1)
CS-482	System Incident Handling	3(3-0)
CS-490	Advance Topics in Computing	3(3-0)
EC-303	Mobile Application Development for SME's	3(2-1)
EE-322	Wireless Networks	3(3-0)
EE-330	Digital Signal processing	4(3-1)
EE-350	Data Communication	3(3-0)
EE-430	Telecommunication Systems	3(3-0)
EE-433	Digital Image Processing	4(3-1)
SE-301	Object Oriented Software Engineering	3(3-0)
SE-313	Design Patterns	3(2-1)
SE-422	Software Testing	3(3-0)
SE-423	Software Metrics	3(3-0)
SE-431	Software Engineering Economics	3(3-0)
SE-440	Business Process Automation	3(3-0)
SE-490	Advanced Topics in Software Engineering	3(3-0)
CS-260	Human Computer Interaction	3(3-0)

General Education Elective Courses

Note: No limit on number of courses, minimum 12 Credit Hours
(The list below is by no means exhaustive. Any NUST ACM Approved University Elective can be opted with the approval of Department)

Course Code	Course Title	Credits
CS-271	Computational Logic	3(3-0)
CS-309	Computing and Society	3(3-0)
ECO-130	Engineering Economics	2(2-0)
FIN-100	Principles of Accounting	3(3-0)
FIN-204	Financial Management for IT Professional	2(2-0)
HRM-240	Organizational Behavior	2(2-0)
HRM-241	Organizational Behavior	3(3-0)
HRM-441	Human Resource Management	2(2-0)
HRM-442	Human Resource Management	3(3-0)
HU-102	Psychology	3(3-0)
HU-103	Principles of Sociology	3(3-0)
HU-104	English Literature	3(3-0)
HU-223	Professional Ethics	3(3-0)
MATH-232	Complex Variables and Transforms	3(3-0)
MGT-164	Introduction to Management	2(2-0)
MGT-175	Intellectual Property Rights	3(3-0)
MGT-452	New Business Ventures	2(2-0)
MKT-102	Principles of Business and Marketing	2(2-0)
OTM-455	Engineering Project Management	2(2-0)
PHY-101	Applied Physics	4(3-1)
PHY-401	Advanced Physics	3(2-1)
CH-101	Applied Chemistry	3(2-1)

Supporting Science Elective Courses

Note: No limit on number of courses, minimum 9 Credit Hours

Course Code	Course Title	Credits
CS-382	Fundamentals of Cryptography	3(3-0)
EE-102	Basic Electrical Engineering	4(3-1)
EE-201	Engineering Mechanics	3(3-0)
EE-215	Electronic Circuits & Devices	4(3-1)
EE-232	Signals and Systems	4(3-1)
EE-414	Digital Electronics	4(3-1)
EE-477	Analog and Digital Communication	4(3-1)
MATH-112	Calculus II	3(3-0)
MATH-133	Engineering Mathematics	3(3-0)
MATH-221	Number Theory	3(3-0)
MATH-232	Complex Variables and Transforms	3(3-0)
MATH-234	Multivariable Calculus	3(3-0)
MATH-351	Numerical Methods	3(3-0)
MATH-352	Numerical Methods	3(2-1)
PHY-401	Advance Physics	3(2-1)

Bachelors of Science in Computer Science

The aim of the degree programme is twofold: firstly to create well-rounded computer scientists who will fulfil the demand for computer science researchers and software developers in Pakistan, and, secondly to nurture entrepreneurship among the young computer scientists to promote innovation at a national level. The emphasis of entrepreneurship in the programme will hopefully give birth to new developments in the field of computing. The students of this programme will help in strengthening research projects in core computer science areas and bring new ideas for establishing independent businesses that shall contribute towards the economy of the country.

The programme contains mandatory courses in the areas of artificial intelligence, compiler construction, theory of automata and formal languages, scientific computing and analysis of algorithms. In addition, the CS programme will contain courses like Introduction to Management, Strategic Marketing and Management, Entrepreneurship, Intellectual Property, Accounting and New Business Ventures to encourage entrepreneurship in the students.

Why join this program?

The aim of the Bachelors in Computer Science degree is to produce well-rounded computer professionals who can create new technologies and ideas and devise new ways to use computers. The degree in CS is the most flexible of degrees and can open doors into the professional worlds of many other disciplines. The programme serves those students who wish to proceed as entrepreneurs or generalists in computing or who aspire to graduate study, research positions, or cross-disciplinary innovation. This Programme develops skills in students for applying the concepts, principles, and practices in Computer Science for analysing and solving real world problems to support industry, research and development. The students are provided effective personal development and team-work skills for continuing professional growth and life-long learning and awareness of their social, professional and ethical responsibilities in national and international environment.

Associated Careers

Computer Science graduates have a world of career opportunities before them. The CS professionals can generate and implement creative solutions to difficult problems, as well as to train the next generation of computer scientists and software professionals. They not only can work as entrepreneurs but also have the option to work as software developers and analysts in many different sectors such as software industry, telecommunications, finance, healthcare etc.. In addition, the CS programme develops a strong background for pursuing higher education and research.

Scheme of Studies

Programme Code-606

Semester I

Course Code	Course Title	Credits
CS-100	Fundamentals of ICT	2-1
CS-110	Fundamentals of Computer Programming	3-1
HU-101	Islamic Studies	2-0
HU-109	Communication Skills	2-0
MATH-111	Calculus-I	3-0
MATH-161	Discrete Mathematics	3-0
	Total	**17**

Semester II

Course Code	Course Title	Credits
CS-212	Object Oriented Programming	3-1
EE-221	Digital Logic Design	3-1
HU-107	Pakistan Studies	2-0
MATH-112	Calculus - II	3-0
PHY-101	Applied Physics	3-1
XX-xxx	University Elective-I	2+X-X
	Total	**19+X**

Semester III

Course Code	Course Title	Credits
CS-220	Database Systems	3-1
CS-235	Computer Organisation and Assembly Language	3-1
CS-250	Data Structures & Algorithms	3-1
HU-212	Technical & Business Writing	2-0
MATH-222	Linear Algebra	3-0
	Total	**17**

Semester IV

Course Code	Course Title	Credits
CS-251	Design and Analysis of Algorithms	3-0
CS-260	Human Computer Interaction	3-0
EE-321	Computer Architecture and Organisation	3-1
MATH-361	Probability and Statistics	3-0
XX-xxx	CS Elective-I	3-X
	Total	**16-X**

Semester V

Course Code	Course Title	Credits
CS-330	Operating Systems	3-1
SE-200	Software Engineering	3-0
EE-353	Computer Networks	3-1
CS-370	Artificial Intelligence	3-1
XX-xxx	CS Elective – II	3-X
	Total	**18-X**

Semester VI

Course Code	Course Title	Credits
CS-352	Theory of Automata and Formal Languages	3-0
HU-222	Professional Ethics	2-0
MATH-333	Numerical Analysis	3-1
XX-xxx	CS Elective – III	3-X
XX-xxx	University Elective – II	3-0
XX-xxx	University Elective –III	3-0
	Total	**18-X**

Semester VII

Course Code	Course Title	Credits
CS-354	Compiler Construction	3-1
CS-499	Final Year Project-I	0-3
MGT-271	Entrepreneurship	2-0
XX-xxx	CS Elective – IV	3-X
XX-xxx	University Elective -IV	2+X-X
	Total	**14-X**

Semester VIII

Course Code	Course Title	Credits
XX-xxx	University Elective – V	3-0
XX-xxx	CS Elective – V	3-X
XX-xxx	CS Elective – VI ***	3-X
CSL-401	Community Service	1****
CS-499	Final Year Project-II	0-3
	Total	**12+X**
	Grand Total	**131+X**

Notes:

* Minimum Credit Hours of CS Electives and University Electives are fixed to 18 and 13 respectively.
** Number of CS & University Elective courses is dynamic with respect to minimum credit hours.
*** The CS Elective VI may not be offered, if the minimum 18 credit hours requirement is already met.
**** Community Service is a non-credit course.

CS Elective Courses

Course Code	Course Title	Credits
Track	**Data and Knowledge Management System**	
CS423	Data Warehousing and Data Mining	4(3+1)
CS321	Advanced Database Systems	3(3+0)
CS340	Web Technologies-I	3(2+1)
CS443	E-Commerce and Solutions	3(3+0)
CS424	Information Retrieval	3(3+0)
CS322	RDBMS Using Oracle	3(2+1)
CS441	Web Technologies-II	4(3+1)
CS425	Management Information Systems	3(3+0)
Track	**Intelligent Systems**	
CS471	Machine Learning	4(3+1)
CS472	Natural Language Processing	3(3+0)
CS473	Theory of Intelligent Systems	4(3+1)
CS476	Speech and Image Processing	4(3+1)
CS474	Computer Vision	3(2+1)
BIO317	Computational Biology	3(3+0)
BIO215	Bioinformatics	3(3+0)
Track	**Computer Graphics and Multimedia Systems**	
CS361	Computer Graphics	4(3+1)
EE433	Digital Image Processing	4(3+1)
CS362	Multimedia Systems and Design	3(2+1)
CS363	Visualization	3(2+1)
CS364	Game Programming	3(2+1)
Track	**Parallel and Distributed Systems**	
CS332	Distributed Computing	4(3+1)
CS342	Mobile Computing	3(3+0)
CS433	Applied Parallel Computing	3(2+1)
CS334	Open Source Systems	4(3+1)
CS331	System Programming	3(2+1)

Course Code	Course Title	Credits
Track	**Software Engineering**	
SE440	Business Process Automation	3(3+0)
SE313	Design Patterns	3(2+1)
SE423	Software Metrics	3(3+0)
SE422	Software Testing	3(3+0)
SE431	Software Engineering Economics	3(3+0)
SE430	Software Project Management	3(3+0)
SE320	Formal Methods	3(3+0)
SE301	Object-oriented Software Engineering	3(3+0)
SE210	Software Design and Architecture	4(3+1)
SE321	Software Quality Engineering	3(3+0)
SE311	Software Requirements Engineering	3(3+0)
CS344	Web Engineering	4(3+1)
Track	**Computer Security**	
CS381	Network Security	4(3+1)
CS380	Introduction to Computer Security	3(3+0)
CS481	Computer Forensics	4(3+1)
CS482	System Incident Handling	3(3+0)
EE322	Wireless Networks	3(3+0)
Track	**Miscellaneous**	
EE430	Telecommunication Systems	3(3+0)
EE232	Signals and Systems	4(3+1)
EE330	Digital Signal Processing	4(3+1)
EE350	Data Communication	3(3+0)
CS213	Advanced Programming	4(3+1)
EC303	Mobile Application Development for SME's	3(2+1)
CS414	Advanced Java with emphasis on Internet Applications	4(3+1)
CS453	Programming Languages	3(3+0)
CS490	Advanced Topics in Computing	3(3+0)

University Electives

Course Code	Course Title	Credits
HRM441	Human Resource Management	2(2+0)
MGT175	Intellectual Property Rights	3(3+0)
HU115	Principles of Sociology	3(3+0)
HU102	Psychology	3(3+0)
HU104	English Literature	3(3+0)
FIN100	Principles of Accounting	3(3+0)
CS309	Computing and Society	3(3+0)
MGT164	Introduction to Management	2(2+0)
HRM240	Organizational Behavior	2(2+0)
ECO130	Engineering Economics	2(2+0)

Course Code	Course Title	Credits
MKT102	Principles of Business and Marketing	2(2+0)
FIN204	Financial Management for IT Professional	2(2+0)
MGT452	New Business Ventures	2(2+0)
EE212	Basic Electronics	3(2+1)
CS271	Computational Logic	3(3+0)
CH101	Applied Chemistry	3(2+1)
PHY401	Advanced Physics	3(2+1)
MATH232	Complex Variables and Transforms	3(3+0)
OTM455	Engineering Project Management	2(2+0)

MS and PhD in Computer Science

The aim of this degree programme is to create well-rounded computer scientists who can fulfil the demand for computer science researchers, academics, and practitioners in Pakistan. Furthermore, this programme tends to target system-level approach for the design of computing applications, so only highly-specialised, theoretically-sound, and practically-important courses will be offered. The main objective of the MSCS degree programme is to give its students a strong background in advanced topics of computer science which will then be complimented with specialised postgraduate courses in areas of immense research and commercial potential. This programme has been designed to produce highly-skilled professionals who would be trained computer science areas, namely Algorithms and Complexity, Architecture and Organisation, Operating Systems, Intelligent Information Management, Graphics and Visual Computing, Human-Computer Interaction, Web Technologies, and Software Engineering.

Why join this program?

The Masters of Computer Science programme will provide a theoretical and in-depth perspective of the principles and practice of emerging and classical software systems with an emphasis on hard core computer science aspects of these systems. The coursework is structured in a way that will ensure that the students are equally capable of applying their knowledge and skills to particular specialisation areas such as High Performance Computing, Data Management and Intelligent Software Systems. Based on their learning and research interactions, MSCS students at Department of Computing get a unique exposure by visiting world-class research labs, both for short and long-term projects.

Associated Careers

In this programme, highly-specialised, theoretically-sound, and practically-important courses will be offered. Graduates of this programme can subsequently utilise their knowledge to pursue a PhD, get employment in relevant national and multinational companies/ industries, become entrepreneurs or research scientists.

MS Coursework
Semester-I

Course Code	Course Name	Credits
CS-813	Mathematical Methods for Computing	3
CS-837	Advanced Operating Systems	3
CS-850	Advanced Theory of Computation	3
CS-854	Advanced Algorithm Analysis	3

Elective Courses

Parallel and Distributed Computing (PDC)

Course Code	Course Title	Credits
CS-821	Distributed Databases	3
CS-830	Advanced Computer Architecture	3
CS-832	Parallel Computing	3
CS-833	Cloud Computing	3
CS-834	Scientific Computing	3
CS-836	Advanced Distributed Computing	3
CS-839	Parallel and Distributed Simulation	3
CS-865	Ubiquitous and Autonomic Computing	3
IS-838	Advanced Simulation & Modeling	3
CS-897	Advanced Topics in Computing	3
Graphics and Visual Computing (GVC)		
CS-861	Advanced Computer Graphics	3
CS-862	Advanced Image Processing	3
CS-864	Scientific Visualization	3

Programme Code-613

CS-866	Information Visualization	3
CS-867	Computer Vision	3
CS-869	Game Design	3
CS-876	Augmented and Virtual Reality	3
CS-893	Advanced Computer Vision	3
CS-897	Advanced Topics in Computing	3
Intelligent Information Systems (IIS)		
CS-863	Applied Artificial Intelligence	3
CS-871	Machine Learning	3
CS-875	Natural Language Processing	3
CS-878	Deep Learning	3
CS-879	Advanced Machine Learning	3
CS-890	Advanced Data Science	3
CS-891	Multi Agent Systems	3
CS-895	Big Data Analytics	3
CS-897	Advanced Topics in Computing	3
Software Design and Management (SDM)		
CS-810	Advanced Requirements Engineering	3
CS-811	Component-based Software Engineering	3
CS-812	Object Oriented Analysis & Design	3
CS-840	Software Verification	3
CS-841	Software Quality Engineering	3
CS-842	Rich Internet Applications	3
CS-853	Formal Methods	3

CS-860	Advanced Software Engineering	3
CS-869	Model Driven Software Engineering	3
CS-897	Advanced Topics in Computing	3
Computer & Wireless Networks (C&WN)		
IT-877	Advance Computer Networks	3
IT-872	Wireless Networks	3
IT-874	Wireless Sensor Networks	3
IT-875	QOS for Networks	3
IS-852	Data Communication Networks & Security	3
CSE-879	Network Performance Analysis	3
EE-981	Network Switching and Routing	3
CS-897	Advanced Topics in Computing	3
IS-821	Advanced Network / Web Security	3
Research / Thesis		
CS-899	MS Thesis	6
CS-999	PhD Thesis	30
Additional Courses		
RM-898	Research Methodology	2
SEM/WKSP-897	Seminar / Workshop	1
SEM/WKSP-997	Seminar / Workshop	1

PhD Course Curriculum

The PhD candidates can take any course of 800/900 level with consultation with their supervisor and GEC. The GEC may specify additional subjects to be taken by the PhD student, if considered essential. After successful completion of 800/900 level courses with a minimum CGPA 3.5 out of 4.0, the student take the qualifying examination. The examination is conducted into parts, Part-A is written comprehensive test and Part-B is Oral examination.

PhD Coursework

PhD candidates can take any of the following courses during their coursework.

Course Code	Course Title	Credits
CS-813	Mathematical Methods for Computing	3
CS-837	Advanced Operating Systems	3
CS-850	Advanced Theory of Computation	3
CS-854	Advanced Algorithm Analysis	3
CS-821	Distributed Databases	3
CS-830	Advanced Computer Architecture	3
CS-832	Parallel Computing	3
CS-833	Cloud Computing	3
CS-834	Scientific Computing	3
CS-836	Advanced Distributed Computing	3
CS-839	Parallel and Distributed Simulation	3
CS-865	Ubiquitous and Autonomic Computing	3
IS-838	Advanced Simulation & Modeling	3
CS-897	Advanced Topics in Computing	3
CS-861	Advanced Computer Graphics	3
CS-862	Advanced Image Processing	3
CS-864	Scientific Visualization	3
CS-866	Information Visualization	3
CS-867	Computer Vision	3
CS-869	Game Design	3
CS-876	Augmented and Virtual Reality	3
CS-893	Advanced Computer Vision	3
CS-897	Advanced Topics in Computing	3
CS-863	Applied Artificial Intelligence	3
CS-871	Machine Learning	3
CS-875	Natural Language Processing	3
CS-878	Deep Learning	3
CS-879	Advanced Machine Learning	3
CS-890	Advanced Data Science	3
CS-891	Multi Agent Systems	3
CS-895	Big Data Analytics	3
CS-897	Advanced Topics in Computing	3
CS-810	Advanced Requirements Engineering	3
CS-811	Component-based Software Engineering	3
CS-812	Object Oriented Analysis & Design	3
CS-840	Software Verification	3
CS-841	Software Quality Engineering	3
CS-842	Rich Internet Applications	3
CS-853	Formal Methods	3
CS-860	Advanced Software Engineering	3
CS-869	Model Driven Software Engineering	3
CS-897	Advanced Topics in Computing	3
IT-877	Advance Computer Networks	3
IT-872	Wireless Networks	3
IT-874	Wireless Sensor Networks	3
IT-875	QOS for Networks	3
IS-852	Data Communication Networks & Security	3
CSE-879	Network Performance Analysis	3
EE-981	Network Switching and Routing	3
CS-897	Advanced Topics in Computing	3
IS-821	Advanced Network / Web Security	3
CS-999	PhD Thesis	30

MS and PhD in Information Technology

The MS (IT) degree aims to equip graduates with a range of technical, business and behavioral skills needed for the successful implementation and management of Information Technology in todays' business environment. Graduates of the programme take IT professional positions in industry and organizations, or pursue higher education and research in related disciplines.

Why join this program?

The Masters of Information Technology curriculum inculcates advanced knowledge of information and communication technology. It is an ideal choice for a student who wishes to enhance his/her expertise with specialist IT knowledge. Based on their learning and research interactions, MSIT students at Department of Computing get a unique exposure by visiting world-class research labs, both for short and long-term projects.

Associated Careers

The graduates of MSIT programme have gone on to achieve success in both industry and research in Information Technology and Computing. They attribute their success to the high quality of teaching and emphasis on research activities. The graduates are working in various national and multinational IT firms as research scientists, managers, business analysts, network system analysts, and a few of them are successful technology entrepreneurs.

Programme Code-600

MS Coursework

Semester – I

Course Code	Course Title	Credits
CS-820	Advance Database Concepts	3
CS-812	Object-oriented Analysis & Design	3
EE-981	Network Switching and Routing	3
IT-852	Mathematical Methods of IT	3

Elective Courses

Mobile and Cloud Technologies (MCT)

CS-831	Parallel Computing	3
CS-833	Cloud Computing	3
CS-836	Advance Distributed Computing	3
CS-865	Ubiquitous and Autonomic Computing	3
SE-816	Advanced OO Design and Implementation	3
IT-817	Enterprise OO Technologies	3
IT-861	Applied Cloud Computing	3
IT-862	Mobile Application Development	3
CS-897	Advanced Topics in Computing	3

Network Technologies (NWT)

IT-853	Advanced Network Security	3
IT-860	Advanced Data Communication	3
IT-872	Wireless Networks	3
IT-874	Wireless Sensor Networks	3
IT-875	QOS for Networks	3
IT-876	Network Design & Management	3
IT-877	Advance Computer Networks	3

EE-884	Photonic Networks	3
CSE-844	Performance Analysis of Networks	3
IT-863	Internet of Things	3
IT-864	Software Defined Networking	3
CS-897	Advanced Topics in Computing	3

Database Technologies (DBT)

CS-821	Distributed Databases	3
CS-822	Data Mining	3
CS-823	Advanced Topics in Database	3
CS-824	Web-based Databases	3
CS-825	Information Retrieval	3
CS-826	Object-Oriented Databases	3
CS-866	Information Visualization	3
CS-871	Machine Learning	3
CS-885	Data Security & Privacy	3
CS-897	Advanced Topics in Computing	3

E-Commerce Technologies (ECT)

IT-800	Strategic Information Management	3
IT-801	E-commerce Engineering	3
IT-802	Planning and Designing E-commerce Projects	3
CS-803	Internet Marketing	3
CS-804	E-commerce Laws and Regulations	3
CS-842	Rich Internet Applications	3
CS-897	Advanced Topics in Computing	3

Additional Elective Courses

IT-807	Cryptography and Security Mechanisms	3
IT-815	Graph Theory & Algorithm	3
IT-855	Logical & Formal Methods	3
CS-810	Advanced Requirements Engineering	3
CS-811	Component-based Software Engineering	3
CS-832	Distributed Computing	3
CS-834	Scientific Computing	3
CS-840	Software Verification	3
CS-841	Software Testing & Quality Engineering	3
CS-853	Formal Methods	3
CS-861	Advanced Computer Graphics	3
CS-862	Advanced Image Processing	3
CS-864	Scientific Visualization	3
CS-872	Ontology Engineering	3
CS-873	Semantic Web	3
CS-877	Artificial Intelligence & Machine Learning	3
CS-880	Information Assurance	3
CS-882	Advanced Information Security	3
CS-881	Computer Security Architecture	3
SE-860	Advanced Software Engineering	3
SE-869	Model Driven Software Engineering	3
IS-838	Advanced Simulation & Modeling	3

Research / Thesis

CS-899	MS Thesis	6

Additional Courses

RM-898	Research Methodology	2
SEM/WKSP-897	Seminar / Workshop	1

PhD Course Curriculum

The PhD candidates can take any course of 800/900 level with consultation with their supervisor and GEC. The GEC may specify additional subjects to be taken by the PhD student, if considered essential. After successful completion of 800/900 level courses with a minimum CGPA 3.5 out of 4.0, the student take the qualifying examination. The examination is conducted into parts, Part-A is written comprehensive test and Part-B is Oral examination.

PhD Coursework

PhD candidates can take any of the following courses during their coursework.

Course Code	Course Title	Credits
CS-820	Advance Database Concepts	3
CS-812	Object-oriented Analysis & Design	3
EE-981	Network Switching and Routing	3
IT-852	Mathematical Methods of IT	3
CS-831	Parallel Computing	3
CS-833	Cloud Computing	3
CS-836	Advance Distributed Computing	3
CS-865	Ubiquitous and Autonomic Computing	3
SE-816	Advanced OO Design and Implementation	3
IT-817	Enterprise OO Technologies	3
IT-861	Applied Cloud Computing	3
IT-862	Mobile Application Development	3
CS-897	Advanced Topics in Computing	3
IT-853	Advanced Network Security	3
IT-860	Advanced Data Communication	3
IT-872	Wireless Networks	3
IT-874	Wireless Sensor Networks	3
IT-875	QOS for Networks	3
IT-876	Network Design & Management	3
IT-877	Advance Computer Networks	3
EE-884	Photonic Networks	3
CSE-844	Performance Analysis of Networks	3
IT-863	Internet of Things	3
IT-864	Software Defined Networking	3
CS-897	Advanced Topics in Computing	3
CS-821	Distributed Databases	3
CS-822	Data Mining	3
CS-823	Advanced Topics in Database	3
CS-824	Web-based Databases	3
CS-825	Information Retrieval	3
CS-826	Object-Oriented Databases	3
CS-866	Information Visualization	3
CS-871	Machine Learning	3
CS-885	Data Security & Privacy	3
CS-897	Advanced Topics in Computing	3
IT-800	Strategic Information Management	3
IT-801	E-commerce Engineering	3
IT-802	Planning and Designing E-commerce Projects	3
CS-803	Internet Marketing	3
CS-804	E-commerce Laws and Regulations	3
CS-842	Rich Internet Applications	3
CS-897	Advanced Topics in Computing	3
IT-807	Cryptography and Security Mechanisms	3
IT-815	Graph Theory & Algorithm	3
IT-855	Logical & Formal Methods	3
CS-810	Advanced Requirements Engineering	3
CS-811	Component-based Software Engineering	3
CS-832	Distributed Computing	3
CS-834	Scientific Computing	3
CS-840	Software Verification	3
CS-841	Software Testing & Quality Engineering	3
CS-853	Formal Methods	3
CS-861	Advanced Computer Graphics	3
CS-862	Advanced Image Processing	3
CS-864	Scientific Visualization	3
CS-872	Ontology Engineering	3
CS-873	Semantic Web	3
CS-877	Artificial Intelligence & Machine Learning	3
CS-880	Information Assurance	3
CS-882	Advanced Information Security	3
CS-881	Computer Security Architecture	3
SE-860	Advanced Software Engineering	3
SE-869	Model Driven Software Engineering	3
IS-838	Advanced Simulation & Modeling	3

Research / Thesis

CS-999	PhD Thesis	30

Additional Courses

SEM/WKSP-997	Seminar / Workshop	1

MS & PhD in Information Security

The Masters in Information Security (MS-IS) programme aims to produce highly-skilled professionals who are trained in three important areas of information security, namely Network Security, Computer Security, and Data Security. In addition to the focus on information security management and technical principles, another distinguishing aspect of the MS-IS programme is the application of information security to research and development in advanced computer and communication systems. The coursework of the MS-IS programme has been designed with a special emphasis on preparing research-ready students that can undertake significant postgraduate research work, as well as equipping them with practical knowledge needed to pursue a career in information security engineering.

Why join this program?

Information security is one of the most essential requirements for an information-based economy of the future. Organisations and people that use and depend on information technology must ensure that their systems are not compromised and exploited by attackers. This programme will expose the students to the advanced technologies in attacking computer and communication systems as well as preventing attacks. Students will have a solid foundation to conduct research and development in new security technologies which will give them a competitive advantage in the industry. It should be noted that this degree is intellectually challenging and students with a passion for problem solving using mathematics and/or computer programming will find this course very interesting and rewarding.

Associated Careers

The MS-IS degree can create opportunities for employment as security consultants in major public service sectors, such as telecommunications and banking, as well as employment within specialist information security research and development companies (both local and foreign).

MS Coursework

Programme Code-630

Core Courses

Course Code	Course Title	Credits
IS-820	Computer Security	3
IS-821	Network Security	3
IS-842	Advanced Cryptography – I	3
IS-830	Information Security Management	3
IS-899	MS Thesis	6

Elective Courses

Course Code	Course Title	Credits
Cryptology		
IS-843	Advanced Cryptography – II	3
IS-844	Cryptanalysis	3
IS-845	Quantum Cryptography	3
IS-846	Formal Methods for Information Security	3
IS-891	Advanced Topics in Cryptology	3
Systems / Network Security		
IS-822	Wireless Network Security	3
IS-825	Vulnerability Exploitation and Defense	3
IS-827	Electronic Warfare – Principles and Techniques	3
IS-851	Secure Communications	3
IS-852	Data Communication Networks & Security	3
IS-853	Cloud Computing Security	3
IS-854	Advanced Web Security	3
IS-861	Secure Electronic Commerce	3
IS-863	Cellular and Mobile Network Security	3
IS-859	Information Security Engineering	3
IS-893	Advanced Topics in Systems Security	3
Information Security Management		
IS-831	Information Security Project Management	3
IS-833	IT Security Evaluation & Auditing	3
IS-832	Legal Aspects of Information Security	3
IS-834	Security Planning and Incident Management	3
IS-835	Security Risk Analysis and Management	3
IS-836	Auditing Networks, Perimeters and Systems	3
IS-837	Security and Privacy of Information and Information Systems	3
IS-894	Advanced Topics in Information Security Management	3

Digital Forensics and Incident Response		
IS-823	Computer Forensics	3
IS-839	Critical Infrastructure Protection and Incident Management	3
IS-855	Information Hiding	3
IS-870	Network Forensics	3
IS-871	OS & File System Forensics	3
IS-872	Forensics Incident Response	3
IS-873	Malware Analysis and Reverse Engineering	3
IS-874	Intrusion Detection	3
IS-895	Advanced Topics in Digital Forensics and Incident Response	3
General		
IS-810	Secure Coding	3
IS-824	Biometrics	3
IS-826	Cyber Warfare	3
IS-856	Access Control and Database Security	3
IS-890	Advanced Topics in Information Security	3
IS-838	Advanced Simulation and Modeling	3
CE-838	Analysis of Stochastic Systems	3
SE-802	Pattern Recognition	3
SE-805	Advance Artificial Intelligence	3
IS-999	PhD Thesis	30
Additional Courses		
RM-898	Research Methodology	2
SEM/WKSP-897	Seminar / Workshop	1
SEM/WKSP-997	Seminar / Workshop	1

PhD Course Curriculum

The PhD candidates can take any course of 800/900 level with consultation with their supervisor and GEC. The GEC may specify additional subjects to be taken by the PhD student, if considered essential. After successful completion of 800/900 level courses with a minimum CGPA 3.5 out of 4.0, the student take the qualifying examination. The examination is conducted into parts, Part-A is written comprehensive test and Part-B is Oral examination.

PhD Coursework

PhD candidates can take any of the following courses during their course work.

Course Code	Course Title	Credits
IS-830	Information Security Management	3
IS-843	Advanced Cryptography	3
IS-851	Secure Communications	3
IS-852	Data Communication Networks & Security	3
IS-844	Cryptanalysis	3
IS-810	Secure Coding	3
IS-822	Wireless Network Security	3
IS-823	Computer Forensics	3
IS-825	Vulnerability Exploitation & Defense	3
IS-833	IT Security Evaluation & Auditing	3
IS-824	Biometrics	3
IS-831	Information Security Project Management	3
IS-826	Cyber Warfare	3
IS-856	Access Control and Database Security	3
IS-855	Information Hiding	3
IS-854	Advanced Web Security	3
IS-853	Cloud Computing Security	3
IS-842	Applied Cryptography	3
EE-852	Information and Coding Theory	3
CE-838	Analysis of Stochastic Systems	3
IS-820	Computer Security	3
IS-821	Network Security	3

Department of Electrical Engineering

The Electrical Engineering (EE) Department at SEECS currently offers an undergraduate degree in Electrical Engineering with various specializations and a strong postgraduate programme leading to PhD in Electrical Engineering. The EE department offers a broad range of EE courses, both elementary and advanced, spanning the whole gamut of EE disciplines including areas such as electronics, electrical machines, power engineering, control systems, communication systems and networks.
The EE department aims to achieve academic and research leadership in its subject areas through its well-designed curriculum (that emphases conceptual understanding and fosters creativity) coupled with its strong focus on research, innovation, and industry-liaison. The school also strongly emphasizes on imbibing the graduates with strong professional ethics.

Bachelors in Electrical Engineering

Electrical Engineering encompasses a broad spectrum of knowledge areas including electronics (Digital and Analogue), Signal Processing and Communication Systems, Control Systems and Robotics, Electromagnetics and Electro-optics, Electrical Energy Generation and Distribution.
The Electrical Engineering department at SEECS prepares the students to become professional electrical engineers who are proficient in applying the knowledge acquired at school in core electrical engineering disciplines to solve practical engineering problems.

Why join this program?

In the contemporary world, applications of electronics and electrical engineering are both diverse and pervasive. By joining the Electrical Engineering programme you take the first step in becoming a member of an elite group of specialists who will always have a niche area of knowledge which shall never get redundant. The programme is especially prominent for the following reasons:

- Strong focus on teaching excellence
- Strong focus on incorporating practical skills in lab work and on fostering research and innovation
- Increased job opportunities due to greater market acceptance

Associated Careers

Electrical and electronic engineering graduates are in demand in a number of industries-broadcast communications, mobile communications, optical communications, integrated circuit design, instrumentation, medical engineering, avionics, consumer electronics and computer networking, to name but a few. Graduates can also pursue research, as PhD students, or join industrial laboratories.

Scheme of Studies

Programme Code: 604

Semester-I

Course Code	Course Title	Credits
MATH-101	Calculus and Analytical Geometry	3-0
ME-104	Engineering Drawing	0-1
HU-100	English	2-0
CS-113	Introduction to Programming	1-1
MATH-121	Linear Algebra and ODEs	3-0
HU-107	Pakistan Studies	2-0
PHY-101	Applied Physics	3-1
	Total	**17**

Semester-II

Course Code	Course Title	Credits
EE-111	Linear Circuit Analysis	3-1
ME-100	Engineering Mechanics	3-0
HU-101	Islamic Studies	2-0
ME-105	Workshop Practice	0-1
MATH-106	Multivariable & Vector Calculus	3-0
CS-212	Object Oriented Programming	3-1
EGR-100	Engineering Foundation Course	Non Credit
	Total	**17**

Semester-III

Course Code	Course Title	Credits
EE-221	Digital Logic Design	3-1
CS-250	Data Structures and Algorithms	3-1
EE-211	Electrical Network Analysis	3-1
ME-102	Thermodynamics	2-0
MATH-232	Complex Variables and Transforms	3-0
	Total	**17**

Semester-IV

Course Code	Course Title	Credits
EE-232	Signals and Systems	3-1
EE-215	Electronic Devices and Circuits	3-1
HU-109	Communication Skills	2-0
EE-222	Microprocessor Systems	3-1
MATH-361	Probability & Statistics	3-0
	Total	**17**

Semester – V

Course Code	Course Title	Credits
MATH-351	Numerical Methods	3-0
EE-260	Electrical Machines	3-1
EE-313	Electronic Circuit Design	3-1
EE-351	Communication Systems	3-1
EE-241	Electromagnetic Field Theory	3-0
	Total	**18**

Semester – VI

Course Code	Course Title	Credits
EE-379	Control Systems	3-1
EE-330	Digital Signal Processing	3-1
ECO-130	Engineering Economics	2-0
EE-383	Instrumentation and Measurements	3-1
EE-XXX CS-XXX	Elective-I	3-X
	Total	**17-X**

Semester – VII

Course Code	Course Title	Credits
OTM-455	Engineering Project Management	2-0
HU-212	Technical & Business Writing	2-0
EE-498	Final Year Project-I	0-2
EE-XXX CS-XXX	Elective – II	3-X
EE-XXX CS-XXX	Elective – III	3-X
EE-XXX CS-XXX	Elective-IV	3-X
	Total	**15-X**

Semester – VIII

Course Code	Course Title	Credits
HU–222	Professional Ethics	2
EE–499	Final Year Project-II	0-4
MGT271	Entrepreneurship	2
XX–XXX	University Elective	3
EE–XXX CS–XXX	Elective-V	0-X
EE-XXX CS-XXX	Elective Lab	0-X
CSL-401	Community Service Learning	0-2*
	Total	**14-X**
	Grand Total	**132-X**

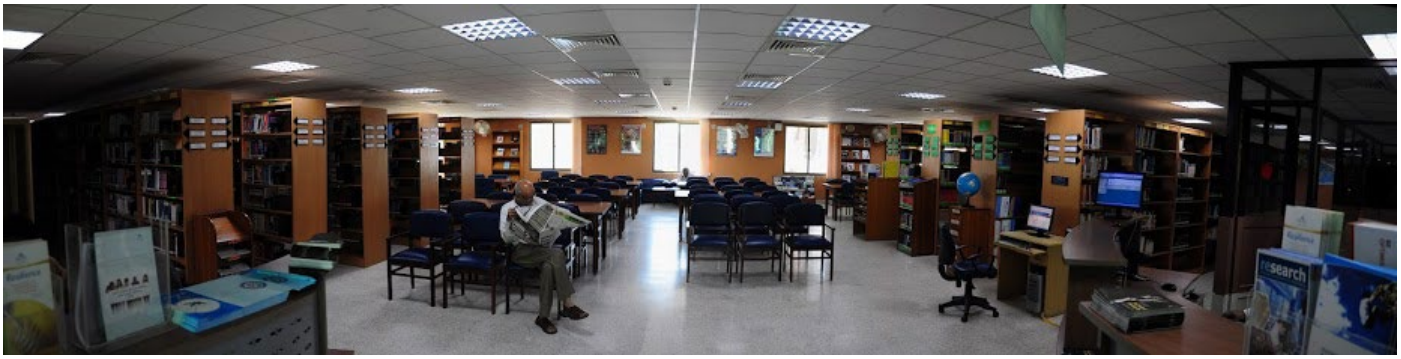
Elective Courses

At the end of first year, the sequence of elective courses for different streams may be announced. The students may choose one of the offered streams. The finalized streams will be decided by the department depending upon the number of students in each stream.

* Community Service Learning is non-credit course

Elective Courses for BE in Electrical Engineering (BEE)

Course Code	Course Title	Credits
CE-185	Basic Civil Engineering	3-1
CS-220	Database Systems	3-1
CS-251	Design & Analysis of Algorithms	3-0
CS-435	Parallel & Distributed Processing	3-1
CS-470	Machine Learning	3-0
CS-474	Computer Vision	2-1
CS-475	Computer Vision	3-0
EE-316	Operational Amplifier Applications	3-1
EE-317	Integrated Circuits	3-0
EE-318	Solid State Electronics	3-0
EE-332	Linear Systems and Signal Processing	3-0
EE-333	Digital Image Processing	3-0
EE-341	Transmission Lines, Antennas and Wave Propagation	3-1
EE-342	Microwave Engineering	3-1
EE-343	Transmission Lines, Waveguides	3-1
EE-344	Wave Propagation and Antennas	3-1
EE-356	Wireless Communication	3-0
EE-357	Computer and Communication Networks	3-1
EE-361	Analysis and Design of Electric Machines	3-0
EE-363	Power Transmission	3-0
EE-364	Power Distribution and Utilization	3-0
EE-365	Renewable Energy Systems	3-0
EE-366	Power Engineering	3-0
EE-367	Electrical Power Transmission & Distribution	3-1
EE-368	Power Electronics	3-1
EE-369	Power Electronics	3-0
EE-372	Digital Control Systems	3-1
EE-374	Optimal Control	3-0
EE-375	Introduction to Adaptive Control	3-1
EE-376	Stochastic Control	3-1
EE-377	Multivariable Control	3-1
EE-378	Introduction to Non-linear Control	3-0
EE-381	Robotics-I	3-1
EE-384	Digital Instrumentation	3-1
EE-385	Industrial Electronics	3-1
EE-411	CMOS Analog Circuits Design	3-0
EE-412	VLSI Circuit Design	3-0
EE-414	Digital Electronics	3-1
EE-415	Opto-Electronics	3-1
EE-421	Digital System Design	3-1
EE-423	Embedded System Design	3-1
EE-428	Industrial Process Control	3-1
EE-441	Microwave ICs Design	3-0
EE-442	Microwave Devices	3-1
EE-443	Electromagnetic Compatibility	3-0
EE-463	Fundamentals of High Voltage Engineering	3-0
EE-464	Power Systems Protection	3-0
EE-465	Power Economics and Management	3-0
EE-466	Advanced Electrical Machines	3-1
EE-472	Industrial Control and Automation	3-0
EE-474	Advanced Control Systems	3-0
EE-475	Power System Operation and Control	3-0
EE-476	System Identification	3-0
EE-481	Robotics-II	3-0
EE-482	Electric Drives	3-0
EE-491	Radar Systems	3-1
EE-493	Applied Control & Navigation Systems	3-0
EE-497	Power Engineering Lab	0-1
SE-200	Software Engineering	3-0
CS-330	Operating Systems	3-1
EE-321	Computer Architecture & Organisation	3-1
EE-444	Antenna Design	3-0
EE-451	Mobile Communication Systems	3-0
EE-452	Satellite Communication Systems	3-0
EE-455	Optical Fibre Communication	3-0
EE-458	Broadband Technologies	3-0
EE-461	Power System Analysis and Design	3-0



MS and PhD in Electrical Engineering

This programme aims to produce highly-skilled professionals focused on productive research and development in the vast domain of electrical and electronics engineering. The postgraduate programme in electrical engineering allows motivated researchers to expand their knowledge base and acquire new skills in analysis and problem solving, creating challenging opportunities for a rewarding research career. The programme has been devised keeping in view the latest market demands and it encompasses a broad area covering advanced digital and analogue electronics, communication, signal processing, multimedia and computer vision, advanced controls of robotics and microelectronics / nanoelectronics. Currently, five areas of specialisation are being offered at the department. These include Digital Signal Processing, Telecommunication & Computer Networks, Power Electronics & Controls, RF & Microwaves and Electronic Material & Devices. The number of elective courses will be offered during the second and third semesters, depending upon the students' interest and availability of specialist faculty.

Why join this program?

By joining the Electrical Engineering programme you become part of a dynamic research community that is actively pursuing solutions for important contemporary problems in a variety of research areas. The postgraduate programme at the EE department of SEECS is especially prominent for the following reasons:

- Vibrant research community that encourages and expects excellence
- Increased options for graduates to participate/ engage in diverse research areas as active members of various SEECS research groups
- Frequent seminars/workshops on various research topics
- Opportunities for research commercialisation and expert entrepreneurial mentoring

Associated Careers

Electrical Engineers contribute to the development of a wide range of technologies. They design, develop, test and supervise the deployment of electrical systems and electric devices. They may work on design of sub-micron Digital and Analogue Integrated Circuits, DSP and Computer Vision Algorithms, Telecommunication Systems, the operation of electric power stations or the electrical control of industrial machinery. Students can subsequently utilise their knowledge to either pursue an advanced research degree or seek employment in technology companies, both local and foreign.

Masters of Science in Electrical Engineering (Digital Signal Processing)

Semester – I

Course Code	Course Title	Credits
EE-891	Stochastic Systems	3
EE-831	Advanced Digital Signal Processing	3
EE-823	Advanced Digital System Design	3
	Total	**09**

Semester – II

Course Code	Course Title	Credits
XX-XXX	Elective - I	3
XX-XXX	Elective - II	3
XX-XXX	Elective – III	3
	Total	**09**

Semester III

Course Code	Course Title	Credits
XX-XXX	Elective – IV	3
XX-XXX	Elective – V	3
	Total	**06**

Semester – IV

Course Code	Course Title	Credits
EE-899	**MS Thesis**	**06**
	Total	**06**

Elective Courses

Course Code	Course Title	Credits
EE-839	Adaptive Filters	3
EE-822	ASIC Design Methodology	3
EE-821	Advanced Embedded System Design	3
EE-897	Detection and Estimation	3
EE-932	Speech Processing	3
EE-835	Multirate Systems and Filter banks	3
EE-837	Advanced Topics in Computer Vision and Image Processing	3
CS-867	Computer Vision	3
EE-832	Pattern Recognition	3
EE-931	DSP Software System Design	3
EE-826	Advanced VLSI Design	3
EE-921	System on Chip Architecture	3
EE-920	System Validation	3
CSE-811	Advanced Computer Architecture	3
EE-833	DSP Hardware System Design	3
EE-834	Applied Signal Processing	3
EE-836	Advanced Digital Image Processing	3

Masters of Science in Electrical Engineering (Telecommunication & Computer Networks)

Semester – I

Course Code	Course Title	Credits
EE-891	Stochastic Systems	3-0
EE-851	Advanced Digital Communication Systems	3-0
CSE-820	Advanced Computer Networks	3-0
	Total	**09**

Semester – II

Course Code	Course Title	Credits
EE-852	Information Computer Networks	3-0
XX-XXX	Elective - I	3-0
XX-XXX	Elective – II	3-0
	Total	**09**

Semester III

Course Code	Course Title	Credits
XX-XXX	Elective – III	3-0
XX-XXX	Elective – IV	3-0
	Total	**06**

Semester – IV

Course Code	Course Title	Credits
EE-899	**MS Thesis**	**06**
	Total	**06**

Elective Courses

Course Code	Course Title	Credits
EE-887	Network Switching and Routing	3
CSE-879	Network Performance Analysis	3
EE-886	Advanced Wireless Networks	3
EE-883	Wireless Sensors and Mesh Networks	3
EE-884	Photonic Networks	3
EE-882	Cognitive Radio Networks	3
EE-854	Optical Communication Systems	3
EE-853	Advanced Wireless Communication	3
EE-950	Advanced Data Communication Systems	3
EE-897	Detection and Estimation	3
EE-855	Error Control Coding	3

tt

Masters of Science in Electrical Engineering (Control Systems)

Semester – I

Course Code	Course Title	Credits
EE-891	Stochastic Systems	3
EE-871	Linear Control Systems	3
XX-XXX	Elective - I	3
	Total	**09**

Semester – II

Course Code	Course Title	Credits
XX-XXX	Elective – II	3
XX-XXX	Elective – III	3
XX-XXX	Elective – IV	3
	Total	**09**

Semester III

Course Code	Course Title	Credits
XX-XXX	Elective – V	3
XX-XXX	Elective – VI	3
	Total	**06**

Semester – IV

Course Code	Course Title	Credits
EE-899	**MS Thesis**	**06**
	Total	**06**

Elective Courses

Course Code	Course Title	Credits
EE-905	Advanced Power Electronics	3
EE-901	Power Electronics and Electric Drives	3
EE-862	Power System Operation and Control	3
EE-863	Power Systems Analysis	3
EE-864	Advanced Machines	3
EE-865	Power Generation Operation and Control	3
EE-861	Alternating Current Electrical Machines and Drives	
EE-872	Optimal Control	3
EE-875	Discrete Time Control Systems	3
EE-878	System Identification	3
EE-879	Robust Control	3
EE-975	Robust & Multivariable Control Systems	3
EE-976	Optimal & Multivariable Control Systems	3
EE-977	Nonlinear Control Systems	3

Masters of Science in Electrical Engineering (RF & Microwave)

Semester – I

Course Code	Course Title	Credits
EE-841	Electromagnetic Theory	3
EE-843	Microwave Transmission Lines and Waveguides	3
EE-847	Microwave Network & Passive Components	3
	Total	**09**

Semester – II

Course Code	Course Title	Credits
EE-844	Antennas and Wave Propagation	3
EE-947	Microwave Devices and Systems	3
XX-XXX	Elective – I	3
	Total	**09**

Semester – III

Course Code	Course Title	Credits
XX-XXX	Elective – II	3
XX-XXX	Elective – III	3
	Total	**06**

Semester – IV

Course Code	Course Title	Credits
EE-899	**MS Thesis**	**06**
	Total	**06**

Elective Courses

Course Code	Course Title	Credits
EE-842	Microwave Communication System Design	3
EE-831	Advanced Digital Signal Processing	3
EE-851	Advanced Digital Communication Systems	3

MS Innovative Technologies in Learning

This newly started graduate programme will provide a design space for mixing and matching of diverse disciplines and research areas thus creating disruptive technologies at the innovative edge of psychology, information technology, graphic design, storytelling and drama.

It will provide a practical forum to look beyond the obvious, to ask questions not yet asked and to provide innovative solutions that could dramatically improve the way people learn - not only for those who go to a school but also those who cannot attend a conventional school.

Educational innovation, driven by a need for continuing education in the labor force, is transforming the global industrial landscape. Moreover, this need has also put a lot of stress on producing dynamic and diverse educational entrepreneurs as well as researchers who can steer the next revolution in education. This is the first programme in Pakistan that will address the deficiency of such individuals and aim to create graduates with the ability to "Learn, Think, Apply, Innovate and Educate".

Why join this program?

We have about 5 million adults in Punjab who go to high school, but there are more than 8 million adults who dropout before entering high school. This inequality is becoming more pronounced as times passes. Inequality in education, in opportunities and in financial status of families is linked to disturbing indicators in a society. This is like a time bomb which is ticking not only for the poor but also for the neighboring rich. The planners have never thought that the poor will never be able to send their children to high school - the school should reach out to their children (at different times) whenever they needed it. Not only the school should reach out, it should provide free textbooks, the required stationery, and more importantly a personalized pedagogy for each learner; fast learners can move swiftly while slow learners are provided additional tools to support their learning. Moreover, we should not forget that the school should only deliver the content needed by the children. The local software industry is swiftly moving towards design of mobile educational applications and games. Currently, there is no pedagogical grounding which can provide a framework for designing interactive applications. The proposed MS programme will enable our graduates to take advantage of the billion dollar emerging industry dealing with edutainment.

Objectives

- To develop entrepreneurial innovations in educational practice.
- To evaluate technology's impact on learning and development.
- To excel in designing interactive media content and learning applications.

Associated Careers

The objectives of proposed MS in ITL are to develop entrepreneurial innovations in educational practice, to evaluate technology's impact on learning and development and to excel in designing interactive media content and learning applications.

The graduates of this MS programme will be suitable and sought after in the following industry:

- Interactive text book design
- Schools
- Games and interactive media
- Online education companies
- Instructional designer, online training
- Animation development, children's and adults educational television network
- Educational start-ups
- War games design and development

MS Coursework

Programme Code-614

Semester-I

Course Code	Course Title	Credits
ITE-801	Learning Through Pedagogy and Technology	3
ITE-802	Universal Design for Learning	3
ITE-812	Design of Learning Interfaces	3
PSY-811	Psychology of Learning and Cognition	3

Semester-II

Course Code	Course Title	Credits
ITE-811	Role of Technology in Education	3
XX-XXX	Elective-I	3
XX-XXX	Elective-II	3
XX-XXX	Elective-III	3
RM-898	Research Methodology	2

Semester-III

Course Code	Course Title	Credits
ITE-899	**MS Thesis**	**6**

Elective Courses

Course Code	Course Title	Credits
ITE-803	Pedagogy of the Oppressed: Critical Thinking	3
ITE-813	Design of Games for Learning	3
ITE-821	Innovative Entrepreneurship in Education	3
ITE-831	Advanced Topics in Education (Seminar Course)	3
ITE-832	Navigating Pakistan's Educational Landscape	3
CS-822	Data Mining	3
CS-861	Advanced Computer Graphics	3

Funded Projects

Investigating the Impact of Game Based Learning Using Tablets in learning Mathematics for Primary School Students.

The study is mainly focused on children belonging to Out-of-School Children Schools in Islamabad that cater to the needs of street kids and those who have missed out their years of admitting into regular mainstream school. The aims and objectives of this research are:

- To create a knowledge base and stimulate debate at national and international level.
- To address the issues of equity, quality and efficiency at primary education level using game-based learning delivered through tablets technology.
- To demonstrate interactive, individualized and customized learning for each learner of both the genders belonging to various socio-economic backgrounds.

The research seeks to evaluate the effectiveness of a game-based tablet application on the topic of Primary School Mathematics, with focus on measurements, when compared with traditional classroom instructional system. The study is utilizing a quasi-experimental approach, where an experiment and a control group comprised of Grade-I Math students are studied to determine differences in their engagement and motivation levels.

This research would provide a better appreciation of the potential impact of digital game-based learning for school-aged learners, while emphasizing a number of research questions as below:

- Does Game-based learning using tablet result in increased engagement, motivation and academic achievement and better learning beliefs for primary school students of different genders and socio-economic background in learning mathematics?
- To what extent is it possible to practice self based learning in mathematics through a tablet based app without the need of an instructor for the student?
- Do teachers find game based learning using tablets an acceptable treatment for use in the classroom compared to traditional techniques for learning mathematics?

Principal Investigators

Principal Investigator 1	Dr Muddassir Malik	SEECS	muddassir.malik@seecs.edu.pk
Principal Investigator 2	Farzana Ahmad	SEECS	farzana.ahmad@seecs.edu.pk
Principal Investigator 3	Dr Salma Siddiqui	S3H	salma.siddiqui@s3h.edu.pk

Funding Agency

The Foundation for Information Technology Education and Development (FIT-ED) of the Philippines, as part of the Information Networks in Asia and Sub-Saharan Africa (INASSA) program funded jointly by the International Development Research Centre (IDRC) of Canada and the Department for International Development (DFID) of the United Kingdom, announced this open call for full proposals on Digital Learning for Development (DL4D).

Funding

Total Funding Received: PKR. 4,121,552.21.

The Game Developed for Intervention

Measure Land – A fun way to learn measurements

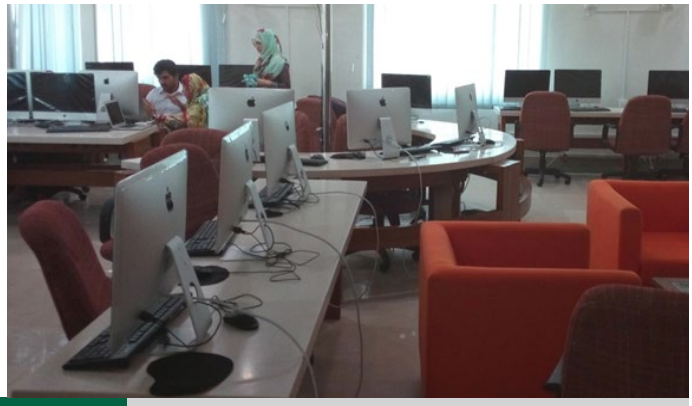
The game "Measure land" is a learning game developed for grade 1 to grade 5 students with a concept of self-paced fast track or "speed literacy" learning, in and out of schools using low cost tablets technology. This game covers learning outcomes of the topic of "Measurements" from the National Curriculum. Through guided narration and bilingual instructions, students are explained the concepts of measurements and are involved in a series of interactive activities based on Bloom' Taxonomy to master the content. Positive reinforcement is provided throughout in the form of constructive feedback and rewards. At the end of each level, students are shown the 'brain Power' achieved which further encourages young learners to learn Mathematics with more enthusiasm. Through this game, students acquire skills to develop deep strategies of learning Mathematics and apply learning in real world scenarios, thus resulting in becoming more informed, analytical and confident learners.

Prominent Features:

- Supports Android 4.0 and above
- Self paced fast track learning from Grade 1 to Grade 5 on the topic of Measurements
- Learning outcomes mapped to the National Curriculum of Mathematics.
- Step by step bilingual instructions (English and Urdu) to enhance students understanding of the concepts.
- Interactive activities for students' cognitive development.
- Caters to the needs of auditory, visual and kinaesthetic learners
- Embedded Assessments, rewards and feedback
- Easy game mechanics
- Vibrant graphics based on every day themes and scenarios to support meaningful learning.

Research Labs

Media lab started in 2014. Purpose of this lab to help prepare outstanding educators, scholars, researchers, and professionals who can transform society by raising awareness through effective use of technology, analysis and development of educational policy, leadership and social inclusion.Key Research Areas in this lab are educational games and application.



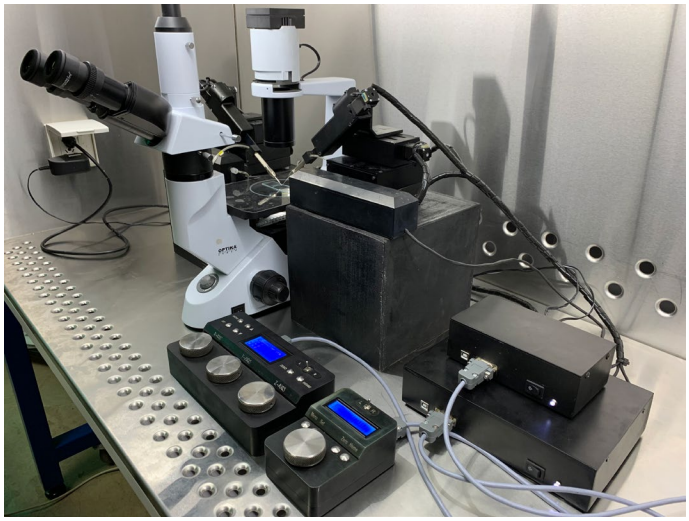
Events

A Symposium on ICT in Education was held as part of the the 15th HONET-ICT International Conference on 9th October 2018, at the School of Electrical Engineering and Computer Sciences (SEECS), National University of Science and Technology (NUST) Islamabad. The speakers of the symposium talked about 'STEM Education in Pakistan'.

The Symposium was chaired by NUST the Pro-Rector Academics Dr Asif Raza, Principal SEECS Dr S. M. Hasan Zaidi, HoD Department of Innovative Technologies in Learning, Dr Muddassir Malik.

Ms Nishat Riaz, Director Education British Council Pakistan delivered her keynote address, wherein she emphasized on the significance of Science, Technology, Engineering and Mathematics (STEM) education in schools and universities for sustainable development in Pakistan. She also highlighted the importance of STEM education for women especially in Pakistan for inclusive growth. Other speakers included; Ms Nida Athar CEO of STEM School and Pakistan Innovation Foundation, Mr Shamyl Bin Mansoor the CTO Learn-o-Bots and Ms Manzil-e-Maqsood, Assistant Professor SEECS. The speakers talked about their contributions and experiences of non-formal STEM education in Pakistan.

The symposium was very well received by the guests, dignitaries, speakers, educators and students alike. There was a general consent on the need for revamping the way STEM subjects are taught in schools and universities in Pakistan, and to include a more collaborative, constructionist approach to teaching science, technology and mathematics where students take ownership of their own learning, become critical thinkers, and take a creative, innovative approach to addressing their local problems. The speakers and audience were also were of the opinion that STEM needs to take a center stage in our education system so that graduating students can create more jobs, and rely of 'making' instead of consumerism.



RESEARCH INSTITUTE FOR MICROWAVE AND MILLIMETER-WAVE STUDIES (RIMMS), ISLAMABAD


RIMMS

Research Institute for Microwave and Millimeter-Wave Studies (RIMMS), Islamabad

About the Institute

The Research Institute for Microwave and Millimeter-Wave Studies (RIMMS) is a unique postgraduate institute at NUST, offering MS and PhD in Electrical Engineering with special focus on RF and Microwave domain since 2010. The institute works closely with industrial partners on joint R&D and consultancy projects, providing students practical experience during their studies. With an aim to become a Center of Excellence for research and consultancy in the RF and Microwave domain, this institute holds state-of-the-art microwave measurement capabilities such as Anechoic Chamber for antenna testing, EMC/EMI Lab for electromagnetic compatibility and immunity measurements and microwave lab for passive and active components testing.

Vision: To achieve national prominence and international recognition in the field of RF and Microwave. This is envisaged through a prolific team of faculty members, a strong research oriented graduate programme, well equipped laboratory facilities and strong industrial collaboration.

Mission: To become a Center of Excellence for teaching, research and consultancy in the RF and Microwave domain.

Academics

RIMMS has been offering MS and PhD programme focused on RF & Microwave since 2010 and is well known for its high quality teaching standards. The course work broadly covers electromagnetics, passive and active microwave components, antenna design and EMC/EMI. The theoretical knowledge is supported by simulations in latest 3-D electromagnetic software such as CST Microwave Studio as well as hands-on experience using state-of-the-art measurement equipment in the associated laboratories.

Research Environment

RIMMS offers a conducive environment for conducting top level research to its students. This includes research related to latest technologies such as antennas for LTE and 5G communications, inkjet printed antennas and sensors, on-chip antennas, MIMO antennas, MEMS based antennas etc. In addition, applied research projects from public sector R&D organizations also become topic of MS theses. A prolific team of faculty members guide the students throughout their research work. These research facilities and active collaborations drive students and researchers to work on problems of national and international significance.

Faculty Profile

Engr Shahid Niaz, Principal
MS (Nanjing University of Science & Tech), China
Discipline: Electrical Engineering
Specialization: Digital Signal Processing

Dr Hammad Mehmood Cheema, Head of Department
PhD (Eindhoven University of Technology), The Netherlands
Discipline: Electrical Engineering
Specialization: Analog and RF Integrated Circuit Design

Dr Farooq Ahmad Tahir
PhD (University of Toulouse), France
Discipline: Electrical Engineering
Specialization: Microwave, Electromagnetism and Optoelectronics

Dr M. Umar Khan
PhD (KFUPM), Saudi Arabia
Discipline: Electrical Engineering
Specialization: Applied Electromagnetics

Dr Nosherwan Shoaib
PhD (Politecnico Di Torino), Italy
Discipline: Electrical Engineering
Specialization: RF and Microwave

Dr Fahimullah Khan
PhD (Griffith University), Australia
Discipline: Electrical Engineering
Specialization: MEMS, Microsystems

Engr Ahsan Azhar
MS (University of Gavle), Sweden
Discipline: Electrical Engineering
Specialization: RF Measurement Systems

Engr Maira Islam
MS (NUST), Pakistan
Discipline: Electrical Engineering
Specialization: RF and Microwave

National and International Linkages

Academic Linkages

RIMMS takes pride for its national and international academic linkages that have resulted in joint journal and conference publications, exchange visits and joint seminars/workshops. Some of the current foreign collaborators include King Abdullah University of Science & Technology (KAUST), Masdar Institute, UAE University, Fredrick University Cyprus, University of Saskatchewan and Macquarie University. In addition, RIMMS is actively engaged in joint research with ITU, UET Taxila, SCME-NUST and CIIT in Pakistan. This includes joint MS and PhD theses for graduate students providing fruitful learning experience.

Industry Linkages

One of the cornerstone of RIMMS vision is to forge strong and long lasting collaborations with our industry partners. These partners provide valuable input for our graduate programme so that it addresses the current industry requirements. Furthermore, RIMMS provides testing and consultancy services to the industry partners. Graduate students are involved in the practical hands-on industrial tasks in the research labs which helps them immensely in their careers after graduation.

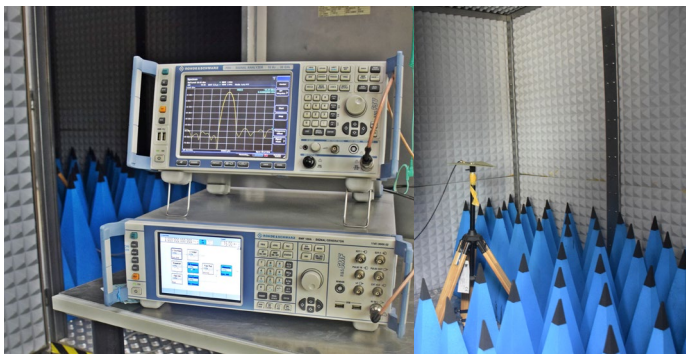
Lab Facilities

Anechoic Chamber

This facility is used to characterize antennas in the frequency range from 0.8GHz to 40GHz. The anechoic chamber is equipped with the near-field planner scanner, and far-field tower to measure the radiation pattern of a given antenna under test (AUT). The measurement software has the capability to transform the near-field data to far-field data for plotting antenna radiation patterns in 3D. In addition, antenna arrays, RCS measurements of RFID tags and other applications where isolated environment is required can be supported by the anechoic chamber.

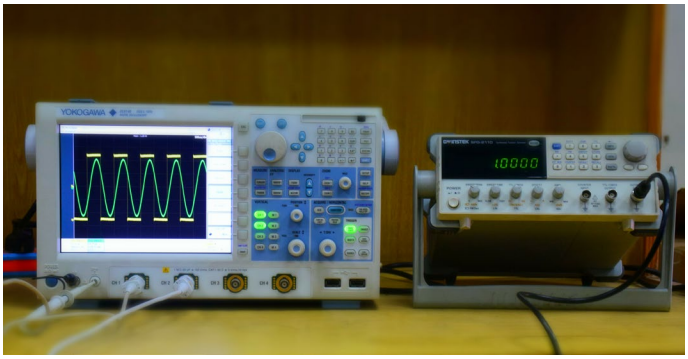
EMC/EMI Lab

This lab aims at imparting EMC/EMI knowledge to students and researchers both from NUST and other universities and organizations. In addition, the facility is utilized to provide EMC/EMI pre-compliance testing of commercial products. Presently, the lab has the capability to perform testing as per European standards including Conducted Emissions, Radiated Emission, Radiated Immunity, Harmonic and Flicker, Electrostatic Discharge and Surge, Burst and Power Fail test.



Microwave Research Lab

The Microwave Research Lab houses the equipment required for impedance, s-parameter and spectrum measurements both for passive components such as antennas and active components such as power amplifiers and low noise amplifiers.



Fact file

- RF & Microwave MS & PhD programme since 2010.
- Specialized equipment and lab facilities.
- More than 40 students have already graduated.
- High publishing rate in journals and conferences.
- High recruitment rate in academia and industry as well as PhD opportunities abroad.
- Active industrial collaborations.

RIMMS Alumni

"I am Saleem Shahid and I joined RIMMS as MS Student in September 2011. It was a wonderful experience as a student to work with highly talented faculty and using state-of-the-art testing and measurement facilities like Network Analyzer, Anechoic Chamber and EMC/EMI Chamber. RIMMS is a place full of opportunities, I got chance to work on antenna measurement project of King Abdullah University of Science and Technology (KAUST), Saudi Arabia. RIMMS inside NUST is truly a place of defining futures."

SALEEM SHAHID

"I am Sana Ahmed and I joined RIMMS as MS student in 2013. Joining RIMMS, NUST as a postgraduate student was one of the best decisions of my life. This institute is committed to research at high standards. I indeed believe studying here has made me a better person, broadened my horizon and helped me to expand my skills and learning. The highly qualified faculty, the resources and the learning environment established at RIMMS set me up very well for the job I have now and gave me all the tools to boost my professional and research career. The things I admire the most is the support received from everyone at the institute and life-long connections made here. The time spent here has left remarkable inscriptions on me and is truly unforgettable."

SANA AHMED

"I am Saba Fatima and I joined RIMMS in 2012. I choose to learn from the best. My two years in the Master's programme at the RIMMS institute were among the best years of my life. The progressive structure of this department led to my increased confidence as an Electrical Engineer. It combined both of my passions: engineering and education. The balance between theoretical and practical teaching was enough to gain the essential knowledge. The faculty is excellent- they are enthusiastic and care about their students and the research requirements according to latest technology. Currently, I am working as a Senior RF/ MW Design Engineer at an R&D firm and am using the theoretical and technical knowledge gained during the educational experience at NUST. There have been several eureka moments that I will cherish throughout my life. It offered me a first-class education; the space to grow as an individual, to try new things and to meet new and interesting people. There was encouragement coming from all sides and that can never be underestimated in contributing to a successful RF & MW Engineer. I gained much more from the degree than I anticipated and I am proud to say that I'm a NUST graduate.

SABA FATIMA

Postgraduate and Doctoral Programme at RIMMS

The Electrical Engineering postgraduate programme at RIMMS provides students, an opportunity to expand their knowledge and acquire skills in analysis, design, fabrication and measurements related to RF & Microwave components and systems.

Why join this program

By joining the postgraduate programme you become a part of a dynamic research community that is actively engaged in the fields of microwaves, applied electromagnetics, analog and RF integrated circuit design, antenna design and MEMS microsystems. The postgraduate programme at RIMMS is especially prominent for the following reasons:

» Research environment that encourages excellence.
» State-of-the-art design software, laboratories and equipment.
» Training of students to develop end-to-end microwave systems.
» Participation in industry funded projects and consultancies.
» High job prospects after graduation.

MS Electrical Engineering (Evening):

Specialization: RF and Microwave

RIMMS takes two intakes per year, one in the Fall semester and second in the Spring semester. The duration of Master's program is two years out of which 1st year is focused on completing the course work and the 2nd year is dedicated to the research thesis along with a research methodology course. MS students are required to take at least 3 core courses out of the pool of core courses. In addition to the core courses, an MS Student must complete 5 elective courses relevant to the specialized stream. Among these electives, two courses may be taken from other engineering and basic sciences disciplines of NUST Schools / Institutes / Colleges with prior approval.

Scheme of Studies

Semester-I

Course Code	Course Title	Credits
EE-849	Electromagnetic Field Analysis (Core-I)	3
EE-847	Microwave Networks & Passive Components (Core-II)	3
XX-XXX	Core-III	3
XX-XXX	Elective-II	3
	Total	**12**

Semester-II

Course Code	Course Title	Credits
XX-XXX	Elective-II	3
XX-XXX	Elective-III	3
XX-XXX	Elective-IV	3
XX-XXX	Elective-V	3
	Total	**12**

Semester-III

Course Code	Course Title	Credits
RM-898	Research Methodology*	2
XX-XXX	**MS Thesis**	**6**
	Total	**8**

Semester-IV

Course Code	Course Title	Credits
EE-899	**MS Thesis**	**3**
	Total	**6**

*This is a Pass/Fail Course that does not count towards the CGPA calculation. It can be taken in any of the three semesters and a Pass grade is required.

List of Core Courses (Minimum one to be Taken)

Course Code	Course Title	Credits
EE 823	Advanced Digital System Design	3
EE 826	Advanced VLSI Design	3
EE 831	Advanced Digital Signal Processing	3
EE 851	Advanced Digital Communication Systems	3

List of Elective Courses (Minimum five to be Taken)

Course Code	Course Title	Credits
EE 840	RF MEMS: Theory and Applications	3
EE 841	Electromagnetic Theory	3
EE 842	Microwave Communication System Design	3
EE 843	Microwave Transmission Lines & Waveguides	3
EE 844	Antennas & Wave Propagation	3
EE 845	EMC/EMI	3
EE 846	Microwave Photonics	3
EE 848	Radiating Systems & Antennas	3
EE 940	Advanced RF Measurements	3
EE 941	RF Transceiver Design	3
EE 942	Microwave Integrated Circuit Design	3
EE 943	Microwave Devices I	3
EE 944	Microwave Devices II	3
EE 945	Computational Electromagnetics	3
EE 946	Advanced Antenna Theory and Design	3
EE 947	Microwave Devices & Systems	3
EE 948	Advance Electromagnetic Fields	3
EE 949	Selected Topics in Microwave Engineering	3
EE 809	Analog Integrated Circuit Design	3
EE 951	Radar Systems	3

PhD Electrical Engineering (RF & Microwave)

PhD candidates have to complete minimum of 18 credits of 800/900 level courses or equivalent. These 18 credit hours are in ad¬dition to the pre-requisites specified by the PhD Evaluation Acceptance Committee (PEAC). Minimum GPA of 3.5/4.0 is required in the course work. After the successful completion of course work, the student can take the qualifying examination consisting of Part-A (Written Comprehensive Examination) and Part-B (Oral Examination). In addition to the coursework, all doctoral students must register for at least 30 credits of doctoral research. PhD candidates may take any of the courses mentioned above or other graduate courses relevant to their area of research.

SCHOOL OF CHEMICAL AND MATERIALS ENGINEERING (SCME), ISLAMABAD

School of Chemical and Materials Engineering

School of Chemical and Materials Engineering (SCME) commenced its programmes in 2006, and currently offering undergraduate and postgraduate degree programmes in the twin disciplines of Chemical Engineering and Materials Engineering. In line with the futuristic vision of NUST imparting quality education, maiden undergraduate programmes in the fields of Chemical and Materials Engineering were launched in the year 2008. In 2016 the curriculum of Materials Engineering for undergraduate programme was revised and the degree title has been changed from 'Materials Engineering' to 'Metallurgy and Materials Engineering', keeping in view the national and international demand for quality engineering. Presently, the school has 535 students of which more than 176 are pursuing degrees at the MS and PhD levels.

The mission of SCME is to provide students with a broad and through understanding in engineering fundamentals, applications, and design that prepares them to practice engineering at the professional level with confidence and skills necessary to meet the technical and social challenges of the future. Graduate will attain the skills for entry level engineering portions leading to their development into advanced engineering professionals inculcating innovative thinking and entrepreneurship.

The School enjoys reciprocal ties with universities in Europe, China and the ASEAN countries, and continues to forge stronger links with the academia and research communities across the world. In this regard, an MoU has been signed with China (Tsinghua University), Korea (Chungnam National University), Turkey (Marmara University), INPT Toulouse, France, a leading university in the field of Simulation and Modeling of Fluid Dynamics. Our Materials Engineering Department is also collaborating in terms of students and teachers' exchange with Institute of Materials (IMN) Nantes University, France. Several significant industrial projects are at hand, involving private and strategic partners. This is envisioned to provide a framework for present and future collaboration between academia and the industry and to make an important contribution towards revitalizing the industry's capability. It is due to this conviction that university-industry linkage is being forged at SCME in line with prevalent higher education policy.

SCME has a strong tradition of holding seminars and talks on contemporary topics of interest; both in the specific fields of study pursued at the School and areas of wider significance. Internationally recognized faculty involved in cutting-edge contemporary research together with well-equipped, state-of-the-art labs and learning resources provide an ideal setting for professional growth. We encourage, support and celebrate exceptional approaches to teaching that excite and inspire engineering students in a supportive and challenging environment.

Research and Development

SCME has attracted world-class faculty due to its conductive research environment, including graduates from the world's leading institutions like Oxford, Manchester, NTNU (Norway), Kyoto University of Japan, Waterloo University of Canada, and many others. Internationally recognized faculty, coupled with well-equipped state-of-the-art labs and learning resources, provide an ideal setting for professional growth. As a result, the faculty has been receiving attractive research grants and support awards both from local and foreign sponsors. Students are fully supported and financed for initiatives in research activities. It provides opportunity of foreign research experience / research scholars' interaction with students through split research programmes and faculty-invited programmes.

Laboratories and Infrastructure

Chemical Engineering Laboratories

Chemical reaction engineering lab
Fluid mechanics lab
Fuel and combustion lab
Instrumentation and process control lab
Organic & Inorganic chemistry lab
Particulate technology lab
Physical chemistry lab
Polymer lab
Simulation lab
Thermodynamics lab
Heat transfer lab
Mass transfer lab
Simultaneous heat and mass transfer Lab
Membrane Technology Lab

Materials Engineering Laboratories

Corrosion lab
Heat treatment lab
Mechanical testing lab
Microscopy lab
Nano synthesis lab
Sample preparation lab
Scanning electron microscopy lab
Surface engineering lab
Thermal transport lab
Chemical Sensor lab
Non Destructive Testing lab
Welding and Joining lab
XRD lab
XRF lab
AFM lab

Research Facilities in SCME

Atomic Force Microscope (AFM)
BET Surface Area and Porosity Analyzer
Bomb Calorimeter
Fourier Transform Infrared Spectrometer (FTIR)
Gas Chromatograph-Mass Spectrometer (GC-MS)
Gel Permeation Chromatograph (GPC)
High Performance Liquid Chromatograph (HPLC)
Micro Calorimeter Particle Size Analyzer
Scanning Electron Microscope (SEM)
Thermal Gravimetric / Diferential Thermal Analyzer (TG/DTA)
X-Ray Diffraction (XRD)
X-Ray Fluorescence (XRF)
Electrochemical Workstation
Polarized Optical Microscope
Liquid and Solid Sublimation Devices
Potentiostat GAMRY
Micro-Hardness Tester
Differential Scanning Calorimeter (DSC)
3-D Printer
Rheometer
Gas Permeation Rig
UV Vis Spectroscopy
Contact Angle Measurement

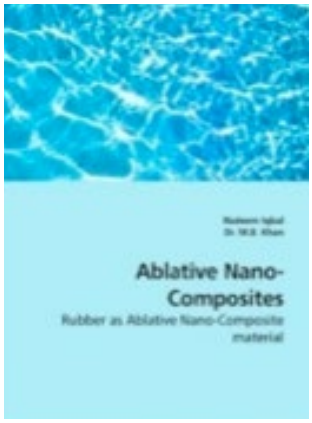
Patents

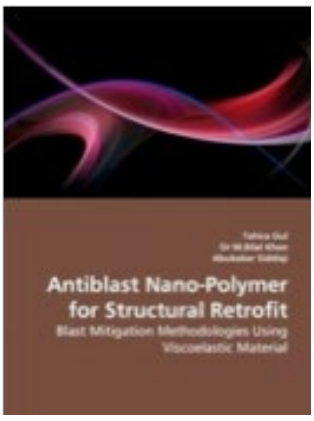
SCME in its short existence has been credited with the acceptance of thirteen patents (SI No 140915, 104916, 104917, 139821, EP2006005834, W02006/136345 A1, EP09012588, US2010/0264368 A1, US2011/0109855 A1, US20110240917 A1; US 2011/0240920, US 2013/0344577 A1, WO 2012175214) in the area of Liquid crystals molecules comprising Hydroazulane Structures, Synthesis, characterization of new polymides, blue phase Liquid crystal composition, Sensor device for sensing toxins, bacteria, binding events on analytes at interfaces, filament Wound Structures, Particles, Composites, Shockwave/ Seismic Absorbance Materials and a method of tackling erosive burning in high C/D rocket motors.

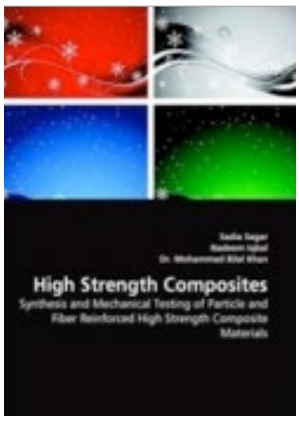
Publications

During the last year, over 10 research papers were presented at national and international conferences of high repute and over 65 papers were published in journals with high impact factor ratings. The School promotes sharing of knowledge and exchange of research at all levels. With this objective in view, the School has recently published four books with VDM, a leading international publisher. The books are available at amazon.com. Publications include:

» Ablative Nano Composites
» Anti-blast Nano-polymer for Structural Retrofit
» High Strength Composites
» Renewable Technologies: Thermionic Energy Conservation







SCME Milestones

- Indigenous Windmill Rotor Fabrication
- Carbon Nanotubes
- Fast-track Bio-diesel Production
- Carbon Fibre Composites
- Advanced Bio-materials
- Nano-membranes
- Fabrication and characterization of CdTe thin films for semiconductors radiation detectors
- Carcinogen-free Radiation Compatible Polymers
- Value-addition in Gems
- Development of low cost eco-friendly inhibitors

Faculty Profile

Dr Arshad Hussain, Dean and Principal
PhD (OVG University) Germany
Specialization: Membrane Technology

Department of Chemical Engineering

Dr Muhammad Bilal Khan Niazi, HOD
PhD (University of Groningen) Netherlands
Specialisation: Product Technology

Dr Abdul Qadeer Malik
PhD (University of Essex) UK
Specialisation: Physical Chemistry (Kinetics)

Dr Erum Pervaiz
PhD (NUST) Pakistan
Specialization: Nanomaterials synthesis and applications

Dr Ifikhar Ahmad Salarzi
PhD (Kyoto University) Japan
Specialization: Process Systems Engineering

Dr Tayyaba Noor
PhD (NTNU) Norway
Specialization: Heterogenous Nano catalysis

Dr Sarah Farrukh
PhD (NUST) Pakistan
Specialization: Membrane Technology, Gas Adsorption

Dr Muhammad Ahsan
PhD (NUST) Pakistan
Specialization: Process modeling & simulation

Dr Waqas Cheema
PhD (Technical University of Denmark) Denmark
Specialization: Integrated water and energy systems

Dr Syed Salman Raza Naqvi
PhD (Universit Teknologi PETRONAS) Malaysia
Specialization: Biomass & Bioenergy, Catalysis

Engr Nadeem Ehsan, Academic Coordinator
MSc (Cranfeld University) UK
Specialization: Energetic materials

Dr Muhammad Nouman Aslam Khan
PhD (COMSATS) Pakistan
Specialization: Fuzzy Algebra

Engr Raheela Nawaz (On leave)
MS (UET Peshawar) Pakistan
Specialization: Heat Transfer

Engr Zaeem Aman
Ms (Karlstad University) Sweden
Specialization: Paper and Pulp

Engr Ayesha Raza
MS (NUST) Pakistan
Specialization: Chemical Engineering

Engr Syed Amir Ali Shah (On leave)
MS (Chalmers University of Technology) Sweden
Specialization: Heat and Environment

Engr Syed Rafay Hussain Jaffery (On leave)
MS (University of Technology) Malaysia
Specialization: Enhanced Oil Recovery, Simulation

Dr Engr Imran-Ullah Khan
PhD (University Technology PETRONAS) Malaysia
Specialization: Pulp, Paper, Surface Treatment Technology

Dr Umair Sikander
PhD (University Technology PETRONAS) Malaysia
Specialization: Catalysis, Hydrogen Production

Engr Nouman Ahmed
BE (Punjab University) Pakistan

Engr Iqra Shakeel
BE (NUST) Pakistan

Department of Materials Engineering

Dr Zakir Hussain, HoD
PhD (Technical University of Braunschweig) Germany
Specialization: Display technologies, Sensors

Dr Mohammad Mujahid (On Leave)
DPhil (University of Oxford) UK
Specialization: Materials Characterization, Phase Transformation

Dr Muhammad Shahid
PhD (University of Manchester) UK
Specialization: Corrosion and Protection

Dr Nasir Mahmood Ahmad
PhD (University of Manchester) UK
Specialization: Polymerization reactors, Micro polymerization reactions

Dr Ifikhar H Gul
PhD (Quaid-i-Azam University) Pakistan
Specialization: Nano-particle Characterization

Dr Khurram Yaqoob
PhD (University of Paris East) France
Specialization: Phase Transformation

Dr Malik Adeel Umer
PhD (KIAST) South Korea
Specialization: Powder Metallurgy

Dr Sofia Javed
PhD (NUST) Pakistan
Specialization: Nano Materials for Energy Applications

Dr Usman Liaqat
PhD (Yonsei University) South Korea
Specialization: Biomaterials, Tissue Regeneration

Dr Muhammad Aftab Akram
PhD (NUST) Pakistan
Specialization: Nanomaterials & Nanostructures

Dr Ahmad Nawaz Khan (On leave)
PhD (NTUST) Taiwan
Specialization: Polymer/Filler composites and nanocomposites

Dr Haris Masood Ansari (On leave)
PhD (The Ohio State University, Columbus OH) USA
Specialization: Thin film deposition & Nano-materials fabrication

Dr Umar Ahmed Munawar (On leave)
PhD (University of Rome 3) Italy
Specialization: Thermal Barrier Coatings, thin films

Dr Mohsin Saleem
PhD (UST) South Korea
Specialization: Energy Harvesting Devices

Engr Mudassar Shehzad
MS (University of the Ulsan) South Korea
Specialization: Ferroelectric Polymers

Engr Nabeel Ahmad (On leave)
MS (Kiel University) Germany
Specialization: Nano chemistry & Nanoengineering

Engr Talha Masood (On leave)
MS (Materials, KTH) Sweden
Specialization: Materials Processing

Dr Muhammad Shoaib Butt
PhD (South-East University of China) China
Specialization: Biomaterials

Dr Amna Safdar
PhD (University of York) UK
Specialization: Solar Cells

Dr Farhan Javaid
PhD (TUD) Germany
Specialization: Micro & Nano Mechanics

Engr Mohammad Irfan (On leave)
MS (Hanyang University) South Korea
Specialization: Bionano Engineering

Engr Muhammad Zafar Khan
BE (NUST) Pakistan

Engr Ahsan Wajid Ali Shah
BE (NUST) Pakistan

Achievements

1. Winner science contest: 17th All GIKI Science Fair ’16 (Feb. 2016) Maqbool Khalid, Rehan Aamir, Mohib Ur Rehman, Talha Athar
2. Best Delegate Award: Fast Nascon ’16 Model United Nation April 2016, Mohammad Shaaz
3. Defended Research paper: SPI -2016 (Sustainability in Process Industries) Oct. 2016, Rida Mehtab, Abdul Hadi Chara
4. Only Scholarship Holder from Asia in National Conference of Student Leadership, USA, Nov. 2016 Mahruhk Mehmood
5. Runner-up, HEC All University Men Rock Climbing April 2016, Ashir Azhar
6. Finalist: Inter University Badminton Zonal Championship, Nov. 2016, Hamza Khan

Moiz Butt

Designation: MPO Operations, Askari Fuelsy

Thinking back on the decision for post-graduation plans I am baffled by the amount of pressure placed on a 20 something old. Pick an employer, a job, and a career path luckily with an engineering degree from NUST; I was fortunate as I imagine many of you are to have hand on experience to handle pressure and excel in what you learn. NUST offers so many opportunities for students to learn pressure handling and make decisions in such situations by boasting more than 30 student organizations from which anyone can choose to take part.

Maria Khan

Designation: Trainee Engineer, Schlumberger

The one thing that distinguishes NUST from other universities is th e freedom it gives the student in both curricular as well as co curricular activities. I was an average student during my bachelors in Chemical Engineering and I would admit that the path to graduation was never clear or straightforward. However NUST gave us a platform high enough that the goal was always in sight.

Library

SCME has a well-equipped library having a large collection of books and periodicals related to chemical and materials engineering. In addition, computers are reserved for literature search and access to HEC digital library. HEC digital library has launched an e-library, Springer books and McGraw Hill collections to provide around 50,000 online books in addition to more than 23,000 journals that have been made available through the Digital Library Program. SCME Library is automated through library software KOHA, OPAC is also available on LAN and has started its barcode enabled circulation; local digital collection is also available on LAN. Scanning and photocopying facility is also available to facilitate the students and researchers.

Clubs, Magazines and Societies

Chimaera - SCME UG Student Magazine

SCME holds the distinction of being the first school to publish "Chimaera" (undergraduate student magazine) in its first year of undergraduate induction. 'Chimaera' is a bilingual (English and Urdu) magazine.

Star Magazine

STAR Magazine publishes the research activities of the post graduate students of SCME. The idea of introducing "STAR Magazine" has been en¬thusiastically embraced especially because this offers an excellent opportunity to showcase the research activities which might not otherwise come to the attention of sci¬entific community at NUST and other organizations in the country.

NUST Literary Circle

The society caters for events including literary thirst of students through organisation of debates, declamations, essay competitions, elocutions, and mushaira on regular basis.

Khayal - The Caring Society

The society spreads the message of care and share, and actively organises awareness campaigns, guest speaker sessions, field trips, fund-raising activities, quiz competitions, walks and workshops of mutual interests.

NUST Science Society

NUST Science Society is a central NUST society, hosted by SCME. It organises interactions with top-class Pakistani and foreign scientists and caters for events / activities of scientific nature. Astronomy night, Project / Industrial Expo, Sytek are some of the events on its calendar.

NUST Materials Society

NUST Materials Society (NMS) is one of the prestigious societies of NUST that enables students to experience more of the world of Material Science and Engineering. Our mission is to propel youngsters that have a knack for materials, towards excellence. NMS holds workshops, talk shows, debate competitions, etc. NMS comes under the international charter of American Society of Materials (ASM), American Ceramics Society (Acers), American Iron Steel Technology (AIST), and The Metals, Minerals and Materials Society (TMS).

NUST Digital Club

NUST Digital Club (NDC) promotes and polishes technological skills among students; and provides awareness about the latest Digital-Technological Advancements; hence bringing out useful outcomes from the time spent on phones and PCs.

SCME Alumni Association

The SCME Alumni Association was established to create a bond between alumni and the alma mater through social, cultural, educational and other such activities. It worked towards establishing a forum through which alumni could contribute towards the development of SCME and its students. It has since then helped in strengthening the sense of friendship and fraternity thus working towards mutual welfare. Within a very short time SA2 has been instrumental in planning and implementing projects for the greater benefit of students and alumni thereby creating opportunities, exposure and connectivity. SA2 has been very active and has to date organized multiple lectures which have emphasized on bridging the industry and the educational institutes. These lectures have seen a growing interest amongst students to connect with their alumni with the end result being a better understanding of the demands of the industry. SA2 had also organized a mock test that helped students prepare for actual tests conducted by companies. There are many other such upcoming projects and SA2 looks forward to become the leading forum for collaborative gain for both, the students and the alumni.

NUST Book Club

NUST Book Club is a central NUST society, hosted by SCME. It aims at supporting all academic and research activities at NUST libraries and is responsible to organise book reading activities, annual Book-Fair and Book-Day celebrations.

Employability

Chemical Engineering

Professional chemical engineers design, construct and manage the process operations all over the world. There is a great demand for their expertise in the national strategic sector. In addition to excellent opportunities for higher studies in world renowned universities, chemical engineers have a bright career with national and multinational companies. Potential employers include:

- Energy sector
- Fertilizer industry
- Fine chemical manufacturing
- Food and beverages
- Oil and gas sector
- Petroleum sector
- Pharmaceuticals
- Plant design and manufacturing
- Processing sectors
- Pulp and paper industry
- Strategic organizations
- Synthetic fibre manufacturing
- Textile industry

Materials Engineering

Materials Engineering has recently become very popular in advanced countries. It owes its existence to a natural evolution in classical metallurgical, mechanical and manufacturing engineering. Professional materials engineers are equipped with the academic background and skills to tackle challenges related to materials industry, environmental problems, material selection and processing, design and engineering, leadership skills, quality control/assurance and understanding to work within the corporate sector. In addition to excellent opportunities to pursue higher education within NUST and in other advanced countries, materials engineers are sought after by national and multinational companies. Some important employers include:

- Aerospace and aviation
- Alloy and composites manufacturers
- Biomedical Industry
- Ceramic industry
- Glass industry
- Heavy industries (HIT, HMC, Steel Mills)
- Oil and gas sector
- Semi-conductor and electronic device manufacturing
- Strategic organisations
- Auto manufacturers
- Steel making industry
- Manufacturing Industry
- Sports Manufacturers
- Surgical Industry

Contacts

Website: www.scme.nust.edu.pk
Email: scme@nust.edu.pk
Telephone: 051-9085-5107
Fax: 051-9085-5002

Academic Programmes

Bachelors in Chemical Engineering

Programme Description

Chemical Engineering deals with the process of converting raw materials or chemicals into more useful valuable products. Its primary theme resides in designing industrial processes which revolve around the rigorous application of thermodynamics, kinetics and transport phenomena at its core. The undergraduate programme covers topics as diverse as mathematics, computer applications, process diagnostics and instrumentation to facilitate plant design and unit operations. The programme is designed to produce competent engineers, with leadership qualities, capable of undertaking projects of national interest.

Associated Careers

Chemical Engineers work in manufacturing, pharmaceuticals, healthcare, design and construction, pulp and paper, petrochemicals, food processing, specialty chemicals, polymers, biotechnology, and environmental health and safety industries, etc. Fertiliser, mining, synthetic fuels, cement, ceramics and composites, defence and aerospace are amongst the leading industries offering a multitude of employment opportunities for chemical engineers.

Department Mission

The mission of the department of Chemical Engineering at SCME is to provide conducive learning environment with quality teaching and cutting-edge research for sustainable solutions to the industry and society. The aim is to produce graduates with strong understanding of chemical engineering principles to meet the challenges of current and forthcoming technologies and to become entrepreneurs as well.

Programme Educational Objectives (PEOs)

The department has defined and established its PEOs as a part of implementation of the Outcome Based Education (OBE) system according to Washington Accord. Graduates of the department should:

PEO-1	Excel as chemical engineers in traditional and emerging fields with sound engineering knowledge and acquire the ability to solve complex problems using modern tools vis-a-vis chemical process industries.
PEO-2	Develop continuously the knowledge and skills through life-long learning for success in pursuing advanced degrees.
PEO-3	Possess strong communication and interpersonal skills to accomplish leadership roles in industry, business and society.
PEO-4	Practice and adhere to the principles of professional ethics, keeping in mind the social and environmental implications.

Scheme of Studies

Programme Code-991

Semester-I

Course Code	Course Title	Credits
CHE-101	Chemical Process Principles-I	3-0
HU–100	English	2-0
MATH–101	Calculus and Analytical Geometry	3-0
ME–105	Workshop Practice	0-1
PHY–102	Applied Physics	2-1
HU–107	Pakistan Studies	2-0
CS–114	Fundamentals of Programming	2-1
	Total	**17**

Semester-II

Course Code	Course Title	Credits
MATH 121	Linear Algebra & ODE	3-0
CH-102	Inorganic& Analytical Chemistry	3-1
ME –109	Engineering Drawing	0-2
HU-109	Communication Skills	2-0
CS-100	Fundamentals of ICT	2-1
HU–101	Islamic Studies	2-0
MSE-101	Fundamentals of Engineering Materials	3-0
	Total	19

Semester-III

Course Code	Course Title	Credits
CH-202	Organic & Biochemistry Chemistry	3-1
MATH-112	Calculus-II	3-0
CHE-221	Fluid Mechanics-I	3-0
CHE-231	Chemical Engineering Thermodynamics-I	3-0
CHE-202	Advanced Chemical Process Principles	3-0
MSE-231	X-ray Diffraction & Crystallography	3-0
	Total	**16**

Semester-IV

Course Code	Course Title	Credits
CHE-211	Chemical Process Technology	3-0
CHE-241	Mass Transfer	2-0
CHE-242	Heat Transfer	3-1
EE-103	Electrical Engineering	2-1
HU-212	Technical & Business writing	2-0
CHE-224	Fluid Mechanics -II	2-1
OTM-454	Project Management	3-0
	Total	**17**

Semester-V

Course Code	Course Title	Credits
CHE-346	Particulate Technology	3-1
CHE-343	Simultaneous Heat & Mass Transfer-I	3-1
MATH-351	Numerical Methods	3-0
CHE-332	Chemical Engineering Thermodynamics-II	3-1
MGT-271	Entrepreneurship	2-0
	Total	**17**

Semester-VI

Course Code	Course Title	Credits
CHE-348	Simultaneous Heat & Mass Transfer-II	3-1
CHE-323	Instrumentation & Process Control	3-1
CHE-347	Chemical Reaction Engineering	3-1
CHE-345	Transport Phenomena	3-0
ECO-130	Engineering Economics	2-0
	Total	**17**

Semester-VII

Course Code	Course Title	Credits
CHE-422	Fuels & Combustion	3-1
CHE-451	Chemical Engineering Plant Design	0-3
CHE-499	Final Year Project	0-3
XXX-XXX	Elective-I	3-0
CHE-452	Chemical Process Design & Simulation	2-1
MSE-4XX	Technical Elective -II	3-0
	Total	**16**

Semester-VIII

Course Code	Course Title	Credits
CHE-425	Maintenance & Process Safety	3-0
CHE-499	Final Year Project	0-3
OTM-456	Production & Operational Management	3-0
XXX-XXX	Elective - II	3-0
XX-XXX	Elective - III (socail)	3-0
	Total	**15**
	Grand Total	**134**

Electives Courses

Course Code	Course Title	Credits
CHE-330	Science of Energetic Materials	3-0
CHE-340	Biochemistry	3-0
CHE-350	Petroleum Refinery Process	3-0
CHE-360	Fundamentals of Polymer Engineering	3-0
CHE-431	Combustion & Propulsion	3-0
CHE-432	Explosive Manufacture, Formulation and Filling	3-0
CHE-441	Fermentation Technology	3-0
CHE-442	Membrane Technology	3-0
CHE-482	Reservoir Engineering	3-0
CHE-483	Production Engineering	3-0
CHE-461	Polymer Reaction Engineering	3-0
CHE-462	Polymer Processing, Design and Characterization	3-0
CHE-484	Natural Gas Engineering	3-0
CHE-491	Sustainability in Processes & Energy Systems	3-0
MCG-126	Basic Concepts of Social Science	3-0
HU-115	Principles of Sociology	3-0
ENE-306	Fundamentals of Environmental Engineering	3-0
MCG-235	Logic & Critical Thinking	3-0

Bachelors in Metallurgy and Materials Engineering

Programme Description

Materials engineering is arguably the most important engineering discipline today. Starting from the study of structure, composition and properties of materials, it covers the manufacturing processes details. There is strapping interdependence between materials engineering, surface engineering and industrial engineering. The Bachelor's in Materials Engineering at SCME offers comprehensive education, with specialization in areas of Surface Engineering. This programme covers the fundamental materials science of metals, ceramics and polymers as well as topics of particular interest in industry, such as material selection and design, environmental adaptation of products and failure analysis. This programme promotes networking of students from different backgrounds (materials science, mechanical engineering, physics and chemistry) with the aim to groom its graduates' inter-disciplinary as well as personal, interpersonal and professional skills.

Associated Careers

Materials Engineers remain in demand in virtually all industries. These engineers may be monitoring impurities in steel destined for an assembly line (in the steel industry), shrinking the size of circuits to improve the reliability of a pager (in the ICT industry), or designing new materials for a missile casing (in the defense industry), industries may employ materials engineers to reduce the overall weight of a vehicle (in the automobile industry), remove limitations in power plants (in the manufacturing industry), or research product failures for a liability suit (in legal and corporate sectors). The Graduates can also exercise the option of working as researchers and scientists in a number of R&D organizations. Strong links exist between the Department of Materials Engineering and Foreign Universities in Europe, USA, China and the ASEAN countries. Provided they fulfill the admission criteria, graduates who would like to proceed abroad for higher studies, are facilitated to avail postgraduate education at various universities of these countries.

Thrust areas of Materials Engineering

1. **Metallurgy**
   Metallurgy is the technology of metals: the way in which science is applied to the production of metals, and the engineering of metal components for usage in products for consumers and manufacturers. It is also the study of physical and chemical behavior of metallic elements, their intermetallic compounds, and their alloys. The production of metals involves the processing of ores to extract the metal they contain, and the mixture of metals, sometimes with other elements, to produce alloys. The curriculum has been designed so as to fulfill the requirement of our industry.
2. **Corrosion & Protection**
   Corrosion is a natural process, which converts a refined metal to a more stable form, such as its oxide or hydroxide. It is the gradual destruction of materials (usually metals) by chemical reaction with their environment. Corrosion Engineering is the field dedicated to controlling and stopping corrosion The problem of corrosion is commonly present in industry like oil & gas sector, paper & pulp industry, automobile industry, railway and aircraft industry etc. SCME trains its students of Materials Engineering to understand science of corrosion and apply their knowledge towards its mitigation.
3. **Polymers Science & Engineering**
   A polymer is a large molecule, or macromolecule, composed of many repeated subunits. Polymers range from familiar synthetic plastics such as polystyrene to natural biopolymers such as DNA and proteins that are fundamental to biological structure and function. The trend of promoting the light weight objects is equally important as the use of biodegradable polymer materials. Polymer science is the field of diverse studies which touched its boundaries with chemical as well as materials science and technology. The incorporation of nanotechnology in polymer science makes it diverse and robust in this domain.

Scheme of Studies

Programme Code-992

Semester-I

Course Code	Course Title	Credits
EE-103	Electrical Engineering	2-1
HU–100	English	2-0
MATH–101	Calculus and Analytical Geometry	3-0
ME–105	Workshop Practice	0-1
PHY–102	Applied Physics	2-1
HU–107	Pakistan Studies	2-0
CS–114	Fundamentals of Programming	2-1
	Total	**17**

Semester-II

Course Code	Course Title	Credits
MATH 121	Linear Algebra & ODE	3-0
ECO-130	Engineering Economics	2-0
ME –109	Engineering Drawing	0-2
HU-109	Communication Skills	2-0
CS-100	Fundamentals of ICT	2-1
HU–101	Islamic Studies	2-0
*MSE-101	Fundamentals of Engineering Materials	3-0
	Total	**17**

Semester-III

Course Code	Course Title	Credits
CH-108	Applied Chemistry	3-1
MATH-112	Calculus-II	3-0
MSE-201	Materials Engineering Lab-1	0-1
MSE-241	Polymer Science	3-0
MSE-221	Materials Thermodynamics & Kinetics	3-0
MSE-231	X-ray Diffraction & Crystallography	3-0
MSE-231	X-ray Diffraction & Crystallography	3-0
	Total	**17**

Semester-IV

Course Code	Course Title	Credits
MATH-351	Numerical Methods	3-0
MSE-202	Materials Engineering Lab 2	0-1
MSE-224	Deformation & Fracture	3-0
MSE-222	Phase Transformation & Equilibria	3-0
HU-212	Technical & Business Writing	2-0
PHY-213	Physics of Materials	2-0
PHY-213	Physics of Materials	2-0
	Total	**14**

Semester-V

Course Code	Course Title	Credits
MSE-303	Materials Engineering Lab 3	0-2
MSE-313	Welding & Joining	2-0
MSE-316	Foundry Engineering	3-0
MSE-333	Materials Testing Techniques	3-0
MSE-342	Polymer Engineering	3-0
MSE-213	Metals and Alloys-1	3-0
MGT-271	Entrepreneurship	2-0
	Total	**18**

Semester-VI

Course Code	Course Title	Credits
MSE-314	Manufacturing Processes	3-0
MSE-304	Materials Engineering Lab 4	0-2
MSE-326	Corrosion & Protection	3-0
MSE-317	Metals and Alloys-2	3-0
MSE-351	Ceramics & Glasses	3-0
MSE-3XX	Technical Elective - I	3-0
MSE-3XX	Technical Elective - I	3-0
	Total	**17**

Semester-VII

Course Code	Course Title	Credits
MSE-461	Composite Materials	3-0
OTM-454	Project Management	3-0
MSE-405	Materials Engineering Lab 5	0-1
MSE-474	Surface Engineering of Materials	3-0
MSE-325	Heat Treatment of Materials	3-0
MSE-499	Final Year Project -I	0-2
MSE-4XX	Technical Elective -II	3-0
	Total	**18**

Semester-VIII

Course Code	Course Title	Credits
MSE-483	Plant Design	3-0
HU-222	Professional Ethics	2-0
ME-312	Measurement & Instrumentation	2-0
MSE-463	Nano-materials	2-0
MSE-499	Final Year Project-II	0-4
MSE-XXX	Technical Elective-III	3-0
	Total	**16**
	Grand Total	**134**

Elective Courses

Course Code	Course Title	Credits
MSE-371	Interfacial Phenomena	3-0
MSE-373	Tribological phenomena on Surfaces	3-0
MSE-381	Industrial Safety	3-0
MSE-382	Design Standards & Quality Assurance	3-0
MSE-383	Operations Research	3-0
MSE-471	Vacuum Technology in Surface Engineering	3-0
MSE-472	Surface Analysis and Characterization	3-0
MSE-473	Novel Techiques in Surface Engineering	3-0
MSE-481	Maintenance Management	3-0
MSE-482	Industrial Economics & Management	3-0
MSE-404	Design of Experiments & Data Analysis	3-0
MGT-401	Total Quality Management	3-0
MSE-452	Electronic and Magnetic Materials	3-0
MSE-362	Introduction to Computational Materials Science	3-0
MSE-485	Metallurgical Plants and Quality Control	3-0
MSE-464	Advanced Materials	3-0
MSE-465	Powder Metallurgy	3-0
MSE-385	Biomaterials and Applications	3-0

MS and PhD in Materials and Surface Engineering

Programme Description

In the age of nano-technology and nano-materials, research and development in the materials technology has become vital for a nation like ours. Nano-technology research has primarily focused on manufacturing, creation of tools, materials, machines and devices that will eventually enable us to untie the fundamental building blocks of nature, easily, inexpensively and in particular with defect-free properties. The Masters programme in Materials and Surface Engineering produces scientists and researchers of the future who can develop and use these materials for the betterment of the society. The emphasis of the programme is on the application of nano-technology to produce thin films, nano-composites, electronic and bio-materials, ablatives, photonics materials, armor and blast protection linings and, modern alloys and smart materials.

MS Coursework

Programme Code-677

Course Code	Course Title	Credits
Core Courses		
MSE 811	Materials Thermodynamics	3
MSE 812	Phase Transformation & Microstructures	3
MSE 821	Mechanical Behavior of Materials	3
MSE 851	Surface Engineering & Characterization	3
Elective Courses (Any four)		
MSE 861	Engineering Ceramics and Glasses	3
MSE 871	Polymer Engineering	3
MSE 852	Advanced Surface Coatings	3
MSE 882	Corrosion and Control Engineering	3
MSE 862	Electronic and Magnetic Materials	3
MSE 831	Modeling of Material Processes	3
MSE 881	Manufacturing Processes	3
MSE 854	Characterization of Materials	3
MSE 872	Composite Materials	3
MSE 856	Nano Materials and Processing	3
MSE 822	Fractography and Fracture Analysis	3
NSE 842	Nano Materials for Energy Applications	3
CHE 843	Separation Process iin Chemical Engineering	3
MSE 899	**MS Thesis**	**6**
	Total	**30**

PhD Coursework

Course Code	Course Title	Credits
Core Courses		
MSE 901	Advanced Engineering Mathematics	3
MSE 954	Advanced Characterization Techniques	3
Elective Courses (Any two)		
MSE 952	Materials for Biomedical Applications	3
MSE 963	Semiconductor and Optical Materials	3
MSE 941	Materials for High Temperature Applications	3
MSE 951	Interface Engineering	3
MSE 999	**PhD Thesis**	**30**

MS and PhD Chemical Engineering

Programme Description

Chemical Engineering is in fact process engineering. Its primary theme resides in designing industrial processes which revolve around the rigorous application of thermodynamics, kinetics and transport phenomena at its core. The postgraduate programme covers topics as diverse as mathematics, computer applications, process diagnostics and instrumentation to facilitate plant design and unit operations. The programme is designed to produce competent engineers, who will evolve as the benchmark for competitors around the globe.

Associated Careers

Chemical Engineers work in manufacturing, pharmaceuticals, healthcare, design and construction, pulp and paper, petro-chemicals, food processing, specialty chemicals, polymers, bio-technology, and environmental health and safety industries, etc. Fertiliser, mining, synthetic fuels, cement, ceramics and composites, defence and aerospace are amongst the leading industries offering a multitude of employment opportunities for chemical engineers.

Programme Code-678

MS Coursework

Course Code	Course Title	Credits
Core Courses		
EME 921	Momentum Heat and Mass Transfer in Chemicals	3
CHE 847	Chemical Kinetics & Reactor Design	3
CHE 843	Separation processes in CHE	3
CHE 899	**MS Thesis**	**6**
Elective Courses		
EME 810	Materials technology	3
ESE 801	Biofuel Engineering	3
EME 981	Advance Fuel Technology	3
CHE 873	Membrane Technology	3
EME 902	Numerical methods in CHE	3
CHE 853	Green Process Engineering	3
CHE 848	Gasification Processes	3
EME 803	Combustion and Propulsion	3
MSE 880	Corrosion and Protection	3
MSE 871	Polymer Engineering	3
ENE 809	Waste water treatment & Design	3
CSE 801	Computation Fluid Dynamics (CFD)	3
CHE 823	Advance Analytical Techniques	3
MSE 952	Materials for Biomedical Application	3
CHE 816	Molecular Nanotechnology	3
CHE 814	Product Technology	3
CHE 815	Nano Catalysis	3
RM 898	Research Methodology	2

PhD Coursework

Course Code	Course Title	Credits
CHE 906	Advanced Transport Phenomena	3
CHE 910	Advanced Chemical Engineering Thermodynamics	3
CHE 920	Advanced Reaction Engineering	3
CHE 915	Colloids & Surface Chemistry	3
CHE 999	**PhD Thesis**	**30**
Elective Courses		
EME 810	Materials Technology	3
ESE 801	Bio fuel Engineering	3
EME 981	Advance Fuel Technology	3
CHE 873	Membrane Technology	3
EME 902	Numerical methods in CHE	3
CHE 853	Green Process Engineering	3
CHE 848	Gasification Processes	3
EME 803	Combustion and Propulsion	3
MSE 880	Corrosion and Protection	3
MSE 871	Polymer Engineering	3
ENE 809	Waste water treatment & Design	3
CSE 801	Computation Fluid Dynamics	3
CHE 823	Advance Analytical Techniques	3
MSE 952	Materials for Biomedical Application	3
MATH 901	Advance Engineering Mathematics	3
CHE 816	Molecular Nanotechnology	3
MSE 872	Composite Material	3
MSE 855	Nano Materials & Nano Processing	3

MS Process Systems Engineering

Programme Description

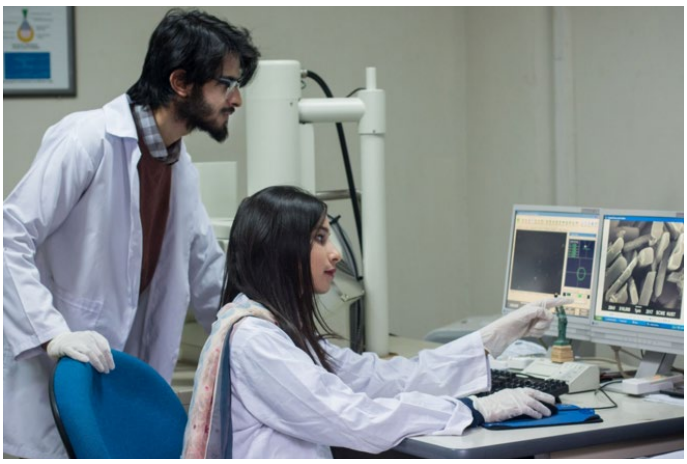
PSE is a blended knowledge of chemical engineering, computer science and mathematics applied to solve industrial problems. It has been observed that the continuation of higher education up to the ladder in this area is the need of the hour. Hence, SCME took the initiative and is offering the first ever degree programme in PSE at any university in the country. The rationale behind this programme is aimed at developing a pool of highly trained engineers with master's degree in the specialized field of PSE to lead research and development activities in academic and industrial domains.

MS Coursework

Course Code	Course Title	Credits
Core Courses		
PSE-801	Process Systems Theory	3
PSE-852	Process Modelling and Simulation	3
PSE-823	Advanced Process Control	3
PSE-802	Optimization and Decision Analysis	3
PSE-899	**MS Thesis**	**6**
Elective Courses (any four)		
CSE-801	Computation Fluid Dynamics (CFD)	3
MGT-924	Supply Chain Management	3
EME-902	Numerical Methods for CHE (Chemical Engineering)	3
TEE-820	Process Intensification	3
ENE-809	Waste water treatment & Design	3
EME-921	Momentum Heat and Mass Transfer (MHMT) in Chemical Engineering	3
CHE-847	Chemical Kinetics & Reactor Design	3
CHE-814	Product Technology	3

Additional Courses

RM-898	Research Methodology	2
SEM/WKSP-897	Seminar / Workshop	1



MS & PhD Nano-Science & Engineering

Programme Description

MS in Nano Science and Engineering will prepare students to take leadership roles in emerging hi-tech industries as well as traditional industries that exploit nanoscale phenomena. Graduates with MS in Nano-science and Engineering will be in great demand in industry, academic institutions and research organizations. The programme caters to a growing demand for Scientists and Engineers who can fabricate systems of sensors, actuators, functional materials and who can integrate electronics at the micro and nanoscale. The graduates of this programme are expected to possess the necessary insights in nano-science to develop new products using these skills

The cross-disciplinary nature of the programme will provide exciting careers in environment, biomedicine, chemistry, and industries such as building, electronics, materials and renewable energy. Graduates with MS in Nano-science and Engineering will also find a range of opportunities outside Pakistan as well. Some of the key areas may include but not limited to nano-medicine, nano-devices, nano-biotechnology, nano-photonics and energy harvesting devices. The programme is offered with the mission that Nano-science and Engineering Postgraduate programme will provide qualified manpower with inter-disciplinary academic foundations needed to develop Nano-science products for the society. The programme is aligned to integrate critical thinking, scholarly training, leadership qualities and sustainable vision in graduates to enable them to cope with the complex problems of the Nano-science and allied industries.

MS Coursework

Programme Code-679

Course Codes	Course Title	Credit
Core Courses		
NSE 813	Essentials of Nanoscience and Engineering	3
MSE 856	Nano Materials and Processing	3
MSE 854	Characterization of Materials	3
NSE 899	**MS Thesis**	**6**
Elective Courses (Choose any three)		
NSE 812	Environmental Nanotechnology	3
NSE 821	Nanofabrication by Self-Assembly	3
NSE 842	Nano Materials for Energy Applications	3
NSE 843	Nano Technology and Photovoltaics	3
NSE 844	Innovation and Entrepreneurship in Nanotechnology	3
NSE 845	Nanolithography and Device Fabrication	3
NSE 847	Essentials of NEMS/MEMS	3
NSE 851	Degradation of Nanomaterials	3
CHE 815	Nano Catalysis	3

PhD Coursework

Core Courses		
NSE 901	Advanced Concepts in Nanoscience & Engineering	3
MATH 901	Advanced Engineering Mathematics	3
NSE 999	**PhD Thesis**	**30**
Elective Courses		
NSE-921	Selected Topics in Nanotechnology	3
NSE-931	Advanced Synthesis and Fabrication Techniques	3
NSE-941	Nano Composite Materials	3
NSE-951	Nano Structured Materials	3
NSE-961	Surface Coatings and Thin Films	3
CH-816	Supramolecular Chemistry	3
ABS-932	Genomics, Proteomics and Bioinformatics	3
IBT-829	Nanobiotechnology: Concepts and Applications	3
IBT-920	Tissue Engineering and Biomaterials Science	3
BMES-941	Advances in Biomedical Materials	3

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING (SCEE), ISLAMABAD

School of Civil and Environmental Engineering

SCEE is a modern and progressive engineering school of the country, the first of its kind that offers a wide choice of BE programmes in Civil, Geoinformatics and Environmental Engineering. In BE programmes, the students are given the option of selecting elective majors. SCEE has very strong postgraduate programmes (MS/PhD) in Structural Engineering, Geotechnical Engineering, Transportation Engineering, Water Resources Engineering, Environmental Engineering, Environmental Science, Geographic Information Systems & Remote Sensing, Urban & Regional Planning and Construction Engineering & Management.

School of Civil and Environmental Engineering (SCEE) was established in November, 2008. It comprises four vibrant institutes, namely National Institute of Transportation (NIT), Institute of Environmental Science and Engineering (IESE), Institute of Geographical Information Systems (IGIS) and NUST Institute of Civil Engineering (NICE). SCEE is a modern and progressive school, the first of its kind that offers a wide choice of programmes in the disciplines of Civil and Environmental Engineering. In BE programmes, students are given the option of selecting an elective major. This means that while remaining Civil or Environmental Engineering graduates, they specialise in a particular field of their discipline. SCEE has advanced postgraduate programmes in Structural Engineering, Geotechnical Engineering, Transportation engineering, Water Resource Engineering and Management, Environmental Engineering, Remote Sensing &Geographic Information Systems, Urban & Regional Planning and Construction Engineering and Management. The programmes are tailored to equip graduates with the requisite knowledge and skills in order to meet the latest challenges in their respective fields. The goal of SCEE is to undertake basic and applied research to educate the next generation of academia and industry leaders, and prepare students for successful careers in relevant professions. SCEE has a competent and experienced faculty, and is equipped with state-of-the-art laboratories, sophisticated equipment and computing facilities. It has an excellent library with the latest books, journals and technical reports pertaining to relevant disciplines. It offers an enabling environment for dynamic students looking for challenging and adventurous professions such as Civil and Environmental Engineering and Geographical Information Systems.

Faculty

Dr Tariq Mahmood, Principal
PhD (Michigan State University) USA
Discipline: Civil Engineering
Specialization: Transportation Engineering

Dr S Muhammad Jamil, Dean
PhD (University of Illinois Urbana Champaign) USA
Discipline: Civil Engineering
Specialization: Geotechnical Engineering

Dr Ishtiaq A Qazi, Associate Dean IESE
PhD (University of Aston in Birmingham) UDC
Discipline: Environmental Chemistry
Specialization: Environmental Analysis, Analytical Techniques

Dr Ejaz Hussain, Associate Dean IGIS
PhD (Purdue University) USA
Discipline: Civil Engineering
Specialization: Remote Sensing & GIS

NIT Faculty

Dr Muhammad Jamaluddin Thaheem, HoD CE&M
PhD (Politecnico di Torino) Italy
Discipline: Construction Engineering & Management
Specialization: Construction Engineering & Management

Dr Malik Asghar Naeem, HoD U&RP
PhD (The University of Hong Kong) SAR China
Discipline: Urban & Regional Planning
Specialization: Urban & Regional Planning

Dr Muhammad Jawed Iqbal HoD Tn Engg
PhD (MUET) Pakistan
Discipline: Transportation Engineering
Specialization: Civil Engineering

Dr M Sohail Anwar Malik HoD Research
PhD (Southwest Jiatong University, Chengdu) China
Discipline: Construction Engineering Management
Specialization: Road & Railway Engineering

Dr Arshad Hussain, OIC Transportation Lab
PhD (Southwest Jiatong University, Chengdu) China
Discipline: Road & Railway Engineering
Specialization: Road & Railway Engineering

Dr Abdul Waheed
PhD (Asian Institute of Technology, Bangkok) Thailand
Discipline: Regional & Rural Development Planning
Specialization: Regional & Rural Development Planning

Dr Sohail Malik
PhD (UET, Taxila) Pakistan
Discipline: Civil Engineering
Specialization: Engineering Management

Dr Kamran Ahmed
PhD, MS (MSU, MI) USA
Discipline: Transportation/Traffic Engineering
Specialization: Transportation/Traffic Engineering

Dr Khurram Iqbal Ahmad Khan
PhD, MS (University of Reading United Kingdom), UK
Discipline: Civil Engineering
Specialization: Construction Management & Engineering

Dr Abdur Rehman Nasir
PhD (Bauhaus University, Weimar) Germany
Discipline: Civil Engineering
Specialization: Construction Engineering & Management

Dr Irfan Ahmad Rana
PhD (Asian Institute of Technology, Thailand)
Discipline: Urban & Regional Planning
Specialization: Regional & Rural Development Planning

Engr Muhammad Zaeem Sheikh
BE (NUST)
Discipline: Civil Engineering
Specialization: Civil Engineering

Engr Kamran Mushtaq
MSc (NED University of Science & Technology) Pakistan
Discipline: Transportation Engineering
Specialization: Civil Engineering

Engr Malik Saqib Mehmood
MS (Michigan University) USA
Discipline: Civil Transportation
Specialization: Transportation/ Traffic Engineering

IGIS Faculty

Dr Ejaz Hussain Associate Dean IGIS
PhD (Purdue University) USA
Discipline: Civil Engineering
Specialization: Remote Sensing & GIS

Dr Javed Iqbal HoD
PhD (Mississippi State University) USA
Discipline: Soil Science
Specialization: GIS and RS Application in Natural Sciences

Dr Ali Tahir
PhD, University College Dublin, Ireland
Discipline: Geoinformatics
Specialization: Geovisualisation

Dr Salman Atif
PhD, University of Paris Diderot France
Discipline: Physical Geography
Specialization: Geography and Natural Environment, Geo Environment

Dr Muhammad Azmat
PhD (Water Resources Engineering,Politecnico Di Torino,Italy)
Discipline: Engg for Natural & Built Environment
Specialization: Water Resource Engineering, Agricultural Engineering

Engr Mansoor Ahmed Malik
MSc (NUST) Pakistan
Specialization: Transportation Engineering
Discipline: Civil Engineering

Engr Muhammad Hasnain
MS (NUST) Pakistan
Discipline: Civil Engineering
Specialization: Construction Engg & Management

Ms Khunsa Fatima
MS, National University of Science & Technology
Discipline: Remote Sensing and GIS
Specialization: Remote Sensing and GIS

Ms Quratulain Shafi
MS, National University of Science & Technology
Discipline: Information Technology
Specialization: Communication Systems Engineering

Mr Junaid Aziz Khan
MS, National University of Science & Technology
Discipline: Remote Sensing and GIS
Specialization: Remote Sensing and GIS

Mr Shahid Nawaz Khan
MS, National University of Science & Technology
Discipline: Remote Sensing and GIS
Specialization: Remote Sensing and GIS

Syeda Maria Zafar
MS (NUST)
Discipline: RS & GIS
Specialization: RS & GIS

Engr Muhammad Naqash Taj Abbasi
BE, National University of Science & Technology
Discipline: GeoInformatics
Specialization: Web GIS

Engr Kashmala Ikram Chaudhry
MS, City University of New York, USA
Discipline: Geographic Information Sciences
Specialization: Advanced Remote Sensing and GIS Applications

IESE Faculty

Dr Imran Hashmi, Associate Dean
PhD (University of Karachi) Pakistan
Discipline: Environmental Sciences
Specialization: Environmental Microbiology

Dr Muhammad Arshad HoD Environmental Sciences
PhD (Institute of National Polytechnique de Toulouse) France
Discipline: Environmental Biotechnology
Specialization: Environmental Biotechnology

Dr Salahuddin Azad HoD Environmental Engineering
PhD (Environmental Management Sciences. BUITEMS Quetta) Pakistan
Specialization: Health Issues of Mining
Discipline: Environmental Management Sciences

Dr Sher Jamal Khan
PhD (Asian Institute of Technology) Thailand, Bangkok
Discipline: Environmental Engineering and Management
Specialization: Water Resource Management

Dr Muhammad Anwar Baig
PhD (University of Arizona) USA
Discipline: Soil Water and Environmental Science
Specialization: Pollutant Transport Monitoring and Modeling

Dr Muhammad Fahim Khokhar
PhD (Institute of Experimental Physics II, University of Leipzig) Germany
Discipline: Experimental Physics
Specialization: Satellite Remote Sensing

Dr Yousuf Jamal
PhD (Texas A&M University) USA
Discipline: Environmental Engineering
Specialization: Resources Recovery & Recycling in Environmental Engineering

Dr Zeeshan Ali Khan
PhD (Asian Institute of Technology) Thailand, Bangkok
Discipline: Environmental Engineering and Management
Specialization: Satellite Remote Sensing of Atmospheric Particulate Matter

Dr Zeshan
PhD (Asian Institute of Technology) Thailand, Bangkok
Discipline: Environmental Engineering
Specialization: Anaerobic Technology and Waste Treatment (Environmental Technology and Management)

Dr Sofia Baig
PhD (Macquarie University) Australia
Discipline: Environmental Sciences
Specialization: Plant Ecology

Dr Deedar Nabi
PhD (EPFL) Switzerland
Discipline: Environmental Engineering
Specialization: Environmental Chemistry

Engr Nida Maqbool
PhD (In-progress, IESE, NUST) Pakistan
Discipline: Environmental Engineering
Specialization: Wastewater Treatment

Ms Khadija Amir
MS (Sustainable Development) University of Exeter, UK
Discipline: Environmental Science and Sustainability
Specialization: Environmental impact assessment and Environmental laws and policies

Engr Arsalan Khalid
MS (Chemical Engineering) King Fahd University
of Petroleum and Minerals, Saudi Arabia
Discipline: Chemical Engineering
Specialization: Polymer Nanocomposite Membranes

Engr Rashid Iftikhar
MS/M.Phil (International Masters of Environmental Science)
University of Cologn, Germany
Discipline: Environmental Engineering
Specialization: Algae Biotechnology

Engr Syed Izhar Hussain Shah
MS (Environmental Engineering, NUST)
Discipline: Environmental Engineering
Specialization: Air Emission Modelling

Engr Erum Aamir
MS (Florida International University) USA
Discipline: Environmental Engineering
Specialization: Desalination

Engr Muhammad Ukasha
PhD (near completion, Colorado State University) US
Discipline: Environmental Engineering
Specialization: Hydrology, Climate Change

Engr Aamir Khan
Bachelor (Institute of Environmental Sciences and Engineering, NUST) Pakistan
Discipline: Environmental Engineering

Engr Naveed Ahmad
BE (University of Agriculture Faisalabad) Pakistan
Discipline: Environmental Engineering

Engr Muhammad Irfan
BE (UET Lahore) Pakistan
Discipline: Environmental Engineering

Engr Amal Sarfraz
MS (University of Bristol), UK
Discipline: Environmental Engineering
Specialization: Water and Environmental Management

Engr Sana Rasool
MS (University of Bristol), UK
Discipline: Environmental Engineering
Specialization: Disaster Management and Climate Change Modelling

Engr Khwaja Ahson Bashir
MSc (Chemical & Petroleum Engineering University of Bradford, UK)
Discipline: Chemical Engineering

Engr Saleem Nawaz Khan
MS (Universiti Teknologi PETRONAS, Malaysia)
Discipline: Chemical Engineering

Ms Mehwish Khalid
MS (NUST)
Discipline: Environmental Sciences

Noor Haleem
MS (NUST)
Discipline: Environmental Sciences

NICE Faculty

Dr Liaqat Ali, Associate Dean
PhD (University of Michigan) USA
Discipline: Civil Engineering
Specialization: Geotechnical Engineering

Engr Nasrul Haq, HoD Survey Engineering Department
MS (School of Military Survey Hermitage Newbury (Berks) United Kigdom
Discipline: Civil Engineering
Specialization: Survey and Mapping)

Dr Syed Muhammad Jamil
PhD (University of Michigan) USA
Discipline: Civil Engg
Specialization: Geotechnical Engg

Dr Hamza Farooq Gabriel, HoD Hydraulics
PhD (Charles Sturt University (CSU), Australia
Discipline: Civil Engg
Specialization: WRE&M

Dr Sajjad Haider
PhD (National Institute of Applied Sciences) France
Discipline: Civil Engg
Specialization: WRE&M

Dr Shakil Ahmad
PhD (University of Tokyo (UT), Japan
Discipline: Civil Engg
Specialization: WRE&M

Dr Rao Arsalan Khushnood
PhD (Politecnico Di Torino) Italy
Discipline: Civil Engg
Specialization: Structural Engg

Dr Umar Saeed
PhD (NUST) Pakistan
Discipline: Mathematics
Specialization: Mathematics

Dr Muhammad Usman
PhD (KAIST) South Korea
Discipline: Civil Engineering
Specialization: Structural Engineering

Mr Abdul Jabbar Khan
MSc (University of Punjab)
Discipline: Geology
Specialization: Geology

Engr Ammara Mubeen
MSc (UET, Lahore) Pakistan
Discipline: Civil Engg
Specialization: WRE&M

Muhammad Imran
M Phil (UA) Faisalabad, Pakistan
Discipline: Physics
Specialization: Material Sciences

Engr Musaad Zaheer
MSc (Cardiff University) UK
Discipline: Civil Engg
Specialization: Structural Engg

Engr Muhammad Ammar
MSc (University of Nottingham), UK
Discipline: Civil Engg
Specialization: Structural Engg

Engr Sana Khan
MS IESE (NUST) Pakistan
Discipline: Civil Engg
Specialization: Environmental Engg

Engr Abdul Basir Awan
MS (MSU) USA
Discipline: Civil Engg
Specialization: Structural Engg

Engr Amir Faiz Ullah
MSc (UET) Lahore, Pakistan
Discipline: Civil Engg
Specialization: Structural Engg

Engr Malik Kamran Shakir
MS (NUST) Pakistan
Discipline: Civil Engg
Specialization: Civil Engg

Muhammad Asad Hanif
MS (Air University, Islamabad) Pakistan
Discipline: Finance
Specialization: Finance

Engr Ameer Hamza
MS (NUST) Pakistan
Discipline: Civil Engg
Specialization: Civil Engg

Engr Muhammad Ibtasam Bin Latif
MS (University of Warwick) UK
Discipline: Engg Management
Specialization: Engineering of Business Management

Engr Junaid Ahmad
MS (UET Taxila) Pakistan
Discipline: Civil Engg
Specialization: Structural Engg

Engr Sara Farooq
MS (Hokkaido University) Japan
Discipline: Civil Engineering
Specialization: Structural Engineering

Engr Arslan Mushtaq
MS (NUST) Pakistan
Discipline: Civil Engineering
Specialization: Structural Engineering

Engr Muhammad Fawad
BE (NUST) Pakistan
Discipline: Civil Engineering
Specialization: Civil Engineering

Engr Zulqarnain Shah
BE (NUST) Pakistan
Discipline: Civil Engineering
Specialization: Civil Engineering

Dr Athar Ali
PhD (Manchester), UK
Discipline: Civil Engineering
Specialization: Structural Engineering

Dr Fawad Ahmed Najam
PhD (Asian Institute of Technology), Thailand
Discipline: Civil Engineering
Specialization: Structural Engineering

Dr Muhammad Israr
PhD (University Technology PETRONAS), Malaysia
Discipline: Mathematics
Specialization: Mathematics (Science/Fluid Mechanics)

Dr Syed Muhammad Turab Haider Jafri
PhD (Hanyang University), South Korea
Discipline: Civil Engineering
Specialization: Geotechnical Engineering

Dr Tariq Mahmood Bajwa
PhD (Carleton University Ottawa), Canada
Discipline: Civil Engineering
Specialization: Geotechnical Engineering

Dr Muhammad Usman Hanif
PhD (University of Malaya), Malaysia
Discipline: Civil Engineering
Specialization: Structural Engineering

Dr Azam Khan
PhD (Imperial College/London University), UK
Discipline: Civil Engineering
Specialization: Structural Engineering

Dr Muhammad Usman Hassan
PhD (Middle East Technical University, Ankara), Turkey
Discipline: Civil Engineering
Specialization: Structural Engineering

RVF Muhammad Anwar
MS: (Grandfield University)
Discipline: Explosive Ordnance Engg
Specialization: Explosive Ordnance Engg

Lecturer Umm-e-Habiba
MPhil (Quaid-i-Azam University) Islamabad
Discipline: Pak Studies
Specialization: Pak Studies

Lecturer Qurat-ul-Ain
MS (NUST), Islamabad
Discipline: Information Technology
Specialization: Information Technology

Lecturer Sami Ullah Khan Bangash
MS (University of Illinois Urbana Champaign), USA
Discipline: Civil Engineering
Specialization: Structural Engineering

Lecturer Sadia Arshad
MPhil (Air University), Islamabad
Discipline: English
Specialization: English Linguistics/Literature

Engr Muhammad Naqeeb Nawaz
BE (University of Engineering & Technology), Taxila
Discipline: Civil Engineering
Specialization: Civil Engineering

Engr Matiullah Shah
BE (NUST), Pakistan
Discipline: Civil Engineering
Specialization: Civil Engineering

Engr Muhammad Hamza Khalid
BE (NUST), Islamabad
Discipline: Civil Engineering
Specialization: Civil Engineering

Engr Atif Mehmood Khan
BE (NUST), Islamabad
Discipline: Civil Engineering
Specialization: Civil Engineering

Engr Ujala Hassan Khan
BE (NUST), Islamabad
Discipline: Civil Engineering
Specialization: Civil Engineering

Engr Bilal Ahmed Khan
BE (NUST), Islamabad
Discipline: Civil Engineering
Specialization: Civil Engineering

MS Transportation Engineering

The programme focuses on solving civil engineering problems in the context of transportation issues. The programme concentrates on practical problems concerned with structural, transportation, traffic and highways, airport and railways engineering. The course aims at encouraging intellectual pursuit of creative ideas to improve human and natural environments.

Why join this program?

Transportation engineers design and operate highways, airports, railroads and public transit. They conduct research in the field of transportation including design & operation, traffic flow & control, demand analysis & planning; and related work in economics, finance & administration. Study in the field of transportation engineering provides opportunities for the study of land-use transportation planning, infrastructure planning & management and environmental aspects of transportation.

Coursework

Programme Code-151

Core Courses

Course Code	Course Title	Credits
CE-860	Pavement Design and Analysis	3
CE-862	Pavement Materials Engineering	3
CE-863	Transportation Planning	3
CE-865	Traffic Engineering	3
CE-899	MS Thesis	6

Elective Courses (Any three)

Course Code	Course Title	Credits
CE-861	Pavement Rehabilitation & Management	3
CE-864	Geometric Design of Highways / Freeways	3
STAT-835	Probability and Statistics	3
CE-867	Urban Transportation System Evaluation	3
CE-897	Special Topics in Civil Engineering	3
	Total	**30**

MS & PhD Structural Engineering

The course focuses on solution of problems in structural engineering by enlarging and deepening students' knowledge so that they have a good grasp of new design concepts and technologies. The course contents encompass advance techniques for structural analysis, structural dynamics, reinforced concrete structures, and analysis and design of pre-stressed concrete structures.

Why join this program?

Structural engineers combine science and art to design and build infrastructure that will resist natural and manmade forces. Buildings, bridges, stadiums and other civil facilities define the traditional core focus of structural engineers. At the periphery of the field, structural engineering extends more broadly to share common interests with mechanical, aerospace and naval engineering for the design of often large, complex systems including power plants, pipelines, aerospace vehicles and ships-submarines.

Coursework

Programme Code-152

Core Courses

Course Code	Course Title	Credits
CE-801	Advanced Structural Mechanics	3
CE-803	Concrete Materials and Technology	3
CE-804	Pre-stressed Concrete Structures	3
CE-805	Advanced Concrete Design	3
CE-899	**MS Thesis**	**6**

Elective Courses

Course Code	Course Title	Credits
CE-802	Matrix Structural Analysis	3
CE-806	Reinforced Concrete Members	3
CE-807	Steel Structures	3
CE-808	Finite Element Method	3
CE-809	Structural Dynamics	3
CE-814	Structural Fire Engineering	3
CE-818	Coastal Engineering	3
CE-823	Slope Stability	3
CE-828	Advance Geotechnical Design	3
CE-829	Geotechnical Site Investigation	3
CE-831	Advance Soil Mechanics	3
CE-836	Construction Management	3
CE-858	Dam Engineering	3
CE-840	Nano-Secrets in Concrete	3
CE-842	Performance-based Seismic Design of Structures	3
CE-851	Vibration Control of Structures	3
CE-810	Earthquake Seismology and Earthquake Hazard	3
ME-820	Advanced Instrumentation and Experimental Methods	3
ME-812	Advanced Control Systems-1	3
ME-815	Advanced Modeling and Simulation	3

Elective Courses

Course Code	Course Title	Credits
CE-879	Design of Hydraulic Structures	3
CE-881	Soil Dynamics	3
CE-882	Deep Foundation	3
CE-897	Special Topics in Civil Engineering	3
STAT-835	Probability and Statistics	3
CEM-801	Construction Project Administration	3
CEM-802	Construction Planning, Scheduling and Control	3
GIS-802	GIS & Remote Sensing Application Civil Engg	3
GIS-842	Natural Hazards and Disaster Management	3
GIS-884	Advance Regression Analysis	3
CE-999	**PhD Thesis**	**30**

MS and PhD Urban & Regional Planning

Programme Description

The Department of Urban & Regional Planning in National Institute of Transportation (NIT) at School of Civil & Environmental Engineering (SCEE) offers a graduate / PhD degree. The objectives of the Urban & Regional Planning Programme are:

a. To provide profound understanding of the forces that give meaning and value to built-environment through acts of creation, design, construction and analysis.
b. The proposed programme will produce professionals equipped with academic knowledge and practical/field skills to tackle challenges of urbanized world.
c. To serve the people of Pakistan through professionally trained leaders in the field of Urban & Regional Planning.

Why Join This Program

The Master of Science degree in Urban and Regional Planning is designed to prepare students for leadership roles and careers in the public and private sectors for the purpose of planning and designing communities and regions. The programme has a strong focus on land use planning; design; policy; and economic, environmental, and cultural issues that shape urban and regional land development patterns in terms of infrastructure, housing, and open space systems. Emphasis is placed on developing research capabilities and graphic skills needed in planning and design. The program's primary focus is to prepare students to become practitioners in the planning profession.

Coursework

Programme Code-158

Core Courses

Course Code	Course Title	Credits
URP-801	Advanced Planning Techniques	3
URP-804	Regional Development Planning	3
URP-805	Urban & Regional Transportation Systems	3
URP-806	Sustainable Urban Land-Use Planning	3
URP-899	**MS Thesis**	**6**

Electives

URP-802	Comparative Urban Planning	3
URP-803	Planning Research Methods	3
URP-807	Disaster Management	3
URP-808	Social Engineering for Sustainable Development	3
URP-813	Special Topics in Urban & Regional Planning	3
URP-902	Contemporary Urban Planning	3
URP-913	Special Topics in Urban & Regional Planning	3

MS & PhD Construction Engineering & Management

The course is designed to prepare potential industry leaders, capable of implementing the best engineering and management practices and technologies in construction industry.

Why join this program?

In Construction Engineering and Management, civil engineers manage and direct physical construction of a project from start to finish. This field is also known as construction management. Construction engineers apply the knowledge of construction methods and equipment along with principles of financing, scheduling, planning, organisation, and coordination to convert paper designs into completed usable facilities. They maintain a continuous record of personnel, time, materials, and costs and prepare periodic reports depicting the project's progress to completion.

Coursework

Programme Code-154

Core Courses

Course Code	Course Title	Credits
CEM-801	Construction Project Administration	3
CEM-802	Construction Planning, Scheduling and Control	3
CEM-805	Safety Management in Construction	3
CE-898	Contract Management	3
CEM-899	**MS Thesis**	**6**

Elective Courses

Course Code	Course Title	Credits
CEM-803	Economic Decision Analysis in Construction	3
CEM-804	Construction Cost Estimating and Control	3
CEM-807	Risk Management in Construction	3
CEM-836	Construction Management	3
CEM-811	Construction Quality & Productivity Management	3
CEM-812	Sustainable Construction	3
CEM-813	Supply Chain Management in Construction	3
CEM-814	Human Resources Management in Construction	3
CE-999	**PhD Thesis**	**30**

Institute of Environmental Science & Engineering (IESE)

IESE is a leading research institute in Pakistan that graduates culturally enlightened, technologically knowledgeable, academically competent, and research-oriented productive citizens who are prepared to lead, inspire and serve humanity. It offers BE Environmental Engineering, MS Environmental Engineering, MS Environmental Science, PhD Environmental Engineering and PhD Environmental Science degrees.

Bachelors in Environmental Engineering

This programme, at the Institute of Environmental Science and Engineering, aims to produce environmental engineers with a sound theoretical foundation and practical knowledge of science and engineering principles to improve the environment for human habitation and to remediate polluted sites. This degree programme addresses water and air pollution control, recycling, waste disposal, and public health issues. It also includes studies on the environmental impact of proposed construction projects through Environmental Impact Assessment (EIA).

Programme Educational Objectives (PEOs)

» Graduate will acquire engineering knowledge and skills to address environmental concerns at national and international level.
» Graduate will progress in their professions while demonstrating continual improvement in interpersonal and collaborative skills.
» Graduate will demonstrate their professional and societal ob gations displaying high moral and ethical standards.
» Graduate will remain committed towards leering through po tgraduate education and continued development of technical and managerial skills.

Scheme of Studies

Programme Code-102

Semester-I

Course Code	Course Title	Credits
ENE-101	Introduction to Environmental Engineering	3(3+0)
HU-100	English	2(2-0)
MATH-101	Calculus & Analytical Geometry	3(3-0)
HU-101	Islamic Studies	2(2-0)
PHY-102	Applied Physics	3(2-1)
ME-105	Workshop Practice	1(0-1)
CS-114	Fundamentals of Programming	3(2-1)
	Total	**17(14-3)**

Semester-II

Course Code	Course Title	Credits
ME-100	Engineering Mechanics	3(3-0)
ENE-111	Introduction to Microbiology	3(3-0)
ME-104	Engineering Drawing	2(0-2)
HU-107	Pakistan Studies	2(2-0)
HU-109	Communication Skills	2(2-0)
MATH-121	Linear Algebra and Ordinary Differential Equations	3(3-0)
ENE-251	Ecological Management	2(2-0)
	Total	**17(15-2)**

Semester-III

Course Code	Course Title	Credits
ENE-213	Environmental Chemistry	3(2-1)
CE-183	Surveying	3(1-2)
MATH-361	Probability & Statistics	3(3-0)
CE-253	Fluid Mechanics	4(3-1)
ENE-212	Environmental Microbiology	3(2-1)
	Total	**16(11-5)**

Semester-IV

Course Code	Course Title	Credits
ENE-262	Computer Aided Design and Drafting	4(2-2)
HU-212	Technical and Business Writing	2(2-0)
MATH-331	Numerical Analysis	3(3-0)
ENE-252	Environmental Economics	2(2-0)
ME-204	Thermodynamics	4(3-1)
EE-101	Electrical Technology	3(2-1)
	Total	**18(14-4)**

Semester-V

Course Code	Course Title	Credits
ENE-302	Water Treatment and Supply Network Design	4(3-1)
GIE-201	Introduction to GIS and Remote Sensing	3(2-1)
CE-223	Soil Mechanics	4(3-1)
CE-356	Engineering Hydrology	4(3-1)
ENE-435	Cleaner Production Techniques	2(2-0)
	Total	**17(13-4)**

Semester-VI

Course Code	Course Title	Credits
ENE-353	Project Planning & Management	2(2-0)
ENE-303	Wastewater Collection &Treatment	4(3-1)
	Elective - I	3(3-0)
ENE-304	Environmental Engineering Lab Techniques	4(2-2)
MGT-271	Entrepreneurship	2(2-0)
ENE-332	Environmental Impact Assessment	2(2-0)
	Total	**17(14-3)**

Semester-VII

Course Code	Course Title	Credits
HU-222	Professional Ethics	2(2-0)
ENE-434	Environmental Health & Safety	2(2-0)
ENE-421	Solid Waste Management	3(3-0)
ENE-442	Water Pollution Control	3(3-0)
ENE-441	Air & Noise Pollution Control	4(3-1)
ENE-499	Final Year Project - I	3(0-3)
	Total	**17(13-4)**

Semester-VIII

Course Code	Course Title	Credits
CE-454	Water Resources & Irrigation Engineering	3(2.5-0.5)
ENE-454	Energy Resources and Management	3(3-0)
	Elective - II	3(3-0)
	Elective - III	3(3-0)
CSL-401	Community Service Learning Course	2(0-2)
ENE-499	Final Year Project - II	3(0-3)
	Total	**17(11.5-5.5)**
	Grand Total	**136**

List of Elective Courses

- Marine Pollution Control
- Mechanics of Solids
- Structural Analysis and Design
- Environmental Modeling
- Environmental Management in Emergencies
- Transportation Engineering
- Water and Wastewater Treatment Plant Design

Elective Courses

Course Code	Course Title	Credits
CHE-441	Fermentation Technology	3(3-0)
CHE-442	Membrane Technology	3(3-0)
GOE-341	Geosciences	3(3-0)
ENE-422	Industrial Waste Management	3(3-0)
ENE-455	Environmental Modeling	3(3-0)
CE-207	Structural Analysis	3(3-0)
CE-242	Transportation Engineering	3(3-0)
CE-372	Quantity Surveying and Cost Estimation	3(3-0)
Total		**24**

MS/PhD Environmental Engineering/Environmental Science

As postgraduate programmes, the research themes are directed towards local environmental issues. IESE can address real-life challenges and, as a result, benefit people from all walks of life. Our research benefits from strong synergy that has been developed between science, engineering and management disciplines. This provides a powerful combination of skills and capability that ensures both industrial relevance and academic rigor. This complements our state-of-the-art research and development facilities that differentiate the IESE research activities from other universities/institutes.

Research Focus

Well thought-out courses build an understanding of the fundamental principles of physical, chemical, and biological processes, employing mathematics and computational tools where relevant. The programme strives for appropriate balance between theory, computation and experimental observation, including both laboratory and field-scale experiments. It offers a healthy balance between research and practical application.

Research Facilities

IESE has a wide range of facilities and equipment to support research activities. Some of our key facilities include: Atomic Absorption Spectrophotometer, Gas Chromatography, X-Ray Fluorescence, Laser Induced Breakdown Spectroscopy, Laser Particle Size Analyzer, Total Organic Carbon Analyzer, Thermocycler, Fluorescent imaging, UV/Vis Spectrophotometer, etc.
Teaching & Research labs are available in the institute which include Water and Wastewater Lab, Environmental Biotechnology Lab, Air, Noise & Solid Waste Lab, Microbiology Lab, Chemistry Lab, Instrumentation Lab and Computer Lab to facilitate students to promote their research work in their respective areas.

MS/PhD in Environmental Engineering

This programme addresses subject themes such as physico-chemical processes in Environmental Systems, Wastewater Treatment and Design, Solid Waste Management, and Environmental Chemistry and Microbiology. It includes courses on Modelling of Environmental Systems, Water Resource Management, Industrial and Hazardous Waste Management, Remote Sensing and GIS, Contaminated Site Remediation, etc.

MS/PhD in Environmental Science

The postgraduate (PG) degree in Environmental Science aims to produce environmental scientists with a sound theoretical foundation and practical knowledge of basic and advanced science principles to improve the environment from pollutant sources such as air, water, soil, etc. This degree programme offers courses in disciplines such as Environmental Biotechnology, Environmental Chemistry, Pollution Control Technologies, Environmental Impact Assessment, Environmental Analytical Techniques, Environmental Microbiology, Environmental Policy, Health Safety and Environment. It also includes courses on the Freshwater Ecology, Municipal Environmental Geology, Environmental Biotechnology, Statistics for Environmental
Analysis, Wetland Management, Remote Sensing and GIS, etc.

Associated Careers

- Service in the federal or provincial environment departments/Divisions or environmental protection agencies
- Affiliation with NGOs, international donors and development agencies such as World Bank, Islamic Development Bank, UNDP, UNICEF, UNEP, etc.
- Environmental engineering portfolio
- Environmental management in the industry
- Academics
- Waste management companies in major cities. WAPDA, WASA.

Why study Environmental Science and Engineering?

Demand for professionals of Environmental Engineering & Scientists is rising every day. Environmental scientists and engineers solve problems related to:

- Water Pollution
- Air Pollution Control
- Wastewater Treatment
- Noise Pollution Control
- Industrial Waste Management
- Municipal Solid Waste Management
- Site Remediation
- EIA Development & Green Growth

MS & PhD Environmental Engineering (Evening)

Programme Description

The course is designed to provide professional engineers with sound theoretical knowledge of basic scientific and engineering principles that would enable them to address the local or global environmental issues in an effective manner.

MS/PhD Coursework

Programme Code-651

Core Courses

Course Code	Course Title	Credits
ENE-809	Wastewater Treatment and Design	3
ENE-813	Physico-Chemical Processes in Environmental Engineering	3
ENE-807	Air and Noise Pollution Control	3
ENE-822	Solid and Hazardous Waste Management	3
ENE-899	**MS Thesis**	**6**

Elective Courses (Any three of the following)

ENS-801	Environmental Analytical Techniques	3
ENE-802	Environmental Impact Assessment	3
ENE-805	Water Resources Management	3
ENE-812	Modeling of Environmental Systems	3
ENE-825	Agricultural Pollution and Control	3
ENE-840	Membrane Tech for Water & Wastewater Treatment	3
ENE-843	Environmental Health and Safety	3
ENE-921	Contaminated Site Remediation	3
ENE-922	Environmental Biotechnology	3
ENE-923	Advanced Analytical Techniques	2+1
ENE-924	Special Topics in Environmental Engineering	3
ENE-999	**PhD Thesis**	**30**

MS & PhD Environmental Science (Evening)

Programme Description

The course is designed to produce scientists with a sound theoretical knowledge of the basic science, economic and ecological policy & management principles that would enable them to address the local or global environmental issues in an effective manner.

MS/PhD Coursework

Programme Code-652

Core Courses

Course Code	Course Title	Credits
ENS 801	Environmental Analytical Techniques	3
ENS 827	Climate Change Adaptation and Mitigation	3
ENS 810	Research Methods in Environmental Sciences	3
ENS 808	Strategic Environmental Assessment	3
ENS 899	**MS Thesis**	**6**

Elective Courses (Any Three of the following)

Course Code	Course Title	Credits
ENS 804	Energy and Environment	3
ENS 806	Environmental Policy & Governance	3
ENS 820	Environmental Chemistry	3
ENS 822	Solid and Hazardous Waste Management	3
ENS 823	Applied Environmental Microbiology	3
ENS 824	Freshwater Ecology	3
ENS 825	Agrochemicals in the Environment	3
ENS 826	Environmental Biotechnology	3
ENS 832	Remote Sensing & GIS Applications in Environment	3
ENS 829	Environmental Risk Assessment and Management	3
ENS 843	Health, Safety and Environmental Management	3
ENS 850	Advances in Plant Ecology	3
ENS 852	Advance Analytical Techniques	3
ENS 854	Principles and Applications of Bioremediation	3
ENS 855	Carbon Sequestration and Environment	3
ENS 860	Treatment and Management of Wastewater	3
ENS 901	Special Topics in Environmental Science	3
ENS 999	**PhD Thesis**	**30**

Institute of Geographical Information System (IGIS)

IGIS is the first-of-its-kind higher education institute in Pakistan where state-of-the-art spatial education is delivered. The institute offers four-year Bachelors of Engineering in Geoinformatics, two-year Masters in Remote Sensing & GIS and PhD in Remote Sensing & GIS. The institute has well-experienced teaching faculty holding PhD and MS degrees from foreign universities who are actively involved in research and development. IGIS conducts short courses from time to time according to the demand of industry in GIS and Remote Sensing related disciplines. IGIS has also signed several MOUs with other national and international organization/ institutes for collaboration in research.

In the years ahead, we hope to pursue, with renewed vigor and zeal; our vision is to expand not only our academic programmes but also the student intake, without diluting our traditional standards of excellence. Our graduates are working in public and private sectors getting salary comparatively high then other discipline. Some of the well-known organizations which require Geoinformatics skills include but not limited to Planning Commission, SUPARCO, Survey of Pakistan, Pakistan Meteorological Department, Punjab Urban Unit, Soil Survey of Pakistan, Army Survey Group, C4I, LMKT, FWO, GCISC, Urban Policy Unit KPK, DHA Islamabad and Lahore, NESPAK, WWF, UNDP etc. Similarly there are number of startups which are actively seeking Geoinformatics graduates. It is envisaged that Geoinformatics will be widely used as a planning mechanism in e government and g-government era.

Bachelors in Geoinformatics Engineering

Programme Educational Objectives

IGIS has defined and established its Programme Educational Objectives (PEOs) keeping in view the desirable attributes of our graduates and with valued input from stakeholders. The educational objectives of undergraduate Geoinformatics Engineering programme at IGIS-SCEE are:

- Graduates will be highly competent and employable demonstrating Geoinformatics knowledge and skills.
- Graduates will be leaders demonstrating effective teamwork and interpersonal skills.
- Graduates will discharge their professional and societal obligations displaying high moral and ethical standards.
- Graduates will pursue lifelong learning through postgraduate education and continued development of technical and managerial skills.

The PEOs for Geoinformatics Engineering programme are also aligned with vision and mission of university and IGIS.

Programme Learning Objectives

1. Engineering Knowledge 2. Problem Analysis 3. Design/Development of Solutions 4. Investigation 5. Modern Tool Usage 6. The Engineer and Society 7. Environment and Sustainability 8. Ethics 9. Individual and Team Work 10. Communication 11. Project Management 12. Lifelong Learning

Bachelors in Geoinformatics Engineering

Programme Code: 104

Semester-I

Course Code	Course Title	Credits
HU-100	English	2-0
CS-114	Fundamentals of Programming	2-1
HU-101	Islamic Studies	2-0
MATH-101	Calculus & Analytical Geometry	3-0
ME-105	Workshop Practice	0-1
PHY-102	Applied Physics	2-1
GIE-100	Geography	3-0
	Total	**14-3**

Semester-II

Course Code	Course Title	Credits
GIE-103	Introduction to GIS	2-1
HU-107	Pakistan Studies	2-0
MATH-121	Linear Algebra and Ordinary Differential Equations	3-0
ME-104	Engineering Drawing	0-2
HU-109	Communication Skills	2-0
CS-212	Object Oriented Programming	3-1
	Total	**12-4**

Semester-III

Course Code	Course Title	Credits
GIE-104	Introduction to Remote Sensing	2-1
ECO-130	Engineering Economics	2-0
CE-182	Surveying-I	2-1
MATH-222	Linear Algebra	3-0
CS-250	Data Structures and Algorithms	3-1
MATH-361	Probability & Statistics	3-0
	Total	**15-3**

Semester-IV

Course Code	Course Title	Credits
GIE-112	Computer Aided GI Drawing	1-2
GIE-203	Digital Mapping & Image Processing	2-1
GIE-204	Photogrammetry	2-1
GIE-205	Spatial Data Analysis	2-1
HU-212	Technical & Business Writing	2-0
CE-223	Soil Mechanics	3-1
	Total	**12-6**

Semester-V

Course Code	Course Title	Credits
GIE-306	Cartography and Map Production	2-1
GIE-312	Geodesy and Map Projections	2-1
GIE-321	Database Management Systems	2-1
GIE-341	Geosciences	3-0
GIE-342	GIS Applications	2-1
GIE-	Elective I	3-0
	Total	**14-4**

Semester-VI

Course Code	Course Title	Credits
GIE-409	Spatial Databases	2-1
GIE-415	GPS Surveying	1-2
GIE-414	Land use Planning	2-1
GIE-474	Web GIS	2-1
GIE-	Elective II	3
GIE	Elective III	3
	Total	**13-5**

Semester-VII

Course Code	Course Title	Credits
HU-222	Professional Ethics	2-0
GIE-419	Spatial Decision Support Systems	2-1
GIE-499	Project I (GI Design Project)	0-3
GIE-475	Geospatial Project Management	2-0
GIE-	Elective IV	3
GIE-	Elective V	3
	Total	**12-4**

Semester-VIII

Course Code	Course Title	Credits
MGT-271	Entrepreneurship	2-0
GIE-499	Project II (GI Design Project)	0-3
GIE-	Elective VI	3-1
GIE-	Elective VII	3
	*Community Service	2
	Total	**8-4**
	Grand Total CHs	**133**

***2 Credit Hours compulsory course (non-credit)**

Elective Courses

Civil Engineering

Course Code	Course Title	Credits
CE-357	Water Resources Engineering and Management	3
CE-453	Water Resources and Irrigation Engineering	4
CE-357	Water Resources Engineering and Management	3
CE-453	Water Resources and Irrigation Engineering	4
CE-121	Engineering Geology	3
CE-371	Construction Project Management	3
CE- 457	Irrigation Engineering	3
CE- 462	River Engineering	3

Computer Science / Electronics Engineering

Course Code	Course Title	Credits
EE-231	Signals and Systems	3
CS-423	Data Warehousing and Data Mining	4
*CS-471	Machine Learning	4
EC-312	Digital Image Processing	3
CS- 340	Web Technologies-I	3

Geoinformatics

GIE-471	GIS Programming	3
*GIE-473	Integrated Geo-Technologies	3

Natural Resources Management

ENE-101	Introduction to Environmental Engineering	3
*ENE-405	Water Supply and Waste Water Engineering	4
GIE-451	Elements of Weather	3
*GIE -453	Environmental Impact Assessment	3
*GIE-455	Renewable Energy Resources	3

Land Use Planning

GIE-461	Regional Planning and Management	3
GIE-462	Introduction to Urban and Transport Planning	3
GIE-463	Land Information System in Third world	3
GIE-465	Fundamentals of Urban Planning	3
GIE-465	Fundamentals of Urban Planning	3
CEM-300	Procurement Management	3

Special Topics

GIE-482	Special Topic in GIS	3
GIE-483	Special Topic in RS	3

MS & PhD Remote Sensing and Geographical Information Programme Code: 625

Core Courses

Course Code	Course Title	Credits
GIS-801	Advanced Geographical Information System	2+1=3
GIS-811	Advanced Remote Sensing and Image Processing	2+1=3
GIS-821	Advanced Geodatabase and Programming	2+1=3
GIS-902	Spatial Analysis and Modeling	2+1=3
RM-898	Research Methodology	2+0=2*
	*2 Credit Hours compulsory course (non-credit)	
GIS-898	**MS Thesis**	**6**

Elective Courses (Any four of the following)

GIS-820	GIS for Agriculture and Natural Resources	3
GIS-803	GIS Pattern Analysis	3
GIS-804	GIS Application Software Development	3
GIS-806	Spatial Statistics	3
GIS-810	Photogrammetry	3
GIS-814	Remote Sensing Application in Urban Areas	3
GIS-815	Engineering Aspects of RS	3
GIS-816	Remote Sensing in Hydrology	3
GIS-817	Remote Sensing of the Environment	3
GIS-834	Hydrology and Water Resources	3
GIS-838	Spatial Hydrology	3
GIS-842	Natural Hazards and Disaster Management	3
GIS-843	Environmental Pollution	3
GIS-848	Spatial Epidemiology	3
GIS-851	Land use Planning and Management	3
GIS-853	Urban Planning	3
GIS-865	Land Information System	3
GIS-871	Geodesy	3
GIS-874	Web GIS	3
GIS-876	Geo-statistics	3
GIS-884	Advanced Regression Analysis	3
ENE-802	Environmental Impact Assessment	3
GIS-903	Advanced Spatial Data Management	3
GIS-913	Microwave and Hyperspectral Remote Sensing	3

Course Code	Course Title	Credits
GIS-902	Spatial Analysis and Modeling	3
GIS-912	Advanced Digital Image Processing	3
GIS-903	Advanced Spatial Data Management	3
GIS-913	Microwave and Hyperspectral Remote Sensing	3
GIS-914	Advanced Mapping Technology	3
GIS-803	GIS Pattern Analysis	3
GIS-804	GIS Application Software Development	3
GIS-806	Spatial Statistics	3
GIS-810	Photogrammetry	3
GIS-814	Remote Sensing Application in Urban Areas	3
GIS-815	Engineering Aspects of RS	3
GIS-816	Remote Sensing in Hydrology	3
GIS-817	Remote Sensing of the Environment	3
GIS-820	GIS for Agriculture and Natural Resources	3
GIS-834	Hydrology and Water Resources	3
GIS-838	Spatial Hydrology	3
GIS-842	Natural Hazards and Disaster Management	3
GIS-843	Environmental Pollution	3
GIS-848	Spatial Epidemiology	3
GIS-851	Land use Planning and Management	3
GIS-853	Urban Planning	3
GIS-865	Land Information System	3
GIS-871	Geodesy	3
GIS-874	Web GIS	3
GIS-876	Geo-statistics	3
GIS-884	Advanced Regression Analysis	3
ENE-802	Environmental Impact Assessment	3
GIS-903	Advanced Spatial Data Management	3

NUST Institute of Civil Engineering (NICE)

The institute is designed and developed on the most modern lines which are tailored to strengthen student's knowledge in Civil Engineering and its related specialties. NICE consists of the following departments;

- Structural Engineering
- Geo Technical Engineering
- Water Resources Engineering and Management
- Survey and Geodesy
- Water Resources Engineering
- Water Resources Management
- Glaciology
- Hydro-Informatics
- International Water Law & Conflict Management
- Climate Change

Teaching & Research Facilities

Laboratories

- Structures
- Geotech
- Survey
- Fluid Mechanics
- Geology
- Computer

Library

The library of the department is equipped with

- Books (hard copies)
- Online books through HEC
- CD's/DVD's
- MS Theses
- Manuals

Library Equipment

Library is fully furnished with new furniture, electronic detector and necessary equipment including computers, photocopy machines, scanner and printers. Wireless and line internet is also available in the library to access other international and HEC library.

Access to National and International Data-Bases

Line and wireless internet is available in the library to access other libraries. Access to various databases is available:-

- McGraw Hill Books
- Springer Link
- ASCE
- Science Direct
- E-brary
- Jstore
- Taylor & Francis Journals, etc.

NICE Vision

To excel as a learning seat for research, innovation and technological excellence in civil engineering. Produce internationally recognized civil engineering graduates who are prepared to lead, are competent to excel as professionals and entrepreneurs and bear unimpeachable integrity.

NICE Mission

To provide high quality education in civil engineering fundamentals, applications, and skills that prepares graduates for successful professional careers.

Programme Educational Objectives (PEOs)

- Graduates will be highly competent and employable demonstrating sound knowledge and skills.
- Graduates will be leaders demonstrating effective teamwork and interpersonal skills.
- Graduates will discharge their professional and social obligations displaying high moral and ethical standards.
- Graduates will pursue lifelong learning through postgraduate education and continued development of technical and managerial skills.

Bachelors in Civil Engineering

Scheme of Studies

Programme Code-103

Semester-I

Course Code	Course Title	Credits
CE-101	Engineering Mechanics	2.5-0.5
CE-102	Civil Engineering Materials	3-0
CE-181	Civil Engineering Drawing	0-2
CS-100	Fundamentals of Information & Communication Technologies (ICT)	2-1
MATH-101	Calculus and Analytical Geometry	3-0
EE-100	Introduction to Electrical Engineering	1.5-0.5
HU-109	Communication Skills	2-0
	Total	**18**

Semester-II

Course Code	Course Title	Credits
CE-103	Mechanics of Solids-I	2-1
CE-121	Engineering Geology	3-0
CE-182	Surveying-I	2-1
CS-111	Fundamentals of Computer Programming	2-1
MATH-104	Differential Equations & Transforms	3-0
ME-103	Mechanical Engineering	1.5-0.5
	Total	**17**

Semester-III

Course Code	Course Title	Credits
CE-205	Mechanics of Solids-II	2-1
CE-241	Transportation Engineering-I	3-0
CE-251	Fluid Mechanics-I	2-1
CE-286	Surveying-II	1-2
HU-101	Islamic Studies	2-0
MATH-352	Numerical Methods	2-1
	Total	**17**

Semester-IV

Course Code	Course Title	Credits
CE-206	Structural Analysis-I	3-0
CE-222	Soil Mechanics-I	2-1
CE-342	Transportation Engineering-II	2-1
CE-252	Fluid Mechanics-II	2-1
CE-287	Geo-Informatics	2-1
MATH-361	Probability and Statistics	3-0
	Total	**18**

Semester-V

Course Code	Course Title	Credits
CE-307	Structural Analysis-II	4-0
CE-308	Plain & Reinforced Concrete-I	3-1
CE-324	Soil Mechanics-II	2-1
CE-354	Engineering Hydrology	1.5-0.5
CE-371	Construction Project Management	2-1
CE-372	Building Construction & Estimation	**3-0**
	TOTAL	**19**

Semester-VI

Course Code	Course Title	Credits
CE-309	Structural Analysis-III	3-0
CE-310	Plain & Reinforced Concrete-II	3-1
CE-355	Public Health Engineering (Water Supply and Sanitary Engg)	2-1
CE-388	Computer Aided Civil Engineering Design and Graphics	1-2
HU-107	Pakistan Studies	2-0
CE-	Elective-I	3-0
	Total	**18**

Semester-VII

Course Code	Course Title	Credits
CE-373	Construction Machinery	1-1
CE-499	Project	3-0
CE-411	Steel Structures	3-0
HU-212	Technical & Business Writing	2-0
ARCH-305	Architecture & Town Planning	2-0
ECO-130	Engineering Economics	2-0
CE-	Elective-II	3-0
	Total	**17**

Semester-VIII

Course Code	Course Title	Credits
CE-458	Irrigation Engineering	2.5-0.5
CE-499	Project	0-3
HU-222	Professional Ethics	2-0
MGT-271	Entrepreneurship	2-0
CE-	Elective-III	3-0
CSL-401	Community Service Learning	1-1
	Total	**15**
	Grand Total	**139**

Elective Courses

Structures		
CE-412	Design of Concrete Structures	3-0
CE-413	Design of Steel Structures	3-0
CE-414	Bridge Engineering	3-0
CE-415	Special Application Structures	3-0
CE-416	Earthquake Engineering	3-0
CE-410	Structural Fire Engineering	
Geotech		
CE-425	Introduction to Rock Mechanics	3-0
CE-426	Slope Stability	3-0
CE-427	Soil and Site Improvement	3-0
CE-428	Design & Construction of Earthen Dams	3-0
CE-429	Introduction to Geotechnical Earthquake Engineering	3-0
CE-430	Applied Soil Mechanics	2-1
CE-431	Investigation and Instrumentation in Geotechnical Engineering	2-1
CE-440	Design of Tunnels and Underground Structures	3-0
Water Resources		
CE-459	Hydraulic Engineering	3-0
CE-460	Computational Hydraulics	3-0
CE-461	Open Channel Flow	3-0
CE-462	River Engineering	3-0
Construction Management		3-0
ENE-433	Environment Management & Impact Assessment	3-0
CE-474	Construction Project Scheduling	3-0
HRM-443	Human Resource Management in Construction	3-0
CE-476	Construction Contract Management	3-0
Transportation		
CE-443	Pavement Design & Rehabilitation	3-0
CE-444	Traffic Engineering & Safety	2.5-0.5
CE-445	Road Construction, Materials & Practices	2.5-0.5
CE-446	Geometric Design of Highway	2.5-0.5

MS & PhD Geotechnical Engineering

The course focuses on strengthening students' knowledge in geotechnical engineering, exposing them to issues related to engineering geology, geotechnic foundation engineering, geological and rock engineering, hydrology, soil structure and pavement design/analysis/rehabilitation.

Why join this program?

Geotechnical Engineering provides flexibility, broad subject coverage, high quality delivery and excellent job prospects on graduation. The course allows development of important technical aspects associated with Geotechnical Engineering. It provides the students with comprehensive and diverse understanding of Geotechnical Engineering which will allow the students to develop their careers. It is not only successful in providing essential technical aspects in the subject, but also allows a sound practical application of the skills learnt.

MS and PhD Coursework

Programme Code-150

Core Courses

Course Code		Course Title	Credits
CE	821	Soil and Site Improvement	3
CE	828	Advanced Geotechnical Design	3
CE	837	Design & Construction of Earthen Dams	3
CE	829	Geotechnical Site Investigation	3
CE	**899**	**MS Thesis**	**6**

Elective Courses

CE	830	Rock Mechanics-II	3
CE	836	Construction Management	3
CE	841	Earth Structures	3
CE	860	Pavement Design and Analysis	3
CE	881	Soil Dynamics	3
STAT	835	Probability & Statistics	3
CE	823	Slope Stability	3
CE	824	Mechanical Properties of Soil	3
CE	831	Advanced Soil Mechanics	3
CE	884	Rock Mechanics-I	3
CE	803	Concrete Materials & Technology	3
CE	804	Pre-stressed Concrete Structures	3
CE	806	Reinforced Concrete Members	3
CE	808	Finite Element Method	3
CE	818	Coastal Engineering	3
CE	835	Water Supply and Wastewater Engg	3
CE	872	Applied Hydrology	3
CE	873	River Engineering	3
CE	875	Computational Hydraulics	3
CE	876	Sediment Transport	3
CE	880	Groundwater Hydrology	3
CE	885	Groundwater Exploration	3
CE	886	Water Resources Economics, Planning & Management	3
CE	888	Watershed Management	3
CE	889	Irrigation & Drainage Engineering	3
CE	890	Ground Water Modeling	3
CE	844	Hydropower Engineering	3
CE	861	Pavement Rehabilitation & Management	3
CE	862	Pavement Materials Engineering	3
CE	897	Special Topics in Civil Engineering	3
CE	898	Contract Management	3
CEM	802	Construction Planning, Scheduling and Control	3
CEM	806	Construction Equipment Management	3
CEM	807	Risk Management in Construction	3
URP	904	Urban Mass Transit	3
GIS	802	GIS & RS and Its Application for Civil Engg	3
GIS	807	Theory of GIS	3
GIS	815	Engineering Aspects of RS	3
GIS	833	Soil Geomorphology and Classification	3
GIS	842	Natural Hazards and Disaster Management	3
ENE	822	Solid & Hazardous Waste Management	3
ENE	921	Contaminated Site Remediation	3
ENV	848	Environmental Geology	3
CE	**999**	**PhD Thesis**	**30**

MS & PhD Water Resource Engineering & Management

The course enables students to appreciate the wide range of activities related to Water Resources Engineering and produce engineering experts with updated knowledge in the fields of Water Resources, Hydrology and Environmental Management.

Why join this program?

Preservation and systematic regulation of water resources is the dire need of the present era. This course provides maximum job opportunities to students to work in different departments in the country.

MS Coursework

Programme Code-153

Core Courses

Course Code	Course Title	Credits
CE-871	Advanced Open Channel Hydraulics	3
CE-872	Applied Hydrology	3
CE-873	River Engineering	3
CE-875	Computational Hydraulics	3
CE-899	**MS Thesis**	**6**

MS and PhD COURSES

Elective Courses

Course Code		Course Title	Credits
CE	810	Hydrodynamics	3
CE	811	Data-Driven Modeling and Real-Time Control of Water Systems	3
CE	812	Modeling Theory and Information Management	3
CE	813	River Flood Modeling	3
CE	818	Coastal Engineering	3
CE	821	Soil and Site Improvement	3
CE	832	River Basin Modeling	3
CE	833	Urban Flood Management and Disaster Risk Mitigation	3
CE	834	Climate Change and Hydrological Cycle	3
CE	836	Construction Management	3
CE	822	Water Law & Policy	3
CE	838	Planning, Development & Management of Hydropower Systems	3
CE	839	Design of Hydropower Plants	3
CE	844	Hydropower Engineering	3
CE	848	Groundwater Hydrology	3
CE	850	Hydrometeorology	3
CE	856	Groundwater Modeling	3
CE	858	Dam Engineering	3
CE	876	Sediment Transport	3
CE	878	Water Management Computations	3
CE	879	Design of Hydraulic Structures	3
CE	886	Water Resources Economics, Planning & Management	3
CE	883	Hydrologic System Modeling	3
CE	885	Groundwater Exploration	3
CE	888	Watershed Management	3
CE	889	Irrigation & Drainage Engineering	3
CE	892	Geographic Information Systems in Water Resources	3
STAT	835	Probability & Statistics	3
CE	837	Design & Construction of Earthen Dams	3
CE	824	Mechanical Properties of Soils	3
CE	829	Geotechnical Site Investigation	3
CE	897	Special Topics in Civil Engineering	3
GIS	802	GIS & Remote Sensing (RS) Application for Civil Engg	3
ENE	802	Environmental Impact Assessment	3
ENE	824	Water Supply and Waste Water Collection Systems	3
ENE	827	Solid Waste Management	3
ENE	887	Water Quality Modeling	3
URP	807	Disaster Management	3
URP	903	Urban Hydrology	3
CE	**999**	**PhD Thesis**	**30**

SCHOOL OF MECHANICAL & MANUFACTURING ENGINEERING (SMME), ISLAMABAD

School of Mechanical and Manufacturing Engineering

The School of Mechanical & Manufacturing Engineering (SMME) has been established to prepare human resource with essential skills in Mechanical Engineering and related disciplines. Its areas of specialisation include manufacturing, automobile and power/energy sectors so as to prepare its graduates to perform effectively in the technological world. Though newly established, it has state-of-the-art laboratories related to mechanical and manufacturing fields. In addition, high-tech laboratories of Robotics, Biomedical and Manufacturing Resource Center (MRC) have also been developed.

The School is running undergraduate programme in Mechanical Engineering and MS and PhD in Mechanical Engineering, Robotics & Intelligent Machine Engineering, Design & Manufacturing Engineering (DME) and Biomedical Engineering. SMME will start MS and PhD in Biomedical Engineering from fall 2012/13 onwards. The programmes have been developed to address a growing concern within industry that fresh graduates do not meet the expectations of today's corporate and industry leaders. It has been noted that the current graduates have little awareness of the actual state of the industry, its culture, and the complex interactive management and operating systems which are based on value-added effort, team performance and result oriented leadership. The graduates of SMME are trained to assist the industry in its effort to meet the challenges posed by domestic and global competition. These graduates will have the knowledge of corporate culture, its internal and external competitive pressures, leadership qualities, team performance, and an expanded understanding of technologies required for industry for effective utilisation of human and financial resources.

The programmes are designed to inculcate the following attributes and skills in the students:

- Ability to design and conduct experiments, analyse data, use relevant tools/models and evaluate alternative mechanical/thermal/manufacturing system designs based on technical/non-technical criteria
- Capability of providing leadership while working in a team, exhibiting a high degree of professionalism
- Ability to work in diverse environments and address multidisciplinary challenges
- Strength and critical understanding of moral values and professional ethics, with a passion for life-long learning and self-improvement
- Ability to visualise and transform their innovation & creativity into practical form

Faculty

Dr Shahid Ikramullah Butt, A/Principal & Dean
PhD (Beijing Institute of Technology), China
Discipline: Mechanical, Manufacturing and Automation
Specialization: Industrial Engineering & Digital Manufacturing

Engr Muhammad Sohail
MS (George Washington University), USA
Discipline: Mechanical Engineering
Specialisation: Structures

Dr Riaz Ahmad Mufti
PhD (University of Leeds) UK
Discipline: Mechanical Engineering
Specialisation: Automotive Engineering

Dr Muhammad Sajid, HoD Research
PhD (University of Cergy Pontiose), France
Discipline: Mechanical Engineering
Specialization: Computational Fluid Mechanics, Heat Transfer, Multiphase Flow

Dr Emad Uddin, HoD Mechanical Engineering
PhD (Korea Advanced Institute of Science and Technology, KAIST), UK
Discipline: Mechanical Engineering
Specialization: Computational fluid dynamics (CFD), Fluid structure interaction (FSI)

Dr Mushtaq Khan, HoD Design & Manufacturing Engineering
PhD (Loughborough University), UK
Discipline: Mechanical/Manufacturing Engineering
Specialization: Rapid Prototyping / Laser Manufacturing

Dr Yasar Ayaz, HoD Robotics & Artificial Intelligence
PhD (Tohoku University) Japan
Discipline: Robotics Engineering
Specialization: Robotics & Machine Intelligence

Dr Nosheen Fatima, HoD Biomedical Engg & Sciences
PhD (Université de Caen), France
Discipline: Biomedical Engineering and Science
Specialization: Molecular Microbiology

Dr Khalid Akhtar
PhD (Asian Institute of Technology), Thailand
Discipline: Manufacturing Engineering
Specialization: Industrial Engineering

Dr Samiur Rahman Shah
PhD (Ecole Centrale Nantes), France
Discipline: Automotive Engineering
Specialisation: Engine Thermodynamics, Combustion and Emissions

Dr Syed Husain Imran
PhD (University of Manchester) UK
Discipline: Mechanical Engineering
Specialisation: Industrial Manufacturing Engineering

Dr Syed Omer Gilani
PhD (National University of Singapore), Singapore
Discipline: Robotics and Intelligent Machine Engineering
Specialization: Visual Neuroscience

Engr Abdul Naeem Khan
MS (Michigan State University (MSU), USA
Discipline: Mechanical Engineering
Specialization: Thermo-fluids, Propulsion

Dr Murtaza Najabat Ali
PhD (University of Sheffield), UK
Discipline: Biomedical Engineering and Science
Specialization: Biomaterials and Bioprosthesis

Shoaib Ahmed
MSc (The Royal Institute of Technology KTH), Sweden
Discipline: Mechanical Engineering
Specialization: Optimization and Control Theory

Engr M. Naweed Hassan, DD MRC
Bsc (UET Lahore), Pakistan
Discipline: Design and Manufacturing Engineering
Specialization: Military Vehicle Design and Evaluation

Dr Aamir Mubashir
PhD (Loughborough University), UK
Discipline: Mechanical Engineering
Specialization: Advanced Mechanics of Materials

Dr Riaz Ahmad Khan
PhD (NUST), Pakistan
Discipline: Applied Mathematics
Specialization: Elastodynamics

Mrs Sara Baber Sial
MS (Middlesex University), London, UK
Discipline: Mechanical Engineering

Dr Jawad Aslam
PhD (BUAA, Beijing), China
Discipline: Automotive Engineering
Specialization: Control Theory and System Engineering

Dr Muhammad Safdar
PhD (NUST), Pakistan
Specialization: Differential Equations

Dr Mian Ashfaq Ali
MS (Hanyang University), Korea
Discipline: Mechanical Engineering
Specialization: Automotive Engineering

Dr Rehan Zahid
PhD (University of Malaya), Malaysia
Discipline: Mechanical Engineering
Specialization: Mechanical Engineering

Umar Ansari
PhD (University of New South Wales) Australia
Discipline: Biomedical Engineering and Sciences
Specialization: Prosthetic Implants designing, Functional Electronic Stimulation (FES) Systems

Dr Zaib Ali
PhD (University of Cambridge), UK
Discipline: Mechanical Engineering
Specialization: Engineering/Computational Mechanics

Dr Hassan Sajid
PhD (University of Kentucky) USA
Discipline: Electrical Engineering
Specialization: Electrical Engineering, Controls and Perception

Dr Kashif Javed
PhD (Åbo Akademi University), Finland
Discipline: Computer Science
Specialization: Fault Tolerance

Dr Syed Ali Abbas Zaidi
PhD (Osaka University), Japan
Discipline: Mechanical Engineering
Specialization: Computational Fluid Dynamics

Dr Muhammad Jawad Khan
PhD (Pusan National University), South Korea
Discipline: Mechanical Engineering
Specialization: Brain-computer interface/ brain controlled robots

Dr Najam-ul-Qadir
PhD (King Fahd University of Petroleum and Minerals), Saudi Arabia
Discipline: Mechanical Engineering
Specialization: Materials Science

Dr Niaz Bahadur Khan
PhD (University of Malaya), Malaysia
Discipline: Mechanical Engineering
Specialization: Computational Mechanics, CFD

Dr Muhammad Asim Waris
PhD (Aalborg University), Denmark
Discipline: Biomedical
Specialization: Neural Engg

Dr Sana Waheed
PhD (Imperial College London), UK
Discipline: Mechanical Engineering
Specialization: Computational Solid Mechanics

Dr Waqas Khalid
PhD (University Name required), (Country)

Engr Ikhlaq Khattak
PhD (CEME NUST), Pakistan
Discipline: Mechanical Engineering
Specialization: Mechanical Engineering

Ms Aamna Hassan
MS (Fatima Jinnah Women University) Pakistan
Discipline: English

Mr Muhammad Shams ur Rahman
MA Islamic Studies (University of the Punjab) Pakistan
Discipline: Islamic Studies

Hafiz Abdur Rehman
MS (King Fahad University) Saudi Arabia
Discipline: Mechanical Engineering

Muhammad Umer
MS (NUST) Pakistan
Discipline: Mechanical Engineering

Hamza Asif Nizami
MS (NUST) Pakistan
Discipline: RIME
Specialization: Robotics

Vaqas Arshad
MS (State University of New York at Buffalo) USA
Discipline: Mechanical Engineering
Specialization: Dynamics, Control and Mechatronics

Engr Wajid Ali
BE (UET) Peshawar, Pakistan
Discipline: Mechanical Engineering

Engr Faizan Saifullah
BE (NUST) Pakistan
Discipline: Mechanical Engineering

Engr M Kashif Farooq
BE (UET Lahore) Pakistan
Discipline: Mechanical Engineering

Engr Muhammad Mansoor Ud Din
BE (UET Lahore) Pakistan
Discipline: Mechanical Engineering

Engr Saadia Qamar (ON STUDY LEAVE)
BE (NUST) Pakistan
Discipline: Electrical Engineering

Engr Usman Abdullah (ON STUDY LEAVE)
MS (NUST), Pakistan
Discipline: Mechanical, Automotive

Dr Mohsin Jamil (ON STUDY LEAVE)
PhD (University of Southhampton) UIC
Discipline: Mechanical Engineering
Specialization: Control System

Ammar Tariq (ON STUDY LEAVE)
MSc (The Royal Institute of Technology), Sweden
Discipline: Mechanical Engineering
Specialization: Engineering Mechanics

Dr Adeeb Shehzad (ON STUDY LEAVE)
PhD (Life Sciences), South Korea
Discipline: Biomedical Engineering and Sciences
Specialization: Cancer Biology & Biochemistry

Dr Waqas Hassan Tanveer (ON STUDY LEAVE)
PhD (Seoul National University), South Korea
Discipline: Mechanical & Aerospace Engg
Specialization: Energy Efficiency (process and simulation) via Industrial Waste Utilization

Engr Jamal Saeed (ON STUDY LEAVE)
MS (GIKI Topi), Pakistan
Discipline: Mechanical Engineering

Naqash Afzal (ON STUDY LEAVE)
BE (Air University) Pakistan
Discipline: Mechatronics
Specialization: Automation and Robotics

Engr Khawaja Fahad Iqbal (ON STUDY LEAVE)
BE (NUST) Pakistan
Discipline: Robotics and Intelligent Machine Engineering
Specialization: Mechatronics Engineering

Muhammad Adnan Hanif (ON STUDY LEAVE)
MSc (Bleking Institute of Technology) Sweden
Discipline: Mechanical Engineering
Specialization: Structural Mechanics, Strategic Sustainability

Engr Muhammad Usman Bhutta (ON STUDY LEAVE)
MS (Technical University Dortmund) Germany
Discipline: Mechatronics
Specialization: Process Automation

Fahad Islam (ON STUDY LEAVE)
MS (Carnegie Mellon University, Pittsburgh,PA) USA
Discipline: Robotics

Establishment of Medical Devices Development Centre (MDDC) at National University of Science and Technology (NUST), Islamabad

A cardiac stent manufacturing facility which was funded by Ministry of Science &Technology MoST, Government of Pakistan to NUST for the production of Angioplasty Balloon Catheter (which is used as a delivery system of cardiac stents).

Currently, NUST has established its Medical Devices Development Centre (MDDC) in a temporary arrangement for the production of Bare Metal Cardiac Stents (BMS) and Angioplasty Balloon Catheters by configuring one of its current academic buildings into a production facility for both BMS and Angioplasty Balloon Catheter. Since the production capacity of this temporary Manufacturing setup is limited (i.e. 12000-13000 BMS per annum) and there is no provision for the production of Drug Eluting Stents (DES) in the current manufacturing setup, therefore, a new PC-I was approved by MoST under the directive of Prime Minister Office for the establishment of purpose-built Medical Devices Development Centre (MDDC) at NUST. The new building is expected to complete within a year DES will also be developed.

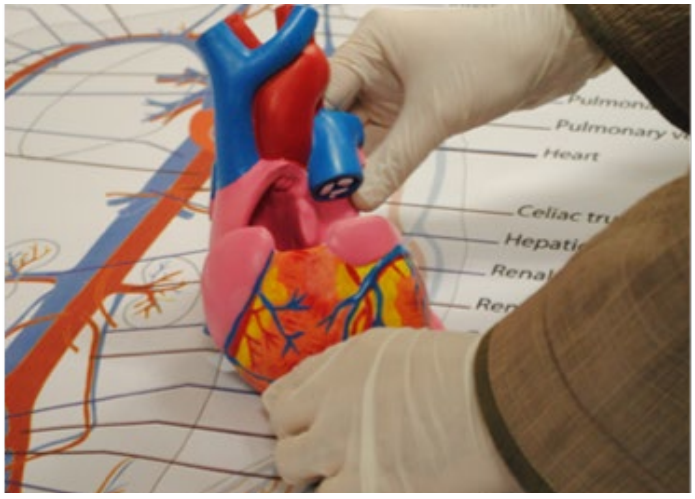
Establishment of National Centre of Artificial Intelligence (NCAI) at National University of Science and Technology (NUST), Islamabad

The National Center of Artificial Intelligence (NCAI) is the latest technology initiatives of Government of Pakistan under the government's Vision 2025 plan for Pakistan which envisions creating a modern and prosperous Pakistan by the year 2025. NCAI is designed to become the leading hub of innovation, scientific research, knowledge transfer to local economy, and training in the area of Artificial Intelligence (AI) and its closely affiliated fields. The central aim is to facilitate the researchers in the field of AI, help them establish and grow AI industry following international trend and seek solutions to the indigenous problems through AI.

Approved by Government of Pakistan in January 2018, NCAI is designed on a consortium model where the most leading researchers in the field of AI are identified on competitive grounds and new state of the art labs are established under their supervision. The project has a funding of PKR 1098.387 Million (US $ 10 Million) which is to be expended in 3 years for development and initial running of the following main labs located in 6 universities of Pakistan:

- Intelligent Field Robotics Lab at NUST, Islamabad
- Deep Learning Lab at NUST, Islamabad
- Medical Imaging and Diagnostics Lab at CIIT, Islamabad
- Smart City Lab at NED UET, Karachi
- Neuro-computation Lab at NED UET, Karachi
- Intelligent Information Processing Lab at UET Peshawar
- Intelligent System Design Lab at UET Peshawar
- Intelligent Criminology Lab at UET Lahore
- Agent Based Modeling Lab at Punjab University, Lahore

The labs and their respective Principal Investigators have been selected through competitive evaluation and rigorous selection process carried out by Higher Education Commission (HEC) and Planning Commission of Pakistan. Out of all the chosen top researchers of Artificial Intelligence in Pakistan, Dr Yasar Ayaz (NUST SMME) has been selected (on competitive grounds) to take the top position of Chairman / Central Project Director of the National Center of Artificial Intelligence (NCAI) of Pakistan.



Lab Facilities

S#	Department	Labs
1	Design and Manufacturing	CIM/Micro CIM Lab, Rapid Prototyping and Reference room Lab, CNC Lab (Lathe & Milling).
2	Mechanical	Fluid Mechanics Lab, Mechanics of Materials Lab, Heat and Mass Transfer Lab, Refrigeration & Air Conditioning Lab, Thermodynamics Lab, I.C. Engine / Tribology Lab, Ergonomics Lab, Mechanics of Machines Lab, Vibrations Lab, Measurement and Instrumentation Lab. Tool Making & Heat Treatment Lab, Automotive Lab, CAD/CAM Lab.
3	Robotics & Artificial Intelligence	Robotics & Intelligent Systems Engineering (RISE) Lab, Electronics Lab, Machine Vision Lab, Advanced Control Lab, CAD/CAM/Artificial Intelligence Lab, Industrial Automation Lab, Aerial Robotics Lab, Computer Aided Engineering/Embedded System Lab.
4	Manufacturing Resource Center	Surface Treatment Lab, Electrical Shop, Bench Fitting Lab, Wood Work and Pattern Making shop, Machine shop, Welding Fabrication shop, Forging & Foundry shop, Tool room.
5	Biomedical	Human Systems Lab, Biochemistry Lab, Prosthetics Lab.

ASME NUST SMME Student Section

American Society of Mechanical Engineers (ASME) promotes the practice of multidisciplinary engineering and allied sciences around the globe by training, professional development, codes and standards, research, conferences and publications, government relations, and other forms of outreach. ASME NUST SMME Student Section was established in May 2013. ASME NUST SMME Student Section has organized workshops for CV writing, freshmen mixer, Human Powered Vehicle challenge (HPVC) in academic year 2015-2016.

Institution of Mechanical Engineers (IMechE) Chapter

IMechE NSC made a monumental change in its vision. It has emerged as a strong technical society with prime focus on high quality student projects with the aim to bridge the gap between Academia and the Industry. The recent success of IMechE NSC to obtain a project from Shell Pakistan is a testament to its vision and hard work. Its ambitions do not end here. The launching of the project to completely design and fabricate an RC Plane coupled with an Aluminium engine - that too designed in house spells the extensive and strenuous learning curve that members of IMechE NSC go through.

IMechE NSC conduction of Speak Out for Engineering (SOfE - NUST) enabled it to sweep two of the three top spots in the SOfE - North '16-'17 round. All Pakistan CAD competition gathered the top CADers from all over Islamabad under one roof and pitched them against each other. The success of the event has encouraged IMechE to feature this regularly.

ASHRAE Student Chapter

The American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) is another prestigious organization, a chapter of which has been established at SMME. The Society focuses on "building systems, energy efficiency, indoor air quality and sustainability within the industry". Through research, standards writing, publishing and continuing education, ASHRAE shapes tomorrow's built environment today".

Student Support Services

A panel of faculty members is designated as advisors who are available to the students for career counseling. They also guide students and solve their problems related to university life.

Alliances and Partnerships

SMME has developed strong links with local and international industry and has conducted joint events and workshops. The school has also designed and developed number of products for these companies.

Millat Tractors

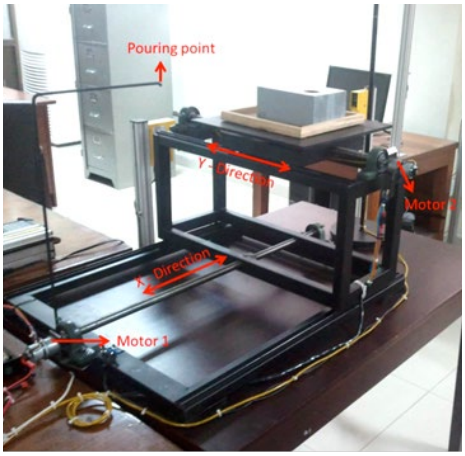
Along with international companies, SMME is also closely working with and supporting local industries. One of the examples is the technical link developed with Millat Tractors.
Knowing our expertise in the field of engines, Millat Tractors and SMME are working on a number of joint projects. This includes, development of engine blow-by monitoring system, real time oil consumption measurement system etc. SMME has designed and developed Green engine test cell, the first of its kind in Pakistan for Millat Tractors

Pakistan Association of Automotive Parts & Accessories Manufactures (PAAPAM)

Along with international companies, SMME is also closely working with and supporting local industries. One of the examples is the technical link developed with PAAPAM. SMME has recently signed an Memorandum of Understanding (MoU) with PAAPAM to provide placement of students from SMME in different industries related to automotive
sector for permanent job, training and internships

Sakura Wheelchairs (Japan)

SMME has signed a Memorandum of Understanding (MoU) with Sakura Wheelchair Project (Japan) under which researchers from leading Japanese Wheelchair Industries and associated Japanese Universities have joined hands with researchers of the Robotics and Intelligent Systems Engineering (RISE) Research Center at SMME to introduce active wheelchairs technology in Pakistan. The researchers are also working to collaborate on research projects for development of state of the art technologies to further research into Autonomous and Semi-Autonomous Active Wheelchairs.



DICE Foundation (USA)

SMME joined hands with DICE Foundation, USA, which is a non-profit organization registered and working in Michigan, USA. Its vision is to foster Innovation & Entrepreneurship culture in the country to make it a part of nation's DNA and rapid socio-economic development through Innovation. Use Innovation as a tool to generate wealth for the nation and fully commoditize digital technologies – bring it to masses in the country. DICE Foundation and SMME established NUST DICE Automotive Innovation Center (NDAIC) at NUST which was inaugurated by President of Pakistan. The center shall combine academic knowledge with Industry expertise to produce the first completely indigenous Multi-Purpose Vehicle (MPV) in the country. Using the platform of NDAIC Pakistan's first multi-purpose vehicle (MPV-1) is being designed with combine efforts of NUST-SMME and its consortium universities namely COMSATS Institute of Information Technology (CIIT) Sahiwal, NED-University of Engineering Technology and Capital University of Science and Technology (CUST).

Patents

- Method and apparatus for measuring the torque on the camshaft of an internal combustion engine (Patent No: EP1816456)
- Method for the measurement of the rotation of a valve train follower and apparatus for carrying out the method (Patent No: EP1835135)
- Development of engine blow-by meter RAM-BB2, Patent Application No: 854/2011.
- Oil film thickness measurement system for engine journal bearings using localized capacitive technique, Patent Application No: 188/2013
- Development of engine blow-by meter based on micro controller, Patent Application No: 190/2013.
- Technique and apparatus for engine tappet speed monitoring system, Patent Application No: 189/2013.
- Engine direct acting follower rotational speed measuring system, Patent Application No: 507/2013
- Vision based Automatic mold Positioning System in a Sand Casting Process (Patent Application No. 696/2013) dated 11/10/2013.
- Pin on Disk Tribometer (Patent filed on 28/10/2013)
- Auxetic structures and their application in non-vascular pathologies (Patent Application No. 104/2013) dated 22/02/2013.
- Anisotropic stent device for the treatment of coronary heart disease dated
- Counter-intuitive auxetic intramedullary bone stent and a method for treating long bone fractures"
- Skeletal Plate system with unique features for the repair of tubular and flat fractured bone (396/2014)
- Intelligent Bandage with drug dispensation and adjustable porosity system for topical wounds
- A Multifunctional Device that Promotes Wound Healing through Drug Delivery and Exudate Removal" 401/2014
- Pin on Disk Tribometer (Patent filed on 28/10/2013)
- Robotic Mannequin, Patent Application No: 332/2013, Filed on: 24 May 2013
- Electronic Valve Train for internal combustion engines (Patent Filed: 2015)
- Dynamic Oil Film Thickness Measurement System for Engine (Patent Filed: 2015)
- Valve Trains using Electrical Capacitive Technique(Patent Filed: 2015)
- Technique and Apparatus for Rotational Speed and Sliding Measurement of Roller in Roller Follower Valve Train in Engine (Patent Filed: 2015)

Industrial Projects

- Follower Rotation Measurement on the VWTDI (AUDI) -Cylinder Head sponsored by British Petroleum
- Slip Roll Ratio Measurement on Low Friction Valve Trains sponsored by British Petroleum
- Design and Development of Engine Test Cell for Green Engine sponsored by Millat Tractors
- Development of Standalone Blow By Monitoring System
- Vision Based quality control solution for football shape analysis sponsored by AKI (Pvt.) Ltd.
- Radiator Dry lead Detection System
- Solar Space Heating of the SMME Building sponsored by HEC
- APU test rig sponsored by HIT
- Fabrication of Jatropha Biodiesel Prototype Pilot Plant sponsored by ST Venture
- Development of 5000 Meter Range Unmanned Helicopter along with all its System sponsored by UNESCO
- APU sponsored by HIT
- Mobile Science Lab sponsored by NUST
- Knee Joint Project sponsored by MVRDE
- Measurement on the Multifunctional Valve Trains RIG (Cummins B Project) sponsored by British Petroleum
- Design, Development & Rapid Prototyping of casing for secure communication device sponsored by AWC
- Development of a 10 KM Range Flight Control System for Helicopter sponsored by NUST
- NUST SMME Fun Stent Graft Treat OES/Cancer sponsored by NUST
- NUST- Dev of Mobile Automotive Technology Test Bed sponsored by NUST
- Tool Analysis for the Drilling of Hard Rocks in Petroleum sponsored by HEC
- Open Source Platform for Numerical Simulation (OPN) sponsored by HEC
- An Industrial project with Fan Industry member of PEFMA to optimize Ceiling Fan production line. Investigating the Oil Film Strength in a Dynamically Loaded Bearing using Localized Capacitance Technique by HEC
- Modeling and robust control of grid connected converters sponsored by HEC
- Manufacturing and Fabrication of Electric Bus for H-12 Sector NUST Campus sponsored by NUST
- Design and Modification of Dinosaur and Solar System sponsored by Pakistan Muesum of National History Islamabad
- Tribological Performance of Cam/Tappet Interaction in a Direct Acting Over Head Valve Train Engine sponsored by PSF
- A Functional Stent-graft for the Treatment of Oesophageal Cancer
- Design and Development of Bioresorbable Drug eluted Stents for Treatment of Coronary Heart Diseases sponsored by HEC
- Human Detection sponsored by NESCOM
- Human Torso Detection sponsored by NESCOM
- Development of computational model saliency for videos sponsored by HEC
- Modeling of Biomechanical Movement for Active Prosthetic Hand Manufacturing and Assembly sponsored by NESCOM
- Piezoelectric Materials Synthesis and Development sponsored by NESCOM

Summer Internships

SMME has strong relationships with many national and international companies. Due to these strong ties, SMME is able to arrange summer internships for all the students who have completed their first four semesters of Mechanical Engineering in local and international industries. Following are the companies in which SMME placed its students for summer internships.

- Atlas Power
- Alpha Chemicals
- Atlas Honda
- Attock Oil Refinery
- Descon
- Fauji Fertilizer
- Heavy Industries Taxila
- IAESTE Pakistan
- Infinity Engineering (Pvt.) Ltd
- Interloop (Pvt.) Ltd
- Kohinoor Mills (Pvt.) Ltd
- Laser Sports
- Mecas Engineering (Pvt.) Ltd
- Metaline Industries (Pvt.) Ltd
- MGR Air Filters (Turkey)
- Millat Equipment Limited
- Millat Tractors Limited
- National Instruments
- OGDCL
- Pak Gen
- Pakistan Aeronautical Complex
- Pakistan Oilfields
- Pakistan Ordinance Factory
- Pakistan Tobacco Company
- PARCO
- Rastgar Engineering Company
- Ravi Autos (Pvt.) Ltd
- Sazgar Engineering Works
- Schlumberger
- Sitara Chemicals
- Spel Group
- Tesla Technologies
- Thermosole Industries (Pvt.) Ltd
- Trojans

Blow By Meter developed by SMME for Millat Tractors

"In realization of the fact we gratefully acknowledge & appreciate the efforts made by you (SMME) and your team for successful development of Blow-by meter for Millat Tractors engine testing facility."

Deputy General Manager Technical
Millat Tractors Limited

Foreign Students Internship

Besides offering internships to our students, school also provides internship to foreign students from countries like Canada, Turkey and Spain in our state of the art laboratories.

Industrial Visits

SMME arranges Industrial visits for students to renowned industries on regular basis. The main objective behind these visits is to explain the working of industrial equipment in running conditions to the students and tell them about the expectations of the industrialists from the fresh engineers. Some of the industries where students of SMME were taken for visits are:

» Fazal Steel, Islamabad
» Students visited Kohinoor Textile Mills
» Askari Cement, Wah Cantt
» Fazal Steel, Islamabad
» Heavy Mechanical Complex, Taxila
» Heavy Mechanical Complex, Taxila
» HIT
» HMC, Taxila
» Honda Atlas
» KSB Pumps
» KSB Pumps
» PAC Kamra
» Rastgar Engineering
» Silicaon CPV (Pvt) Ltd, Hattar
» Tarbela Dam & Power House, Tarbela
» Tesla
» Wilson Pharmaceuticals
» Heavy Mechanical Complex, Taxila
» ITTEHAD MILLS, Industrial Area I-9, Islamabad
» Islamabad Polymer
» Attock Refinery Limited
» Mari Petroleum Company Ltd
» KSB Pumbs, Hasanabdal
» PAC Kamra
» Pakistan Ordinance Factories, Wah Cantt
» Pakistan Tobacco Company, Jhelum
» Rawat Industrial State, Rawat
» STARCO Fans, Gujrat

Short Courses:

Beside Regular curriculum school offers different short courses to student for enhancing their technical qualities and capabilities like:

- CNC/Lathes Training
- CNC programming short Course
- Short course on pro e Wildfire 5
- Lab View Course
- GRE short Course
- Short course on CNC CAD/ CAM
- Advance Manufacturing Techniques
- Introductory Internship for High School Students

Vocational Skill Development Course

School offers vocational skill development courses every year in summer for unskilled persons

- Supervisory Level Course on Industrial Management
- Vocation Skill development course on Welding, Machinist, Electrical
- CNC Programming (Operators Level)

Seminars/Workshops

» Seminar on “Significance of Multidisciplinary Research” by Dr Zulfiqar Khan from Bournemouth University UK on December 6, 2016.
» Entrepreneurship 2016 - Opportunities and Challenges on December 7, 2016.
» Information Session on Fulbright and Global UGRAD Programmes on November 22, 2016 by USEFP.
» Workshop on Outcome Based Education System by Prof Lock on Aug. 27, 2016
» Social Entrepreneurship Workshop by School of Mechanical and Manufacturing Engineering on 25th March, 2016.
» GRE workshop by USEFP on Tuesday, March 29th, 2016
» Lecture on “Entrepreneurship – Opportunities & Threats”, by Mr Tahir Masood, CEO, Institute of Health Management, Rawalpindi was held in November, 2016.
» First aid & firefighting Workshop by NUST Community Service Club, February, 2016.
» Lecture on “Entrepreneurship – Opportunities & Threats”, by Ms Roubina Taufiq Shah, Director General (TDRO) Trade Dispute Resolution Organization, Ministry of Commerce, was held in December, 2016 in SMME Seminar Hall.
» Community Service Orientation workshop & deriving inspirations, 4th Feb, 2016.
» First aid & firefighting workshop, 25th Feb, 2016.
» NUST Leadership Summit, May 14, 2016 (Conference)
» IMEchE CADing Competition, December 3, 2016.
» Lecture on Seerat un Nabi (SAWS) and Our Cultural Behavioral Patterns
» Community Service Learning (CSL-401) class on community service project management, December, 2016.
» DICE Mega Innovation & Entrepreneurship Event, December 2016.
» Workshop on disaster management September2015
» First Aid and Fire Fighting October 2015
» Oil and Gas industry introductory Seminar by SMME on November 15, 2016.
» First International Symposium on Automotive and Manufacturing Engineering (SAME) November 2015
» Workshop on Social Entrepreneurship October 2015
» PCTN Conference on sustainable development
» Deep hole drilling in engine block using minimum quantity lubrication (MQL)
» Resume Writing and Interviewing Skills Workshop.
» Guest lecture by Prof James Wittefrom George Mason University
» Seminar and lecture on Finite element Optimization by Prof. Dr Muhammad Asghar Bhatti IOWA State University, USA
» Guest Lecture by Dr Abid Ali Khan Professor & Head of Aeronautics & Astronautics from Institute of Space and Technology (IST), Islamabad
» Workshop on Entrepreneurship by Mr Bilal Majeed Khan an Entrepreneur

Life at School

In order to keep students in touch with the outer world and provide them with cyber environment, there is high speed wireless internet facility inside the campus. A tea-bar and common room along with indoor games facility are also provided in the School so that students can spend their leisure time. The library and labs remains open from 9 AM to 9PM.

Student Societies

Extracurricular and co-curricular activities play a vital role in the personal grooming of the students.




Student Council of SMME

In October 2009, a student-run society by the name of Arts, Sports and Adventure Society (ASAS) was established which has now been restructured and named as the Student Council SMME. The Council is sponsored by a faculty member and is run directly by the students. A President, a General Secretary, Presidential Secretary and a Treasurer oversee and coordinate the activities of the Council. The Council has 5 wings which are Sports, Performing Arts, Publications, Creativity, Logistics and Event Management. These wings are headed by their respective Directors. The Student Council SMME also consists of batch presidents who bridge communication gaps between students and faculty. The Council has organized numerous activities for SMME's student body, most notable of them sports tournaments which include futsal, cricket, table tennis, etc.

NUST Community Service Club

NCSC (NUST COMMUNITY SERVICE CLUB), formerly known as NVC (NUST Volunteers Club) is a non-profit, student run, volunteer Organization managed by SMME. The mission of NCSC is to bring adolescent minds of the university students and change them into responsible citizens and leaders with lifelong commitment to community service and welfare of the society. We focus on facilitating the under privileged.

ASME NUST SMME Student Section

American Society of Mechanical Engineers (ASME) promotes the practice of multidisciplinary engineering and allied sciences around the globe by training, professional development, codes and standards, research, conferences and publications, government relations, and other forms of outreach. ASME NUST SMME Student Section was established in May 2013. ASME NUST SMME Student Section has organized workshops for CV writing, freshmen mixer, Human Powered Vehicle challenge (HPVC) in academic year 2015-2016.

ASHRAE Student Chapter

The American Society of Heating, Refrigeration and Air-conditioning Engineers is another prestigious organization, a chapter of which has been established at SMME. The Society focuses on "building systems, energy efficiency, indoor air quality and sustainability within the industry". Through research, standards writing, publishing and continuing education, ASHRAE shapes tomorrow's built environment today".

Institution of Mechanical Engineers (IMechE) Chapter

IMechE NSC made a monumental change in its vision. It has emerged as a strong technical society with prime focus on high quality student projects with the aim to bridge the gap between Academia and the Industry. The recent success of IMechE NSC to obtain a project from Shell Pakistan is a testament to its vision and hard work. Its ambitions do not end here. The launching of the project to completely design and fabricate an RC Plane coupled with an Aluminium engine - that too designed in house spells the extensive and strenuous learning curve that members of IMechE NSC go through.

IMechE NSC conduction of Speak Out for Engineering (SOfE - NUST) enabled it to sweep two of the three top spots in the SOfE - North '16-'17 round. All Pakistan CAD competition gathered the top CADers from all over Islamabad under one roof and pitched them against each other. The success of the event has encouraged IMechE to feature this regularly.

Departments

School of Mechanical and Manufacturing Engineering (SMME) along with its 30 PhDs educated from reputed international and national universities, consist of following departments:

» Department of Mechanical Engineering
» Department of Design and Manufacturing Engineering
» Department of Robotics and Intelligent Machine Engineering (RIME)
» Department of Biomedical Engineering and Sciences (BMES)

Quick Facts

Undergraduate Programmes

Course Starting:	September 2019
Duration:	4 years
Eligibility:	Matric/ Equivalent (minimum 60% marks) FSc/ equivalent with Physics, Maths & Chemistry (Minimum 60% marks)

Postgraduate Programmes

Course Starting	September 2019
Duration:	Minimum 1.5 years (For MS) and 3 years (For PhD)
Eligibility:	BE in Mechanical / Industrial/ Manufacturing/ Mechatronics or equivalent Engineering degree from a PEC/HEC recognized institution of Pakistan or abroad. (For Robotics and Intelligent Machine Engineering BE Computer Science Student can also apply.)

Department of Mechanical Engineering

Mechanical Engineering is the oldest and broadest field of Engineering which combines skills in designing of components and systems in a wide range of engineering technologies. Mechanical Engineering department is an integral part of SMME PhD faculty educated from reputed international and national universities and around four hundred undergraduate students and an additional four hundred and fifteen postgraduate students and sixteen PhD students. The mission of the Mechanical Engineering programme is to provide students with the fundamental knowledge, skills and professional experience necessary for successful careers in industrial or academic roles. The department of Mechanical Engineering provides excellent platform for young students to study and perform in challenging environments. The Department is equipped with all laboratory equipment necessary for undergraduate and postgraduate studies in the area of Mechanical Engineering. The Department also works in close coordination with our newly developed Manufacturing Resource Center (MRC). MRC has a large number of manufacturing facilities where the ideas of the young students and researchers are brought into reality. The curriculum is designed to meet challenges faced by the industry and expectations of the modern corporate world. Due to excellent academic record in the last couple of years, the department is receiving large number of applications for admission at undergraduate and postgraduate level.

Bachelors in Mechanical Engineering

The aim of the undergraduate programme in Mechanical Engineering is to train young graduates with technical, analytical, business and interpersonal skills to meet the challenges of the modern industries. The curriculum is tailored to provide skills in various areas

of Mechanical Engineering such as design, thermo-fluids, refrigeration and air conditioning, heat and mass transfer, industrial manufacturing, management and interpersonal skills. The programme is structured to create ability in the students to apply a multi-disciplinary approach to conceive, plan, design and implement solutions to a large number of Mechanical Engineering problems. The curriculum is integrated with computer based technologies facilitating the design and simulation of mechanical components and systems. In addition to all, the curriculum is set so that it helps students to choose a specific area or interdisciplinary fields such as industrial, manufacturing, materials and other wide range of engineering technologies. Modern mechanical engineers use sophisticated computer-aided design and engineering skills to ensure the reliability, efficiency and economics of products. There is an increasing demand for trained graduates with technical, analytical, business and interpersonal skills. The modern industry has led the world in innovation for almost a century, and its operations are now firmly integrated with computer-aided design, manufacturing and engineering. Our programme in Mechanical Engineering with its relevant specializations provides skill, knowledge and understanding in the areas of computer-based technologies and innovative design processes. These are associated with current and future generations of machines.
Within a few years of graduation, the students with Bachelors in Mechanical Engineering are expected to attain the following.

PEO 1: Have strong competence in Mechanical Engineering resulting in successful careers.
PEO 2: Pursuing research and innovation and be able to provide industrial solutions for engineering and technical problems.
PEO 3: Leading or participating in efforts to address societal and technical / business challenges.
PEO 4: Enhancing their professional development and technical knowledge through continuing education.

Scheme of Studies

Semester-I

Course Code	Course Title	Credits
MATH-101	Calculus & Analytical Geometry	3-0
HU-100	English	2-0
HU-107	Pakistan Studies	2-0
CH-109	Applied Chemistry	2-0
PHY-102	Applied Physics	2-1
CS-114	Fundamentals of Programming	2-1
ME-105	Workshop Practice	0-1
ME-105	Workshop Practice	0-1
	Total	**16**

Semester-II

Course Code	Course Title	Credits
MATH-121	Linear Algebra & ODEs	3-0
ME-221	Engineering Materials	3-0
ME-113	Engineering Mechanics-I: Statics	3-0
HU-101	Islamic Studies	2-0
HU-109	Communication Skills	2-0
ME-109	Engineering Drawing	0-2
MATH-121	Linear Algebra & ODEs	3-0
ME-130	Thermodynamics-I	3-0
	Total	**15**

Semester-III

Course Code	Course Title	Credits
MATH-232	Complex Variables and Transforms	3-0
ME-230	Fluid Mechanics-I	3-0
ME-130	Thermodynamics-I	3-0
ME-114	Engineering Mechanics-II: Dynamics	3-0
EE-103	Electrical Engineering	2-1
ME-223	Advanced Workshop Practice	1-1
ME-211	Computer Aided Drawing	0-1
ME-115	Engineering Mechanics Lab	0-1
CSL-401	Community Service Learning	0-2*
	Total	**19**

Semester-IV

Course Code	Course Title	Credits
MATH-351	Numerical Methods	3-0
ME-210	Mechanics of Materials-I	3-0
ME-330	Fluid Mechanics-II	3-0
ME-231	Thermodynamics-II	3-0
EE-227	Electronics Engineering	2-1
HU-212	Technical and Business Writing	2-0
ME-337	Fluid Mechanics Lab	0-1
ME-232	**Thermodynamics Lab**	**0-1**
	Total	**19**

Semester-V

Course Code	Course Title	Credits
ME-218	Machine Design-I	3-0
ME-212	Mechanics of Materials-II	3-0
ME-331	Heat & Mass Transfer	3-0
ME-322	Manufacturing Processes	3-1
ME-325	Engineering Economics	2-0
ME-216	Mechanics of Materials Lab	0-1

Semester-VI

Course Code	Course Title	Credits
ME-310	Mechanics of Machines	3-0
ME-339	Control Engineering	2-1
ME-325	Engineering Economics	2-0
ME-326	Heating, Ventilating and Air Conditioning	3-0
ME-332	Heat Transfer and HVAC Lab	0-1
MATH-361	Probability & Statistics	3-0

ME-339	Control Engineering	2-1	ME-332	Technical Elective-1	2-0
	Total	**19**		**Total**	**17**

Semester-VII

Course Code	Course Title	Credits
MGT-271	Entrepreneurship	2-0
ME-411	Introduction to Finite Element Analysis	2-1
ME-421	Mechanical Vibrations	3-0
ME-433	Mechanisms and Mechanical Vibrations Lab	0-1
XXX-000	Technical Elective-2	2-0
ME-430	Power Plants	3-0
ME-499	Final Year Project-1	0-3
	Total	**17**

Semester-VIII

Course Code	Course Title	Credits
HU-222	Professional Ethics	2-0
ME-420	Project Management (Management Elective)	2-0
ME-424	Health, Safety and Environment	1-0
XXX-000	Technical Elective-3	2-0
ME-439	Internal Combustion Engines	3-0
ME-431	IC Engines & Power Plants Lab	0-1
ME-498	Internship (Pass/Fail basis)	-
ME-499	Final Year Project-II	0-3
	Total:	**14**
	Grand Total	**136+2***

*CSL-401 (1+1) is not counted towards CGPA calculation. College of E&ME will offer CSL-401 in 7th Semester.
CH-101 Applied Chemistry will be offered as 3-0 at College of E&ME until the establishment of Chemistry Lab.

Electives

Course Code	Course Title	Credits
ME-401	Fundamentals of Aerodynamics	2-0
ME-408	Applied Heat Transfer	2-0
ME-409	Applied Thermodynamics	2-0
ME-412	Automotive Technology	2-0
ME-413	Basic Naval Architecture	2-0
ME-414	Computational Fluid Dynamics	2-0
ME-415	Computer Aided Engineering	1-1
ME-416	Computer Aided Thermal System Design	1-1
ME-424	Introduction to Oil and Natural Gas Engineering	2-0
ME-429	Laser & its applications	2-0
ME-438	Mechanical Engineering Design	2-0
ME-470	Marine Environment Issues	2-0
ME-471	Optimization Techniques	2-0
ME-473	Power Generation and Distribution	2-0
ME-474	Electrical Machines	2-0
ME-475	Energy Conversion and Power Electronics	2-0
ME-476	Engine Tribology	2-0
ME-477	FEM applications in Automobile	2-0
ME-478	Finite Element Methods	2-0
ME-479	Gas Dynamics	2-0
ME-484	Gas Turbines	2-0
ME-485	Fuel Cell Technology	2-0
ME-486	Power Plant Engineering	2-0
ME-487	Power System Analysis	2-0
ME-488	Renewable Energy Technologies	2-0
ME-489	Robotics and Automation	2-0
ME-490	Ship Propulsion Engineering	2-0
ME-491	Solar Energy Systems	2-0
ME-492	Vehicle Design Performance	2-0
ME-493	Production Tooling & Automation	2-0
ME-496	Vehicle Dynamics	2-0
ME-497	Advanced Engineering Design	2-0
ME-498	Power Train Systems	2-0
DME-480	Automotive Manufacturing Systems	2-0
DME-481	Computer Applications in Automobile Manufacturing	2-0
DME-482	Computer Applications in Manufacturing Systems	2-0
DME-483	Industrial Maintenance Management	2-0
DME-484	Logic Design & Micro-processors	2-0
DME-485	Logistics and Inventory Management	2-0
DME-486	Ergonomics, Work Study and Methods Engineering	2-0
DME-487	FEM applications in Manufacturing	2-0
M&S-402	Introduction to Modeling and Simulation	1-1
RIME-222	Introduction to Mechatronics Design Fundamentals	2-0
Management Electives		
ME-384	Operations Management	2-0
ME-427	Operations Research	2-0
ME-425	Total Quality Management	2-0
ME-428	Engineering Law	2-0

MS and PhD in Mechanical Engineering

The mission of the MS programme in Mechanical Engineering is to impart knowledge in the art and science of Mechanical Engineering through a comprehensive and advanced curriculum that produces specialized mechanical engineers of having adequate skill, fully prepared for entry into industry, government, graduate school and private enterprise. The curriculum covers broad range of areas such as design, thermo-fluids and management. The laboratories are equipped with state-of-the-art facilities in material characterization, design and analysis of automotive systems, instrumentation and computational mechanics. The programme is expected to enable the students to research, design, develop, test, evaluate and implement engineering solutions to problems that are of a complexity encountered in professional practice. The interdisciplinary nature of the curriculum allows the students to communicate effectively with colleagues in other disciplines such as manufacturing, biomedical engineering, robotics and architecture etc. The student will be made proficient with computer-based design simulation and analysis tools. The department has dedicated, student-focused faculty available to guide the students at every stage of their research.

MS Coursework

Programme Code: 622

Core Courses

Course Code	Course Title	Credits
MATH-812	Applied Engineering Mathematics	3
ME-801	Optimization of Engineering Systems	3
ME-802	Finite Element Methods	3
ME-803	Continuum Mechanics	3
Elective-I*	To be selected from the list of electives	3
Elective-II*	To be selected from the list of electives	3
Elective-III*	To be selected from the list of electives	3
Elective-IV*	To be selected from the list of electives	3
ME-899	**MS Thesis**	**6**

Electives

Any two from the following Streams and Two from NUST approved Courses (Subject to availability of Faculty)

Course Code	Course Title	Credits
Dynamics & Control		
ME-812	Advanced Control Systems-I	3
ME-813	Advanced Control Systems-II	3
ME-814	Digital Control Systems	3
EM-806	Operations Research	3
EE-977	Nonlinear Control Systems	3
ME-852	Rapid Prototyping, Tooling & Manufacturing	3
ME-853	Manufacturing System Design & Management	3
ME-854	Computer Integrated Manufacturing	3
ME-831	Computational Fluid Dynamics-I	3
ME-819	Instrumentation & Data Acquisition Systems	3
ME-820	Advanced Instrumentation and experimental methods	3
EM-800	Introduction to Advanced Robotics	3
ME-898	Special Topics	3
Computational Mechanics		
ME-831	Computational Fluid Dynamics-I	3
ME-881	Advanced Fluid Mechanics	3
ME-833	Computational Fluid Dynamics-II	3
ME-835	Advanced Mechanics of Materials	3
ME-839	Advanced Finite Element Analysis	3
ME-859	Mechanics of Fibre Reinforced Composites (FRC Materials)	3
ME-820	Advanced Instrumentation and experimental methods	3
ME-840	Computational Fluid Dynamics and Heat transfer	3
ME-898	Special Topics	3
Product & Manufacturing Systems Design		
ME-812	Advanced Control Systems-I	3
EM-806	Operations Research	3
ME-851	Advanced Manufacturing Processes	3
ME-852	Rapid Prototyping, Tooling & Manufacturing	3
ME-853	Manufacturing System Design & Management	3
ME-854	Computer Integrated Manufacturing	3
ME-855	Material Selection & Design	3
ME-859	Mechanics of Fibre Reinforced Composites (FRC Materials)	3
ME-862	Advanced Engineering Materials	3
ME-863	Product Lifecycle Management	3
ME-871	Product Design & Development	3
ME-875	Computer Aided Engineering Design	3

ME-819	Instrumentation & Data Acquisition Systems	3
MTS-852	Advanced Measurement Techniques	3
ME-876	Product Design and Development	3
ME-868	Operations Management	3
ME-869	Project Management	3
ME-870	Supply Chain Management	3
ME-898	Special Topics	3
Design		
ME-851	Advanced Manufacturing Processes	3
ME-855	Material Selection & Design	3
ME-824	Engine Tribology	3
ME-875	Computer Aided Engineering Design	3
ME-876	Product Design and Development	3
ME-867	Quality and Reliability Management	3
ME-868	Operations Management	3
ME-869	Project Management	3
ME-870	Supply Chain Management	3
ME-898	Special Topics	3

Thermofluids		
EM-806	Operations Research	3
ME-831	Computational Fluid Dynamics-I	3
ME-881	Advanced Fluid Mechanics	3
ME-819	Instrumentation & Data Acquisition Systems	3
ME-840	Computational Fluid Dynamics and Heat transfer	3
ME-891	Internal Combustion Engines	3
ME-898	Special Topics	3

* Remaining electives of all the above streams are available on SMME website. **www.nust.edu.pk/institutions/schools/smme**

PhD Courses (Any six of the following)

ME-931	Internal Combustion Engine Technology	3
ME-932	Combustion and Pollution Chemistry	3
ME-933	Industrial Energy Management	3
ME-934	Economical Aspects of Energy Conversion	3
ME-935	Renewable Energy	3
ME-936	Solar Technologies	3
ME-937	Vehicle Design and Analysis	3
ME-938	Mechanical Vibration and Noise	3
ME-939	Mechatronics and Robotics Applications	3
ME-940	Vehicle Dynamics and Control	3
ME-941	Analytical Dynamics	3
ME-942	Advanced Stress Analysis	3
ME-943	Laser Manufacturing	3
ME-999	Special topics for PhD program	3
(Any subject on the research interest of the faculty available)		
ME-999	**PhD Thesis**	**30**

Department of Design & Manufacturing Engineering

The Department of Design and Manufacturing Engineering (DME) was established at SMME in September 2011. DME has PhD faculty educated from reputed international and national universities and more than 100 postgraduate students. The role of DME is to offer such programmes which address industrial needs and also focuses on the leading research areas in design, manufacturing and industrial engineering.

MS and PhD in Design & Manufacturing Engineering

This educational programme has been started to address the demands of the modern industry. We at SMME are well- aware of the fact that today's graduates must have the knowledge of the actual state of the industry, its culture and the complex interactive management and operating systems which are based on value-added efforts, team performance and result-oriented leadership. SMME is offering MS and PhD programme in Design & Manufacturing Engineering and aspires to develop expertise in other disciplines as well. The purpose of the programme is to develop understanding of manufacturing and management techniques along with specialisation in Manufacturing Engineering, Design Engineering and Industrial Engineering. The programme provides a firm foundation in lean manufacturing, product engineering, quality systems, and skills for effective utilisation of human and corporate resources necessary to improve manufacturing business performance. It integrates systems perspectives, combining the classroom learning of engineering and business with laboratory work, plant tours, industry-related internship & research project. It also provides ample opportunities to work in teams with other manufacturing professionals to analyse real-time problems and develop economical solutions.

The Masters Programme students are required to complete 22 classroom credit hours, 2 laboratory credit hours and an industrial research thesis of six credit hours. Laboratory work includes understanding and use of CIM, Micro CIM, CNC and Rapid Prototyping. The thesis is designed to provide a platform for the students to demonstrate competencies in learned methodologies and acquired skills to enhance real-time manufacturing and business performance. The "partner manufacturing industry" serves as a laboratory for the research project. The Programme will inculcate the skills and ability in the students to effectively fulfill the requirements of such positions as Manufacturing Systems Engineer, Process Improvement Specialist, Lean Manufacturing Consultant, Supply Chain / Logistics Systems Specialist and Manufacturing Business Planner / Consultant.

MS Coursework Programme Code: 620

Core Courses

Course Code	Course Title	Credits
MATH-815	Applied Engineering Mathematics	3
DME-811	Product Design and Development	3
DME-812	Advanced Manufacturing Processes	3
DME-813	Product Lifecycle Management	3
DME-814	Computer Integrated Manufacturing	3
Elective-I*	To be selected from the list of electives in respective disciplines	3
Elective-II*	To be selected from the list of electives in respective disciplines	3
Elective-III*	To be selected from the list of electives in respective disciplines	3
DME-899	**MS Thesis**	**6**

Elective Courses

Specialisation in "Manufacturing Engineering" (Any Three)

Code	Course Title	Credits
DME-821	Rapid Prototyping, Tooling and Manufacturing	3
DME-822	Laser Material Processing	3
DME-823	Advanced Manufacturing Technologies	3
DME-824	Design for Manufacturing	3
DME-825	Lean and Agile Manufacturing	3
DME-826	Manufacturing Systems Design and Management	3
DME-827	Special Topics in Manufacturing Engineering	3

Specialisation in "Design Engineering" (Any Three)

Course Code	Course Title	Credits
DME-828	Design of Machine Elements	3
DME-829	Design of Mechanisms	3
DME-830	Cognitive Ergonomics in Design	3
DME-831	Integrated Product Design	3
DME-832	Design of Mechatronics Systems	3
DME-833	Medical Device Design and Standards	3
DME-834	Engineering Design Management and Business Studies	3
DME-835	Industrial Design and Human Factors	3
DME-836	Statistics for Design	3
DME-837	Materials Selection and Design	3
DME-838	Special Topics in Design Engineering	3
CSE-820	Finite Element Methods	3
CSE-805	Introduction to Modelling & Analysis	3

Specialisation in "Industrial Engineering" (Any Three)

Course Code	Course Title	Credits
DME-839	Quality and Reliability Management	3
DME-840	Financial Management of Operations and Enterprise	3
DME-841	Leadership and Entrepreneurship	3
DME-842	Operations Management	3
DME-843	Special Topics in Industrial/ Engineering Management	3
MEM-801	Project Management	3
MEM-820	Supply Chain Management	3
MEM-823	Operations Research	3

PhD Programme (Any Six)

DME-931	Advances in Manufacturing Technologies	3
DME-932	Rapid Prototyping and Manufacturing	3
DME-933	Advanced Topics in Systems Engineering & Management	3
DME-934	Advanced Information Systems for Manufacturing	3
DME-935	Special Topics for PhD Program	3
DME-936	Advanced Laser Material Processing	3
DME-941	System Safety Engineering and Management	3
DME-942	Facility Planning and Layout	3
DME-943	Production Planning and Control	3
DME-944	Production Scheduling Techniques	3
DME-945	Special Topics for PhD Program	3
DME-951	Design and Analysis of Allocation Mechanism	3
DME-952	Advanced Topics in Human Factors in Product Design	3
DME-953	Advanced Optimal Design of Mechanical System	3
DME-954	Special Topics for PhD Program	3
DME-961	Service Engineering	3
DME-962	Advanced Topics in Quality Management	3
DME-963	Special Topics for PhD Program	3
DME-999	**PhD Thesis**	**30**

Department of Robotics and Artificial Intelligence (R&AI)

Intelligent robotics is widely believed to spearhead the upcoming technological revolution where robots and intelligent machines will become an integral part of everyday human life. Be it industrial automation, surgical robotics, household robotics or active prosthetic rehabilitation, robotic technology is being introduced everywhere in order to assist humans in their everyday tasks. Moreover, recent developments in industry have led to more and more automation being introduced in operations ranging from simple to most complex.

The Department of Robotics and Artificial Intelligence (R&AI) was established in September 2011 and currently seventy two postgraduate students are completing their Master and PhD in Robotics and Intelligent Machine Engineering (RIME). Department of R&AI houses dedicated laboratories for Robotics, Machine Vision, Control Systems, Industrial Automation, Electronics and Computer Aided Engineering whereas it is supported by other labs at the SMME including Rapid Prototyping (RP) and Computer Numerical Control (CNC) etc. which facilitate mechanical fabrication of indigenously designed robot prototypes. These laboratories comprise equipment both for research as well as teaching purposes including robotic arms of various types, mobile robots, stereo vision camera systems, robot designing kits, advanced microcontroller instrumentation, pneumatic / hydraulic workstations and PCB board fabrication facilities. These enable the student to get maximum practical exposure to modern day robotic technology at par with similar graduate programmes in other leading international universities.
The department is home to highly qualified faculty from leading universities of Japan, USA, UK, France and Singapore.

MS and PhD in Robotics and Intelligent Machine Engineering

The postgraduate programme of Robotics and Intelligent Machine Engineering (RIME) is focused towards advanced level education and state of the art research in the cutting edge areas of:

- Robotics & Automation
- Mechatronics & MEMS
- Control Systems Engineering
- Machine Intelligence
- Computer Vision

The Master's programme requires the student to complete 22 – 23 credit hours of theory and 1 – 2 credit hours of lab work including 6 core and 2 elective courses. The students are required to take up a research thesis in any of the streams identified above. The PhD programme requires the students to study 6 courses focusing on the stream of their choice and then undertake research for a PhD dissertation. The laboratories housing most modern equipment available at the department make it possible for the students to gather practical results for their experiments wherever required.

MS Coursework

Programme Code: 622

Core Courses

Course Code	Course Title	Credits
RIME-811	Robot Mechanics and Control	3
CSE-860	Artificial Intelligence	3
EC-803	Computer Vision	3
RIME-812	Mobile Robotics	3
RIME-899	MS Thesis	6

Electives

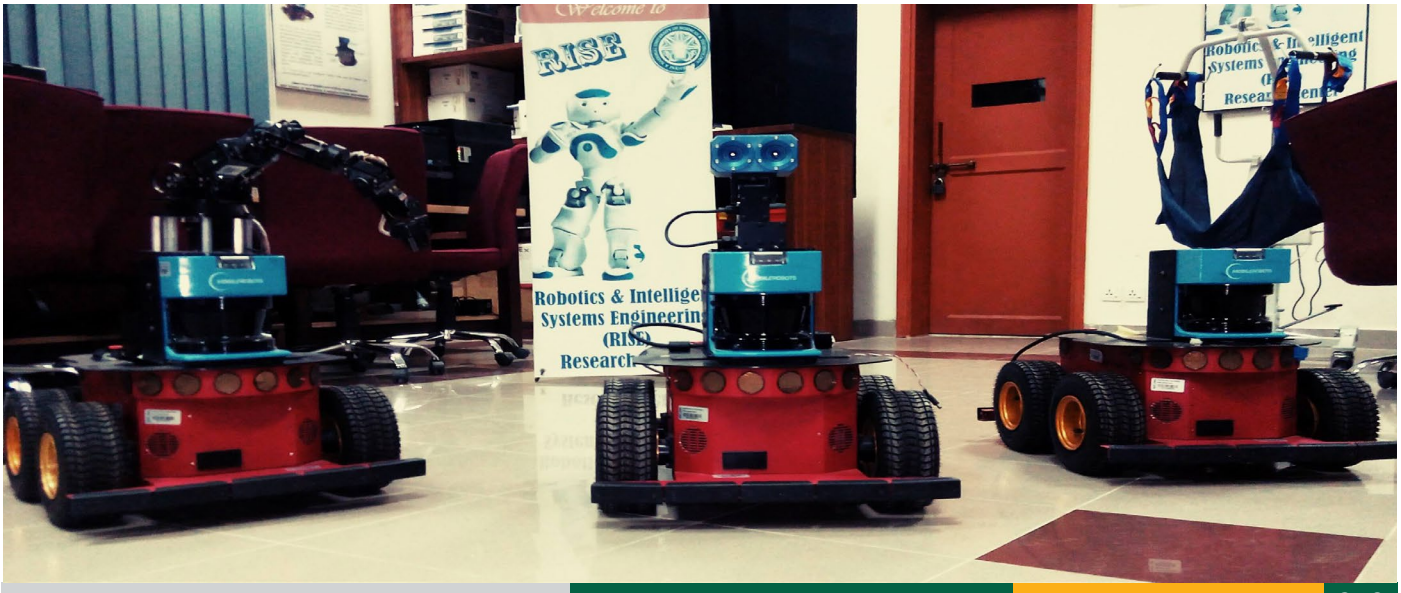
Any two from the following Streams and Two from NUST approved Courses (Subject to availability of Faculty)

Course Code	Course Title	Credits
RIME-821	MEMS Design and Fabrication	3
RIME-832	Machine Learning	3
MTH-811	Advanced Engineering Mathematics	3
IME-813	Computer Integrated Manufacturing	3
EM-840	Data Acquisition and Control	3
EM-870	Advanced Embedded Systems / Micro-Controllers	3
EM-890	Modeling and Simulation	3
EE-873	Fuzzy Control	3
EE-827	Non Linear Control Systems	3
EE-830	Adaptive Control	3
EM-800	Robotics – I	3
EM-805	Robotics – II	3
EE-871	Linear Control Systems	3
EE-822	Advanced Logic Design	3
RIME-833	Deep Learning	3
RIME-813	Robotic Grasping and Fixturing	3

RIME-814	Rehabilitation and Assistive Robotics	3
RIME-815	Legged Robotics	3
RIME-816	Robot Design	3
RIME-835	Human Robot Interaction	3
RIME -836	Probabilistic Robotics	3
RIME-843	Sensors and Sensing	3
RIME-837	Simultaneous Localization and Mapping	3
RIME-817	BioRobotics	3
RIME-823	Medical Devices and Robotics	3
EE-840	RF MEMS:Theory and Applications	3
NSE-847	Essentials of NEMS MEMS	3

PhD Courses (Any six of the following)

RIME-913	Robotic Manipulation	3
RIME-914	Robot Motion Planning	3
RIME-916	Special Topics for PhD program (Robotics)	3
RIME-922	Microfluidics and BioMEMS	3
RIME-923	Special Topics for PhD program (Mechatronics)	3
RIME-933	Advanced Artificial Intelligence	3
RIME-934	Special Topics for PhD program (Artificial Intelligence)	3
RIME-942	Pattern Recognition	3
RIME-943	Special Topics for PhD program (Machine Vision)	3
RIME-921	Design of Fault-Tolerant Systems	3
RIME-932	Social Robotics	3
RIME-911	Humanoid Robotics	3
RIME-999	**PhD Thesis**	**30**



Department of Biomedical Engineering & Sciences

Biomedical is among the fastest growing multidisciplinary area which combines design and problem solving Engineering skills with Medical and Biology. The demand for more sophisticated medical equipment and procedures, cost efficiency and effectiveness will boost demand for biomedical professionals. In future biomedical professionals will have an enormous impact on the improvement of health services and related industry.
The Biomedical Engineering and Sciences programme at SMME with its one hundred and nineteen post graduate students is aimed to meet the requirement of skilled and professional engineers and scientists in the market including hospitals, biomedical equipment and prosthetic manufacturers etc.

MS and PhD Biomedical Engineering/Biomedical Sciences

The programme offers MS degree to the students with different backgrounds and provides them education and training in different areas of Biomedical engineering and sciences. The curriculum of Biomedical Postgraduate programme is designed to match the needs of local and international industry, health organizations and institutes, research and development, as well as prevailing needs of higher education in the world. The typical pursuits of the programme include:

- To translate discovery into treatments that transform the practice of medicine; determine the effectiveness and outcomes of primary, secondary and tertiary health interventions on patients and populations;
- To provide leading-edge research that related to human health and disease
- To support the academia, hospital and medical businesses, Government health service agencies
- Research and development in regulatory affairs and medical devices standards
- Development of biosensors.
- Research and development in diagnosis and treatment of cancer
- Indigenous production of pharmaceutical materials
- Research and development in computational and experimental neuroscience
- To provide cutting edge research in biomedical imaging
- To provide support for Healthcare information and management system

The Master course consists of eight taught lecture modules plus a research project work. Each taught module is self-contained, and covers a complete topic. Out of eight taught courses, four courses are Core Courses. The core courses are common and compulsory for all students, while the remaining four courses may be selected from any field of specialty (i.e. Biomedical Engineering / Biomedical Sciences).

MS Coursework

Programme Code: 623

Core Courses

Course Code	Course Title	Credits
BMES-821	Human Physiology and Anatomy	3
BMES-813	Biomedical Instrumentation	3
BMES-811	Signals and Images in Medicine	3
BMES-812	Medical Devices Design and Standards	3
BMES-899	MS Thesis	6
BME-802	Applied Mathematics*	0

* Introductary courses

Elective Courses (Engineering Stream) (Any four)

Course Code	Course Title	Credits
BME-831	Biofluid Mechanics	3
BMES-842	Advanced Biomaterials	3
BMES-814	Neural Engineering	3
BME-822	Selected Topics in Biomedical Engineering	3
BMES-862	Clinical Biostatistics	3
BMES-832	Biomechanics	3
BMES-823	Molecular Neuroscience	3
BME-833	Prosthetics and Rehabilitation	3
MATH-814	Advanced Engineering Mathematics	3
ME-820	Advanced Instrumentation and Experimental Methods	3
BME-843	Modeling Organs and Tissues	3

BME-844	Visual Perception	3
BMES-845	Rehabilitation Engineering	3

Non Credit Courses

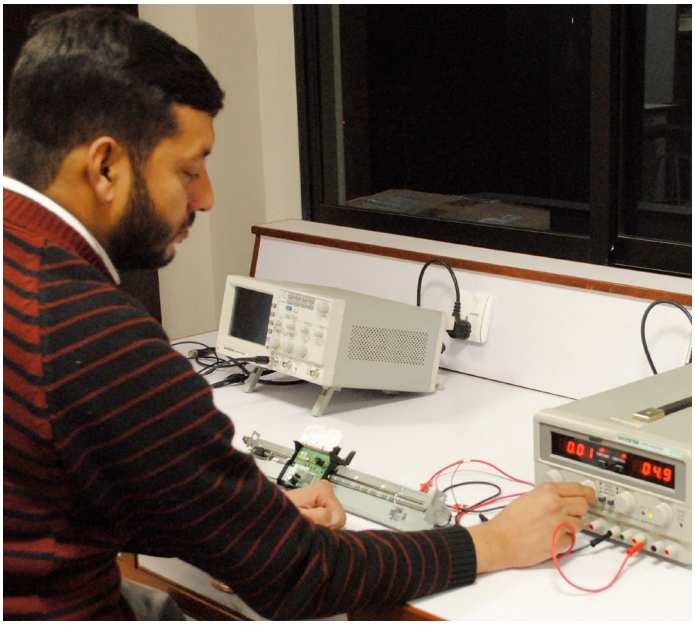
Course Code	Course Title	Credits
BMES-801	Biology for Engineers	0
BMES-802	Applied Mathematics	0

Additional Courses MS

Course Code	Course Title	Credits
RM-898	Research Methodology	2
SEM/WKSP-897	Seminar / Workshop	1

PhD Biomedical Engineering Courses

Course Code	Course Title	Credits
BMES-941	Advances in Biomedical Materials	3
BMES-942	Artificial Organs and Biomedical Applications	3
BMES-931	Advances in Biological Perception	3
BMES-932	Image and Vision Computing in Medicine	3
BMES-934	Advanced Bio-signal Processing	3
BMES-923	Advances in Neural Rehabilitation Engineering	3
BMES-999	PhD Thesis	30
	Dissertation	3



MS and PhD Biomedical Sciences

Programme Code: 624

Core Courses

Course Code	Course Title	Credits
BMES-821	Human Physiology and Anatomy	3
BMES-813	Biomedical Instrumentation	3
BMES-811	Signals and Images in Medicine	3
BMES-842	Advanced Biomaterials	3
BMES-899	MS Thesis	6
BMES-802	Applied Mathematics*	0

Elective Courses (Sciences Stream) (Any Three)

Course Code	Course Title	Credits
BMES-832	Biomechanics	3
BMES-814	Neural Engineering	3
BMS-822	Selected Topics in Biomedical Sciences	3
BMES-862	Clinical Biostatistics	3
BMES-812	Medical Devices Design and Standards	3
BMES-823	Molecular Neuroscience	3
MVI-851	Medical Genetics	3
BMES-825	Cancer Cytogenetic	3
BMES-815	Biosensors and Instrumentation	3
ME-820	Advanced Instrumentation and Experimental Methods	3
BMS-843	Systems Pharmacology and Therapeutics	3
BMS-844	Nano and Micro Drug Delivery Systems	3
BMES-845	Rehabilitation Engineering	3
Non Credit Courses		
BMES-801	Biology for Engineers* (Non Credit Course)	0
BMES-802	Applied Mathematics* (Non Credit Course)	0
Additional Courses MS		
RM-898	Research Methodology	2
SEM/WKSP-897	Seminar / Workshop	1

* Introductary courses

List of PhD Courses

Course Code	Course Title	Credits
BMES-950	Recent advances in Molecular Biology and Biomedicine	3
BMES-941	Advances in Biomedical Materials	3
BMES-923	Advances in Neural Rehabilitation Engineering	3
BMES-942	Artificial Organs and Biomedical Applications	3
BMES-952	Tissue Engineering	3
BMES-951	Bio-Nanotechnology	3
BMES-999	PhD Thesis	30
Additional Course PhD		
SEM/WKSP-997	Seminar / Workshop	1

RESEARCH CENTER FOR MODELLING AND SIMULATION (RCMS), ISLAMABAD

Research Center for Modelling and Simulation (RCMS)

Research Center for Modeling and Simulation was established in 2007 to bring the cutting edge of computational research to NUST. The center houses the country's most powerful computer and expert faculty to provide a true multi-disciplinary research environment. The center aims to act as a platform to integrate design and development efforts by the government, academia and industry through collaborative cross-disciplinary research and educational programmes. Specifically, there was a need for integrating analytical and computational techniques with advances in computer hardware and software. In its short history, RCMS has conducted high end research in Aerospace, Computational Biomedical Engineering, Bioinformatics, and Computational Chemistry etc through its faculty and students.

RCMS started its first MS programme in Computational Science and Engineering in Fall 2008. In Fall, 2010, the programme was extended to PhD in Computational Science and Engineering. In Fall 2013, RCMS launched Pakistan's first ever MS programme of Systems Engineering. The MS Bioinformatics programme was launched in Fall 2016. Facilitated by the enabling environment comprising state of the art constituent laboratories, library and adaptive mechanisms, faculty and students at RCMS developed a multi-disciplinary approach to research and education, making many notable contributions. Recently, the education, training and research activities have been divided into two main streams or departments, namely: Computational Sciences; and Computational Engineering. These departments have been further divided into divisions to keep the activities focused, better managed as well as synergized. Computational Sciences comprises Real Time Systems and Computational & Applied Mathematics. Similarly, Computational Engineering division is divided into Engineering Sciences, Systems Engineering and Operations Research.

Faculty

Dr Rizwan Riaz **Principal**
PhD (University of Manchester), UK
Discipline: Mechanical Engineering
Specialization: Computational Fluid Dynamics/Aeroacoustic

Engr Sikander Hayat Mirza **HoD Computational Engineering**
Oi/c ScREC
MS (Iowa State University), USA
Discipline: Avionics Engineering
Specialization: Communication & Signal Processing

Dr Absaar ul Jabbar
PhD (TU Dortmund University), Germany
Discipline: Mechanical Engineering
Specialization: Computational Fluid Dynamics

Dr Adnan Maqsood HoD Research
PhD (Nanyang Technological University (NTU)), Singapore
Discipline: Mechanical & Aerospace Engineering
Specialization: Aerodynamic/ Flight Mechanics & Control

Dr Ishrat Jabeen, HoD Computational Sciences
PhD (University Of Vienna), Austria
Discipline: Chemistry
Specialization: Medicine Chemistry

Dr Uzma Habib
PhD: University of Heidelberg, Germany
Discipline: Chemistry
Specialization: Computational Chemistry

Dr Zamir Hussain
PhD (Bahauddin Zakariya University), Pakistan
Discipline: Statistics
Specialization: Statistics

Dr Fouzia Malik
PhD: Quaid-e-Azam University, Pakistan
Discipline: Physical Chemistry
Specialization: Physical Chemistry

Dr Shahzad Rasool
PhD (Nanyang Technological University (NTU)), Singapore
Discipline: Computer Engineering
Specialization: Haptics

Dr Mian Ilyas Ahmad
PhD (Imperial College London), UK
Discipline: Control Systems
Specialization: Control Systems, Model order Reduction

Dr Salma Sherbaz
PhD Harbin Engineering University, China
Discipline: Fluid Mechanics
Specialization: Computational Fluid Dynamics

Dr Zartasha Mustansar
PhD (University of Manchester), UK
Discipline: Biomedical Engineering/Sciences
Specialization: Image-Based Modeling

Dr Rehan Zafar Paracha
PhD (National University of Sciences & Technology), Pakistan
Discipline: Virology and Immunology
Specialization: Drug Discovery & Development

Dr Mehak Rafiq
PhD: University of Greewich & University of Sussex, UK
Discipline: Biology
Specialization: Translational Biology & Molecular Medicine

Dr Ammar Mushtaq
PhD (National University of Sciences & Technology), Pakistan
Discipline: Computational Science & Engineering
Specialization: Computational Fluid Dynamics

Dr Tariq Saeed
PhD (National University of Sciences & Technology), Pakistan
Discipline: Computational Science & Engineering
Specialization: Model Checking/Parallel Computing

Engr Muhammad Hassan Khan
BEng (University of Engineering & Technology, Taxila), Pakistan
Discipline: Electronics Engineering
Specialization: Parallel Computing/Cluster Management

Engr Fawad Khan
MS (National University of Sciences & Technology), Pakistan
Discipline: Computer Software Engineering
Specialization: Optical Networks

Dr Junaid Ahmad Khan
PhD (National University of Sciences & Technology), Pakistan
Discipline: Computational Science & Engineering
Specialization: Computational Fluid Dynamics

Student Support Facilities

Classrooms

RCMS provides conducive learning environment through spacious and air conditioned classrooms equipped with smart podiums, multimedia projector, CD player for video sessions, high speed internet facility and smart white boards.

Library

The library possesses latest books /journals relevant to the fields of specialization being offered at the Center. Textbooks are loaned to students for one semester without any charge. The collection of books is updated continuously and most suited and beneficial new books are acquired on the recommendation of faculty members as well as students. Access to HEC' Online Digital Library is also available to faculty and students. Moreover, RCMS library provides its users access to about 3000 multidisciplinary collection of e-books through our networked CD-ROM server.

Research Facilities

» **Supercomputing Research and Education Facility (ScREC)**
For multidisciplinary research including Finite Element Analysis, Fluid Flow Simulation, Aerodynamic Design Analysis, Applied Mechanics and Flight Dynamics.
In 2012, NUST established Supercomputing Research & Education Centre (ScREC) at RCMS. Supercomputer at ScREC comprises GPUs inter connected with QDR infini-band switch with following specifications:

- 128 TERA FLOPS Theoretical Peak Performance
- 2 Head Nodes (16 CPU Cores)
- 32 Compute Nodes (256 CPU Cores)
- 32 Nvidia Tesla Processors (30,720 GPU Cores)
- 21.6 TB SAN Storage
- 1.312 TB RAM
- QDR Infiniband Switch (Data Rate 40 Gb/s)

» **PhD Research Lab (Computational Science)**
PhD cubicles equipped with workstations, Printers, white boards, UPS and Lockers, etc.

» **PhD Research Lab (Computational Engineering)**
PhD cubicles equipped with workstations, Printers, white boards, UPS and Lockers, etc.

» **MS Research Lab (All programmes of RCMS)**
Facility for MS students comprising research desks equipped with computers, UPS and Lockers, etc. This lab is specially designed for all three major programmes of RCMS i.e. Computational Science & Engineering, System Engineering & Bioinformatics.

It's a privilege for me to pursue my MS from RCMS. Computational Science and Engineering (CSE) is a multidisciplinary application-driven field that deals with the development and application of computational models and simulations in various research areas. Applying numerical simulations in medical field to make a real difference to patients has always remained fascinating to me. The department with its extensive computational resources and cutting-edge technology has given me a chance to sharpen my skills in my field of choice. It's been great to be taught by such a talented and supportive faculty members who are always interested in our ideas. I am confident that the skills I am learning here, are preparing me well for a better career.

Nabisha Farooq,
MS Student, RCMS
Computational Biomedical Engg.

Supercomputing Research and Education Center (ScREC)

Computing has experienced revolutionary transformation due to the emergence of massively parallel computing platforms such as Graphics Processing Units (GPUs) and multicore CPU's. In 2012, NUST established Supercomputing Research & Education Center (ScREC) at RCMS. Supercomputer at ScREC comprises GPUs inter connected with QDR infiniband switch.

Being the best university in country and scenic campus are not the only reasons to fell in love with NUST. Life at NUST has been amazing. Two years at NUST have molded me into someone who is confident and ready to take challenges. Beside excellent education, NUST has nurtured my social and personal life as well. NUST offers freedom to students to actively participate in both curricular and extra-curricular activities. The faculty members are highly qualified, supportive and always welcoming to innovative ideas. NUST has highly equipped labs which provide opportunities to experiment with latest tools and technologies. RCMS in particular houses fastest super computer in the country that offers various softwares and tools, which makes RCMS an ideal research environment for researchers and students.

Asad Hayat
MS student
CSE-8

MS and PhD in Computational Science and Engineering (CS&E)

MS and PhD in Computational Science and Engineering

Computational Science & Engineering (CS&E) is an interdisciplinary field focusing on understanding and analyzing complex systems, predicting their behavior and eventually optimizing processes and designs. CS&E heavily relies on computer architecture and powerful algorithms. Currently, there are many open problems and challenges in healthcare. Validation and verification of computational models due to their approximate behavior is important. To overcome this, RCMS offers powerful methods and techniques for assimilation of very large data sets, including techniques for visualization and animation.

Computational Science and Engineering at RCMS

Recently, after a comprehensive review of the curriculum, the core courses of MS Computational Science & Engineering at RCMS have been aligned with the recommendations of SIAM' Working Group. As regards the elective courses, in keeping with best International practices, the same have been grouped in a manner that a student may select a specialization stream right from the start of the program. Based on the selection, the student may pursue three to four courses in the respective specialization area. At present, RCMS offers following six specialization streams in MS / PhD programmes in Computational Science & Engineering subject to appropriate student registration and course offering:

» **Computational Engineering**
- Applied Mechanics (AM)
- Communication Systems & Networks (CS&N)
- Computational Biomedical Engineering (CBE)
- System Analysis and Control (SAC)

» **Computational Science**
- Applied Computer Science (CS)
- Computational Chemistry (CC)

Scheme of Studies

Programme Code: 640

Core Courses

Course Code	Course Title	Credits
CSE-880	Computational Linear Algebra & Optimization	3
CSE-882	Computing For Computational Science & Engineering	3
CSE-881	Applied Mathematics For Computational Science & Engineering	3
CSE-883	Data Analysis & Statistics	3
CSE-899	**MS Thesis**	**6**

Additional Course (To evaluate research potential / aptitude and prepare for thesis)		
RM-898	Research Methodology	2

Communication Systems & Networks (CS&N)		
CSE-843	Performance Analysis of Comm. Systems	3
CSE-844	Performance Analysis of Networks	3
CSE-864	Network Programming	3
EE-851	Advanced Digital Comm. Systems	3
EE-831	Advanced Digital Signal Processing	3
IT-877	Advanced Computer Networks	3
CSE-842	Comm. Systems & Networks	3
SYSE-831	Introduction to Information Security	3
SYSE-832	Network and System Level Security	3
CSE-845	Applied Machine Learning	3
DME-811	Product Design and Development	3
Computational Bio-medical Engineering (CBE)		
CSE-885	Anatomy and Physiology For CSE	3
CSE-888	Computational Modeling of Physiological Systems	3
CSE-890	Analysis of Biomechanical Systems	3
BMES-832	Biomechanics	3
BMES-842	Advanced Biomaterials	3
BMES-931	Artificial Organs and Biomedical Applications	3
BMES-941	Advances in Biomedical Materials	3
BME-822	Selected Topics in Biomedical Engineering	3
CSE-831	Finite Element Methods	3
CSE-845	Applied Machine Learning	3
DME-811	Product Design and Development	3
CSE-847	Biomedical Engineering	3
BMES-813	Biomedical Instrumentation	3
BMES-812	Medical Devices Design and Standards	3
BMES-811	Signals and Images in Medicine	3
BMES-801	Biology for Engineers	3
Applied Mechanics (AM)		
CSE-801	Computational Fluid Dynamics	3
CSE-831	Finite Element Methods	3
CSE-894	Ship Hydrodynamics	3
CSE-872	Non-Newtonian Fluid Mechanics	3
CSE-901	Advanced Compressible Fluids	3
CSE-902	Advanced Incompressible Fluids	3
CSE-903	Advanced Heat Transfer	3
CSE-906	Boundary Layer Theory	3
CSE-911	Advanced Flight Mechanics	3
ME-837	Non-Linear Dynamics	3
CSE-931	Advanced Numerical Methods	3
ME-833	Computational Fluid Dynamics –II	3
ME-815	Advanced Modeling & Simulation	3
SYSE-822	Applied Aerodynamics	3
CSE-845	Applied Machine Learning	3
DME-811	Product Design and Development	3

Computational Chemistry (CC)		
CSE-876	Biochemistry	3
CSE-884	Quantum Chemistry	3
CSE-892	Organometallic Chemistry	3
CSE-917	Concepts in Supramolecular Chemistry	3
CSE-915	Modeling of Molecular Properties	3
CSE-916	Metals in Biological Systems	3
CSE-914	Computational Enzymology	3
CH-807	Coordination Chemistry	3
CSE-878	Computational Chemistry	3
CSE-871	Chemical Kinetics and Reaction Dynamics	3
CSE-913	Modeling of Cluster Compounds	3
CSE-918	Modeling Polymeric Materials	3
CSE-893	Biomolecular Simulations	3
SYSE-804	Modeling, Simulation and Optimization	3
CSE-845	Applied Machine Learning	3
DME-811	Product Design and Development	3
Applied Computer Science		
CSE-952	Advanced Model Checking	3
CSE-870	Petri Nets	3
CSE-869	Real Time Systems	3
CSE-815	Graph Theory and Algorithms	3
CSE-811	Parallel Computing for Heterogeneous Platforms	3
CSE-867	Virtual Reality	3
CSE-865	3D Geometric modeling and Reconstruction	3
CSE-868	Human Computer Interaction	3
CSE-845	Applied Machine Learning	3
DME-811	Product Design and Development	3
System Analysis & Control (SAC)		
EE-871	Linear Control Systems	3
EE-875	Discrete Time Control Systems	3
EE-873	Fuzzy Control	3
EE-872	Optimal Control	3
EE-874	Adaptive Control	3
EE-829	System Identification	3
CSE-879	Model Order Reduction	3
EE-977	Nonlinear Control Systems	3
RIME-953	Robust Control	3
EE-976	Optimal and Multivariable Control	3
ME-837	Nonlinear Dynamics	3
CSE-845	Applied Machine Learning	3
DME-811	Product Design and Development	3
Bio-Informatics (BI) for PhD only		
CSE-876	Biochemistry	3
CSE-877	Statistics in Bioinformatics	3
CSE-953	Advanced Computational Biology	3
CSE-873	Computational Drug Design	3
CSE-874	Molecular Modeling and Drug Design	3

CSE-870	Petri-Nets	3
CSE-952	Advanced Model Checking	3
CSE-895	Microarray and RNA Sequencing	3
CSE-896	Translational Bioinformatics	3
CSE-919	Modeling of Biological Regulatory Networks	3
CSE-920	Computational Bio-pharmaceuticals and pharmacokinetics	3
BI-831	Microarray Analysis	3
BI-832	Next Generation Sequencing Analysis	3
BI-851	Computational Immunology	3
BI-852	Computational Vaccinology	3

For PhD CS&E Program:

1. Core courses
2. Minimum 18 credit hours of specialization courses as specified by the Guidance and Examination Committee (GEC).
3. Pre-requisite courses to study specialization courses, if any.
4. Any other additional course(s) specified by the GEC.

Note: Selection/Allotment/Choice/Offering for specialization stream depends on:

1. Student's/applicant's background
2. Sufficient number of students opting for a particular stream
3. Availability of faculty

MS in Systems Engineering

Systems Engineering is an interdisciplinary field of engineering focusing on how complex engineering projects and products should be designed and managed over their entire life cycles. The aim of education in Systems Engineering is to simply formalize the approach and in doing so, identify new methods and research opportunities similar to the way it occurs in other fields of engineering. As an approach, Systems Engineering is holistic and interdisciplinary.

Its focus is on integration and overall system optimization to ensure that all likely aspects of a project, product or system are taken into consideration and embedded into design and management planning. It is a considered opinion that Systems Engineering will play an important role for the future of the scientific discovery process and engineering design.

Systems Engineering at RCMS

» MS in Systems Engineering at RCMS comprises of 05 core courses followed by 03 courses of specialization domain. The core courses are based on the recommendations of INCOSE Reference Curriculum Group. The specialization courses focus the holistic nature of the programme and are taught from the system's perspective by treating various constituents / parts within a system as sub-systems, rather than at the physical component / part level. At present, RCMS offers following six specialization streams subject to appropriate student registration:

» Autonomous Aerospace Systems (AAS)
» Cognitive Systems (CS)
» Command, Control, Communication, Computers & Intelligence (C4I)
» Communication Systems & Networks (CS&N)
» Information Assurance (IA)
» Applied Computer Science

MS Systems Engineering

MS Coursework

Programme Code: 642

Core Courses			
Course Code		**Course Title**	**Credits**
SYSE	801	Systems Engineering Principles	3
SYSE	803	System Integration and Validations	
SYSE	804	Modeling , Simulation and Optimization	3
SYSE	805	System Engineering Project Management	3
Additional Course			
RM	898	Research Methodology	2
SEM / WKSP	897	Seminar / Workshop	1
Elective Courses Stream Wise			
1. Cognitive Systems			
PSY	823	Psychology of Learning & Cognition	3
SYSE	812	Human Factors Engineering	3
SYSE	813	Interaction Design	3
2. Autonomous Aerospace Systems			
SYSE	821	Unmanned Aircraft Systems	3
SYSE	822	Applied Aerodynamics	3
SYSE	823	Performance Analysis of Fixed and Rotary Wing Aircraft	3
3. Communication Systems & Networks			
SYSE	831	Introduction to Information Security	3
SYSE	832	Network and System Level Security	3
4. Communication & Network Systems			
CSE	842	Communication Systems & Networks	3
CSE	843	Performance Analysis of Comm Systems	3

CSE	844	Performance Analysis of Networks	3
5. Applied Computer Science			
CSE	870	Petri Nets	3
CSE	952	Advanced Model Checking	3
CSE	869	Real-time Systems	3
For Cousre Based MS Program: General Elective (For all Specialization)			
SYSE	812	Human Factors Engineering	3
CSE	815	Graph Theory & Algorithms	3
CSE	883	Data Analysis & Statistics	3
CSE	870	Petri-Nets	3
CSE	952	Advanced Model Checking	3
SYSE	817	Design and Analysis of Experiments	3
1. Cognitive Systems			
SYSE	814	Human Supervisory Control	3
SYSE	817	Design and Analysis of Experiments	3
2. Communication & Network Systems			
IT	877	Advanced Computer Networks	3
EE	831	Advanced Digital Signal Processing	3
EE	851	Advanced Digital Communication Systems	3
SYSE	831	Introduction to Information Security	3
SYSE	832	Network & System Level Security	3

For MS Systems Engineering Program: In addition to the core courses, minimum four (04) courses from the specialization stream to complete 24 credit hour coursework requirement followed by six (06) credit hours of thesis research.

Note: Selection/Allotment/Choice/Offering for specialization stream depends on:

1. Student's/applicant's background
2. Sufficient number of students opting for a particular stream
3. Availability of faculty

MS Bioinformatics

Bioinformatics is the interdisciplinary field of science which primarily focuses on the convergence of computer science, mathematics and biology in one big-picture. The goal of this field is to apply statistical and informatics methodologies to the growing amount of biomedical and genomic data in order to bring meaning to the data and build tools, which can be utilized by scientists, clinicians, and patients.

Bioinformatics is nowadays a pre-requisite for an accurate understanding of clinical knowledge which includes finding similarities in patient populations, interpreting underlying biological processes and identifying therapeutic treatments and health consequences that cannot otherwise be completely understood with the help of experiments.

Bioinformatics is a relatively young field and was first brought forward during last quarter of a century. It was initially presented as a way to aid data storage, organization, retrieval and improved interpretation of the available clinical research. With the passage of time, it was realized that Bioinformatics needed to develop grounds for cross-referencing data with the help of complex algorithms in order understand data in more detail.

MS Bioinformatics at RCMS

MS in Bioinformatics at RCMS comprises of 06 core courses followed by 02 courses of specialization domain. A systematic methodology pipeline was used to develop curriculum for MS in Bioinformatics. The goal of this methodology pipeline was to come up with a set of courses that are practiced at international levels for the graduate Bioinformatics program. At present, RCMS offers following three specialization streams subject to appropriate student registration:

- Translational Bioinformatics
- Systems Biology
- Computational Drug-Design

MS Coursework

Core Courses		
Course Code	**Course Title**	**Credits**
BI-801	Computing for Bioinformatics	3
BI-802	Mathematics for Bioinformatics	3
CSE-883	Data Analysis and Statistics	3
CSE-899	MS Thesis	6
CSE-877	Statistics in Bioinformatics	3-0
CSE-953	Advanced Computational Biology	3-0
BI-899	MS Thesis	6-0
Elective Courses (Specialization wise)		
Computational Drug Design		
CSE-873	Computational Drug Design	3
CSE-874	Molecular Modeling and Drug Design	3
BI-811	Machine Learning in Drug Design	3
Translational Bioinformatics		
BI-831	Microarray Analysis	3
BI-832	Next Generation Sequencing Analysis	3
CSE-895	Microarray and RNA Sequencing	3
CSE-896	Translational Bioinformatics	3
Common Electives		
BI-851	Computational Immunology	3
BI-852	Computational Vaccinology	3
CSE-876	Biochemistry	3
HCB-811	Cancer Genetics	3
ABS-839	Proteomics	3
HCB-841	Molecular Medicine	3
ABS-933	Principles of Molecular Biology	3
HCB-813	General & Molecular Immunology	3
CSE-845	Applied Machine Learning	3

CSE-953	Advanced Computational Biology	3
CSE-877	Statistics in Bioinformatics	3
CSE-880	Computational Linear Algebra and Optimization	3
CSE-870	Petri-Nets	3
CSE-952	Advanced Model Checking	3
Additional Courses		
RM-898	Research Methodology	2
SEM/WKSP-897	Seminar / Workshop	1

For MS Bioinformatics Program: In addition to the core courses, minimum four (04) courses from the specialization stream to complete 24 credit hour coursework requirement followed by six (06) credit hours of thesis research.

Note: Selection/Allotment/Choice/Offering for specialization stream depends on:

1. Student's/applicant's background
2. Sufficient number of students opting for a particular stream
3. Availability of faculty

UNITED STATES PAKISTAN CENTER FOR ADVANCED STUDIES IN ENERGY (USPCAS-E), ISLAMABAD


Center For Advanced Studies
ENERGY

United States Pakistan Center for Advanced Studies in Energy (USPCAS-E)

Introduction

The core mission of the Centre is to efficiently address and implement the E3 criteria (Energy, Environment and Economy) for sustainable societal development. The Centre is going to create an ecosystem for addressing energy requirements by influencing policy makers, developing technologies, human resources and mobilizing communities for energy conservation. The Centre for Energy Systems lately titled as U.S.-Pakistan Centre for Advanced Studies in Energy (USPCAS-E) was launched in June 2011 to provide impetus to energy sector programmes and support and consolidate related activities/ projects with a view to contributing to national economy in times of energy crisis. It was inaugurated on January 9, 2012. Collaborating partners from Canada, USA, UK, RSA and KSA warmly participated in the event. The Centre aims at providing sustainable supply of energy at affordable rates with greater share of renewable in the energy mix to reduce environmental footprint. The centre's vision resides in setting up pilot plants to demonstrate the feasibility of specific programmes in the various energy sectors.

Overview

The U.S. Pakistan Centre for Advanced Studies in Energy (USPCAS-E) aims to focus on applied research relevant to Pakistan's energy needs and serve as a bridge between the government, industry, and academia and undertake sustainable policy formulation. USPCAS-E is a partnership between the National University of Science and Technology (NUST), Islamabad; University of Engineering and Technology, Peshawar (UET); and U.S. partner Arizona State University (ASU).

At the end of the project, the Centres at NUST and UET will be sustainable hubs to address energy related issues. Collaboration between the partner USPCAS-E universities and the Higher Education Commission of Pakistan will help ensure institutionalization and sustainability of USPCAS-E.

Objectives

- Help Pakistan unleash its enormous potential for economic growth
- Become Pakistan's premier energy think-tank and engage stakeholders in both industry and government
- Improve relevance and quality of curricula, strengthen use of effective teaching methods, and upgrade graduate programmes
- Enhance responsiveness of university research and graduates' skills to public and private sector needs;
- Focus on cutting-edge applied research & finding indigenous solutions to challenges;
- Build a nationwide network for energy professionals by establishing and facilitating channels for interaction including networking sessions, workshops, and exchange programmes
- Increase access to higher education in energy-related professions for women and economically disadvantaged students
- Establish channels to facilitate local and international networking in the energy sector;
- Emerge as financially self-sustained national hub for energy issues;

Research Agenda

Provide leadership, research, support, and policy development for conventional and renewable energy, and emerging technologies from a variety of platforms, such as

- State of the art methods to enhance existing energy and power system utilization
- Emerging solar, energy storage and fuel cell technologies
- Advance the usage of biomass/biofuels for power generation
- Efficient thermal power plants with carbon mitigation and nuclear energy research.
- Energy efficient and green building research
- Wind resource assessment and power generation through advance tools and technology
- Advance turbomachinery design and development for various energy conversion systems

- Energy policies leading to cost-conscious, responsible development of Pakistan's energy resources and commitment to environmental quality.
- Energy efficient transport technologies
- Emphasis on SMART Grid Research, FACTS devices and Hardware in the loop for grid
- Explore instrumentation and measurement issues for modern power systems

Postgraduate Degree Programmes

The Postgraduate programme at USPCAS-E aims to provide access to higher education in energy-related professions for women and economically disadvantaged students across Pakistan; by internationally competitive multi-disciplinary graduate training, with improved relevance and quality curricula and by use of effective teaching methods. The Centre builds a nationwide network for energy professionals by establishing and facilitating channels for interaction including world class research laboratories, library, networking sessions, seminars, workshops, and international exchange programmes.

International and National Partnerships

- Arizona State University, USA
- Oregon State University, USA
- United Nations Industrial Development Organization (UNIDO)
- World Bank Group
- Dr Razi Nalim Purdue University (IUPUI)
- Fauji Fertilizer Corporation Limited
- ICI / AKZO Nobel
- Pakistan State Oil
- All Pakistan Textile Mills Association (APTMA)
- Alternative Energy Development Board (AEDB)
- Attock Refinery Limited
- Attock Generation Limited
- Sustainable Development Policy Institute (SDPI)
- Planning Commission of Pakistan (National Steering Committee on Sustainable Energy for ALL)

Equipment and Software Facility

- Elemental Analyzer
- Fischer Tropsch Synthesis Plant
- Gas Chromatograph
- Albedometer, Pyrheliometer, Pyrgeometer
- Thermal Dilatometer
- Gas Sorption Analyser
- Fourier Transform Infrared Spectrometer
- Volumetric Sorption Analyser
- Coin Cell Battery Fabrication Line
- PEM Fuel Cell Testing Station
- Photo-bio reactors
- High-Performance Liquid Chromatography (HPLC)
- 7500 Real-Time PCR System
- Power Grid Simulator
- Phasor Data Concentrator
- Rigol Oscilloscope
- Power Quality Analyzer
- UV-VIS-NIR Spectrophotometer
- Simultaneous Thermogravimetry/ Differential Thermal Analysers (TGA/DTA)
- Gas Chromatograph Mass Spectrometer (GCMS)
- Atomic Force Microscopy (AFM)
- DC-RF Sputtering System
- X-ray Diffraction (XRD)
- Scanning Electron Microscope (SEM) with Energy Dispersive X-ray Spectroscopy (EDS).
- Wind masts
- 18x18'' Wind tunnel
- Wind LiDAR
- Mini' Sputter Coater, Glow Discharge System
- Super Critical Fluid Extraction Facility
- Subsonic wind tunnel
- Real Time Phasor Mode Simulator
- 250 kW PV solar power plant
- Machine Shop
- Thermal Spray Facility

Research Facilities

- Smart Grids
- Meteorological High Precision Station
- Biofuel Engineering & Power
- Advance Energy Materials & Fuel Cells Lab
- Solar Energy
- Thermal Energy
- Emerging Technologies Lab
- Energy Storage Lab

Library

The library is designed to meet the requirements of degree programmes currently being offered at USPCAS-E. A large number of books are there to cover the domains of energy systems, thermal engineering, wind, solar, nuclear, photovoltaics, energy policy and economics. The library is digitally subscribed with HEC which gives access to online energy related journals. Two magazines namely national geographic and reader's digest are also in library's subscription list.

Experimental and Simulation Facilities

Research Labs

- Fossil fuel Lab
- Solar Energy Lab
- Advance Energy Materials & Systems (AEMS) Lab
- Energy Storage and Conservation Lab
- Biofuel Lab
- Thermal Energy Engineering Research Lab
- Smart Grid & Power Systems Lab
- Combined Lab/ Emerging Technologies Lab

Simulation Facilities

- PSCAD
- Aspen Plus
- Multi Sim
- Dig Silent Power Factory
- PV* sol,
- HOMER
- ASAP
- windPRO
- Engineering Equation Solver (EES)

Faculty

Dr Zuhair S Khan Acting Principal/Dean
PhD (Kyoto University) Japan
MS Engineering (Linkoping University) Sweden
Specialization: Advanced Energy Materials & Surface Engineering, Thin Films, Surface & Coatings Technology

Dr Mohammad Bilal Khan Professor
DIC/PhD (Imperial College-London) UK
MS (USA)
Specialisation: Energy systems, Interface Engineering, Polymer Engineering.

Dr Adeel Javed HoD Thermal Energy Engineering
PhD Gas Turbine and Turbomachinery (TU Delft) Netherlands
MSc Aerospace Propulsion (Cranfield University) UK
Specialization: Gas turbine performance, Aero-Thermal aspects of Turbomachinery, Computational Fluid Dynamics, Experimentation

Dr Kashif Imran HoD Electrical Power Engineering
PhD Electrical Power Engineering (University of Strathclyde) UK
Specialization: Electrical Power Systems Engineering

Dr Naseem Iqbal
PhD Chemistry (TU Vienna) Austria
Specialization: Catalysis, PEMFCs, Energy Storage, Gas Adsorption

Dr Adeel Waqas
PhD Energy Technology (Asian Institute of Technology) Thailand
Specialization: Solar Thermal, Passive heating and cooling of Buildings

Dr Nadia Shahzad
PhD Material Sciences (Politecnico di Torino) Italy
Specialization: Nanostructured and Photoactive Materials for Solar Energy Application

Dr Rabia Liaquat
PhD Environmental Biotechnology/Microbiology,
QAU, Islamabad & The University of Queensland, Australia
Specialization: Bio Energy

Dr Muhammad Hassan
PhD and MS in Bio-environmental & Energy Engineering (Nanjing Agricultural University) China
Specialization: Methane Enhancement Technologies, Bioenergy Production from Agricultural

Dr Parvez Akhter
PhD Solid State & Surface Physics (Sussex University) UK
Specialization: Solid State & Surface Physics

Dr Majid Ali
PhD (Nuclear Energy Science and Technology), Harbin Engineering University, China

Dr Muhammad Zubair
Professional Doctorate of Engineering (TU Delft) Netherlands
MS Engineering (NUST)
Specialization: Process and Equipment Design, Thermal Engineering, Fuels and Combustion, Biofuels

Dr Muhammad Bilal Sajid
PhD Mechanical Engineering (KAUST KSA)
MSc Mechanical Engineering (UET Taxila) Pakistan
Specialization: Thermal Energy Engineering

Dr Muhammad Aamir
PhD (Chongqing University) China
Specialization: Engineering Thermophysics, Heat Transfer, Spray Cooling

Dr Syed Muhammad Raza Kazmi
PhD Power Electronics (Tohoku University) Japan
Specialization: Wind and Solar Energy Conversion Systems

Dr Hassan Abdullah Khalid
PhD Electrical Engineering (University of Laquila) Italy
MS Electrical Power Engineering (Chalmers University of technology) Sweden
Specialization: Power quality, Grid connected Converters

Dr Khawaja Arsalan Habib
PhD Electrical Power Engineering (University of Electronic Science and Technology) China
MSc. Embedded Intelligent Systems (University of Hertfordshire,)UK
Specialization: Innovative measurement and instrumentation solutions for modern power systems and Smart Grid, System identification and optimal sensor placement

Dr Syed Ali Abbas Kazmi
PhD in Electrical (Power) Engineering (SungKyunKwan University (SKKU)) South Korea
MS in Electrical (Power) Engineering (UET Peshawar) Pakistan
Specialization: Smart Distribution Network Planning

Dr Kafaitullah
PhD Energy Economics and Management (TU Twente) Netherlands
Specialization: Energy Policy

Engr Akif Zia Khan (Ex-Pakistan Leave for PhD)
BE Electrical Engineering, MS Electric Power Systems
Specialization: SMART Power Generation

Shahid Hussain Ansari (Ex-Pakistan Leave for PhD)
MS, BS in Chemical Engineering

Dr Abraiz Khattak
PhD Electrical (Power) Engineering (COMSATS Institute of Information Technology, Islamabad-Pakistan)
Specialization: Power Engineering

Dr Sahar Shakir
PhD Experimental Physics (University of Malaya-Malaysia)
Specialization: Materials/Photovoltaics (PV)

Dr Mariam Mahmood
PhD Machine and Systems Engineering for Energy, Environment and Transport (University of Genova, Italy).
Specialization: Solar Thermal Energy Applications, Thermal Storage Systems, Gas Turbine Modelling and Diagnostics.

Dr Abasin Ulasyar
PhD Electrical and Electronics Engineering. (Koç University, Istanbul, Turkey).
Specialization: Power Electronics, Robust and Adaptive Control, Real Time Operation and Control of Power Systems, Optimization of Magnetic Circuits for Different Real Time Applications, Design of Motors and Linear Actuators, Vibration Suppression Mechanisms, Mechatronic

Dr Khawaja Khalid Mehmood
PhD Electronics and Electrical Engineering (Sungkyunkwan University- South Korea).
Specialization: Power System Planning And Operations

On-going projects

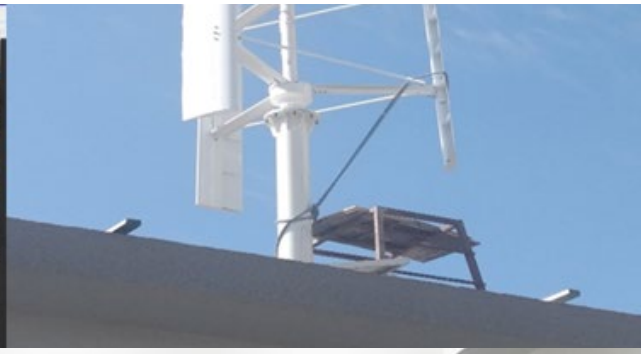
The Center for Advanced Studies is working with multiple public and private and donor bodies on different applied projects in the field of energy. Details of the projects are given below:

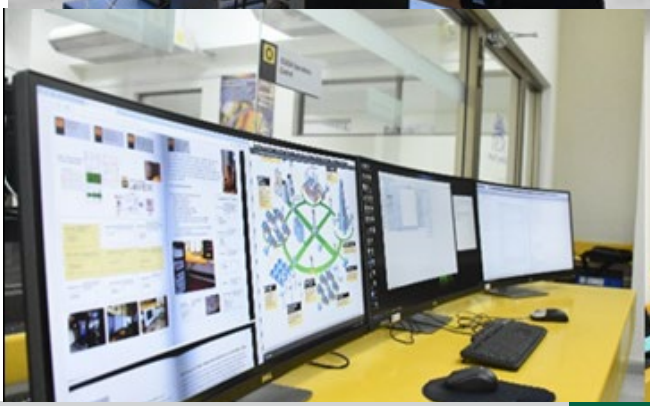
Joint Research Grants

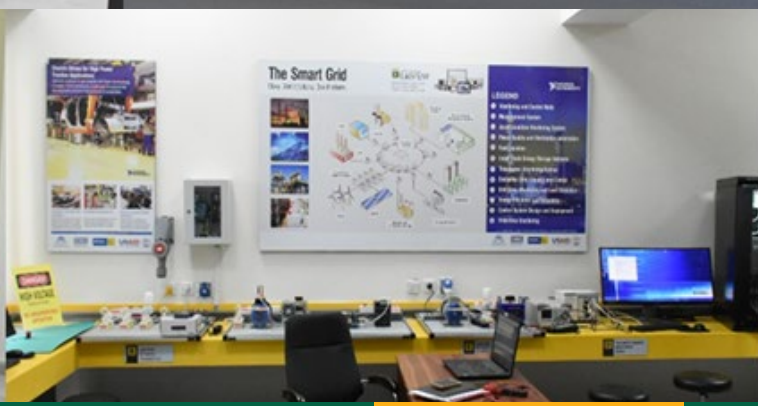
1. Smart Condition Monitoring based Design and Development of Solar Micro Grid – Community Empowerment through Access to Energy in the Rural Areas of Pakistan (NUST-ASU).
2. Development of Hybrid Micro Combined Heat & Power System for Distributed Generation in Pakistan (NUST-ASU).
3. Developing the Strategy for policy oriented energy research modelling at USPCAS-E (NUST-ASU).
4. Energy Efficiency Improvements in Building Sector of Pakistan (NUST-ASU).
5. Solar space Heating Systems Integrated with Thermal Energy Storage (NUST-ASU).

Applied Research Grants

6. Development of Advanced Metering Infrastructure & Customer Side Systems
7. Double pervoskite based multiferroic materials for solar cell applications
8. Indigenous Design and Development of a Solar Powered Adsorption Refrigerator (SPAR)
9. DC Module to Improve the Efficiency of String Inverter Solar PV System
10. An Advance Rotor for H-Darrieus Type Vertical Axis Wind Turbine (VAWT)
11. Autonomous 11kV Distribution Line Fault Localization System
12. Designing and Fabrication of Semi-Continuous Stirring Tank Reactors to Evaluate and Optimize the Anaerobic Co-Digestion of Poultry Manure
13. Pseudo-Noise based Impedance Spectroscopy for Battery Health Monitoring.







Masters in Energy Systems Engineering (MS-ESE)

The MS Energy Systems degree programme offers excellent opportunities to the graduates to serve in national and international institutions, research, planning and development departments of the energy ministries, energy companies, industries, and education and research institutions. It will impart baseline knowledge and train professionals to become entrepreneurs and start up their own small to medium scale enterprises in the diverse energy fields, apart from opportunities in the diverse renewable energy sector.

Scheme of Studies

Core Courses

Course Code	Course Title	Credits
ESE 804	Applied Solar Energy	03
ESE 809	Modelling of Energy Systems	03
ESE 820	Energy and Environment	03
ESE 821	Energy Resources and Technologies	03
ESE 899	**MS Thesis**	**06**
	Total	**18**

Electives (Any Four)

Course Code	Course Title	Credits
ESE-800	Clean Coal Technologies	03
ESE 802	Photo bioreactor Engineering & Bio-Processing	03
ESE 811	Solar Energy	03
ESE 812	Energy Management in Buildings	03
ESE 813	Energy Economics and Policy	03
ESE 814	Fuel Cells	03
ESE 815	Thin Films	03
ESE 816	Economic Evaluation of Thermal Energy Projects	03
ESE 817	Wind Energy	03
ESE 818	Power Distribution Systems	03
ESE 819	Environment Impact Assessment	03
TEE 801	Advanced Thermodynamics	03
ESE 801	Biofuel Engineering	03
ESE 822	Geothermal Engineering	03
ESE 823	Thermal Hydraulics	03
ESE 824	Nuclear Energy Engineering	03
ESE 825	Hydropower Engineering	03
ESE 826	Industrial Catalysis for Energy Systems	03
CSE 801	Computational Fluid Dynamics	03
EEE 812	Advanced Power System Protection	03
EEE 801	Clean Energy Generation, Integration and Storage	03
EEE 811	Electric Power Quality	03
EEE 814	Advanced Power Electronics	03
TEE 803	Conventional and Renewable Energy Power Plants	03
TEE 814	Environmental issues of fossil fuel power plants	03
TEE 815	Advanced Heat and Mass Transfer	03
TEE 816	Fuels and Combustion	03
TEE-820	Process Intensification	03
ESE-803	Photovoltaic Devices	03
ESE-810	Computer Application in Energy Systems	03
ESE-828	Energy Storage Systems	03
RM-898	Research Methodology	02
ESE-832	Energy and Climate Change	03

PhD in Energy Systems Engineering (PhD-ESE)

The Ph.D. in Energy Systems Engineering programme is being started for academic research and development in public and private sector commensurate with the needs of allied industries. It is essential to produce scientists who will make significant contributions in the productive research and development in the vast domains of science and engineering especially in the field of energy production. The courses have been designed keeping in view the latest market demand and encompasses a broad area covering advanced requirements for the development of energy generation and conversion materials.

Scheme of Studies

The duration of the PhD Energy Systems Engineering programme will be according to the existing policy of NUST for PhD. The main programme requires a minimum of 18 credit hour (CH) course work and a 30 CH research which will be counted towards the thesis.

Core Courses

Course Code	Course Title	Credits
ESE 901	Recent Trends in Energy Systems Engineering	03
ESE 902	Socio-Economic Aspects of Energy Systems	03
ESE 999	**PhD Thesis**	**30**

Electives (Any Four)

Course Code	Course Title	Credits
ESE 903	Contemporary Materials for Advanced Energy	03
ESE 904	Advanced Energy Materials: Synthesis & Characterization	03
ESE 905	Advanced Heat and Mass Transfer	03
ESE 906	Biomass/Coal Gasification	03
ESE 907	Photo catalysis-Advancement and Applications	03
ESE 908	Nuclear Thermal Hydraulics	03
ESE 909	Smart Grid Architecture	03
ESE 910	Smart Power Systems	03
ESE 911	Carbon Capture and Utilization	03
RM 899	Research Methodology	03
CHE 848	Gasification Processes	03
EME 803	Combustion and Propulsion	03
EME 981	Advanced Fuel Technology	03
NSE 842	Nano Materials for Energy Applications	03
MSE 901	Advanced Characterization of Materials	03
NSE 931	Advanced Synthesis and Fabrication Techniques	03
EME 901	Advanced Engineering Mathematics	03
ME 935	Renewable Energy	03
ME 936	Solar Technologies	03
CSE 931	Advanced Numerical Methods	03
PHY 921	Plasma Physics	03
PHY 924	Experimental Techniques of Physics	03
	Total	**36**

Masters in Thermal Energy Engineering (MS-TEE)

The degree programme offers excellent opportunities to the graduates to serve in national and international institutions, research, and planning and development departments of the energy ministries, energy companies, industries, and education and research institutions. It will impart baseline knowledge and train professionals to become entrepreneurs and start up their own small to medium scale enterprises in the diverse energy fields, apart from serving in the predominant thermal energy mix sector.

Scheme of Studies

Core Courses

Course Code	Course Title	Credits
TEE 801	Advanced Thermodynamics	03
TEE 802	Design and Modelling of Thermal energy systems	03
TEE 815	Advanced Heat and Mass Transfer	03
TEE 816	Fuels and Combustion	03
TEE 899	**MS Thesis**	**06**
	Total	**18**

Elective Courses

TEE-803	Conventional and Renewable Energy Power Plants	03
TEE-810	Advanced Process Energy Analysis & Optimization	03
TEE-812	Advanced Fluid Dynamics	03
TEE 813	Turbomachinery	03
TEE 814	Environmental issues of Fossil Fuel Power Plants	03
TEE 817	Computational Fluid Dynamics for Thermal Energy Systems	03
TEE 818	Advanced Heating, Ventilation and Air Conditioning System (HVAC)	03
TEE 820	Process Intensification	03
TEE 821	Advanced Thermal Energy Storage Systems	03
ESE 800	Clean Coal Technology	03
ESE 811	Solar Thermal Energy	03
ESE 814	Fuel Cells	03
ESE 816	Economics Evaluation of Energy Projects	03
ESE 822	Geothermal Energy	03
ESE 823	Thermal Hydraulics	03
ESE 824	Nuclear Energy Engineering	03
RM 898	Research Methodology	02
TEE-822	Gas Turbine Performance	03
TEE-823	Solar Thermal Power Systems	03

PhD in Thermal Energy Engineering

PhD Thermal Energy Engineering programme at USPCAS-E is being started for academic research and development in public and private sector commensurate with the needs of allied industries. This programme will address needs for academic and industry related research in thermal energy systems. The programme signifies a combined approach of theoretical analysis, numerical techniques and experimental investigations in thermal energy applications. It will create new technical knowledge and skills required for achieving the better management of thermal energy systems, designing of efficient thermal energy systems and processes, utilization of renewable energy sources for thermal power generation and mitigation strategies for the effective reduction and control of environmental pollution due to thermal power generation.

Scheme of Studies

Core Courses

Course Code	Course Title	Credits
TEE-901	Emerging Trends in Thermal Technologies	3
TEE-902	Sustainability in Thermal Energy Systems	3
TEE-903	Phase Change Thermal Processes	3
TEE-904	Laser Diagnostics for Thermal Engineering Applications	3
TEE-906	Advanced Combustion Kinetics	3
TEE-907	Technologies for Enhanced Heat Transfer	3
TEE-908	Advance Turbo/Machinery Application	3
ESE-904	Synthesis and Analytical Characterization of Advanced Energy Materials	3
ESE-905	Analytical and Numerical Techniques in Heat Transfer	3
ESE-906	Biomass Gasification	3
ESE-908	Nuclear Thermal Hydraulics	3
ESE-913	CO2 Capture, Utilization and Sequestration	3
MATH-901	Advanced Engineering Mathematics	3
ME-931	Internal Combustion Engine Technology	3
ME-884	Convection Heat Transfer	3
CSE-803	Data Analysis and Statistics	3
TEE-999	**PhD Thesis**	**30**

Department of Electrical Engineering (Power)

The power sector of Pakistan is in doldrums for last couple of decades and is in dire need of reforms, good governance and qualified human resource. The country lacks competent and energetic workforce in this important sector in the industry as well as academia. Although many higher education institutes are offering degree programmes in electrical engineering but power centric curriculum meeting the indigenous demands are offered at a few universities in Pakistan. The start of degree programme at USPCAS-E is an attempt to fulfil this national requirement through human resource development and indigenous research. The significance of this degree programme is to train the students with contemporary curricula about clean power production, economic dispatch and distribution of power, computational power flow, transient studies and studies pertaining to monitoring, control, and protection of power system and integration of renewable energy systems with convention power grid. In addition to that the students will also be exposed to state of the art Smart Grid and Electrical power engineering labs at the Centre during their research phase. distribution of power, computational power flow, transient studies and studies pertaining to monitoring, control, and protection of power system and integration of renewable energy systems with convention power grid. In addition to that the students will also be exposed to state of the art Smart Grid and Electrical power engineering labs at the Centre during their research phase.

Masters in Electrical Engineering (Power)

Electrical Engineering (Power) programme is tailored to meet the indigenous needs of the ailing power sector of the country by nurturing the human resource in this field. The programme is designed to equip the students with advanced and contemporary technical knowledge of electrical power systems and will enable them to better manage and govern the national power system. Primarily focus will be on electrical power and energy systems, and it covers advanced aspects of power system modelling, computational power flow analysis, high voltage engineering and dielectric studies, online monitoring and protection of electrical equipment with digital relays, transients, and energy measurement with smart meters and PMU.

Scheme of Studies

Core Courses

Course Code	Course Title	Credits
EEE 800	Power System Operation, Control and Optimization	3
EEE 801	Clean Energy Generation, Integration and Storage	3
EEE 802	Advanced Power System Stability and Transient Studies	3
ESE 909	Smart Grid Architecture	3
EEE-899	**MS Thesis**	**6**
	Total	**18**

Elective Courses (Any four)

EEE-811	Electric Power Quality	3
EEE-812	Advanced Power System Protection	3
EEE 814	Advanced Power Electronics	3
EEE 813	Computer Modelling of Electrical Power Systems	3
EE-861	Alternating Current Electrical Machines and Drives	3
EEE-815	Electric Power Generation Transmission and Distribution	3
ESE 803	Photovoltaic Devices	3
ESE 824	Nuclear Energy Engineering	3
ESE 813	Energy Economics and Policy	3
ESE-820	Energy and Environment	3
ESE-817	Wind Energy	3
ESE-814	Fuel Cells	3
EE-891	Stochastic Systems	3
MATH-812	Advanced Engineering Mathematics	3
MATH-850	Advanced Numerical Analysis	3
EEE-817	High Voltage Engineering	3
EEE-816	Electric Power Markets	3

PhD Electrical Engineering (Power)

Core Courses

Course Code	Course Title	Credits
EEE-900	Signal Processing for Modern Power Systems	3
EEE-901	Advanced Converter Control Techniques	3
EEE-902	Technologies for Smart Transmission Systems	3
ESE-909	Smart Grid Architecture	3
ESE-910	Smart Power Systems	3
ESE-811	Solar Energy	3
ESE-817	Wind Energy	3
EE-861	Alternating Current Electrical Machines and Drives	3
EE-863	Power System Analysis	3
EEE-800	Power System Operation, Control and Optimization	3
EEE-801	Clean Energy Generation, Integration and Storage	3
EEE-802	Advanced Power System Stability and Transient Studies	3
EEE-811	Electric Power Quality	3
EEE-812	Advanced Power System Protection	3
EEE-814	Advanced Power Electronics	3
EE-920	System Validation	3
EE-977	Nonlinear Control Systems	3
EE-871	Linear Control Systems	3
EE-891	Stochastic Systems	3
IS-838	Advanced Simulation & Modeling	3
CS-877	Artificial Intelligence & Machine Learning	3
Math-901	Advanced Engineering Mathematics	3
Math-850	Advanced Numerical Analysis	3
EEE-999	PhD Thesis	30
Additional Courses		
RM-898	Research Methodology (Required for those who haven't taken it in MS)	2
SEM/WKSP-997	Seminar / Workshop	1

APPLYING TO NUST

National Students

- Eligibility Criteria
- Admission Process
- Selection Procedure
- Migration

International Students

National Students

Undergraduate Programmes

Dates to Remember

Online Registration	
Selection of Candidates:	August 2019
Commencement of Courses:	
All institutions less CAE	September 2019
CAE	October 2019
Submission of SAT Results:	July 15, 2019

Salients of NUST Entry Test-2019

Mode of Test

› **Computer Based Test**

Computer Based Entry tests for all disciplines will be held in multiple sessions at NUST Campus Islamabad according to the following schedule:

NET-2019 (Series-1)	December 2019
NET-2019 (Series-2)	March-April 2019
NET-2019 (Series-3)	June- July 2019

» During an admission cycle, candidates can appear in Entry test more than once to improve their score with their best score considered for admissions.

» The result of NET will remain valid for the current admission cycle only which will culminate in Fall 2019.

› **Paper Based Test**

Karachi and Quetta in April and July 2019.

» Candidates will have an option to appear either in computer based test at Islamabad or the paper based test.

» Candidates will have an option to change their programme preferences after the announcement of NET results within the time-frame to be specified after the test.

Eligibility Criteria

» A minimum of 60% aggregate marks each in SSC and HSSC / equivalent exams.

» Candidates of FSc stream can apply for the NUST Entry Test on the basis of FSc Part – I but the confirmation of their admission is subject to provision of FSc certificate or Detailed Marks Certificate (with a minimum of 60% aggregate marks) before the commencement of the relevant programme of study.

» O & A level and other non-FSc stream candidates need to obtain equivalence certificates from Inter Board Committee of Chairmen (IBCC), Pakistan.

» Candidates of O / A Level stream can apply on the basis of O Level equivalence certificate duly issued by IBCC, but the confirmation of their admission is subject to provision of A Level equivalence certificate before the commencement of the relevant programme of study. Valid O Level equivalence certificate is mandatory at the time of applying to NUST.

» Candidates can apply on the basis of NUST Entry Test (NET) or SAT or both.

» Candidates having diploma of Associate Engineering (DAE) with minimum 60% marks in various technologies can apply for relevant Engineering programmes through NUST Entry Test. For details, visit NUST website.

Engineering

HSSC (Pre- Engineering group) from any Board of Intermediate and Secondary Education OR an equivalent qualification like A level OR any other foreign qualification with Mathematics, Physics and Chemistry.

DAE candidates can apply for admission in selected engineering programmes on open merit. To apply, the candidates should have minimum 60% marks in Matric as well as DAE. For details, please visit NUST website.

BS Computer Science

HSSC (Pre- Engineering Group /Computer Science Group) from any Board of Intermediate and Secondary Education OR an equivalent qualification like A level OR any other foreign qualification with Mathematics, Physics and Chemistry / Computer Science / Computer Studies.

Ineligibility

Candidates with any of the following deficiencies are NOT eligible to apply for admission in UG programmes:

» Having secured less than 60% marks in Matric and FSc.

» Having failed / not appeared in any subject in FSc Part-I / II.

» Having secured less than 60% marks in O/A level as per the equivalence certificate issued by IBCC.

» In case of O & A level / equivalent foreign qualification, those not in possession of valid O level or equivalent qualification certificate issued by IBCC at the time of applying to NUST.

» Female candidates are not eligible to apply for Aerospace, Avionics and Civil Engineering at Risalpur Campuses.

» Expelled from NUST on disciplinary grounds.

Submission of Online Applications

NUST accepts only online application forms for UG programmes. A candidate can fill and submit the application form, available online at http://ugadmissions.nust.edu.pk

For subsequent correspondence with NUST, the following address may be used:

Admissions Directorate,
National University of Sciences and Technology (NUST),
Sector H-12, Islamabad, Pakistan.
Tel: +92-51-90856878
E-mail: ugadmissions@nust.edu.pk

Application Processing Fee

NUST Entry Test (per exam)	Rs 3,000 or USD 35
SAT National Seat	Rs 3,500 or USD 40
SAT International Seat	Rs 7,000 or USD 80

Procedure of Admission on the Basis of NET

- » Submission of online application for admission at http://ugadmissions.nust.edu.pk
- » Confirmation of receipt of application by NUST through e-mail (within 24 hours of submission of application)
- » Printing of Fee Invoice
- » Fee deposit through any online branch of Habib Bank Ltd (HBL)
- » Confirmation of receipt of payment by NUST through e-mail (within 5 days of payment)
- » For computer based test, selection of Test Date and Session by Re-Login to candidate's NET account
- » For Islamabad Test Center, confirmation of Test Date, Test Session and allocation of Roll Number, Log-in ID, Password for Computer Based Test.
- » For Paper Based Test at Karachi and Quetta to be held in April and July, issuance of Roll Numbers and allocation of test centers through email (within 24 hours of payment confirmation).
- » Printing of Admit Cards by all candidates by login in to individual accounts
- » Conduct of the test as per the schedule i.e., computer based in Islamabad and paper based test in April and July at Karachi and Quetta
- » Announcement of NET results
- » Desirous candidates may apply in another NET series before the completion of admission cycle
- » Generation of Merit list on completion of NUST Entry Tests
- » Candidates may review their preferences of programmes within given time frame after uploading of merit list
- » Issuance of Selection List on NUST website
- » Printing of Provisional Selection Letter, Medical Certificate Form and Admission Dues Fee Invoice by the selected candidates
- » Deposit of Admission dues (in any online branch of HBL) and submission of required documents to the UG Section, Registrar Directorate, NUST, Sector H-12, Islamabad
- » Issuance of Joining Instructions to the selected candidates who have completed admission formalities by the respective institution
- » Successful candidates join their respective programmes

To do list for candidates **To do list for NUST**

Instructions for Online Application Form

- Visit https://ugadmissions.nust.edu.pk and get registered by providing valid e-mail address.
- Candidate will be allotted a login ID and password to access the online application form.
- Fill the online form, upload recent (not more than 6 months old) passport size photograph (with plain background), and submit the form.
- Successful submission of form will be confirmed through an e-mail by NUST.
- Re-Login to your account and print Fee Invoice for depositing processing fee from My Account page.
- Candidates can deposit fee with any branch of HBL. Fee deposit will be verified through e-mail within 5 days of payment.
- Candidates of computer based test will have to choose Test Date and Session out of the available options.
- Allocation of Test Date and Session will be made on 'First Come First Served' basis.
- Candidates of computer based test will be allocated Roll Number, Test Center, Test Session, Log-in ID and Password.
- For Paper Based Test at Karachi and Quetta in April and July, candidates will be informed through email regarding printing of Admit Card containing exact time and center for Entry Test.
- Candidates are required to print their Admit Cards and bring the same to the Test Centre along with original CNIC/ family registration certificate/passport/original matric/FSc certifcate bearing photograph as proof for identification.
- Candidates can appear more than once to improve their score. Best score will be picked by the system for merit generation.
- The seats becoming available as a result of drop-outs will be re-allocated and filled through the up-gradation of candidates who have confirmed their willingness by depositing admission dues in time.
- Candidates failing to deposit admission dues within the given time will not be considered for admission any further.
- Closing merit of session 2018 for different programmes will be available on the website for guidance
- Admit Cards will be retained at the Test Centres for further verification.
- Candidates with any disability or required to mentioned the same on field provided in the online application form.

Note: Misrepresentation of facts or false information will lead to cancellation of candidature/admission at any stage.

Equivalence Certificate

Candidates submitting A Level, 12th Grade, International Baccalaureate or Advanced Placement certificates are also required to submit equivalence certificates, obtained from the Inter Board Committee of Chairmen (IBCC), within two weeks after joining the respective program. Offices of the IBCC are located in all the provincial capitals. The address of IBCC office at Islamabad is as under:

Inter Board Committee of Chairmen,
Plot No.25, St 38, G-10/4,
Near Federal Government Employees
Housing Foundation (FGEHF),
Islamabad
Phone: (051) 9235018
Web: http://www.ibcc.edu.pk

Note: Candidates are advised to contact IBCC for their eligibility regarding issuance of equivalence certificate of relevant category as per their subjects of study in O/A level or any other foreign qualification.

NUST Entry Test (NET)

NUST Entry Test will be Computer-based for the candidates of Islamabad center, conducted in two sessions daily on different dates whereas for the candidates of Karachi and Quetta centers, it will be paper based to be conducted on one day for all the candidates in April and July 2019.
The standard of test will be that of intermediate level education, aimed at evaluation of factual knowledge, comprehension and its application.

Instructions to attempt computer based Entry test along with mock test module is available on NUST website for guidance of candidates.

For paper based Entry test, correct filling of answer sheets is essential. Detailed instructions for the same are given in the NET section to help the candidates.

Entry Test for Engineering and Computer Science Programmes will be held in the following subjects along with their weightings:

» Mathematics	40%
» Physics	30%
» Chemistry / Computer Science	15%
» English	10%
» Intelligence*	5%

*Intelligence questions will pertain to Mathematical Reasoning, Critical Thinking, Analytical, Problem Solving and Creativity.

Note: Engineering candidates can also opt for BS Chemistry programme in online registration form without paying additional fee. Their merit will be calculated on the basis of Chemistry, English & Intelligence subjects. Candidates with any disability or required to mentioned the same on field provided in the online application form.

Re-checking of NET Papers

Re-checking of paper based Entry Test papers may be requested within 5 days of the declaration of result along with a fee of Rs.500/- in the form of a bank draft/pay order in favour of NUST. The original bank daft / pay order should be dispatched to Admissions Directorate, NUST, Sector H-12, Islamabad, along with written application. Re-checking involves the verification of paper for any unmarked answers and error free totaling of marks.

Provision of Entry Test Results

Desirous candidates may obtain the result details of their test from the link available on NUST website.

Selection Procedure

Final merit list for Engineering / Computer Science programmes will be prepared by assigning weightings as follows:

» NUST Entry Test	75%
» FSc/A Level/equivalent or FSc Part-I	15%
» Matric/O Level*	10%

*O/A Level candidates who are in A Level (final year) will be assigned 25% weighting to their O Level equivalence marks as per equivalence certificate issued by IBCC.

Note

- The above policy may be reviewed by the University whenever deemed necessary.
- It is the responsibility of the candidate to provide his/her academic record in time to the University as per the deadline.
- NUST will not be responsible if result of FSc/equivalent exams is not declared in time.

SAT Seats for National Students

NUST has few reserved seats in Engineering & Computing programmes for induction through SAT scores to facilitate admissions of candidates from O/A Level background. Pakistani candidates of both O/A Level and FSc streams can exercise this option and compete for SAT seats by taking SAT Subject Test and submitting the following results in addition to academic qualification requirements already spelled out.

Engineering

- Mathematics Level-II
- Physics
- Chemistry

Computing Programmes

(Software Engineering, Computer Engineering & BS Computer Science)

- Mathematics Level-II
- Physics

Note: A minimum of 550 score is required in each subject.

SAT Subject Test

SAT Subject Test is a computer-based test held under the management of College Board, USA. For more information on SAT and how to apply, please visit their website at www.collegeboard.com

SAT scores from College Board, USA should reach directly to NUST by July 15, 2019. Scores received after the deadline will not be entertained. SAT scores are valid for two years.
NUST institutional code to receive SAT scores is 2790.
Merit lists for candidates applying on the basis of SAT for national seats is prepared separately

Medical Fitness

Selected candidates will be required to provide Medical Certificate, certifying that the candidate is mentally and physically fit to undertake undergraduate studies and do not require any kind of assistance in this regard, upon joining the relevant program. Medical Fitness Certificate proforma will be sent to the selected candidates along with the Provisional Selection Letter for endorsement from any Government Hospital or a Registered Medical Practitioner.

Rejection of Application

The University may reject an application for admission of any student without assigning any reason.

Submission of Documents

Candidates are required to print the Provisional Selection Letters and send attested photocopies of the following documents along with paid fee invoice (NUST copy) of admission dues to **UG Section, Registrar Directorate, NUST, H-12, Islamabad:**

- Matric/equivalent certificate along with Detailed Marks Certificate
- Detailed marks certificate of FSc Part I
- FSc/equivalent certificate along with Detailed Marks Certificate
- Equivalence certificate(s) from IBCC in case of equivalent examinations

The university will register the student's name as per his/her (SSC) Matric or O level equivalent certificate duly issued by IBCC.

Allocation of Programmes

Selection and allotment of programmes will be carried out strictly according to the merit position and preferences exercised by the candidates.

All candidates will be provided an opportunity to change their preferences given earlier in the online application form after the announcement of NUST Entry Test results/merit positions. This option will be available for **Candidates in first week of August 2019**.

Candidate will be considered for upgradation in respective disciplines by default. However, if candidates want to retain allocated programme, they have to inform immediately through email for blocking of upgradation process in subsequent selections. The seats becoming available as a result of dropouts will be re-allocated and filled through up-gradation of candidates who have confirmed their willingness by deposting the admission dues in time.

Name of those candidates who do not deposit admission dues will not be considered any further.

Cancellation of Admission

Admission is liable to be cancelled if the candidate is found guilty of suppression or misrepresentation of material facts at any stage. The University can further debar him/her from seeking admission elsewhere. Other universities in the country will also be informed about the same.

The seats of those candidates who, after submission of admission dues, do not join within 15 days of commencement date of programmes will be declared vacant and filled up by candidates next on merit.

Migration and Transfer

Under extraordinary circumstances, on the recommendation of the Commandant/Principal of the concerned institution, the Rector may allow migration of a student within NUST, or from other foreign/Pakistani universities/colleges of repute, generally under the following conditions:

- After completion of first year and before the beginning of final year
- Possesses good academic record
- Courses to be transferred have a minimum of B Grade
- Transfer within NUST will be allowed to students admitted on the basis of NUST selection process
- Inter-institutional transfers of students within NUST will be managed and processed on the basis of laid down procedure in vogue

Provisions of NUST Migration Policy, as amended/updated from time to time, will be applicable in processing of all migration cases.

Migration/Transfer Fee

	PKR
Processing Fee	5,000
Migration/Transfer Fee	
Migration from foreign universities	250,000
Migration from local universities	100,000
Transfer within NUST	5,000

Note: For migration application form and details of migration policy and procedure, please visit http://www.nust.edu.pk

MS/PhD Programmes

Dates to Remember

Commencement of Online Admission	April, 2019
Commencement of Programmes (Less MCE/EME/MCS/PNEC/CAE)	September, 2019
Submission of GRE (General)Score	July, 2019
Commencement of Programmes (MCE/EME/MCS/PNEC/CAE)	October, 2019

Masters Programmes of Study

Military College of Signals (MCS), Rawalpindi
- Electrical (Telecomm) Engineering (Evening)
- Software Engineering (Evening)
- Information Security (Evening)
- Systems Engineering (Evening)

College of Electrical & Mechanical Engineering (C of E&ME), Rawalpindi
- Electrical Engineering (Evening)
- Mechanical Engineering (Evening)
- Computer Engineering (Evening)
- Software Engineering (Evening)
- Mechatronics Engineering (Evening)
- Engineering Management (Evening)

School of Electrical Engineering & Computer Science (SEECS), Islamabad
- Information Technology (Evening)
- Computer Science (Evening)
- Information Security (Evening)
- Electrical Engineering (Evening)
- Innovative Technologies in Learning (Evening)

School of Civil & Environmental Engineering (SCEE), Islamabad
- Structural Engineering (Evening)
- Transportation Engineering (Evening)
- Geotechnical Engineering (Evening)
- Construction Engineering and Management (Evening)
- Water Resources Engineering & Management (Evening)
- Remote Sensing and GIS (Evening)
- Environmental Engineering (Evening)
- Environmental Science (Evening)
- Urban and Regional Planning (Evening)

School of Chemical & Materials Engineering (SCME), Islamabad
- Materials & Surface Engineering (Evening)
- Chemical Engineering (Evening)
- Nanoscience and Engineering (Evening)
- Process Systems Engineering (Evening)

Research Center for Modeling & Simulation (RCMS), Islamabad
- Computational Science and Engineering (Morning)
- Systems Engineering (Morning)
- Bioinformatics (Morning)

U.S Pakistan Center for Advanced Studies in Energy (USPCAS-E), Islamabad
- Energy Systems Engineering (Morning)
- Thermal Energy Engineering (Morning)
- Electrical Engineering (Power) (Morning)

School of Mechanical & Manufacturing Engineering (SMME), Islamabad
- Mechanical Engineering (Evening)
- Design & Manufacturing Engineering (Evening)
- Robotics & Intelligent Machine Engineering (Evening)
- Biomedical Engineering (Evening)
- Biomedical Science (Evening)

Pakistan Navy Engineering College (PNEC), Karachi
- Electrical (Control/Communication) Engineering (Evening)
- Mechanical Engineering (Evening)
- Manufacturing Engineering & Management (Evening)
- Naval Architecture (Evening)

Military College of Engineering (MCE), Risalpur
- Construction Engineering & Management (Afternoon)
- Structural Engineering (Afternoon)
- Transportation Engineering (Afternoon)
- Disaster Management (Afternoon)
- Geotechnical Engineering (Afternoon)

College of Aeronautical Engineering (CAE), Risalpur
- Aerospace Engineering (Morning)
- Avionics Engineering (Morning)

Masters Programmes

Eligibility Criteria

Following is mandatory for admission in MS Programmes:

» 16 years of schooling or 4 years education after FA/FSc/A Level with minimum CGPA 2.0 out of 4.0 or 55% marks in relevant discipline as mentioned in the table:-

Programmes	Eligibility Criteria
» Geotechnical Engineering » Structural Engineering » Geotechnical & Tunneling Engineering	BE Civil
» Water Resources Engineering	BE Civil/Agriculture/Environmental/Geological/Geoinformatics/Transportation
» Transportation Engineering	BE Civil/Transportation
» Electrical (Telecom) Engineering	BE in Telecom/Electrical/Electronics/Industrial Electronics/Electrical & Communication/Avionics/Communication Technologies
» Electrical Engineering » Electrical (Control) Engineering	BE in Electrical/Telecommunication/Mechatronics/Electronics/Industrial Electronics/ Electrical & Communication/Avionics /Communication Technologies/Computer System
» Mechanical Engineering	BE in Mechanical/Mechatronics/Industrial/Manufacturing/Aerospace/ Agricultural
» Mechatronics Engineering	BE in Mechatronics/Mechanical/Electrical/Telecom/Computer/ Industrial/Manufacturing/Aerospace/Avionics
» Computer Engineering	BE in Electronics/Industrial Electronics/Computer/Electrical/Electrical and Communication/Telecom/Avionics
» Software Engineering » Information Technology » Computer Science	BE in any discipline OR MCS/MIT or MSc in Statistics/Physics/Applied Physics/Mathematics/Electronics with BCS/BIT
» Information Security	BE in Electrical/Telecom/Computer Software/ Computer System/Electronics/Industrial Electronics/Electrical and Communication/Avionics/Communication Technologies OR MCS/MIT/BCS (4 years)/BIT (4 years) or MSc in Statistics/Physics/Applied Physics/ Mathematics/Electronics with BCS/BIT
» Environmental Engineering	BE in any discipline
» Environmental Science	MSc (Physics / Applied Physics / Chemistry / Biological Science / Microbiology / Biochemistry / Forestry / Agriculture Science) / MBBS / BDS
» Construction Engineering & Management	BE Civil/Transportation/Architecture/Bachelor of Architecture
» GIS & Remote Sensing	MSc/BS (4 years) in Remote Sensing and GIS/Geography/Geology/Computer Science or Engineering/Environmental Science OR MSc/BS (4 years) in Town Planning/City and Regional Planning/Urban Planning/Forestry/Business Management/Health Management/ Public Health/Architecture OR BE in Civil/Environmental/Electrical/Mechanical/Petroleum/Mining /Marine /Transportation
» Materials and Surface Engineering	BE in Materials and Metallurgical/Mechanical/Mining /Petroleum/Chemical/ Engineering Sciences OR MSc in Chemistry/Physics/Mathematics/Environmental Sciences or equivalent qualification may be considered but may have to undertake additional courses as deemed necessary to cover deficiencies for Engineering degree essentials.
» Computational Science & Engineering	MSc/BS (4 years) in any discipline of Engineering, Natural Sciences, Computer Science/ Software Engineering, Operation Research, Defense/Strategic Studies, Management Sciences
» Engineering Management	BE in any discipline

» Manufacturing Engineering and Management » Design and Manufacturing Engineering	BE Mechanical/Manufacturing/Industrial/Mechatronics/Automotive/ Aerospace/Electrical/ Electronics/Avionics/Design Engineering
» Robotics & Intelligent Machine Engineering	BE Mechatronics/Mechanical/Electrical/Computer/Industrial/Manufacturing/ Aerospace/Avionics/Computer Software/Computer Science
» Biomedical Engineering	BE Biomedical/Chemical/Electrical/Mechanical/Mechatronics/Computer/Materials.
» Biomedical Science	BS (4 years) or Masters in Biology, Physics, Chemistry, Computer Science, Materials Science, Biosciences, Pharmacology, Molecular Biology, Genetic Engineering, Biotechnology or MBBS/BDS
» Energy Systems Engineering	BE in any Engineering discipline MSc / BS (4 years) in Chemistry/Physics/Electronics
» Disaster Management	Masters / BS (04 years) in any discipline from HEC recognized institute
» Urban and Regional Planning	BE Civil / Construction / Architecture or BS Architecture / Environmental / Geo Informatics/ City & Town Planning
» Chemical Engineering	BE Chemical Engineering/Petroleum Engineering
» Nano science & Engineering	16 years of education from a recognized institution in Materials Science & Engineering /Physics/Chemistry/Chemical Engineering/Mechanical Engineering/Environmental Science & Engineering/Electronics/Biosciences / Polymer Engineering
» Systems Engineering	BE in any Engineering Discipline recognized by PEC OR MSc/BS (04 years) in Chemistry/Physics/Electronics/Environment
» Innovative Technologies in Learning	16 years of education, from HEC recognized Institutes, in Computer Science/ Information Technology/Education/Social Sciences/Management Sciences/Basic Sciences or BE in any discipline
» Transportation Engineering	BE in Civil/Transportation Engineering
» Thermal Energy Engineering	BE in any Engineering Discipline recognized by PEC OR MSc/BS (04 years) in Chemistry/Physics/Electronics/Environment
» Aerospace Engineering	BE in Aerospace /Mechanical/ Mechatronics/Industrial/Manufacturing/Electrical
» Avionics Engineering	BE in Electrical/Electronics/Avionics/Computer/Software/Aerospace
» Electrical Energy Engineering	BE in Electrical/Electronics
» Bioinformatics	BS in Bio-Informatics / Biosciences / MBBS / BS/MSc Molecular Biology / Biotechnology / BS/MSc in Computer Science

» For all Masters programmes minimum 50 accumulative score in GAT (General) test conducted by NTS or HAT conducted by ETC (HEC) or GRE (General) conducted by ETS, USA with following minimum accepted score.

Quantitative	151/170
Verbal	146/170
Analytical Writing	3.5/6.0

» NUST will accept the scores of GAT (General) conducted by NTS on or after August 1, 2017. OR HAT conducted by ETC(HEC) on or after March 2018

» GRE conducted after August 1, 2015 will be accepted.

» Candidates are responsible for providing hard copy of GRE score directly on following address:

Postgraduate Programme Directorate,
National University of Sciences & Technology (NUST)
Sector H-12, Islamabad

Note:

» PEC/HEC recognised degrees (as applicable) will only be accepted.

» The degree must be relevant to the discipline applied for, as shown in the above table.

» Candidates who are awaiting final result can also apply, provided their CGPA/Percentage till last semester is equal to 2.0/55% and they can submit their final result before commencement of classes..

Selection and Admission

MS Programmes

Admission of postgraduate students in various programmes of Engineering and Sciences will be based on GRE/GAT (General) / HAT conducted by ETS/NTS/ETC, previous academic record and interview.

Admission in MS will be based on the following weighting:

- GRE (General) / GAT (Gen) score / HAT 50%
- Previous Academic Record 25%
- Interview 25%

Submission of Online Applications

Instructions for Online MS Application Form

- Visit www.pgadmission.nust.edu.pk and register with valid e-mail address.
- Candidate will be allotted a password to access the application form.
- Fill the application form.
- Enter CGPA only, If both percentage and CGPA are mentioned on Bachelors/Masters Degree/Transcript.
- Enter earned percentage/CGPA of last term/semester, in case final results are awaited.
- Upload recent photograph (with plain background).
- Upload scanned copies of the following documents with the online application:
  - Matric/equivalent certificate
  - Intermediate/equivalent certificate
  - Undergraduate degree along with final transcript(s) showing the exact duration
  - Masters degree along with transcript showing the exact duration (if applicable).
  - Computerised National Identity Card
- Consult eligibility criteria before opting for the program(s). **Candidates will not be considered for the programmes for which they are not eligible.**
- Candidates can deposit the fee online, after taking print of Challan Form, in any branch of HBL.

Misrepresentation of facts or false information will lead to cancellation of candidature/admission at any stage.

Admission at NUST can be cancelled at any stage of studies if any document/information provided by a student is found to be fake/incorrect or not meeting the eligibility criteria, with no liability on NUST.

Admission Process

Application
- Access web-link: www.pgadmission.nust.edu.pk
- Fill online application form.
- Upload scanned copies of required documents.

Application Confirmation
Application confirmation will be sent at the given email address wihtin 24 hours of submission.

Application Fee
Deposit application fee online in any HBL branch.

Fee Receipt
Fee confirmation will be sent at the given email address within 15 days of payment.

Application Status
Application status would be communicated through email/websigte within 2 days of scrutiny of documents.

Interview Calls
Eligible candidates and those who qualify GAT-Gen or relevant tests will be asked to appear for interviews.

Interviews
Candidates would appear for interviews at the concerned School/College/Center in June.

Selection List
Selection list will be uploaded on NUST website by 1st week of August.

Admission Dues
Candidates will deposit admission dues in any HBL branch as per challan form available online.

Documents Submission
- Candidates will prepare documents as per given check-list available online and will submit to the PGP Directorate, Main Office NUST.
- All original documents, Medical Certificate and Affidavit will be submitted to the respective Schools/Colleges/Centers at the time of joining.

Joining Instructions
Relevant NUST School/College/Center will issue joining instructions to those candidates who have completed all admission requirements.

Joining
Successful candidates will join relevant programmes as per joining instructions in 1st week of September.

To do list for Applicant To do list for NUST

Rejection of Application

The University may reject an application for admission of any student without assigning any reason.

PhD Programmes

Eligibility Criteria

» For admission into the PhD minimum CGPA 3.0 out of 4.0 (in the Semester System) or First Division (in the Annual System) in M.Phil/M.S/Equivalent degree is required. Percentage will be valid only if the CGPA is not mentioned in degree/transcript.

» GRE Subject International (score ≥ 60 percentile) or GAT Subject by NTS (score ≥ 60 %) or local GRE subject type test (Score≥70 %) conducted by NUST (as applicable) is required.

Submission of Application

Desirous candidates for PhD programmes (all types) may apply to PGP Directorate online according to the advertised schedule of admissions.
Each candidate finally selected for admission to the PhD programme will be notified formally.

Evaluation of Research Proposal

Selection of candidates for the PhD Programmes is dependent on GRE Subject/GRE Subject-type Test score/GAT subject (as applicable), their acceptance by a supervisor and evaluation of their research proposals.

International Students

Undergraduate Programmes

National University of Sciences and Technology (NUST) has some SAT specific seats in undergraduate programmes for international candidates.

NUST encourage and facilitate both foreign as well as Pakistani origin dual nationality holder students, to seek admission in NUST.

General Eligibility Criteria:-

- The following categories can only apply for international seats:
  - Foreigners and Pakistanis having dual nationality, irrespective of the place of their study of HSSC or equivalent, Pakistan or abroad.
  - Pakistani students studied abroad for HSSC or equivalent but appearing in the Pakistani board from abroad.
  - Pakistani national students having passed an examination, equivalent to intermediate level of Pakistan, from a foreign education system.
- Desirous candidates can avail the facility accordingly, provided they meet the specified eligibility criteria and are willing to pay tuition fee and allied charges of the category.
- Separate application form will be used for applying on SAT basis, available on NUST website.
- The applicant must have passed Higher Secondary School Certificate (HSSC) or equivalent qualification like Cambridge Overseas Higher School Certificate, British General Certificate of Education (Advanced Level), American High School Graduation Diploma (9-12th Grade) or any other equivalent qualification in relevant category showing twelve years of school education with minimum 60% marks, which is mandatory requirenment.
- In case of any foreign qualification, candidates have to obtain equivalence certificates from IBCC, Pakistan with required subjects and minimum 60% marks, which is a mandatory requirement.
- Valid TOEFL or IELTS with score of 500 or 5.5. (not applicable for those students whose medium of instruction is English at HSSC level).
- For all Programmes, a minimum of 550 SAT score is required in each subject. SAT scores are valid for two years only.
- All Bachelor programmes at NUST are taught in English. No SAT based seats available in Avionics & Aerospace Engineering programs.
- The candidate should also possess adequate mental and physical health to continue his/her course of studies.

Academic Requirements

Engineering

HSSC (Pre- Engineering group) from any Board of Intermediate and Secondary Education OR an equivalent qualification like A level OR any other foreign qualification with Mathematics, Physics and Chemistry.

Computing Programmes
(Software Engg, Computer Engg & BS Computer Science)

HSSC (Pre- Engineering Group / General Science Group) from any Board of Intermediate and Secondary Education OR an equivalent qualification like A level OR any other foreign qualification with Mathematics, Physics and Chemistry / Computer Science / Computer Studies.

SAT Requirements

Engineering

SAT Subject Test in

- Mathematics Level II
- Physics
- Chemistry

Computing Programmes

SAT Subject Test in

- Mathematics Level II
- Physics

SAT scores from College Board, USA should reach directly to NUST by July 15, 2019. NUST institutional code to receive SAT scores is 2790.

It is the responsibility of the candidate to enter their SAT scores in online application form by due date.

For correspondence:

Undergraduate Section, Registrar Directorate,
National University of Sciences and Technology (NUST),
Main Office, Sector H-12, Islamabad, Pakistan.
Email : satadmissions@nust.edu.pk

Provisional Admission

On fulfillment of the requirements mentioned, a candidate will be admitted to the University as per policy in vogue. This admission shall, however, be provisional until all the original degrees or certificates submitted by him / her have been checked and verified. In case any document proves to be false, fake, or fabricated at a later stage, a provisionally admitted student shall be liable to expulsion from the University at any stage or to any other disciplinary or legal action the University may deem necessary.

On receipt of university admission / acceptance letter, foreign nationality holders will approach the Pakistani mission abroad for the visa and submit the following documents:-

- Application Form (Student Visa Form)
- Photocopy of passport
- No Objection Certificate (NOC) issued by the home country for studying in Pakistan.
- Photograph
- Educational Documents
- Admission letter of university

For more details, please visit the under mentioned link of Higher Education Commission (HEC), Pakistan: -http://www.hec.gov.pk/InsideHEC/Divisions/AECA/Pages/AdmissionofForeignStudents.aspx

Merit List

Merit list of international students is prepared separately.

Final Approval

Cases of the international students, finally selected for admission, will be referred to Higher Education Commission and relevant Government department(s) for final approval as per policy in vogue.

Postgraduate Programmes

International students, Pakistanis holding foreign nationality and Pakistanis living abroad can apply for postgraduate programmes. They have to compete with the local students for admission on merit.

Eligibility Criteria

Eligibility criteria is the same as for national students. International Students are only eligible for programme at Main Campus H-12, Islamabad.

GRE Score

International applicants are required to appear for GRE conducted by ETS, USA. Last date for scores of GRE to reach NUST is July, 2019.

Minimum Score is mentioned below:

Quantitative	151/170
Verbal	146/170
Analytical Writing	3.5/6.0

» Degree must be in relevant discipline

The candidates are responsible for providing GRE score directly to NUST on the following address:

Postgraduate Programme (PGP) Directorate,
National University of Sciences and Technology
Sector H-12, Islamabad, Pakistan.

Processing

» Cases of international students selected for admission will be processed through HEC/relevant government departments.
» International students have to obtain NOC from their respective Embassy in Pakistan.

Accommodation

Hostel accommodation to international students is guaranteed.

FEE & FUNDING

- National Students
- International Students

National Students

Undergraduate Programmes

Fee Structure

Admission Dues	PKR
Admission Processing Fee (Non-refundable)	35,000
Security Deposit (Refundable)	10,000

Tuition Fee	
Engineering & Computing Programmes (Per semester)	95,000
Miscellaneous dues (Per semester)	2,700

Payment of Dues

- At the time of admission students have to pay the admission processing fee, security and full semester fee in advance. Dues have to be paid on semester basis.
- Invoice/Challan for admission charges along with first semester fee and Provisional Selection Letter will be available on NUST website.
- Tuition fee will be payable on semester basis. Students have to pay their fee in advance before the commencement of semester .

Note: All fees are subject to revision.

Merit-based Financial Assistance

A fixed amount is allocated for financial assistance, and will be provided to top three position holders of each section of a batch / class. Qualifying GPA is 3.5 or above in a semester.

Need-based Scholarship/Fee Waiver

NUST has launched a need-based scholarship scheme to enable financially under-privileged but talented students to acquire higher education. Salient features of the scheme are:

- Scholarships will be awarded to needy students of the new batch every year.
- The scholarships will be for full duration on-campus of the programme in which the student is enrolled.
- The scholarships will cover full tuition fee.

Deferred Payments

- Financially under-privileged students, who cannot pay their fees and also do not qualify for merit-based scholarship are allowed deferred payment, on case-to case basis on completion of 1st semester of their studies.

Other Opportunities for Financial Assistance

- HEC in collaboration with USAID, PEEF in collaboration with DFID/UKAID, CMEEF (KPK) and certain philanthropic individuals/organizations provide merit cum needs based scholarships to the freshly inducted students of NUST. Information on how to apply is available on NUST webportal and the constituent institutions. Students may also apply on their own for other scholarships such as those offered by:
  - > Higher Education Commission (HEC)
  - > Shell Pakistan, etc.
- Further details are available on the NUST webportal and with the respective institutions.

Note: The award of scholarship/financial assistance is subject to availability of funds, high performance and good conduct of the students.

Tuition Fee Refund Policy Applicable to both UG and PG Students

% age of Tuition Fee	Timeline for Semester/Trimester System
Full (100%) of Tuition Fee Refund	Apply upto 7th day of convening of classes
Half (50%) of Tuition Fee Refund	From 8th – 15th day of convening of classes
No Fee (0%) Refund	From 16th day of convening of classes

- Admission Processing Fee is not refundable under any circumstances.
- University will not accept any claim of refund after 3 years of the completion of degree / withdrawn from university and the amount of security will be transferred to the NUST Endowment Fund.

Fines/Penalties on Late Payments

Period	National Students	International Students
After the due date till start of semester	5% of the total payable amount	USD 35
From start of semester till 15th day *	10 % of the total payable amount	USD 70
16th day from start of semester *	Registration shall be suspended. For re-activation of registration, student will be required to pay the Admission Processing Fee again along with all outstanding charges and fines.	Registration shall be suspended. For re-activation of registration, the student will be required to pay the Admission Processing Fee again along with all outstanding dues.

*In any case student will not be able to attend classes till clearance of dues.

Postgraduate Programmes

Masters

Fee Structure

Admission Dues	**PKR**
Admission Processing Fee (Non refundable)	10,000
Security Deposit (Refundable)	10,000

Tuition Fee per Semester

Engineering Management and Construction Engineering & Management	105,000
Other Engineering/IT programmes	68,000
Miscellaneous dues (Per semester)	2,700

PhD

Admission Dues

Admission Processing Fee (Non refundable)	5,000
Security Deposit (Refundable)	10,000

Tuition Fee per Semester

All programmes	68,000
Miscellaneous dues (Per semester)	2,700

Tuition fee can be exempted subject to certain conditions

Note: All fees are subject to revision.

Payment of Dues

- At the time of admission students have to pay the admission processing fee, security and full semester fee in advance. Dues have to be paid on semester basis.
- Invoice/Challan for admission charges along with first semester fee and Provisional Selection Letter will be available on NUST website.
- Tuition fee will be payable on semester basis. Students have to pay their fee in advance before the commencement of semester.

Supervisor's Fee and Research Fund

- Sponsored Students: As per scholarship/sponsorship award.
- Non-Sponsored Students: To be paid by the University

HEC and Other Sponsorships

HEC will bear the cost of its scholarship awardees, as per the scholarship award details. For other sponsored students, all charges as per the details provided above, will be borne by their sponsoring agency. Students will be responsible for timely deposit of dues by their sponsoring agency. Scholarship provisions for postgraduate studies for candidates from FATA and Balochistan are also available through HEC for which they may apply directly to HEC.

Merit-based Scholarship/Tuition Fee Waiver

MS Programmes

- Selected students are awarded monthly stipend of **Rs 18000/-** pm and tuition fee waiver.

PhD Programmes

- NUST sponsored PhD students will be paid monthly stipend of **Rs 30,000/-** pm and tuition fee waiver in addition to supervisor remuneration.
- There are numerous opportunities for additional academic pursuits, e.g. students will be provided financial support for attending seminars, conferences and making presentations/publication of research papers within Pakistan and abroad.
- During research phase of PhD studies at NUST, students can also get an opportunity for collaborative/joint research training programmes with other well-reputed foreign universities.
- Full time PhD students can also be exempted from payment of tuition fee, if they are willing to do Teaching Assistant (TA)/Research Assistant (RA) duties and fulfilled other conditions.

Bond for NUST Sponsored Students

- NUST sponsored MS/PhD students will be required to complete the program.
- NUST sponsored MS/PhD Students will work as TA/RA, as and when required.
- The students who fail or do not fulfil the undertaking, will have to reimburse the total amount spent on them (including Tuition Fee, Stipend, Supervisor's Fee and Research Expenditure, etc).

Need-based Scholarship/Fee Waiver

NUST has launched a need-based scholarship scheme to enable financially under-privileged but talented Masters students to acquire higher education. Salient features of the scheme are:

- Scholarships will be awarded to needy students of the new batch every year.
- The scholarship will be for full duration (2 years) of the programme in which the student is enrolled.
- All awardees are given 100% tuition fee waiver.

Other Opportunities for Financial Assistance

- HEC in collaboration with USAID, PEEF in collaboration with DFID/UKAID, CMEEF (KPK) and certain philanthropic individuals/organizations provide merit cum needs based scholarships to the freshly inducted students of NUST. Information on how to apply is available on NUST webportal and the constituent institutions.

International Students

Undergraduate Programmes

Finances (UG Programmes)

Students selected through this process will be required to pay their fees and other charges in USD.

Fee Structure

Engineering and Computing Programmes	USD
Admission Processing Fee (Non-refundable)	600
Tuition Fee (Per Annum)	4700
Security Deposit (Refundable)	250
Health Facilities (per annum)	120

- Tuition fee for the first academic year (two semesters) will be deposited (as per selection letter).
- Tuition fee will be payable on annual basis. Students have to pay their fee in advance before the commencement of the academic year, otherwise they will not be eligible to sit in the class.
- **All fees are subject to revision from time to time.**

Postgraduate Programmes

Finances (PG Programmes)

International students selected through this process will be required to pay the applicable charges in USD. Please note that admission is granted only to those candidates who come up to the required position on the merit list meant for open merit.

Monthly Accommodation Charges (H-12 Campus)

Single Students

- Single occupancy (with attached bath) USD 70
- Double occupancy (with attached bath) USD 60
- Double occupancy (with community bath) USD 50
- Tripple occupancy with community bath USD 40

Married Students

- One bedroom apartment USD 120
- Two bedroom apartment USD 170

Note

- Security Fee of USD 117/- (Refundable) will be charged at the time of allotment.
- Hostel includes accommodation charges only.

Accommodation information in NUST Colleges can be found in their respective sections of the prospectus.

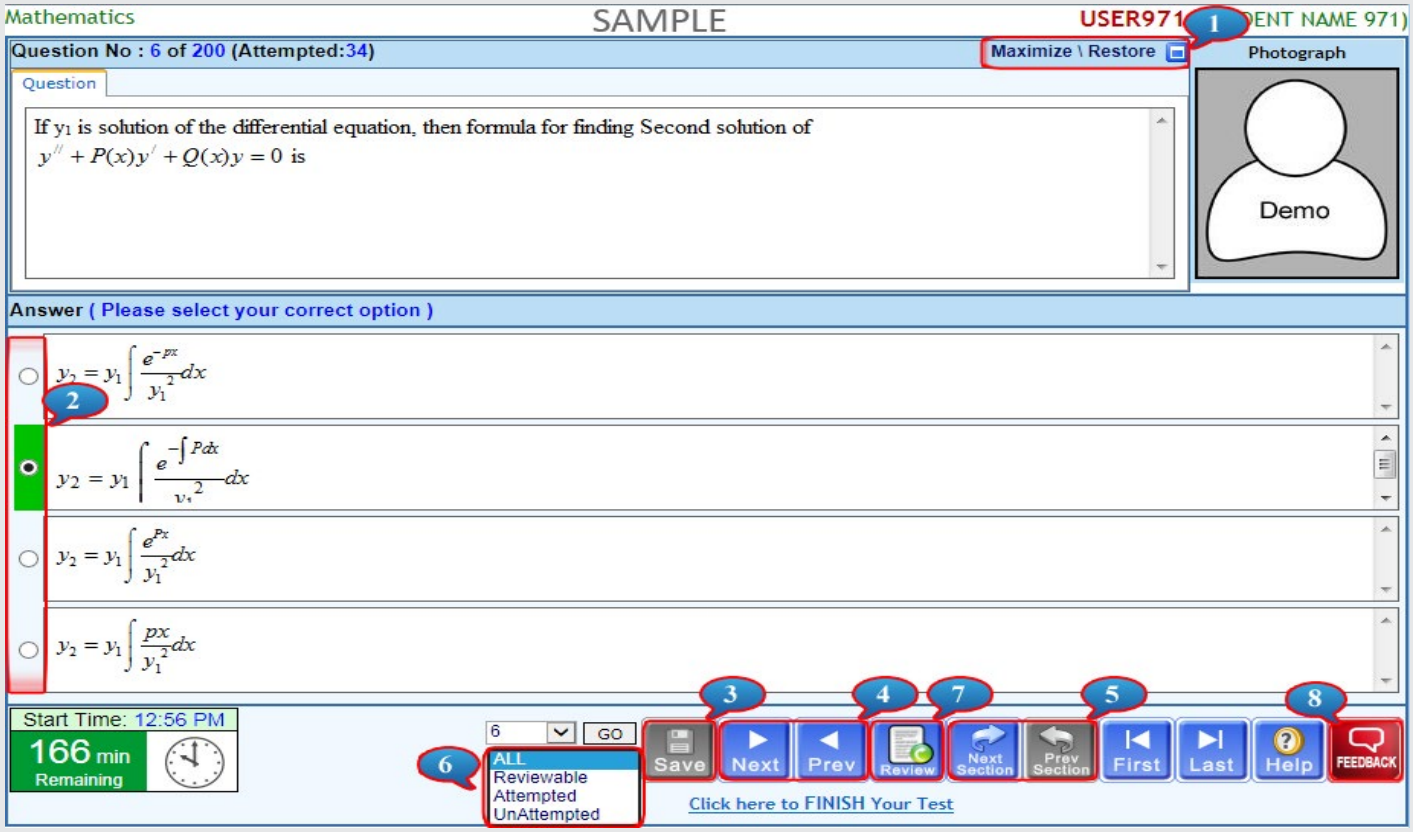
Fee Structure

The fee structure of the programmes of study is as under:

	MPhil/MS		PhD
	Engineering Management and Construction & Engineering Management	Other Engineering/IT programmes	All Programmes
One Time Charges:	**USD**	**USD**	**USD**
Admission Processing Fee	110	110	60
Security Deposit (refundable)	100	100	100
Semester Fee	950	640	640
Course Repeat Fee (Per Credit Hour)	40	40	40

NUST Entry Test (Computer Based)

- NUST Entry Test (computer based) will be held in multiple sessions. Paper based test will be held in Karachi and Quetta in (April and July).
- Computer-based test is designed in accordance with the internationally practiced system of on-line examinations. It is easy to attempt with minimal practice. Instructions to attempt computer-based Entry test alongwith sample test module will be available on NUST website for guidance.
- The pattern and the standard of question papers for both types of tests is the same.
- All kinds of data carriers and calculators, including mobile phone, Bluetooth, hands free devices, etc, are strictly prohibited inside the examination hall.



Instructions for Paper-based Entry Test of Engineering and Computer Science

The Entry Test will be held for applicants in the following subjects:

a. Mathematics **b. Physics** **c. Chemistry/Computer Science**
d. English **e. Intelligence**

These instructions deal with multiple choice answer sheets, which will be provided for examination. The answer sheets will have two parts, i.e., personal information and answers. A filled in answer sheet is printed on the next page for illustration and guidance. Answer sheets are marked through computer, therefore, it is important that the candidates read and understand these instructions thoroughly before taking the exam. Non-compliance will affect scoring adversely.

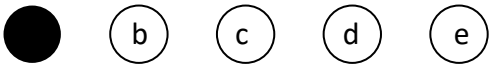
PERSONAL INFORMATION (See appropriate block in the specimen answer sheet). Exam superintendent will brief on filling in of this portion before start of the exam.

- Clearly write your name in Capital Letters in the box titled **FULL NAME**. Fill corresponding circles. If the name is longer than the space provided, fill in as much as fits in the given space. (In the specimen answer sheet, **Ali Nawaz** is the name of a candidate).
- Write your Roll No in the box titled **ROLL No**. (In the specimen answer sheet, the Roll No of the candidate is **16245016**).
- In the SUBJECT column, use "**111**" as subject code for Engineering and "**222**"Computer Science.
- In the SEQ CODE column, write NET Code written inside the question booklet. (SEQ Code 01 is marked in the specimen answer sheet).
- In the **CITY/CENTRE** column, use the following codes and fill in the corresponding circles. (In the specimen sheet, **IS** is marked for Islamabad). **KI**: Karachi **QA**: Quetta **IS**: Islamabad
- Put your date of birth in the column Date of Birth. 11-04-85 is marked as the Date of Birth on the specimen sheet.
- In the **SEX** column, fill **M** for male candidates and **F** for female candidates and **O** for other candidates. (In the example a male candidate is marked).

MARKING Of ANSWER SHEET

In the specimen answer sheet, first 6 questions have been attempted. See the specimen sheet and the following instructions:

- Mark your choice with **2B lead pencil** by filling in the appropriate circle completely, making it a dark black circle as shown below.



- Some examples of improper marking are shown below:

(The computer will mark improperly filled circle as wrong answer)

- Do not mark more than a single circle for an answer choice. Multiple answers for a single question will be regarded as an unanswered question.
- If you need to erase an answer, do so clearly/cleanly, using a good quality eraser.
- Do not bend/fold your answer sheet, make stray marks or mark any area outside the provided circles.

MISCELLANEOUS

- **Answer sheet is to be signed both by the invigilator as well as by the candidate, in respective blocks, with ballpoint pen only.**
- **PLEASE DON'T FORGET TO BRING A CLIPBOARD ALONG.**
- **USE 2B lead pencil only. DO NOT USE ink pens**, ballpoint pens or felt-tip pens on the answer sheet.
- You are allowed to bring along clipboard, pencils, eraser and sharpener only.
- Use your time effectively. Do not spend too much time on one question, otherwise you will run short of time for other questions.
- Write your **Roll No** on the front page of the **QUESTION BOOKLET** and the back side of the answer sheet in the given blocks. Do not write elsewhere.
- **Return the complete questions booklet along with the answer sheet** on completion of the test.

- You are not allowed to take away any part of the question booklet or note questions elsewhere. Non-compliance will be regarded as use of unfair mean.
- You are **NOT ALLOWED** to use any device which could assist in calculation such as a **calculator, tables, digital watch, mobile phone, electronic diary, Palm Pilot, etc.**
- **There is no negative marking.**

The NUST Emblem

The Book of Knowledge lights up the darkness, through the Vine of Wisdom which bears the two moons and stars facing towards the East and the West, symbolising the diversity of disciplines and the fruit of knowledge.

The Rising Sun brings change, hope and enlightenment. It emanates inspiration and from the light of knowledge, four birds take wing from the nests of light, and spread out to the four corners of the world, symbolising the quest for spiritual gratification through knowledge and wisdom.

The NUST Blue is a colour that represents the future. It carries all the characteristics of the colour blue, like dignity, grace, freshness, professionalism, prudence and resolve.

National University of Sciences & Technology (NUST),
Sector H-12, Islamabad, Pakistan.

UAN: 111-116-878 | NUST | nust.edu.pk