NED UNIVERSITY
OF ENGINEERING & TECHNOLOGY

POSTGRADUATE PROSPECTUS 2024

Master Degree Programmes

Leading to the Degree of

M. Engg., MEM, MS, M. Arch, MURP

NED University of Engineering & Technology
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NED UNIVERSITY

OF ENGINEERING & TECHNOLOGY

KARACHI-75270, PAKISTAN

PROSPECTUS FOR
POST GRADUATE PROGRAMMES

LEADING TO THE DEGREE OF
M. ENGG., MEM, MS, M. Arch, MURP

2024`

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1. General Information

1.1 Historical Background of The University 1
1.2 Thar Institute of Engineering, Sciences and Technology (TIEST) 2

2. Administration & Academic Support 3

3. Departments 6

3.1 Department of Civil Engineering 6
3.1.1 Departmental Facilities 6
3.1.2 Research Fields 8
3.1.3 Programme Structure 10
3.1.4 Principal Faculty for the Programme 10
3.2 Department of Urban & Infrastructure Engineering 12
3.2.1 Departmental Facilities 12
3.2.2 Principal Faculty for the Programme 13
3.3 Department of Earthquake Engineering 14
3.3.1 Masters in Earthquake Engineering 14
3.3.2 Departmental Facilities 14
3.3.3 Computing Facilities 15
3.3.5 Principal Faculty for the Programme 15
3.4 Department of Petroleum Engineering 16
3.4.1 Departmental Facilities 16
3.4.2 Principal Faculty for the Programme 17
3.5 Department of Environmental Engineering 18
3.5.1 Departmental Facilities 18
3.5.2 Principal Faculty for the Programme 19
3.6 Department of Mechanical Engineering 20
3.6.1 Departmental Facilities 20
3.6.2 Principal Faculty for the Programme 20
3.7 Department of Industrial and Manufacturing Engineering 22
3.7.1 Departmental Facilities 22
3.7.2 Principal Faculty for the Programme 22
3.8 Department of Textile Engineering 24
3.8.1 Departmental Facilities 24
3.8.2 Principal Faculty for the Programme 25
3.9 Department of Automotive and Marine Engineering 26
3.9.1 Departmental Facilities 26
3.9.2 Principal Faculty for the Programme 26
3.10 Department of Electrical Engineering 27
3.10.1 Departmental Facilities 27
3.10.2 Principal Faculty for the Programme 29
3.11 Department of Computer & Information Systems Engineering 30
3.11.1 Departmental Facilities 30
3.11.2 Principal Faculty for the Programme 31
3.12 Department of Electronic Engineering 32
3.12.1 Departmental Facilities 32
3.12.2 Principal Faculty for the Programme 32
3.13 Department of Telecommunication Engineering 34
3.13.1 Departmental Facilities 34
3.13.2 Principal Faculty for the Programme 34
3.14 Department of Biomedical Engineering 36
3.14.1 Departmental Facilities 36
3.14.2 Principal Faculty for the Programme 36
3.15 Department of Software Engineering 37
3.15.1 Principal Faculty for the Programme 37
3.16 Department of Computer Science & Information Technology 38
3.16.1 Departmental Facilities 38
3.16.2 Eligibility Requirement 39
3.16.3 Principal Faculty for the Programme 39
3.17 Department of Materials Engineering 40
3.17.1 Departmental Facilities 40
3.17.2 Principal Faculty for the Programme 40
3.18 Department of Chemical Engineering 42
3.18.1 Departmental Facilities 42
3.18.2 Principal Faculty for the Programme 42
3.19 Department of Polymer & Petrochemical Engineering 43
3.19.1 Departmental Facilities 43
3.19.2 Principal Faculty for the Programme 43
3.20 Department of Architecture and Planning 44
3.20.1 Principal Faculty for the Programme 44

3.21 Department of Mathematics 45
3.21.1 Principal Faculty for the Programme 45
3.22 Department of Physics 46
3.22.1 Departmental Facilities 46
3.22.2 Research Fields 46
3.22.3 Principal Faculty for the Programme 46
3.23 Department of Chemistry 47
3.23.1 Departmental Facilities 47
3.23.2 Principal Faculty for the Programme 47
3.24 Department of English Linguistics & Allied Studies 48
3.24.1 Eligibility Criteria for Seeking Admission 48
3.24.2 Research Fields 49
3.24.3 Principal Faculty for the Programme 49
3.25 Department of Economics and Management Sciences 50
3.25.1 Principal Faculty for the Programme 50
3.26 Panjwani-Hisaar Water Institute (PHWI) 51
3.26.1 Departmental Facilities 51
3.26.2 Programme Structure 51
3.26.3 Principal Faculty for the Programme 52

4 Courses offered under the faculties 53

4.1 Master Programmes in the Faculty of Civil and Petroleum Engineering 53
4.1.1 M.Engg. in Civil Engineering. 53
4.1.2 M.Engg. in Structural Earthquake Engineering 54
4.1.3 M.Engg. in Petroleum Engineering 55
4.1.4 M. Engg. in Environmental Engineering 55

4.2 Master Programmes in the Faculty of Mechanical and Manufacturing Engineering 55
4.2.1 M.Engg. in Mechanical Engineering 55
4.2.2 M.Engg. in Manufacturing Engineering 57
4.2.3 M.Engg. in Textile Engineering 57
4.2.4 M. Engg. in Automotive Engineering 57
4.2.5 MS in Textile Management 58

4.3 Master Programmes in the Faculty of Electrical and Computer Engineering 58
4.3.1 M. Engg. in Electrical Engineering 58
4.3.2 M. Engg. in Computer Systems Engineering 59
4.3.3 M. S. in Data Engineering & Information Management 60
4.3.4 M.S. in Artificial Intelligence 60
4.3.5 M.Engg. in Electronic Engineering 61
4.3.6 M.Engg. in Telecommunications Engineering 61
4.3.7 M.S. in Telecommunication Systems 61
4.3.8 M. Engg. in Biomedical Engineering 62
4.3.9 M. Engg. In Software Engineering 62
4.3.10 Courses in MS Streams in the Department of Computer Science and Information Technology 63
4.3.10(a) M.S. in Computer Science and Information Technology 63
4.3.10(b) M.S. in Information Security 63
4.3.10(c) M.S. in Data Science 64
4.3.10(d) M.S. in DS (Geospatial Data Science) 64

4.4 Master Programmes in the Faculty of Chemical and Process Engineering 65
4.4.1 M. Engg. in Materials Engineering 65
4.4.2 M. Engg. in Chemical Engineering 65
4.4.3 M. Engg. in Polymer Engineering 65

4.5 Master of Engineering Management (MEM) Programme 66

4.6 Master Programme in the Faculty of Architecture & Sciences 68
4.6.1 Master of Architecture Programme 68
4.6.2 Master of Urban & Regional Planning Programme 69
4.6.3 M.S. in Applied Mathematics 69
4.6.4 M.S. in Physics 70
4.6.6 M.S. in Industrial Chemistry 70
4.6.7 M.S. in Applied Linguistics 71
4.6.8 M.S. in Economics and Finance 71

5. Number of Seats, Fees and Deposit 72

5(a) Number of Seats to be offered for Admission to the Programme 72
5(b) University Fees and Deposit 72

6 Regulations for the Master Degree Programmes as offered by NED University 73

6.1 General 73
6.1.1 Title 73
6.1.2 Commencement 73
6.1.3 Nature of the Degree 73
6.1.4 Nature of Programme and Number of Seats 73
6.1.5 Criteria and Procedure for Admission 73
6.1.6 Medium of Instruction 74
6.2 Scheme of Studies 74
6.2.1 General 74
6.2.2 Duration of Course and Time Schedule 74
6.2.3 Admission in Any Semester 74
6.2.4 Transfer of Credits / Exemption 75
(ii) Transfer of Credits 75
(iii) Exemption of Courses 75
6.2.5 Cancellation of Admission 75
6.2.6 Withdrawal from Semester 75
6.2.7 Withdrawal from Programme 76
6.2.8 Re-Admission in the Programme 76
6.3 Examination 76
6.3.1 Conduct of Examination 76
6.3.2 Class Attendance 76
6.3.3 Grade Point Average 76
6.3.4 Academic Performance 77
6.3.5 Absence from Examination 77
6.3.6 Change of Grade/ Improvement 77
6.4 Thesis 74
6.4.1 Proposal for Thesis 74
6.4.2 Thesis Assignment and Supervision 74
6.4.3 Evaluation of Thesis 78
6.4.4 Submission of Thesis 78
6.5 Award of Degree 79
6.6 General Provision 79

7. Supporting Infrastructure 80

7.1 Engr. Abul Kalam Library 80
7.2 Information Technology (IT) Department 80
7.2.1 Network & Hardware (Internet Facility) 80
7.2.2 Online Learning Management System 81
7.2.3 Hardware Maintenance and Inventory 81
7.2.4 Video Conferencing Facility 81
7.2.5 Information Systems and Software Section 81
7.2.6 Research & Development Section 81
7.3 Instrumentation Centre 82
7.4 NED Academy 82
Key Domains of NED Academy 83
Future Plans of NED Academy 83
7.4.1 Centre of Continuing Engineering Education (CCEE) 83
7.4.2 Centre for of Professional Excellence (CoPE) 83
7.5 Cowasjee Earthquake Study Centre 84
7.6 Shake Table Testing Facility 84
7.7 Advanced Material Testing Facility 84
7.8 PCB Fabrication Laboratory 84
7.9 Product Development Centre 84
7.10 Directorate of Industrial Liaison 84
7.11 Office of Research, Innovation and Commercialization (ORIC) 85
7.11.1 Objectives 85
7.11.2 Initiatives and Activities 85
7.11.3 Organizational Support 85
7.11.4 Lab Commercialization 85
7.11.5 Entrepreneurship Development 86
7.11.6 Workshops & Training 86
7.11.7 Industry Linkages 86
7.11.8 Business & Technology Incubation 86
7.11.9 Campus Companies 86
7.11.10 Maker Studio 86
7.11.11 Research Internship Programme 87
7.12 Directorate of University Advancement & Financial Assistance 87
7.13 Medical Department 87

1 HISTORICAL BACKGROUND OF THE UNIVERSITY

1.1 Brief History of the University

The NED University of Engineering & Technology, was established in March 1977 under an Act of the Provincial Assembly of Sindh after upgrading of the former NED Government Engineering College, which was set up in 1921. The NED University is thus one of the oldest institutions in Pakistan for teaching and producing Engineering graduates. Prior to this, the D.J. Science College, used to run classes to train subordinates for the Sindh P.W.D., the Municipalities and Local Boards.

On August 29, 1921 College Principal C.S Shahani made a concerted effort to get Engineering Degree classes started to meet demands of Civil Engineers on the project for completion of the Sukkur Barrage. Application to this effect was made to the University of Bombay through the Commissioner of Sindh, who was ex-officio president of Sindh Collegiate Association (a registered society of subscribers for providing higher education in Sindh). The Bombay University, however, rejected the application on the grounds of insufficient finances and insisted on entirely separate buildings, laboratories for the engineering college as a separate institution. After collection of donations from the Puribai and Becharbai Trust, Vishandas Fatehchand Brothers and one huge donation (for that time) of Rs.150,000 from the heirs of Mr. Nadirshaw Edulji Dinshaw, the new college buildings and laboratories were constructed on a separate land. The new college was originally the Prince of Wales Engineering College but later renamed in memory of Nadirshaw Edulji Dinshaw. The NED College was provisionally granted affiliation on 23-05-1923 by the University of Bombay for the First and Second Year courses in Civil Engineering and 78 students were provisionally admitted into first year classes in 1922. Permanent affiliation followed in February 1927.

The first-full time Principal of NED Engineering College was Mr. G.N. Gokhale who joined on 1st July 1923. Prior to this, Rai Sahib Bhupatrai had acted as Honorary Principal. The first professor (and Vice Principal) was Mr. S.B. Jannarkar who, along with Mr. Gokhale, did all the spadework in organizing and equipping the various departments and ordering the equipment for the Power House, Boiler Room, Hydraulics Laboratory, Engine Room and Machine Shops.

The original NED Engineering College was housed in four blocks of buildings and two sheds. The main block was named as Seth Fatehchand Dewandas Khilnani Hall. The block housing the Power House, Electrical and Hydraulics Laboratories, and Workshops was named after Bai Puribai and Bacharbai. Further additions were made to this block to provide accommodation for the Machine Shop on the ground floor and a (Mechanical) Drawing Hall on the first floor. The fourth block, completed in 1945, contained a Classroom and Clerk's Office on the ground floor and another (Civil) Drawing Hall on the first floor.

Two sheds were also built, one to house the Carpentry and Smithy Shops, and the other, alongside the Electrical Laboratory and Engine Room, to train technicians. The total cost of the buildings was just over Rs. 265,000 and the cost of equipment (including machinery, electrical instruments; models, steam, gas and oil engines; surveying and leveling instruments), books and furniture was just under Rs. 400,000.

The college remained affiliated to the University of Bombay from its inception in 1922 to 1947, after which it was taken over by the Government of Sindh; renamed as NED Government Engineering College and affiliated to the University of Sindh. After establishment of the University of Karachi in 1951, the affiliation of the College was transferred to this University. In 1964, a comprehensive plan was prepared to shift the college from its location in the congested downtown area (where no expansion was possible) to a new site adjoining the University of Karachi. The project was carried out with the assistance of the World Bank which provided Rs.118 millions in two phases and the College was shifted to its new 40 hectares Main Campus in 1975.

On the 1st of March, 1977 the NED Government Engineering College became the NED University of Engineering and Technology. From an enrolment of 50 students in 1923, the student population, at undergraduate, graduate and Ph.D. levels, has now gone up to nearly 13881. The Departments of Biomedical Engineering and Food Engineering are located at NED LEJ Campus for which the land and building - estimated value Rs. 350 million - was donated by (Late) Latif Ebrahim Jamal, a well-known philanthropist.

The first Vice Chancellor of the University was Mr. A. M. Akhoond who was succeeded in sequential order by Prof. Dr. A. T. Khan, Prof. Dr. Jameel Ahmed Khan, Prof. Dr. M. Munir Hasan, Prof. Dr. A. Q. Qazi Engr. Abul Kalam and Prof. Dr. M. Afzal Haque, Dr. S. H. Lodi is the present Vice Chancellor.

1.2 Thar Institute of Engineering, Sciences and Technology (TIEST)

TIEST is established at Mithi, Tharparkar which is around 350 km towards East from Karachi. The main purpose of establishing this institute was to provide direct access of quality education to the deprived students of this district as well as producing qualified workforce for the future need of this rapidly developing area of the province.

TIEST is currently established in a temporary building which will eventually be shifted to its main campus which is going to be established at a land of around 300 acres on the main road leading to Islamkot and is almost in the mid of Mithi and Islamkot. It is also at a reasonable distance from the Airport. At TIEST currently, Bachelor of Computer Science and Bachelor of Civil Engineering programmes are offered with 60 and 50 seats respectively. First Principal of TIEST is Prof. Dr. Muhammad Raza Mehdi, who was succeeded by Prof. Dr. Nasir Uddin Shaikh

2 Administration & Academic Support

Vice-Chancellor

Dr. S. H. Lodi
B.E. (Civil) NED UET; M.S. Oregon State University, USA;
Ph.D. Heriot-Watt University, UK

Pro Vice-Chancellor

Prof. Dr. Muhammad Tufail
B.E. (Mech.) NED UET;
M.Sc. (Manufacturing System) Nottingham University, UK;
Ph.D. Nottingham University, UK; C.Eng; FIMechE, Mem ASME

Dean Faculty of Civil and Petroleum Engineering, Dean (CPL)

Prof. Dr. Asad-Ur-Rehman Khan
B.E. (Civil) NED UET; M.S. (Civil) KFUPM, Saudi Arabia;
Ph.D. (Civil) KFUPM, Saudi Arabia

Dean Faculty of Mechanical & Manufacturing Engineering, Dean (MME)

Prof. Dr. Syed Amir Iqbal
B.E. (Mech.) NED UET; M.E. (Mech.) NED UET;
Ph.D.(Mech.) University of Manchester, UK

Dean Faculty of Electrical & Computer Engineering, Dean (ECE)

Prof. Dr. Saad Ahmed Qazi
B.E. (Electrical) NED UET; M.Sc. (DSP) UK;
Ph.D., UK; MIEE, UK; MIEEE, USA

Dean Faculty of Chemical & Process Engineering, Dean (CPE) (Acting)

Prof. Dr. Syed Amir Iqbal
B.E. (Mech.) NED UET; M.E. (Mech.) NED UET;
Ph.D.(Mech.) University of Manchester, UK

Dean Faculty of Architecture and Sciences, Dean (ASC)

Prof. Dr. Noman Ahmed
B.Arch,; M.C.P., METU, Turkey;
Ph.D., UK; MPCATP

Principal, Thar Institute of Engineering, Sciences and Technology (TIEST)

Prof. Dr. Nasir Uddin Shaikh
B.E.(Mech.) NED UET; M.Sc(Mech.) NED UET;
Ph.D. (Thermofluids) Concordia University, Montreal, Canada

Registrar (Acting)

Mr. Ghazanfar Hussain
M.Phil; Ph.D. (In progress) UoK;
M.Sc.(Physical Chemistry), UoK

Additional Registrar

Engr. Rubina Naz
B.E. (Civil), MHRM, MS (Public Administration)

Deputy Registrar (Academic)

Mr. Irfan Ali
M.A. (Economics)

Deputy Registrar (Security & General) / Coordination

Mr. Makhdoom Khalid Hashmi
M.A. (Economics)

Controller of Examinations (Acting)

Mr. Safi Ahmed Zakai
B.E. (Electrical) NED UET; MBA (Marketing), IBA Karachi;
M. Engg. (Telecommunications) NED;
M.Phil (Management), UoK

Additional Controller of Examinations

Syed Rafiq ul Hoda
B.Sc. Hons. (Mathematics) UoK; M.Sc. (Applied Mathematics) UoK;
MCS, MAJU; MS (Comp. Sci & Info Tech) NED UET;
Ph.D. (Comp Sci. & Info. Tech.) (In Progress) NED UET

Director of Finance

Mr. Muhammad Sajeeruddin
B.Com UoK; L.L.B. UoK; A.C.M.A. (Accounts) ICMAP;
F.C.M.A. (Accounts) ICMAP.

Resident Auditor (Acting)

Mr. S. M. Hassan Shamsie
B.Com UOK; M.A. (Economics) UoK

Director (Planning & Projects) (Acting)

Engr. Ashfaq Ahmed Khan
B.Sc., B.Sc. Engg. (Civil)
Member S.A.M.E. (U.S.A.); P.E

.

Librarian (Acting)

Ms. Huma Sardar
B.Sc. (Microbiology) UoK; B.L.I.S. (Library and Info. Science) UoK;
M.L.I.S. (Special Libraries) UoK

Director, QEC

Dr. Muhammad Wasif
B.E. (Mech.); M. Engg. (Mfg. Engg.)
Ph.D., Canada

Director of Works & Services and Provost

Engr. S. Wasi Uddin
B.E. (Civil); M.Engg.(Env.)

Controller Student Affairs (Acting)

Dr. Ali Hasan Mahmood
B. E. (Textile); M. Engg (Textile);
Ph.D. (Textile), University of Manchester, UK

Director Procurement

Mr. Abdul Wahab
M.B.A. (Finance and Accounting)

Director Industrial Liaison (Acting)

Dr. Muhammad Amir Qureshi
B.E. (Textile) NED UET; M.Engg. (Textile) NED UET;
Ph.D., Heriot-Watt University, UK

Director, Information Technology Department (Acting)

Dr. Muhammad Asad Arfeen
B.E. (Comp. & Info. Sys.); M.Engg (Comp. Sys);
Ph.D. (Teletraffic Engineering) New Zealand

Director General, NED Academy (Acting)

Prof. Dr. Bilal Zahid
B.E. (Textile); M.Engg. (Textile); MBA (Textile Management);Ph.D., (Textile Science & Technology), UK

Director, Office of Research, Innovation & Commercialization (ORIC) (Acting)

Dr. Riazuddin
B.E. (Electrical) NEDUET, M.Engg.(Electrical) NEDUET,
Ph.D. (Mechatronics), GIST, South Korea.

Principal Medical Officer, Medical Department

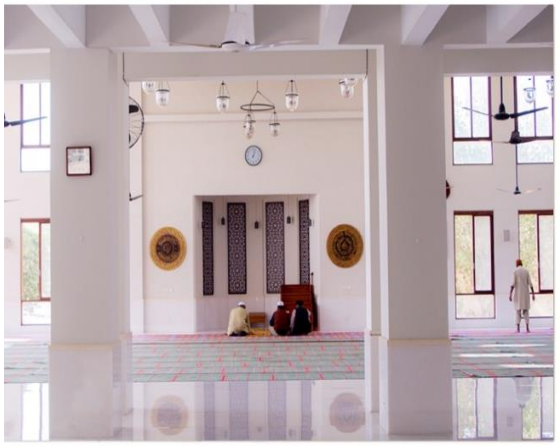
Dr. Mariam Alam
M.B.B.S (Baqai Medical University)

Technical Assistant to the Vice Chancellor

Engr. Danish Ur Rehman Khan
B.E. (Computer Sys.) NED UET; M. Engg. (Electrical) NED UET;
M.Engg. (Computer Networks & Performance Evaluation) NED UET;
Ph.D. NED UET

MECHANICAL ENGG. DEPTT.

WAHAB SHAIKH STUDENTS' FACILITIES CENTRE
FOOD CENTER CANTEEN
ONLY FOR GIRLS



DMS
CAFETERIA

3. DEPARTMENTS

3.1 DEPARTMENT OF CIVIL ENGINEERING

The Department of Civil Engineering has been offers four-year programme leading to Bachelor of Engineering (Civil) and Bachelor of Civil Engineering (Specialisation in Construction) over the past several decades. The graduates from these programmes have not only earned distinctions in the practical field but many of them have also distinguished themselves as renowned researchers and scholars across the globe.

The Department of Civil Engineering has the honour of being the first department of the University to offer a programme in Master of Science in Civil Engineering from the session 1979-80 and also has the honour to start the Master of Engineering Programme for the first time in the area of Transportation Engineering in Pakistan. The M.Engg. Civil (Specialisation in Structural Engineering), and M.E.M (Construction Management) are one of the most popular Masters programmes in Pakistan which also have international acceptability, and recognition.

It is the first & only department in Pakistan offering M.Engg. Civil with Specialisation in Construction Engineering Law programme. Construction Engineering Law programme has distinction of being included in the Program listing of Society of Construction Law International (SCL). Moreover, the programme is also acknowledged by Chartered Institute of Arbitrators (ClArb) Pakistan.

3.1.1 Departmental Facilities

❖ **CLASSROOMS AND LECTURE HALLS**

The department has three buildings, namely R-block, N-Block and A-block. These blocks house a total number of sixteen classrooms, one lecture hall and a state-of-the-art A/V facility named as Ashraf Habibullah A/V Hall. All the classrooms are equipped with multimedia facilities. Additionally, sound facility/equipment has also been provided at selected classrooms.

❖ **SMART CLASSROOMS (SCR)**

The Smart Classrooms is a learning initiative by HEC that assists educators to make ICT integral to learning. These smart classrooms are equipped with high tech touch computing machines, provided with all accessories for student's studying remotely, Two Instructor Touch Smart Computers at front and back for having sense of Classroom. High end cameras and speaker systems which automatically senses any motion and place the camera to a person speaking or moving, Air-conditioning support, carpeted floors etc. Apart from these hardware supports, a unique software for learning management is specifically designed for user needs and installed in all computers. The SCR has been established by Higher Education Commission under it's smart classroom project.

❖ **LABORATORIES**

Apart from undergraduate laboratories for Materials Testing, Structures and Soil Mechanics, which house the basic testing facilities, new postgraduate laboratories have been developed.

- **Material Testing Lab**

Advanced Structural Engineering and material testing facility already exists with the Department, where research work and postgraduate studies leading to Ph.D. are being undertaken. The laboratories are equipped with state-of-the-art Times Group 2000 kN Universal Testing Machine, (Shimadzu 500kN / 1000kN Universal Testing Machine, Forney Compression Testing Machine of 2000 kN capacity, Tinus Olsen Universal Testing Machine of 60,000 pounds, a Forney Pipe Testing Machine of 300 kN capacity, apart from other equipment for testing and data acquisition. The laboratory equipment has been over-hauled and calibrated.

- **Advanced Material Testing Lab**

Advanced Material Testing facility equipped with state-of-the-art equipment, reaction floor and reaction wall, which is being used for testing of structures subjected to vertical and lateral loads. The laboratory has the facility to test pre-stressed girders up to 110 ft. long. Equipment includes a Portal Frame designed to work with the 5000 kN Pseudo Dynamic Test System. This system consists of 2 large structural H beams to provide the vertical support and is mountable to reaction floor. Complete system includes 5000 kN actuator, Hydraulic Power Supply, Hydraulic Service Manifold, Digitally supervised analogue servo controls, Pseudo dynamic application software, and a 300 channel data acquisition system. Other equipment includes Dynamic Hydraulic Linear Actuator 55 kip (250 kN), Dynamic Hydraulic Linear Actuator 110 kip (500 kN), Structural Test Hydraulic Actuator 220/335 kip (1000/1500kN), Hydraulic Linear Actuator 450/600 kip (2000 kN/2670 kN), 300 Channel Data Acquisition System, LVDTs, Load Cells. New addition in lab facility includes 06 hydraulic cylinders (600kN / 750kN / 1500kN / 1600kN). The facility is now shared and being administered by the Department of Earthquake Engineering.

- **Soil Mechanics (Geotechnical) Lab**

The postgraduate Geo-technical laboratory has acquired a Seismograph along with the already existing facilities comprising of Triaxial Testing Machine and Plate Loading Test equipment. The laboratory has been extensively utilised for postgraduate research leading to Ph.D.

- **Fluid Mechanics/Hydraulics Lab**

Fluid Mechanics and Hydraulic Laboratory features Hydrostatic bench that allows testing of static liquids. It also contains Hydraulic bench that may be used for testing of pumps and turbines at variable flows and configurations. Pipe network and pipe friction laboratory apparatus provide an opportunity to test various pipe materials and configuration of pipes in water supply network.

- **Water Resources Lab**

Irrigation and Water Resources Engineering laboratory features 7.5 m long open channel to test various hydraulic structures. Time Domain Reflectometry for irrigation scheduling, Channel loop for sediment transport, Acoustic Velocity meter for on spot flow measurement in stream, automatic water level recorder, GPS and computerised laboratory with GIS capabilities provide opportunities for conducting postgraduate studies and research. Rainfall simulator provides an opportunity to study the surface water rainfall – runoff relationships.

- **Durability Lab**

Durability lab is one of the state and art laboratory. This lab is being used for research purpose in undergraduate, postgraduate and doctorate program. The testing facilities includes concrete durability tests like; carbonation test, half-cell potential test, absorption test, chloride concentration etc. as per the standards. The testing facility for determining the water quality is also available using pH and TDS tests as per standard.

- **Foamcrete Lab**

The foamcrete lab is equipped with an array of equipment to provide a broad practical exposure to produce lightweight materials and to develop comprehensive understanding of their working principles and fundamentals. The lab is installed with an assembly of different operating units such as pumping, foaming and mixing systems all combined under one head, as Foam Concrete Generator System, to perform wide range of experiments and have detailed insights into manufacturing, methodology and behavior of lightweight materials in different varieties. These facilities offer diversified research opportunities to students and scholars for producing and exploring various novel material compositions and their behavior by adopting advanced technologies.

Laboratories' facilities of other departments may also be utilised for research purposes as well as other departments are also being benefited by the facilities mentioned.

❖ **COMPUTING FACILITIES**

- **Undergraduate Computer Lab (UGCL)**

Department of Civil Engineering houses undergraduate computer lab (UGCL). The Department's computer lab (UGCL) which runs under a System Manager and is equipped with 70 workstations along with scanning and printing facilities. It has a large number of licensed software related to Civil Engineering and its various specialisations. The labs is utilized as per need basis in the evening/weekend classes for postgraduate courses requiring computing and software use.

- **The Postgraduate Computer Centre (PGCC)**

The Postgraduate computer centre (PGCC) contains modern computing facilities, scanners, plotter, and laser printing facilities. The centre also contains a state-of-the-art Structural Engineering Software Library, which comprises of packages for analysis and design of RC structures including CSI software and TNO Diana. The CSI Package with network license consists of SAP 2000, ETABS, SAFE, CSI Section Builder and Perform 3D. The centre is mostly utilized for facilitating research assistants and students working on their thesis as part of their postgraduate studies.

❖ **RESEARCH CENTRES**

- **FIN Pakistan**

Department of Civil Engineering has also the honour of being the country's Information Node on FERROCEMENT. Ferrocement International Network (FINPAKISTAN) was established in the Department through International funding in 1990, and since then has been serving as National Node for disbursing research material, disseminating related knowledge and imparting know-how in ferrocement. The National node working under INTERNATIONAL NODE at IFIC-AIT-BANGKOK, has access related to the research endeavours in Ferrocement, and has links with researchers, and resource Persons in this field.

- **Cowasjee Earthquake Study Centre (CESNED)**

The Department of Civil Engineering established Cowasjee Earthquake Study Centre (CESNED) in year 2001 after the devastating Bhuj earthquake. The objectives of this endeavour include housing national and global data pertaining to earthquakes and act as a centre for disseminating accumulated knowledge, as well to respond to emergency needs and be able to provide guiding principles for pre and post-earthquake mitigation. Recently, CESNED has been strengthened with the installation of a 3m × 3m Shore Western Seismic Table and Syscom Strong Motion Recorder. Earthquake shaking tables is used extensively in seismic research, as they provide the means to excite structures

in such a way that they are subjected to conditions representative of true earthquake ground motions. The shake table system has been used to simulate earthquake loading on masonry structures. A scaled model of a typical block masonry house was recently tested to assess the seismic behaviour of block masonry construction. The activities of CESNED are now administered by the Department of Earthquake Engineering.

- **Virtual Reality Center (VRC)**

The NED University of Engineering and Technology, Karachi has established a state-of-the art facility for integrating virtual reality in the education, research and practice. The facility that is named as "NED University Virtual Reality Center" housed at Department of Civil Engineering which is the first of its kind in the entire region (sub-continent). The facility houses systems including, virtual teaming system, walking VR systems, Projection VR system Passive 3D screen system, Augmented/Mixed Reality Systems, UAVs, Laser Scanning & Energy Efficiency Systems. The major objectives of VR Center are to gear up the performance, by being a capacity builder, solution provider & knowledge innovation hub. VR center is working on utilizing it for engineering, technology and science related visualization. The VR systems are exceptionally helpful in establishing a realistic learning and development environment for both academic institutions and professional practices. It has open-ended utilization in research and development based on the concept of innovation. The major objectives of VR Center are to gear up the performance delivery by being a capacity builder, solution provider and knowledge innovation hub.

- **Building Information Modeling Center (BIMC)**

Building Information Modeling (BIM) Centre established at the Department of Civil Engineering. NED's BIM Centre is the first of its kind in Pakistan. It was gifted from NED Alumni Association of Tri-State (NEDATS), USA to students of the NED Varsity and the local AEC Industry. BIM Centre is aimed at bringing maturity in the local and regional construction industry for sustained improvement of project life cycle performance as well as enhancing academic, professional and employability skills of students at various levels.

- **Water Modelling Centre (WMC)**

The Water Modelling Centre (WMC) is new addition to the Department of Civil Engineering at NED University. The purpose of WMC is to develop modelling skills for fellow researchers and students to resolve water related issues, enhance water and environmental conditions throughout the country, perform flood and watershed management practices, and develops models for the upcoming environmental challenges due to climate change. The WMC has capability of simulating different models including surface water models, coastal hydrodynamic and morphodynamic models, and groundwater models. Surface water modelling includes hydrological and hydraulic modelling. Groundwater models can evaluate the water quality and quantity present under the surface. The WMC has continuously improved since its inauguration in March 2013 in terms of modelling expertise, software, and infrastructure to help students and researchers for solving water problems around the province and country.

❖ **INTERNATIONAL LINKAGES**

The Department has formed a number of linkages with other Universities around the world. An international linkage has been established between the Faculties of Civil and Petroleum Engineering WEDC, Loughborough University, UK, through joint funding provided by the Higher Education Commission-Pakistan and the British Council.

American Concrete Institute (ACI) Pakistan Chapter has been established in the department to promote research activities in the area of concrete technology and reinforced concrete. The ACI chapter provides a platform to disseminate knowledge about concrete and latest development about the codes and specifications. The department has achieved ACI Outstanding University Award for last several years.

The Department has shown significant progress in the area of earthquake engineering over the last several years. It is part of several projects related to capacity building funded by UNDP and UNESCO on topics related to earthquake engineering, seismology and impact of tsunamis. Department has established linkages with Society of Construction Law International (SCL) & CIArb – Chartered Institute of Arbitrators w.r.t Construction Engineering Law Program.

Department of Civil Engineering subscribes to a number of international research journals to support the academics and research at the postgraduate level.

3.1.2 Research Fields

The current research interests of the Department are as follows:

❖ **STRUCTURAL ENGINEERING**

- Re-strengthening and repair techniques
- Constitutive modelling of reinforced concrete and ferrocement
- Tensile and compressive membrane action
- Behaviour of reinforced concrete in mixed moment field
- Post cracking tensile strength

- Bond in reinforced concrete
- Structural behaviour of cold formed steel sections
- Models for shear and flexural strength of ferrocement
- Ferro-cement application and its use
- Infilled masonry panels subjected to lateral loads
- Non engineered construction in the rural areas
- Ductility of reinforcing bars produced in Pakistan
- Structural use of recycled concrete aggregates
- Finite element analysis of reinforced concrete structures
- Impact loads on reinforced concrete structures
- Fire resistance of concrete structures
- Fibre reinforced polymers in Construction
- Behaviour and assessment of masonry structures

❖ **MATERIALS ENGINEERING**

- Design, development, production and assessment of materials in the transportation industry
- Design, development, production and assessment of materials in the construction industry
- Durability of bituminous materials under tropical conditions
- Evaluation of engineering properties of mineral compounds, super plasticisers, binders, polymeric compounds and stabilising agents
- Determination of rheological properties of cement pastes and bitumen
- Mechanical properties of recycle concrete aggregates
- Cement replacement materials
- Properties of locally manufactured reinforcing bars
- High strength and high performance concrete

❖ **GEO-TECHNICAL ENGINEERING**

- Numerical / Constitutive modelling of soils
- Evaluation of static and dynamic parameters of different soil strata
- Evaluation of sub soil geological conditions
- Indigenous methodologies for ground improvement techniques
- Development of indigenous methodologies and equipment to carry out experiments in the field and laboratories
- Static and dynamic stiffness of pile foundation

❖ **TRANSPORTATION ENGINEERING**

- Pavement distress evaluation and material characterisation
- Redesign and signal optimisation of roundabouts
- Capacity improvements of major urban and rural routes
- Road condition monitoring and development of remedial strategies
- Road design techniques in arid and coastal areas
- Geometric and structural design of flyovers in Karachi using software packages
- Stability analysis of highway embankments under waterlogged conditions
- Use of expert systems in geometric design of highways
- Analysis and design of urban road drainage systems
- Mechanistic and finite element analysis of major national highways in Pakistan
- Pavement condition monitoring and evaluation of roads and airport airside
- Non-linear behaviour of pavements under heavy axle loads
- Development of travel demand forecasting models for urban areas
- Economic appraisal of highway projects using HDM and RTIM models
- Application of Geographic Information System (GIS) for facility management

❖ **CONSTRUCTION ENGINEERING AND MANAGEMENT**

- Building Information Modelling
- Sustainable Engineering and Construction
- Information and Communication Technology
- Risk Management in Pakistani Construction Industry
- Health and Safety Management
- Quality Assurance in Pakistani Construction Industry
- Application of Artificial Intelligence to Construction Engineering and Management Issues
- Assets Management
- Productivity Improvement in Pakistani Construction Industry
- Cost Analysis and Control in Construction Projects
- Advance Methods in Construction Procurement
- Construction Contracts, Claims and Dispute Resolution
- Infrastructure Engineering and Management
- Energy Efficient Buildings
- VR/AR/MR for Construction
- Sustainable Construction
- LCA and LCCA
- Construction Waste Management
- Construction Supply Chain Management
- Financial Management and Economics in Construction Industry
- Construction Jobsite Management
- Crime Prevention through Environmental Design
- Surveying Applications in Construction Engineering and Management
- Construction Industry Stakeholder Management
- Innovation and Entrepreneurship in Construction Industry
- Management and Leadership Development in Construction Industry
- Capacity Building of Pakistani Construction Industry
- IoT in Construction.
- Artificial Intelligence and Machine Learning for applications in construction

❖ **CONSTRUCTION ENGINEERING LAW**

- Intellectual Property (IP) Protection and Professional Ethics
- Construction Contracts and Procurement Law and Claims
- Construction Specifications and Documentation
- Building Codes and Regulations and International Perspective of Construction Law
- Forensic Engineering
- Alternate Dispute Resolution
- Construction Law Case Studies
- Risk Management

❖ **COASTAL AND HARBOUR ENGINEERING**

- Morphology of Coastal Processes (waves, currents, tides, dredging, etc.)
- Port Planning Method and Models
- Development of Containerisation
- Computer Application in Port Containerisation
- Environmental Impact of Port development
- Port Economics

❖ **WATER RESOURCES ENGINEERING**

- Sectoral Water Allocation, Releases and Performance
- Barrage and Canal System, Watercourse Lining
- Water Supply: Domestic, Industrial, Agriculture, etc.
- Modelling Groundwater System
- Water Balance, Recharge/Discharge Areas Delineation
- Monitoring and Evaluation, Climatology
- Hydrologic and Hydraulic Modelling
- Simulation and Optimisation Modelling
- Tertiary Level Irrigation System in Indus Basin
- Water Accounting and Irrigation Scheduling
- Surface and Subsurface Drainage System

3.1.3 Programme Structure

The Department currently offers two degree programmes at the Master's level: Master of Engineering (Civil) and Master of Engineering Management. Under these two programmes, a number of specialisations are currently in the offering as shown below:

Programme Streams	Specialisations
M.Engg. (Civil)	Structural Engineering Geotechnical Engineering Transportation Engineering Coastal and Water Resources Engineering Construction Engineering Law
MEM	Construction Management

All these specialisations are offered as part-time programmes i.e. classes being conducted during weekdays in the evening hours. Students enrolled in the part-time stream have an option to complete their degree requirements in a minimum duration of 2.5 years if they choose to take the coursework only option, or they may complete their degree requirements in a minimum duration of 2 years if they choose to take the coursework plus Thesis option.

Some of these specialisations are also offered as full-time programmes, wherein the students get involved with the Department on full-time basis during morning hours, thereby getting an opportunity to undertake research along with their coursework. This option is more suited for students who appreciate the importance of full-time study and are willing to spend a minimum of 1.5 years with the University to complete their degree requirements.

A limited number of specialisations are also offered as Weekend programmes, wherein the students get the option of completing their degree requirements in a minimum duration of 1.5 years through coursework only. Classes for this stream are conducted on Saturdays and Sundays during daytime.

3.1.4 Principal Faculty for the Programme

Chairperson

Prof. Dr. Abdul Jabbar Sangi

Professor Emeritus

Prof. Dr. Sahibzada Farooq Ahmad Rafeeqi
B.E. (Civil) NED UET; M.S. (Civil) KFUPM, Saudi Arabia;
Ph.D. (Structures), Heriot-Watt University, UK

Professors

1. Dr. Asad-ur-Rehman Khan
   B.E. (Civil) NED UET; M.S. (Civil) KFUPM, Saudi Arabia;
   Ph.D. (Civil) KFUPM, Saudi Arabia

2. Dr. Abdul Jabbar Sangi
   B.E. (Civil) NED UET; M.Engg. (Civil) NED UET;
   Ph.D. (Civil) Heriot-Watt University, UK

3. Dr. Syed Imran Ahmed *(ALEF Chair Professor)*
   B.E. (Agri Engg.) Sindh Agriculture University;
   M.S. (Bio Resource Engg.) Oregon State University, USA;
   M.S. (Bio Systems Engg.) IOWA State University, USA;
   Ph.D. (Bio Systems Engg.) IOWA State University, USA

4. Dr. Rizwan-Ul-Haque Farooqui *(On Foreign Leave)*
   B.E. (Civil) NED UET;
   M.S. (Civil Engineering) National Uni. of Singapore;
   Ph.D. (Civil) Florida International University, USA

5. Dr. Amanullah Marri
   B.E. (Civil) QUEST, Nawabshah;
   M.E. (Civil) Asian Institute of Technology, Thailand;
   Ph.D. (Civil) University of Nottingham, UK

Associate Professors

1. Dr. Haider Hasan
   B.Sc.(Hons) (Math. & Computing) Kingston University; M.Sc. (Environmental & Industrial Modeling) University of Bristol, UK; Ph.D. (Civil) University of Nottingham, UK

2. Dr. Huma Khalid *(On Leave)*
   B.E. (Civil) NED UET;
   M.Sc. (Computer Science) NED UET;

3. Dr. Arjumend Masood
   B.E. (Civil) NED UET; M.Engg. (Env.) NED UET; M.Engg. (Civil) NED UET; Ph.D. (Civil Engg.) NED UET
   Ph.D. (Computational Mechanics) Imperial College, UK

4. Dr. Farrukh Arif
   Postgraduate Coordinator
   B.E. (Civil) NED UET;
   MEM (Construction Management) NED UET;
   Ph.D. (Civil) Florida International University, USA
   Post-Doc (Construction Engineering & Management) Florida International University, USA

5. Dr. Sadaf Qasim
   B.E. (Civil) NED UET;
   M.Sc. (Environmental Sciences) UoK;
   M.Engg. (Civil) NED UET; Ph.D. (Civil), UTP, Malaysia

6. Dr. Farnaz Batool
   B.E. (Civil) NED UET; M.Engg. (Civil) NED UET;
   Ph.D. (Materials, Structures) University of Alberta, Canada

7. Dr. Shamsoon Fareed
   B.E. (Civil) SSUET; M.Engg. (Civil) NED UET;
   Ph.D. (Civil) Heriot-Watt University, UK

Assistant Professors

1. Dr. Syed Salman Mobeen
   B.E. (Civil) NED UET;
   M.Sc. (Structures) University of Alberta, Canada;
   Ph.D. (Structures) University of Alberta, Canada

2. Dr. Syeda Saria Bukhary
   B.E. (Civil) NED UET; M.Engg. (Civil) NED UET;
   M.S. (Civil) University of Nevada, USA;
   Ph.D. (Civil) University of Nevada, USA

3. Engr. Farhan Saleem
   B.E. (Civil) NED UET; M.C.S. University of Karachi;
   M.S. (Construction Management) Florida Int'l University, USA

4. Engr. Muhammad Saqib *(On Foreign Leave)*
   B.E. (Civil) NED UET;
   M.C.S. University of Karachi; MS (IT) PIMSAT;
   MEM (Construction Management) NED UET

5. Engr. Haris Akram Bhatti
   B.E. (Civil) NED UET; M.Engg. (Civil, Water Resources) NED UET; Ph.D. (In Progress)

6. Dr. Aslam Faqeer Muhammad
   B.E. (Civil) NED UET; M.Engg. (Civil) NED UET;
   Ph.D. (Structural Engg.) Sapienza Univ. of Rome, Italy

7. Dr. Fawwad Masood
   B.E. (Civil) NED UET; M. Engg. (Civil) NED UET;
   Ph.D. (Civil) NED UET

8. Engr. Muhammad Umer *(On Study Leave)*
   B.E. (Urban) NED UET; MEM (Construction Management) NED UET; Ph.D. (In Progress) USA

9. Dr. Sajjad Ali
   B.E. (Civil) NED UET; M. Engg. (Civil) NED UET
   Ph.D. (Civil) NED UET

10. Engr. Shoaib Ahmed *(On Study Leave)*
   B.E. (Urban) NED UET; M.Engg. (Civil) NED UET
   Ph.D. (In Progress) USA

11. Engr. Syed Muhammad Noman
   B.E. (Urban) NED UET;
   M.S. (Transportation) Hasselt University, Belgium

12. Dr. Rana Rabnawaz Ahmed
   B.E. (Civil) NED UET; MEM (Construction) NED UET;
   Ph.D. (Civil) Hong Kong University of Science and Technology

13. Dr. Wajeeha Mahmood
   B.E. (Civil) NED UET; M.Engg. (Civil) NED UET;
   Ph.D. (Civil) NED UET

14. Dr. Areba Syed
   B.E. (Urban) NED UET;
   M.Engg. (Water Resources) NED UET;
   Ph.D. (Agri & Bio Systems Engg.) IOWA State University, USA

15. Dr. Fatima Khalid
   B.E. (Civil) NED UET; M.Engg. (Civil) NED UET;
   Ph.D. (Civil) NED UET

In addition to regular faculty members, qualified personnel in other departments and in the industry may be engaged for post-graduate teaching.

Applications in response to advertisement for Master of Engineering and Master of Engineering Management shall be duly completed and submitted, personally or by registered post to:

The Chairperson
Department of Civil Engineering
NED University of Engineering & Technology
Karachi 75270, Pakistan
Ph. No: +92-21-99261261-8 Ext: 2205
Fax No: +92-21-99261255
E-mail: ccd@neduet.edu.pk

3.2 DEPARTMENT OF URBAN AND INFRASTRUCTURE ENGINEERING

A fundamental need of civilization in the 21st Century is the development of urban habitats that are both environmentally sustainable and functionally dependable for people and society. To meet these challenges, the Department of Urban and Infrastructure Engineering had been introduced in 2008. This department aims to provide the students, background of planning, design and management of urban communities. Its objective is to deliver capacity building and value addition to the youths of the society in the form of "Urban & Infrastructure Engineer". This objective is well served with state-of-the-art teaching facilities and dedicated faculty members. The department also keeps close coordination with other local and international stakeholders such as City District Government, Karachi (CDGK), Jinnah Post-graduate Medical centre and University of Mississipi (USA) for research-based sharing of knowledge and service oriented activities. In December 2012, the department signed a MOU with Transport Research Institute University of Hasselt, Belgium, Instituut voor Mobiliteit (IMOB) that includes collaborative research in the fields of traffic congestion, faculty and student exchange (using virtual environment teaching), value addition short courses, joint PhD programmes, as well as the reduction of the annual tuition fee (equivalent to European nationals) for students of NED for their Master's study at Instituut voor Mobiliteit (IMOB), Belgium.

The Department of Urban and Infrastructure Engineering, has taken another initiative by introducing a post graduate degree programme (MEM) in Transportation Infrastructure Management. The major idea behind this programme is to linkthe concepts of management with the deriving engineering fields to produce professionals that are better capable of managing the engineering projects than the conventional business managers. Transportation Infrastructure Management is an attempt to strengthen the nation with another much needed derivative. Considering the wide scope of the field, this masters program is focused towards the management of transportation systems and their sustainable operation.

3.2.1 Departmental Facilities

The Department of Urban and Infrastructure Engineering manages the following facilities:

- Surveying & Geomatics lab possesses modern digital theodolites, digital levels, Electronic distance meters, Total stations and GPS equipment. The department has in-house capabilities to handle these sophisticated instruments and at number of occasions, department has provided their services for various infrastructure projects within the University and outside.

- Project Library was funded by NEDAT to facilitate students in their research activities. It consists of 11 computer and also provides facilities such as; printers, scanner and photocpier. Moreover, provides a research friendly environment.

- Pavement Material Testing and Advanced Asphalt Concrete laboratories possesses all types of basic testing facilities for pavement materials. Recently, the laboratory is equipped with a state-of-the art wheel tracking device and number of research projects have been initiated to use this machine for testing of pavement defects.

- RSGIS Lab has been established for to envision ITS and Traffic Engineering as well as GIS and Geospatial Laboratories to carry out dedicated research in these emerging fields that are well connected to Transportation Infrastructure Management.

- Recently, Advanced Traffic Lab (ATLAS) is established with the aim of providing solutions to traffic problems especially those of developing cities by carrying out innovative research. This lab practices state-of-the-art methods and techniques such as use of latest software and equipment. It continuously targets to fill the gap between industry and academia..

Laboratories of other departments are also utilized for research purposes as well as other departments are also being benefited by our facilities.

Computing Facilities

The Department of Urban and Infrastructure Engineering has special computing facilities housed in its computer centre. The centre contains good computing facilities, scanners, plotters, colour and black & white laser printing facilities. The centre also contains state-of-the-art transportation modelling softwares such as EMME/2, S- PARAMICS and GIS softwares such as ARC GIS etc.

Research Fields

The current research interests of the department relevant to the Transportation Infrastructure Management Masters Programme are as follows:-

- Impact Assessment of Roadway Traffic on Urban Air Quality.
- Assessment of Carbondioxide Emission from Freight Transportation.
- Development of an ITS–based Traffic Management Model for Metropolitan Areas of Pakistan.
- Incorporation of Traffic Heterogeneity in Capacity Analysis of Multi-Lane Urban
- Arterials of Karachi through Development of a Simulation Mode
- Road Safety and Crash Investigation Research.
- Incorporating rutting potential in pavement performance evaluation methodologies
- Traffic Congestion Costing
- Establishing Trips rate and Parking Ratios for selected Area of Karachi
- Development of Highway Pavement Maintenance Management System for Pakistan
- Pavement asset maintenance management through use of innovative materials.

3.2.2. Principal Faculty for the Programme

Chairperson

Prof. Dr. Adnan Qadir

Professors

Prof. Dr. Adnan Qadir
B.E. (Civil) NED; M.Sc. (Civil) NED
Ph.D. (Middle East Technical Uni, Ankara, Turkey
(HEC Approved PhD Supervisor)

Associate Professor

Dr. Afzal Ahmed
B.E. (Urban) NED; M.S. (Civil) Uni. of Mississippi, USA;
Ph.D. (Institute of Transportation Studies, Leeds, UK)
(HEC Approved PhD Supervisor)

Assistant Professors

1. Dr. Ashar Ahmed
   B.E. (Civil) NED; M.Engg. (Civil) NED
   Ph.D. (Civil) USM, Malaysia
   (HEC Approved PhD Supervisor)

2. Dr. Nida Azhar
   B.E.(Civil)NED; M.Engg.(Civil) NED
   Ph.D. (Construction Management) USA

3. Dr. Sana Muqeem (On Leave)
   B.E. (Civil) NED; M.Engg. (Civil) NED;
   Ph.D. (Malaysia)

4. Dr. Muhammad Ahmed
   B.Sc. Hons. (Geography) UoK; M.Sc. (Geography), UoK;
   M.Phil (RSGIS), UoK, PhD. (Urban & Regional Planning)
   (NEDUET)
   (HEC Approved PhD Supervisor)

5. Syeda Madiha Zaidi
   B.E.(Civil)NED; M.Engg.(Civil) NED

6. Ms. Madiha
   B.E.(Urban)NED; M.Engg(Civil) NED

7. Syed Muhammad Fahad Abdullah
   B.E. (Civil) NED; MEM (Water Resources Management)

In addition to regular faculty members, qualified personnel in other departments and in the city are engaged for post-graduate teaching.

Applications in response to advertisement for Master of Engineering Management (Transportation Infrastructure Management) shall be duly completed and submitted, personally or by registered post to:

The Chairperson
Department of Urban and Infrastructure Engineering
NED University of Engineering & Technology,
University Road Karachi- 75270, Pakistan.
Ph. No: +92-21-99261261-8 Ext: 2354
Fax No: +92-21-99261255
E-mail: cuid@neduet.edu.pk

3.3 DEPARTMENT OF EARTHQUAKE ENGINEERING

Large scale natural hazards cause enormous damage and transform socioeconomic setup of a given region. This is particularly true for earthquakes owing to their spatial and temporal unpredictability. While developed nations have achieved the minimum required levels to mitigate earthquake disaster, countries like Pakistan lag significantly behind, resulting in unprecedented human and monetary losses in earthquake events. These loses have emphasized the need of better preparedness in order to reduce the seismic threat faced by the Country. One of the key components of hazard preparedness is capacity building of professionals working in the construction industry by providing them necessary training and by transforming the indiginous research into best practice.

Recognizing the need of capacity building for pre- and post-earthquake disaster mitigation, the Department of Earthquake Engineering has initiated Master Degree programmes in Earthquake Engineering and Disaster Management and Sciences. The intent of these programmes is to produce professionals who are current with the latest developments in different aspects of disaster mitigation so that they are able to provide safer and economical built environment. Furthermore, it also aims at producing graduates who are well equipped to undertake research in earthquake engineering and disaster management both at national and international levels. These aims are reflected in the courses that have been designed for the programmes and in different research activities being conducted by the Department. A list of current research projects is available on our website.

3.3.1 Masters in Earthquake Engineering

Earthquake Engineering is a specialized field of knowledge that deals with understanding and implementation of ideas related to generation and propagation of earthquakes through various geological features and response of structures subjected to seismic loading. This field can be divided in three branches, namely: Structural Earthquake Engineering (SEE), Geotechnical Earthquake Engineering (GEE), and Engineering Seismology (ES). SEE comprises of the study of elastic and inelastic response of structures subjected to ground motion excitation and deals with seismic design and assessment of structures. GEE, on the other hand, comprises of the study of elastic and inelastic behaviour of seismic waves as they travel through the earth's crust and surficial geology. ES deals with the core aspects of seismology which includes theoretical seismology, movement of active faults, signal processing and strong motion seismology, etc. The Department currently offers Masters Degree in Structural Earthquake Engineering; however, the plans to start the other two degree programmes are also under consideration.

3.3.3 Departmental Facilities

The Department currently owns two most modern laboratories in the Country. These include Shake Table Laboratory (STL) and Advanced Material Testing Laboratory.

The Shake Table Laboratory (STL) consists of a 3M x 3M seismic simulation table. The table has a linear hydraulic actuator with a fatigue rating of 110 kip (500 kN) which is guided by linear bearings. The stroke capability of the unit is ± 300 mm (± 12 in.) with a nominal peak velocity of 1 m/sec (40 in./sec) and average velocity of 1/2 m/sec (20 in./sec). The linear guide bearings are sized to test a 20 MT payload with a CG 3 M off the table surface. This may include 60 MT-M over turning moment at 1g.

The new Advanced Material Testing Laboratory is equipped with state-of-the-art testing equipment and is one of its kinds in the region. It has a 1m thick reaction floor and 1.3m thick reaction wall which can be used for testing of structures subjected to vertical and lateral loads. The Lab has the facility to test prestressed girders of up to 110 ft. length. The equipment include a portal frame designed to work with the 5000 kN pseudo dynamic test system. This system consists of 2 large structural H beams to provide the vertical support and is mounted on reaction floor. Complete system includes 5000 kN actuator, hydraulic power supply, hydraulic service manifold, digitally supervised analog servo controls, pseudo dynamic application software, and a 300 channel data acquisition system. Other equipment include dynamic hydraulic linear actuators of capacity of 55 kip (250 kN) and 110 kip (500 kN), structural test hydraulic actuator of 220/335 kip (1000/1500 kN), hydraulic linear actuator of 450/600 kip (2000/2670 kN), LVDTs, load cells.

CESNED is also a part of the Department of Earthquake Engineering. The objectives of the Center include housing national and global data pertaining to earthquakes, acting as a centre for disseminating knowledge as well as to respond to emergency needs and to provide guiding principles for post-disaster mitigation.

In addition, the Department shares laboratory facilities in Material Testing Laboratory administered by the Department of Civil Engineering. Similarly,

laboratory facilities of other departments may also be utilized for research purposes.

3.3.4 Computing Facilities

The Department of Earthquake Engineering shares the computing facilities housed in Postgraduate Computational Centre with the Department of Civil Engineering. The centre also contains a state-of-the-art structural engineering software library including analysis and design of RC Structures using CSI Package and TNO DIANA. The CSI Package with network licenses consists of SAP 2000, ETABS, SAFE and CSI Section Builder.

3.3.5 Principal Faculty for the Programme

Chairperson

Prof. Dr. Muhammad Masood Rafi

Professors

1. Prof. Dr. Muhammad Masood Rafi
   B.E. (Civil) NED UET; M.Sc. (Civil) NED UET; Ph.D. (Structural Behavior in Fire) University of Ulster, UK
2. Prof. Dr. Rashid Ahmed Khan
   B.E. (Civil) NED UET; M.Sc. (Civil) NED UET ; Ph.D. (Civil Engineering) Heriot-Watt University, UK

Associate Professor

Dr. Mukesh Kumar *(On Ex-Pakistan Leave)*
B.E.(Civil) NED UET;
M.Sc. (Earthquake Engineering), University of Pavia, Italy;
Ph.D. (Earthquake Engineering), Imperial College of London, UK

In addition to regular faculty members, qualified personnel in other departments and in the city may be engaged for post-graduate teaching.

Applications in response to advertisement for Master of Engineering (Earthquake) shall be duly completed and submitted, personally or by registered post to:

The Chairperson
Department of Earthquake Engineering
NED University of Engineering & Technology
University Road, Karachi 75270, Pakistan
Ph. No: +92-21-99261261-8 Ext: 2605
Fax No: +92-21-99261255
E-mail: rafi-m@neduet.edu.pk

3.4 DEPARTMENT OF PETROLEUM ENGINEERING

Energy sector in Pakistan play a vital role in the development and economic growth of the country. Oil & Gas from bulk of primary commercial energy supply mix of Pakistan. Depletion of exciting resources combined with an increased demand of energy in the country, requires a strong technological base and expertise for meeting the energy challenges of the country.

Established in 2005 on the request of Petroleum industry, the Department of Petroleum Engineering at NED University of Engineering & Technology has been offering a competitive undergraduate programme in the country. With high qualified & motivated faculty, sate-of-the art facilities, an exclusive Petroleum advisory Board, PPL Academic Chair, strong linkages with the industry, collaboration with universities of international repute and meritorious students, the department had been recognized for the quality education in Petroleum Engineering.

The new addition of Norwegian Centre of Excellence in Petroleum studies (NCEPS) is aimed to provide excellence in education, research and trainings.

Considering the competitive energy scenario on locals and global levels, new trends in energy productions and technological innovations, a Master programme is now being offered in Petroleum engineering. The programme has been designed in collaboration with Norwegian University of Science and Technology (NTNU) under the umbrella of "Norwegian Center of Excellence in Petroleum Studies" with active support from the petroleum industry and professionals from petroleum engineering departments around the globe.

The programme is focused on the professional development in the upstream-oil industry that includes drilling, reservoir and production engineering. The new trends of unconventional reservoirs have also been targeted.

3.4.1 Departmental Facilities

The Department of Petroleum Engineering possesses state-of-the-art Laboratory facilities that include the following:

1. Mud and Cementing Laboratory
2. PVT Laboratory
3. Petrophysics Laboratory
4. Core Laboratory
5. Drilling Simulation Laboratory
6. Computing Laboratory

The above laboratories cater the need of teaching and research for both undergraduate and graduate programmes and also satisfy the international standards.

Computing Facilities

The Department of Petroleum Engineering has specious and resourceful computing laboratory. It houses latest computers, scanning and printing facilities, multimedia and affective sound system. The laboratory contains state-of-the-art industry licensed software including Eclipse, Petrel, IPM suite, KAPPA suite, Bicep Open Flow, Pan System & others for simulation modeling and analysis.

Video Conferencing Facilities

NCEPS offers HD Video conferencing Facilities that are used not only for making live connections with far distant local and international academic practitioners and industry experts, but also for live video lectures offered for the students and faculty members by well known researchers and scholars around the globe.

Research Fields

NCEPS is being geared up to start research in collaboration with universities of international repute. The research will be oriented towards the unconventional hydrocarbon resources in the areas of drilling, reservoir and production engineering.

Linkages with Universities and Industry

The department is able to develop strong and sustainable linkages with Norwegian University of Science and Technology (NTNU) and Portsmouth University, UK.

In addition to this the department also enjoys strong linkage with petroleum industry in Pakistan. The above linkages have been very fruitful in the following achievements:

- Undergraduate Curriculum Revision.
- Post-graduation from NTNU.
- Development of Master's Programme.
- Training of Faculty members & Lab engineers abroad.
- Establishment of Norwegian Center of Excellence in Petroleum Studies (NCPES)
- Organizing international conferences and workshops.
- Visits to Operational Field sites.

The First ever international conference on Unconventional Hydrocarbon Resources (ICOUR-1) in Pakistan was organized by the department under the auspices of NCEPS.

Professor on PPL Chair

PPL Chair has been established by the foremost E&P Company of the country, Pakistan Petroleum Limited. Currently department is looking for the most suitable personel, who can develop and enhance the research and industry collaboration.

Petroleum Engineering Advisory Board

The Petroleum Advisory Board of the department represents members from the Academia, Foreign University Faculty and Multinational Oil & Gas Companies. The Advisory Board ensures the quality of the programme and provides regular review of the curriculum in order to meet the requirements of the growing Petroleum Industry around the globe.

Programme Structure

The Department currently offers Master of Engineering (Petroleum). The students will have the wide variety of choosing the different courses from the list of elective courses and common electives besides taking their compulsory ones. The classes will be conducted during weekdays / weekends in the evening hours in the Department of Petroleum Engineering.

3.4.2 Principal Faculty of the Programme

Chairperson

Dr. Javed Haneef

Associate Professors

Dr. Javed Haneef
B.E. (Mech.) NED UET;
M.Sc. (Petroleum Tech); MCS, UoK;
M.E. (Petroleum), University of Alberta, Canada;
Ph.D. (Petroleum), University of Leeds, UK

Assistant Professors

1. Dr. Abdul Majeed
   B.E. (Petroleum) MUET;
   M.Sc. (Petroleum) Heriot Watt University, UK;
   Ph.D. (Petroleum), University of Leeds, UK
2. Engr. Faizan Ali
   B.E. (Petroleum) NED UET;
   MS (Petroleum) NTNU, Norway
3. Engr. Syed Adnan-ul- Haque
   B.E. (Petroleum) MUET;
   MS (Petroleum) NTNU, Norway
4. Engr. Aftab Hussain Arain *(On Study Leave)*
   B.E. (Petroleum), MUET;
   MS (Petroleum) NTNU, Norway
   Ph.D. (In Progress) Malaysia
5. Engr. Shaine M. Ali Lalji
   B.E. (Petroleum) NED UET;
   MS (Petroleum) NTNU, Norway
6. Engr. Muhammad Noman Khan
   B.E. (Petroleum & Natural Gas Engg) MUET;MS (Petroleum Engg.) UTM, Malaysia

In addition to regular faculty members, qualified personnel from other departments and in the petroleum industry are engaged for post graduate teaching as visiting faculty.

Application in response to advertisement for Master of Engineering Programme (Petroleum) shall be dully completed and submitted, personally or by registered post to:

The Chairperson
Department of Petroleum Engineering
NED University of Engineering & Technology,
University Road Karachi, 75270. Pakistan
Ph. No: +92-21-99261261-8, Ext: 2345
Fax No: +92-21-99261255
E-Mail: cpd@neduet.edu.pk

3.5 DEPARTMENT OF ENVIRONMENTAL ENGINEERING

Established as the Institute of Environmental Engineering and Research thirty-three years ago to cater for the national need of professional training in environmental assessment and improvement at postgraduate level, the Department of Environmental Engineering has been effectively contributing in academics, research, training, and community based activities since its inception.

The Department administers postgraduate programme leading to the degrees of Masters of Engineering (Environmental) and Master of Engineering Management (MEM) in Environmental Management. The programme is conducted both in morning and evening times and also a weekend programme has started from Fall Semester 2015. The degree programme is structured so as to deepen and broaden the student's knowledge in the field of Environmental Engineering. The Department of Environmental Engineering has the honour to start the master programme for the first time in Environmental Engineering in Pakistan and also has the honour to be one of the first departments of NED University to successfully offer Masters of Engineering programme in the morning. Though the Department is not administering any undergraduate level programme, it is providing all necessary support to it's allied engineering disciplines in assessing, designing, and synthesising environmental impacts of engineering developments through class room tutorials and laboratory practices.

Emphasis of the postgraduate programme is to equip students and practicing professional with advanced knowledge, information and data base so that they can cope with ever increasing environmental degradation of the country in general and of the city in particular. During these studies a student completes a number of courses in water, air, noise, and land pollution, industrial and municipal solid waste management, Environmental Impact Assessment, water quality management, marine pollution, sustainable development and other major and minor topics related to environment. Course work is supplemented with field investigation, seminars, and guest lectures to enable students to broaden their understanding of issues and remedies related to environment.

The students graduated from the Department of Environmental Engineering are actively participating in the development works at regional, national and international levels.

They are holding key positions in public and private sectors in Pakistan and abroad utilizing the knowledge gained during their studies in the department.

The Department is also offering the postgraduate degree programme in Master of Engineering Management (MEM) in Environmental Management. The programme is conducted in morning, evening and on weekends. Some of the broad objectives of the programme are to equip students and future Environmental Managers with the ability to clearly understand and interact in Engineering as well as Management related activities and roles in Environmental Studies.

The Department is actively participating in community-based activities working together with Sindh EPA, NGOs, City District Government and other relevant organizations in different development works aimed at restoring and improving public sector services and infrastructures. The department is working with industries on various projects. In future the Department intends and plans to work in the advisory capacity for agencies responsible for environmental management of urban areas as well as the natural resources.

3.5.1 Departmental Facilities

The Department maintains Environmental Engineering Laboratories having adequate facilities to carry out essential environmental analysis and monitoring. These include air quality / emission monitoring, water chemistry analysis, water pollution and water quality monitoring and process design studies. A computer Lab for postgraduate students provides access to professional software in Environmental Engineering, internet surfing and retrieving data from other resources outside University. Department library contains selected books on various related topics, database, case studies and research documents of national interest for ready reference during course of studies.

Research Fields

The current fields of research encompass. Water and Wastewater Treatment, Water Quality, Microbial Ecology, Ecotoxicology, Environmental Biotechnology, Nanotechnology, Environmental Impact Assessment, Sustainability and Biofuels / Bioenergy.

Research in the fields described above are being carried out under supervision of foreign qualified faculty members. Moreover, the department is also working on industry-based problems and is in the process of establishing research collaborations with world class International Universities.

3.5.2 Principal Faculty for the Programme

Chairperson

Prof. Dr. Atif Mustafa

Professors

1. Prof. Dr. Asif Ahmed Shaikh
   (On Lien as VC, Sukkur IBA University)
   B.E. (Civil) NED UET;
   M. Engg. (Environmental System Engineering), Japan;
   Ph.D. (Engineering Systems Science), Japan
2. Prof. Dr. Atif Mustafa
   B.E. (Civil) NED UET; M. Engg. (Environmental) NED UET;
   Ph.D. (Environmental Engineering), UK

Associate Professors

1. Dr. Mehmood Ali
   B.E. (Mechanical) NED UET;
   M. Engg. (Environmental) NED UET;
   Ph.D. (Mechanical Engineering), UK
2. Dr. Sadia Khan
   M.Sc. (Microbiology) UoK;
   M. Phil (Molecular Medicine), UoK;
   Ph.D. (Civil & Environmental Engineering), UK
3. Dr. Abdul Ghaffar
   B.S. (Microbiology), Sindh University;
   MEM (Environmental Management) NED UET;
   Ph.D. (Environmental Science & Engineering), China

Assistant Professor

Dr. Zuhaib Siddiqui *(On Ex-Pakistan Leave)*
B.E. (Civil) MUET; M.Engg. (Environmental Engineering & Management), Thailand;
Ph.D. (Waste/Industrial Waste Treatment), UK

In addition to regular faculty members, qualified professionals from other Departments and organizations are also engaged for post- graduate teaching.

Applications in response to advertisement for Master of Engineering (Environmental) and Master of Engineering Management (MEM) Programme in Environmental Management shall be duly completed and submitted, personally or by registered post to:

The Chairperson
Department of Environmental Engineering NED University of Engineering & TechnologyUniversity Road, Karachi-75270, Pakistan
Ph. No. +92-21-99261261-8 Ext. 2346
Fax No. +92-21-99261255
E-mail: chenv@neduet.edu.pk

3.6 MECHANICAL ENGINEERING DEPARTMENT

The Department of Mechanical Engineering is one of the oldest and well established departments of NED University. Currently both undergraduate and post-graduate programs are offered by the department. The undergraduate program is based on four years instructional education at the main campus of the University leading to the degree of Bachelor of Engineering (Mechanical). Theoretical instruction is reinforced with adequate laboratory and computational work. In addition to undergraduate program, Master of Engineering (M.Engg.) degrees with specialisation in Design, Energy Systems, Renewable Energy and Mechatronics, and Master of Engineering Management (MEM) in Energy and Plant Management are offered. The department has also started weekend programs from Fall Semester 2016 in M.Engg. (Energy System) and MEM (Energy and Plant Management). The programs are aimed at preparing students to shoulder their professional responsibilities and enable them to pursue higher studies and research in Mechanical Engineering related fields.

The department also offers Ph.D. program. Interested candidates may enroll under the supervision of PhD supervisors through applications on forms as prescribed by the University in research areas mentioned afterwards.

3.6.1 Departmental Facilities

Laboratory and Computational Facilities

The Department of Mechanical Engineering has laboratories and workshops with a built-up area of about 5000 square meters besides teaching and faculty rooms covering an area of around 2000 square meters.

The department is equipped with a Computational Laboratory that has more than 50 PCs. All computers are connected through LAN to two HP-Compaq servers with high-speed network support and a separate user profile with full security for each user. Internet access is also available on all computers. Several licensed software like ANSYS, ProE, Solid Edge, Unigraphics, FLUENT, Matlab and AutoCAD are available for use by students. Many of these softwares are introduced as part of the curriculum in various courses in the Master of Engineering program.

Post-graduate laboratories in the areas of Solar and Wind Energies, Desalination, Fluid Mechanics. Heat Transfer, Acoustics and Vibrations, Materials Engineering, Hydrogen Energy and Energy Conservation exist in the department and are open for students desirous of carrying out experimental research in these fields. In addition to the above laboratories the department has free access to all the facilities provided by the High Performance Computation Centre such as parallel computing and access to more than 40 licensed softwares.

Research Fields

Some of the research areas in which our faculty is currently engaged include: Solar and Hydrogen Energy, Energy conservation, Refrigeration and Airconditioning, Desalination, Computational Fluid Dynamics, Fracture Mechanics, Mechanical Vibrations, Computer Aided Design and Manufacturing, Composite Materials and Mechanical Properties of Metals & Metallic Coatings.

3.6.2 Principal Faculty for the Program

Chairperson

Prof. Dr. Mubashir Ali Siddiqui

Co-Chairperson

Prof. Dr. Muhammad Shakaib

Professors

1. Prof. Dr. Nasiruddin Shaikh
   B.E (Mech.) NED; M.Sc. (Mech.) NED; PhD (Thermofluids) Canada
2. Prof. Dr. Mubashir Ali Siddiqui
   B.E (Mech) NED; M.S (USA); PhD (USA)
3. Prof. Dr. Murtaza
   B.E (Mech.) NED; M.Engg (Mech.) NED; PhD (Mech.) S. Korea
4. Prof. Dr. Muhammad Shakaib
   B.E (Mech.) NED; M.Sc. (Mech.) NED; PhD (Desalination) NED; Postdoc (Malaysia)
5. Prof. Dr. Maaz Akhtar
   B.E (Mech.) NED; M.Engg. (Mfg.) NED; PhD (Mech.) Oman (On Ex-Pakistan Leave)

Associate Professors

1. Dr. Muhammad Uzair
   B.E (Mech.) NED; M.Engg (Mech.) NED; PhD (Mech.) New Zealand
2. Dr.–Ing. Usman Allauddin
   B.E (Mech.) NED; M.Engg. (Mech.) NED; PhD (Mech.) Germany
3. Dr. Haider Ali
   B.E (Mech.) NED; M.Engg. (Mech.) NED; PhD (Mech.) Kingdom of Saudi Arabia (KSA)

Assistant Professors

1. Ms. Amber Fishan Zafar
   B.E (Mech.) NED; M.S (Mech.) NUST
2. Mr. Imran Sikandar
   B.E (Mech.) NED; MS (Mech.) USA
3. Dr. Muhammad Ehtesham ul Haque
   B.E (Mech.) NED; MS (Mech.) USA; PhD (Mech.) Malaysia

4. Mr. Masood Ahmed Khan
   B.E (Mech.) NED; M.Sc.(Comp.Sc.) NED; M.Engg (Mfg.) NED

5. Dr. Kashif Noor
   B.E (Mech.) NED; M.Engg (Mech.) NED MBA, PhD (Mech.) NED

6. Ms. Erum Khan
   B.E (Mech.) NED; M.Engg (Mech.) NED

7. Dr. Tariq Jamil
   B.E (Mech.) NED; M.Engg (Mech.) NED; PhD (Mech.) USA

8. Dr. Mahrukh
   B.E (Mech.) NED; M.Engg (Mech.) NED; PhD (Mech.) UK; (On Postdoc Study Leave)

9. Dr. Mumtaz Hussain Qureshi
   B.E (Mech.) NED; M.Engg (Mech.) NED; PhD (Mech.) Taiwan

10. Dr. Syed Ahmad Raza
    B.E (Mech.) NED; M.Engg (Mech.) NED; PhD (CFD), Taiwan

11. Dr. Muhammad Muzamil
    B.E (Materials) NED; M.Engg (Mech.) NED; PhD (Mech.), China

12. Mr. Saqib Sharif
    B.E (Mech.) NED; M.Engg (Mech.) NED; PhD under progress

13. Mr. Adeel Ahmed Khan
    B.E (Mech.) NED; M.Engg. (Mech.) NED; PhD under progress

14. Dr. Syed Aun Ali Rizvi
    B.E (Mech.) NED; MS (Mech.) NUST; PhD (Mech.) NED

15. Mr. Arshad Siddiqui
    B.E. (Mech.) NED; M.Engg (Mech.) Canada

16. Dr. Muhammad Uzair Yousuf
    B.E (Mech.) NED; M.Engg. (Mech.) NED; PhD (Mech.) New Zealand

17. Dr. Shehroze Tahir Khan
    B.E (Mech.) NED; M.Engg. (Mech.) NED; PhD (Mech.) NED

18. Dr. Syed Muhammad Asad Akhtar
    B.E (Mech.) NED; M.Engg. (Mech.) NED; PhD (Mech.) NED

In addition to regular faculty members qualified personnel in other departments and in the city may be engaged for post-graduate teaching.

Applications in response to advertisement for Master of Engineering (Mechanical) shall be duly completed and submitted, personally or by registered post to:

The Chairperson
Mechanical Engineering Department
NED University of Engineering & Technology
Karachi 75270, Pakistan
Ph. No: +92-21-99261261-8 Ext: 2206
Fax No: +92-21-99261255
E-mail: cmed@neduet.edu.pk

3.7 DEPARTMENT OF INDUSTRIAL & MANUFACTURING ENGINEERING

Industrial and Manufacturing Engineering education has become pivotal in establishing a Acompetitive posture across the entire spectrum of Metal working and Manufactured parts' industry in Pakistan. Both the reality and perception of domestic production points to the need for a stronger, more productive manufacturing industry in this country producing high quality parts at low cost. In view of the fast-changing technological and industrial scenario the University started this separate Department. Industrial and Manufacturing Engineering spans a broad spectrum of engineering topics such as: Computer Aided Design (CAD); Computer Aided Manufacturing (CAM); Numerical Control (NC); Computer Integrated Manufacturing (CIM); Flexible Manufacturing System (FMS); Robotics & Automation; Product Design; Tools and Machines; Manufacturing Processes; Quality Control; Production and Inventory Control; and Economics Analysis.

This Department was initially started under the auspices of Mechanical Engineering Department in October 1999 and started as a separate Department in October 2000 with the name of Industrial & Manufacturing Engineering Department. The Department is offering Master of Engineering (by course work) with the specialisations in Manufacturing Engineering and Engineering Management. The Engineering Management program further offers choices of specialisation in Industrial Management, Quality Management and Supply Chain Manageme0nt. The Department of Industrial & Manufacturing Engineering has highly qualified and experienced regular and visiting faculty members.

3.7.1 Departmental Facilities

The Department has following laboratories:

- CAD
- Industrial Automation
- Advance Manufacturing
- CAM
- Industrial Safety
- Metrology & Gauging
- CAED
- Methods Engineering
- Tool Design

These laboratories are equipped with sophisticated equipment and state of the art software. EDM Machine, Wire-Cut EDM, Five-axis Machining Centre, Injection Moulding Machine and Robotic Arm with (five degrees of freedom), are some of the equipment available in these laboratories. Industrial Automation related equipment including PLC's are available at the Department. Computer laboratory is equipped with state of the art personal computers along with Scanning, Printing and Plotting facility. Advanced Designing and Simulation software including Unigraphics, Pro-E, Solid Edge, AutoCAD, Mechanical Desktop, ANSYS, Lathe CAM Designer, Mill CAM Designer are also available in the Department and being fully utilized by the students at undergraduate and postgraduate level.

Other Supporting Facilities

Department of Industrial & Manufacturing Engineering have been facilitated with PRODUCT DEVELOPMENT CENTRE (PDC). This centre is fully equipped with complete range of sophisticated equipment and software to be used for reverse engineering, rapid prototyping and additive manufacturing of parts and products. Product Development Centre is facilitated with a 3D scanning system, faro arm, 3D printing machines and a vacuum casting and system.

Research Field

The current Research interests of the Department are as follows:

- 3D Printing/Additive Manufacturing
- Advanced Manufacturing Processes
- CAD / CAM / CAE
- Composite Materials
- Computer Aided Project Planning
- Ergonomics and Industrial Safety
- Industrial Automation & Robotics
- Operations Research
- Project Management
- Rapid Prototyping (Reverse Engineering)
- Simulation and Modeling
- Supply Chain Management
- Sustainable Manufacturing Processes
- Quality Management

3.7.2 Principal Faculty for the Programme

Chairperson

Dr. Maqsood Ahmed Khan

Professors

1. Prof. Dr. Muhammad Tufail
   B.E. (Mech.); M.Sc. (Mfg. Systems); Ph.D. (UK)
2. Prof. Dr. Syed Amir Iqbal
   B.E. (Mech.); M. Engg. (Mfg. Engg.); Ph.D. (UK)

Associate Professors

1. Dr. Maqsood Ahmed Khan
   B.E. (Mech.); M. Engg. (Mfg. Engg.); Ph.D. (Canada)
2. Dr. Muhammad Wasif
   B.E. (Mech.); M. Engg. (Mfg. Engg.); Ph.D. (Canada)
3. Dr. Anis Fatima
   B.E. (Ind. & Mfg.); M. Engg. (Mfg. Engg.); Ph.D. (UK)

Assistant Professors

1. Dr. Ali Zulqarnain
   B.E. (Mech.); M. Engg. (Mfg. Engg.); Ph.D. (NED)
2. Ms. Sadia Majeed
   B.A. (Hons); M.A. (Eco.); M. Phil. (KU)
3. Dr. Syed Mehmood Hasan *(On Leave)*
   B.E. (Ind. & Mfg.); M.S. (Engg. Mgm.); Ph.D. (UK)
4. Dr. Asim Zaheer
   B.E. (Mech.); M.S. (Engg. Mgm.); Ph.D. (UK)
5. Dr. Shaheen Perween
   B.E. (Mech.); M. Engg. (Mfg. Engg.); Ph.D. (NED)
6. Dr. Aqeel Ahmed
   B.E. (Mech.); M. Engg. (Mfg. Engg.); Ph.D. (Canada)
7. Dr. Shakeel Ahmed
   B.E. (Ind. & Mfg.); M. Engg. (Energy Systems); Ph.D. (UK)
8. Ms. Rabia Siddiqui
   B.E. (Ind. & Mfg.); M. Engg. (Mfg. Engg.)
9. Ms. Rabiya Zubair
   B.E. (Ind. & Mfg.); M. Engg. (Mfg. Engg.)
10. Ms. Javeria Younus
    B.E. (Ind. & Mfg.); M. Engg. (Mfg. Engg.); Ph.D. (In-progress)
11. Ms. Naima Javed
    B.E. (Ind. & Mfg.); M. Engg. (Mfg. Engg.)

In addition to regular faculty members qualified personnel in other departments and in the city may be engaged for post-graduate teaching.

Applications for M. Engg. (Manufacturing Engineering) & MEM (Industrial Management, Quality Management and Supply Chain Management Programmes duly completed are required to be submitted, personally or by registered post to:

The Chairperson
Department of Industrial & Manufacturing Engineering
NED University of Engineering & Technology
Karachi – 75270, Pakistan
Phone No. 92-21-99261261-8
Fax No. 92-21-99261255
Email: cid@neduet.edu.pk

3.8 DEPARTMENT OF TEXTILE ENGINEERING

The Textile Engineering Department was established in NED University in 1996. The department has been offering program of Bachelor of Engineering (BE) in Textiles since 1996. At Postgraduate level, Department offers three programs i.e. Master of Engineering (M.Engg.) in Textile, Master of Engineering Management (MEM) in Textile Management and Master of Science (MS) in Textile Management. Department has twenty one (21) faculty members out of which fifteen have doctoral degrees and six have masters degree.

The postgraduate programs are evening programs designed to accommodate working textile engineers who are in a quest to broaden their knowledge and deepen their technical & managerial skills to address the iussues of Textile Industry.

The programme of Master of Engineering (M.Engg.) in Textiles was started in year 2005. The courses of this program are designed to incorporate advanced concepts of Textile Engineering & Technology and are at par with similar programs offered in developed countries. The program aims to produce qualified textile professionals who would not only take-up managerial & operational functions of a Textile mill but would contribute to other aspects such as product development, process analysis, quality assurance and environment. Courses are also tailored to meet the requirements of Pakistan Textile Industry and the textile business sector in general.

The Textile Engineering graduates take up various management responsibilities during their professional careers. In today's world it is getting difficult for organisations to remain competitive and profitable. Today's market requires not only technically sound engineers but also excellent managers who can work in competitive environment and produce desired results. Realizing the importance of management skills for Textile Engineers, the Department introduced postgraduate programs of Master of Engineering Management (MEM) and Master of Science (MS) in Textile Management. These programs aim to educate the next generation of engineers and scientists to plan and manage the textile industry, improve the production and quality of textile products and lead the industry. The courses are structured to provide both technical knowledge along with management skills to empower the textile engineer for leadership roles in complex and competitive business environment.

3.8.1. Departmental Facilities

The Department has following functional laboratories:

- Yarn Manufacturing Laboratory
- Fabric Manufacturing Laboratory
- Dyeing & Finishing Laboratory
- Fiber Testing Laboratory
- Yarn Testing Laboratory
- Fabric Testing Laboratory
- Textile Chemistry Laboratory
- Computer Laboratory
- SMART Manufacturing & Responsive Textile Lab.
- Erasmus+ SMARTEX Laboratory

Computing Facilities

The Department has two computing facilities, the general purpose "Computer Laboratory" and the specialized "Computation, Simulation & Design - CSD Laboratory" equipped with a cumulative node count of more than eighty high-end workstations. The laboratories are connected with the national HEC-PERN network through high-speed fibre optic link and all online information resources including the University Portal and the National Digital Library are accessible from within the Departmental LAN. The Department also has access to campus wide wifi service through NED Smart University Network and related services.

Research Fields

The current research interests of the Department are as follows:

- Conventional textiles
- Novel wet processing techniques
- Conductive textiles
- Textile sensors
- Protective textiles
- Textile composites
- Finite element modelling & simulation
- Biomechanical engineering of textiles
- Yarn texturing process using air-jet technique
- Nonwovens
- Image processing in textiles
- Thermal properties of textiles
- Nano finishes
- Inkjet printing
- Colour science

3.8.2. Principal Faculty For The Programme

Chairperson

Prof. Dr. Sheraz Hussain Siddique

Co-Chairperson

Prof. Dr. Bilal Zahid

Professor

1. Prof. Dr. Sheraz Hussain Siddique
   B.E. (Textile Engg. Pakistan);
   M.Sc. (Textile & Clothing Management, Germany);
   Ph.D. (Textile Science & Technology, United Kingdom)
2. Prof. Dr. Bilal Zahid
   B.E. (Textile Engg. Pakistan);
   MBA (Textile Management, Pakistan);
   M.Engg. (Textile, Pakistan);
   Ph.D. (Textile Science & Technology, United Kingdom)
3. Prof. Dr. Muhammad Dawood Husain
   B.E. (Textile Engg. Pakistan);
   M.Sc. (Textile & Clothing Management, Germany);
   Ph.D. (Textile Science & Technology, United Kingdom)

Associate Professor

1. Dr. Salma Farooq
   B.Sc. (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan);
   Ph.D. (Textile, United Kingdom)
2. Dr. Ali Hasan Mahmood
   B.E (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan);
   Ph.D. (Textile Science & Technology, United Kingdom)
3. Dr. Fareha Asim
   B.E (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan);
   Ph.D. (Textile, Pakistan)
4. Dr. Muhammad Ali
   B.E. (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan)
   Ph.D. (Textile Science & Technology, United Kingdom)
5. Dr. M. Owais Raza Siddiqui
   B.E. (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan);
   Ph.D. (Textile, United Kingdom)
6. Dr. Saira Faisal
   B.E (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan);
   Ph.D. (Textile Science & Technology, United Kingdom)
7. Dr. Shenela Naqvi
   B.E (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan);
   Ph.D. (Textile Science & Technology, United Kingdom)
8. Dr. Quratulain Mohtashim
   B.E. (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan);
   Ph.D. (Textile Science & Technology, United Kingdom)

Assistant Professor

1. Dr. Agha Deedar Hussain
   B.Sc. (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan)
   Ph.D. (Supply Chain Management, Portugal)
2. Dr. Farhana Naeem
   B.E (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan);
   Ph.D. (Textile, Pakistan)
3. Dr. Muhammad Amir Qureshi
   B.E (Textile Engg. Pakistan);
   M.Engg. (Textile, Pakistan);
   Ph.D. (Textile, United Kingdom)
4. Dr. Sabeen Jahanzeb
   B.E. (Textile Engg. Pakistan);
   M. Engg. (Textile, Pakistan);
   Ph.D. (Textile, Pakistan)

In addition to regular faculty members, qualified personnel from other departments and from outside the university may be engaged for post-graduate teaching.

Applications in response to advertisement for Master of Engineering (Textile) shall be duly completed and submitted personally or by registered post to:

The Chairperson
Textile Engineering Department
NED University of Engineering & Technology
Karachi – 75270, Pakistan
Phone # +92-21-99261261-8
Fax# +92-21-99261255
Email# ctd@neduet.edu.pk

3.9 DEPARTMENT OF AUTOMOTIVE & MARINE ENGINEERING

The Department of Automotive & Marine Engineering was established in 2005 at the NED University of Engineering and Technology, Karachi, primarily to cater the needs of the growing automotive sector in Pakistan with Karachi being considered the hub of the automotive industry. Soon the need of a Masters programme was felt and it was decided to launch the Masters in Automotive Engineering programme, which started from June 2009. This programme offers a focused post-graduate study covering several aspects of Automotive Engineering. These aspects range from the inner working of the automobile engine to external aspects such as vehicle aerodynamics, and from the properties of the materials used in automobiles to transportation analysis. The department offers two specialisations in 'Automotive Design' and 'Automotive Manufacturing', which are designed to achieve the following goals:

- Provide automotive engineers with practical experience in team building, carrying out projects in interdisciplinary areas and in developing and managing projects.
- Provide automotive engineers with an enhanced understanding of related disciplines as well as management and human factor issues related to the design and marketing of automotive systems.
- Strengthen the technical competence and depth of automotive engineers by teaching them advanced courses in their respective specialisation.
- Broaden the horizons of automotive engineers by exposing them to the wide spectrum of interdisciplinary engineering activities involved in the process of development, design and manufacturing of complex automotive systems.

3.9.1 Departmental Facilities

To support the programme, the Department is equipped with several state-of-the-art functioning laboratories, which includes Combustion & Emission Lab, Body & Suspension Lab, Auto-Electronics Lab, Basic Electronic Lab, Computer Lab, and Fuel Cell Lab. For the research purpose, highly sophisticated equipment are available in the department. 'Hydra Research Engine' is one of the good examples. This Engine test bed has a single cylinder engine for both diesel and petrol along with high tech instrumentation panel. The environmental concerns has forced us to work on the alternative clean energy technologies for this purpose the department has a Fuel Cell Laboratory with a Fuel Cell testing system. For Numerical simulations, the Department has the license for Fuel Cell Module of FLUENT. In teaching advanced level subjects, dedicated software's are frequently used in the department by course teachers.

The prospective students of this programme would primarily consist of graduate engineers currently employed in automotive sector as well as those having bachelor's degrees in Automotive, Mechanical, or Industrial & Manufacturing Engineering.

3.9.2 Principal Faculty for the Programme

Chairperson

Prof. Dr. Ali Raza Jafri

Professors

1. Prof. Dr. Ali Raza Jafri
   B.E. (Mechanical) NED;
   M.Engg (Mechanical) NED;
   Ph.D. (Mechatronics) BIT, P.R.China
2. Prof. Dr.-Ing. Syed Mushahid Hussain Hashmi
   B.E. (Mechanical) NED;
   M.Sc. (Mechanical) NED;
   Ph.D. (Mechanical) Institute of Thermodynamic Helmut Schmidt University, Germany

Associate Professor

Dr. Faraz Akbar
B.E. (Mechanical) NED;
Ph.D. (Mechanical), The University of Manchester, UK

Assistant Professors

1. Dr. Munir Ahmed
   B.E. (Mechanical) NED;
   MASc (Mechanical) University of Toronto, Canada;
   Ph.D. (Mechanical) NED
2. Dr. Saqib Jamshed Rind
   B.E. (Industrial Electronics) NED;
   M.Sc. (Automation & Control) University of Newcastle, UK;
   Ph.D. (Motor Drives for Electric Vehicles) University of Liverpool, UK
3. Dr. Noman Uddin Yousuf
   B.E. (Mechanical) NED;
   M.S (Mechanical) Bradley University, USA;
   PhD (Mechanical) Auckland University of Technology, New Zealand
4. Mr. Assad Anis
   B.E. (Mechanical) NED;
   M.S. (Mechanical), Lappeenranta University of Technology, Finland

In addition to regular faculty members qualified personnel from other departments and from outside the university may be engaged for post-graduate teaching.

Applications in response to advertisement for Master of Engineering (Automotive) shall be duly completed and submitted, personally or by registered post to:

The Chairperson
Department of Automotive & Marine Engineering
NED University of Engineering & Technology
Karachi 75270, Pakistan
Phone#: +92-21-99261261-8, Ext. 2539, 2239
Fax #: +92-21-99261255
E-mail: camd@neduet.edu.pk

3.10 DEPARTMENT OF ELECTRICAL ENGINEERING

The Department of Electrical Engineering is rich-both in its history. The undergraduate and postgraduate programs in Electrical Engineering traces back many decades and its alumni have been active in social and professional activities around the world. The Department of Electrical Engineering has contributed in the development of three other engineering disciplines at NED University namely, Computer and Information Systems, Electronic and Telecommunications Engineering. M.Sc. Degree Programme in Electrical Engineering has been offered by this Department since 1984. The department is currently offered a semester-based Masters of Engineering Degree Programme in four specialisations including Electrical Power Systems, Control System, Smart Grid and Electrical Machines. and Energy Management. Masters of Engineering Management with specialisation in Energy Management is also offered by the Department of Electrical Engineering.

The Department of Electrical Engineering also holds the honour to supervise and award the first PhD at NED University. It encourages research at Masters level, ultimately contributing towards PhD projects. Currently, senior faculty is involved in supervising both PhD and Master level projects in cutting edge areas of Electrical Engineering.

3.10.1 Departmental Facilities

The Department of Electrical Engineering provides numerous laboratories and computing for helping quality research output. Following facilities are available:

Laboratory Facilities

The Department of Electrical Engineering has nice blend of field experience and higher education in diverse fields of Electrical Engineering specialisations. The laboratories at Department of Electrical Engineering are equipped with latest technical simulation software and instrumentation equipment to facilitate research in Power Systems Wide Area Monitoring and Control, Protection, Stability, Transients Analysis, State Estimation, Smart Grid Technologies, Phasor Measurement Technologies, Joint Time Frequency Analysis, Language and Speech Signal Processing, Information Visualization, Current-mode circuits and filters. The Department also offers dedicated research area with excellent facilities for researchers. Excellent facilities to perform specific research in areas of Signal Processing, Power Systems and Controls are available.

Figure: Smart Grid Lab

Research Centres

The department of Electrical Engineering also has two research centres including Centre for Advance Studies of Renewable Energy (ASURE Centre) and Haptics, Human-Robotics and Condition Monitoring Lab at NEDUET (affiliated lab of National Centre of Robotics and Automation).

a. **Centre of Advance Studies in Renewable Energy (ASURE Centre)** is providing testing facility to industry, commercial consumers, and government institutions. ASURE Centre envisages to essentially cover multifaceted aspects related to alternate energy including testing, certification, training and research aspects on a broader scale and taking up projects benefitting a larger populace on the broader scale the aims and areas which have been taken up are:

1. To provide testing facility related to renewable energy equipment including PV module testing, inverter testing, battery testing, ceiling fan testing and lamp.
2. To issue certificates and compliance report to the consignee.
3. To create awareness session related to renewable energy to the local industries and residential consumer
4. To bridge the gap between academia and industry through research, consultation and providing customized smart energy solutions.

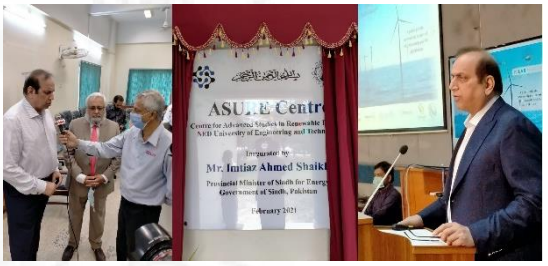


Figure: ASURE Centre

ASURE Centre is facilitating different companies and organizations, some of the clients include Sindh M/s. Solar Energy Project, M/s. Custom Department, M/s. Renewable Power (Pvt.) Ltd., M/s. Solar Tech (Pvt.) Ltd., M/s. Pantera Energy (Pvt.) Ltd., M/s. Zi-Solar, M/s. Eleken Associates, M/s. FNM Engineering and others.

Haptics, Human-Robotics and Condition Monitoring Lab is designed to create national capacity in key emerging areas of Robotics and Automation that have received a lot of attention and focus in the recent years and where a bit of investment and focus may create a competitive advantage for Pakistan. Thus, the structure of NCRA is comprised of a series of Affiliated Labs at a number of universities across the country selected on the basis of demonstrated capability and track record of accomplishments, and a problem-orientation that is either nationally relevant or globally cutting-edge while at the same time leading to sustainability (through generation of non-PSDP revenue) in 3-5 years. The lab specifically focuses on (i) the design and development of Haptics and Teleoperation Setups for disaster management and tele-surgery (ii) the design of the STEM-based education and assistive robots.

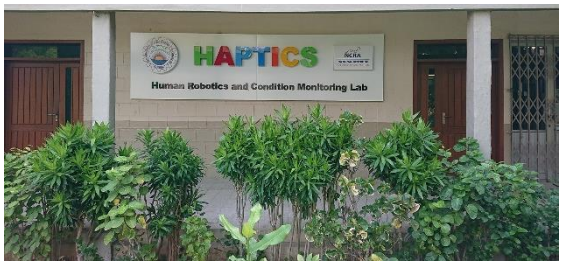


Figure: Haptics Lab

Computing and Allied Facilities

The Department has two Computer labs, capable of performing high end simulations. Latest technical software is installed including MATLAB, PSSE and ETAP. The computers are networked with high-speed internet access.

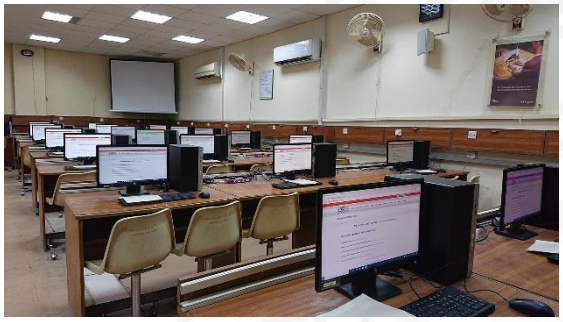


Figure: Computing Facility

ACADEMIC AND INDUSTRIAL LINKAGES

Research flourishes through collaboration, linkages and outreach. The Department of Electrical Engineering recognizes the importance of creating and sustaining strong relationships with others. While academic linkages enhance creation of knowledge, industrial relations boost application. Both are important for keeping research socially relevant.

Figure: ABB Lab

The Department also engages actively with industries to contribute towards addressing problems indigenously. Projects have been undertaken with leading industries such as Siemens, PIA, Pakistan Steel Mills, KANUPP, Areva, and Asia Petroleum. Several initiatives taken by the Department with KESC have resulted in signing of a formal MOU of Strategic Collaboration between NED University and KESC. Additionally, the two institutes are now actively engaged in area of Energy Management which has resulted in a project proposal to transform NED University into first Green Campus of Pakistan.

Figure: K-Electric Lab

The Department has developed contacts with several international universities, including Michigan Tech University, USA, Brunel University, UK, GIST, Korea, Universiti Malaya, Universiti Sains Malaysia, King Fahad University of Petroleum and Minerals, Saudi Arabia, KTH Royal Institute of Technology, Sweden.

Thematic Research

The Department is currently encouraging research proposals under following research themes (but not limited):

Wide Area Monitoring and Control: Wide area monitoring and control is now possible using PMUs (Phasor Measurement Units), which are also available in advance meters and relays. Phasor measurements can be used for monitoring of whole (wide) of the network. This is an emerging field of research in Power Systems.

Advanced Power System Protection: Reliable Phasor measurements are now available in real time from main points of the grid, which are then utilized to address advanced power system protection strategies.

Power System Stability: Voltage and Angle Stability are important aspects of Power System to have equilibrium between the load and generation, it has become more important to study in context of the rapidly changing power grid nowadays.

Power System Transients Analysis: Several Power Systems myths and mysteries are addressed by performing transient analysis on Power System Models.

Power System State Estimation: Availability of real time power systems data has opened a new field of research for more accurate and instantaneous Power System estimation, which will be beneficial to improve power system stability and blackout avoidance.

Black out avoidance Strategies: Wide Area Monitoring and Control techniques using Phasor measurements have provided an opportunity to develop new strategies to avoid blackouts.

Smart Grid Technologies: Different Smart Grid Technologies are being rapidly developed around world. There is a great research opportunity to not only develop the technologies and applications as well.

Phasor Measurement Technologies: This technology is in rapid development phase to be as accurate as possible because this is the basic building block of Sychro-phasor Technology. Joint Time Frequency Analysis: The study is to develop and apply tools which can present signals in a domain where instantaneous time and frequency information is jointly available. The applications vary widely: such as power systems,

communication systems, biomedical imaging, image processing.

Language and Speech Signal Processing: One of the initial aims of Artificial Intelligence is to enable computers to produce and comprehend human languages - spoken as well as written - in order to communicate with us; in the way we do to each other. This is an interdisciplinary area and is widely known as computational linguistics. The area requires expertise in Physics, Signal processing, Pattern recognition, Communication and Information theory, linguistics, physiology and computer Science.

Information Visualization: This field deals with large amount of data represented in such a fashion which supports decision making. This is again an interdisciplinary area of Data Acquisition, Computer Science and Data Mining.

Current mode circuits and Filters:
Current/Voltage mode integrable filter circuits with convenient tunability of the filter parameters having low sensitivity and reduced number of component counts, and extended frequency range will be developed and investigated using special ICs, such as OTS, OAs, NICs, CCC-I & II, etc. Also, component matching technique may be utilized to reduce component counts. Moreover, Active only current mode filter circuits may also be developed and investigated in the PhD Projects.

3.10.2 Principal Faculty for the Programme

Chairperson

Prof. Dr. Attaullah Khawaja

Co-Chairperson

Dr. Muhammad Mohsin Aman

Professors

1. Prof. Dr. Saad Ahmed Qazi
   B.E.(Electrical) NED UET; M.Sc. (Digital Signal Processing Applications in Communication Systems), UK;
   Ph.D. (Intelligent Algorithms and Signal Processing), UK
2. Prof. Dr. Attaullah Khawaja
   B.E. (Electrical), MUET; M.Engg. (Electrical) NED UET;
   Ph.D. (Electrical), China

Associate Professors

1. Dr. Muhammad Ali Memon
   B.E.(Electrical) MUET; M.Engg. (Electrical) NED UET;
   MBA, Sindh University; Ph.D. (Power Systems), USA
2. Dr. Muhammad Mohsin Aman
   B.E.(Electrical) NED UET;
   M. Engg. (Electrical Power Systems) NED UET;
   Ph.D. (Electrical), Malaysia
3. Dr. Riazuddin
   B.E. (Electrical) NED UET;
   M.Engg.(Electrical Power Systems) NED UET;
   Ph.D. (Mechatronics), South Korea

Assistant Professors

1. Dr. Muhammad Javed
   B.E. (Electrical) NED UET;
   M.Sc. (Electrical Engineering) NED UET;
   Ph.D.(Electrical) NED UET
2. Ms. Shahnaz Tabassum
   B.E.(Electrical) NED UET;
   M. Engg. (Electrical Power Systems) NED UET
3. Mr. Shoaib Siddiqui
   B.E.(Electrical); M. Engg. (Electrical Power Systems) NED UET
4. Dr. Raja Masood Larik
   B.E.(Electrical) NED UET;
   M. Engg. (Electrical Power Systems) NED UET;
   Ph.D. (Electrical Power Systems), Malaysia
5. Dr. Umbrin Sultana
   B.E.(Electrical) NED UET;
   M. Engg. (Electrical Power Systems) NED UET;
   Ph.D. (Electrical) Malaysia
6. Ms. Arjumand Samad
   B.E.(Electrical) NED UET;
   M. Engg.(Electrical Power Systems) NED UET
7. Dr. Abdurrahman Javed Shaikh
   B.E.(Electrical) NED UET; M. Engg.(Electrical) NED UET;
   Ph.D. (Photonics), Malaysia
8. Mr. Umar Sajid
   B.E.(Electrical) NED UET;
   M.Sc. (Communication Engineering & Signal Processing), UK; Ph. D (In Progress) NED UET
9. Dr. Abdul Ghani Abro
   B.E.(Electrical); M. Engg.(Power Systems) NED UET;
   Ph.D. (Computational Intelligence), Malaysia
10. Dr. Krishan Lal Khatri
    B.E.(Electrical) MUET;
    MSEE (Telecommunication) SSUET;
    Postgraduate Diploma in Project Management, PIM Karachi; Ph.D. (Electrical), USA
11. Dr. Mirza Muhammad Ali Baig
    B.E.(Electrical);
    M. Engg. (Electrical Power Systems) NED UET;
    Ph.D. (Automatic Segmentation of Speech), NED UET
12. Dr. Beenish Sultana
    B.E. (Electrical) NED UET; M. Engg. (Electrical) NED UET;
    Ph.D. (Electrical), Malaysia
13. Mr. Adnan
    B.E. (Electrical) NED UET;
    M. Engg. (Power Systems) NED UET
14. Mr. Muhammad Hassan ul Haq
    B.E. (Electrical) NED UET;
    M. Engg. (Electrical Power System) NED UET
15. Mr. Shariq Shaikh
    B.E. (Electrical) NED UET;
    M. Engg. (Electrical Power System) NED UET
16. Mr. Fezan Rafique
    B.E. (Electrical) NED UET; M. Engg. (Electrical) NED UET; Ph.D. (In Progress) China
17. Mr. Muhammad Hammad Uddin
    B.E.(Electrical) NED UET;
    M. Engg. (Electrical) NED UET
18. Dr. Abdullah Munir
    B.E. (Electrical) NED UET;
    M. Engg (Electrical Power System) NED UET;
    Ph.D. (Electrical), Malaysia

The Chairperson
Department of Electrical Engineering
NED University of Engineering & Technology
Karachi-75270, Pakistan
Phone No. 92-21-99261261-8 Ext. 2207
Fax No. 92-21-99261255 FAO: CED
E-mail: ced@neduet.edu.pk

3.11 DEPARTMENT OF COMPUTER AND INFORMATION SYSTEMS ENGINEERING

The department of Computer & Information Systems Engineering offers a Master of Engineering (M.Engg.) programme in Computer Systems along with two Master of Science (MS) programmes in Data Engineering & Information Management and Artificial Intelligence.

The **M.Engg. (Computer Systems Engineering)** was launched in the year 2000 as the evening programme to facilitate a supportive environment for researchers and professionals alike. Enthusiastic students prefer to be admitted in this programme because of the high quality of education and the wide demand of computer engineers in the industrial community. Following the modern engineering trends, two areas of specialisation are offered namely; **Computer Architecture & Systems Design** and **Computer Network & System Security**. These specialized streams are designed to meet the need of the industry and indigenous research activities.

The department also offers two MS programmes namely **MS in Data Engineering & Information Management** and **MS in Artificial Intelligence**. They are intended to develop sound professionals with adequate skills and knowledge to meet the latest challenges of big data, information management, artificial intelligence and related technologies and disciplines. The compulsory and elective courses are designed to give broad-based knowledge of the fields along with developing creative and analytical thinking ability. The graduates of these programs will be better able to provide logical and ingenious solutions to critical problems in the area of data engineering and artificial intelligence.

The department provides a vibrant and encouraging environment for the passionate students to get themselves involved in state-of-the-art research. This department has a pool of experienced faculty to help motivate and supervise the students taking up this endeavour. Students with inclination towards research are encouraged to publish their work in national and international conferences and journals. Besides enhancing their expertise in this field, research publications help the students to continue their studies at postgraduate and doctoral levels.

3.11.1 DEPARTMENT FACILITIES

The department has following fully functional laboratories.

1. Computation Laboratory
2. Software Design Laboratory
3. Artificial Intelligence Laboratory
4. Networks Security Laboratory
5. Digital Design Laboratory
6. Microprocessor Laboratory
7. Computer Workshop
8. Computer Laboratory
9. Project Laboratory
10. Postgraduate Laboratory
11. Research Laboratory

The aforementioned laboratories are equipped with the latest hardware equipment and software. These lab facilities also provide adequate opportunities to postgraduate students to undertake research projects. The laboratories are fully air-conditioned and provide a serene and stimulating environment for learning.

RESEARCH FIELDS

The research positions offered in the department include, but not limited to, following areas:

- High Performance Computing / Big Data Analytics
- Artificial Intelligence and Robotics
- Computer Vision & Image processing
- Embedded System Design
- Multiobjective Optimization
- Internet of Things and Web of Things
- Multicore Architecture Design
- Software Defined Communication Systems
- VLSI Design and Testing
- Computer Networks & Distributed Systems

RESEARCH CENTERS

Computer & Information Systems Engineering Department is successfully running four research centers with state-of-the-art R&D projects and collaboration with academia and industry.

1. High Performance Computing Centre / Big Data Analytics

High Performance Computing Centre manages high performance computational resources to address the miscellaneous computational needs. With 50 TFLOPS of computational power (supported by GPGPUs) and various scientific software along with related expertise, the centre provides an excellent state-of-the-art R&D and business opportunities for its users. The centre is equipped with all basic parallel computing platforms / architectures including Shared Memory (SMP), Multi-cores, Distributed Memory (Cluster), GPGPUs and Cloud Infrastructure.

2. National Center in Big Data and Cloud Computing

Exascale Open Data Analytics Lab

Exascale Open Lab is a unique public private partnership concept which will provide framework through which NEDUET can collaborate with leading ICT companies and national and international academia to accelerate the development and deployment of the cutting-edge ICT solutions related to big data and its analytics on cloud using Open source platforms.

Currently Exascale Open Data Analytics Lab is working on application domains namely Cloud Computing, Big Data Analytics, Block Chain, Machine Learning, Image Processing, Software Define Networks (SDN), Quantum Computing, Computational Finance, Computational Astrophysics, Tsunami Modelling, Geonomics and Traffic Modelling.

3. National Center for Artificial Intelligence
Smart City Lab and Neuromorphic lab

The National Centre of Artificial Intelligence, NCAI was inaugurated at the main campus of National University of Sciences & Technology (NUST) on 16th March 2018. The core purpose of NCAI is to apply Artificial Intelligence to solve the indigenous problems of the country; for this purpose, NCAI has selected six universities including NED University.

At NED University, there are two labs under NCAI. The SMART CITY LAB and the NEUROMORPHICE LAB which are focusing on new techniques to improve the quality of life and to provide ease to the people using AI.

To accomplish the goal, the team is doing research based on huge data collection and converting it into a useful visualization using AI. The lab is currently developing different modules and making new applications through machine learning, deep learning and cloud computing.

4. National Centre for Cyber Security
Internet Security Lab, Digital Forensic Lab and Quantum Computing Lab

Due to rapid development in digital technologies and design of smart devices, the boundary between physical and digital world has become inseparable. As the physical security is of utmost importance and cannot be risked, the development of efficient algorithms, protocols, frameworks, and products for securing the cyber environment is highly required.

The National Center for Cyber Security is a huge platform which mainly serves as a bridge between academia and industry in order to develop state-of-the-art cyber security products for both national and international customers. It is an opportunity for NED University to produce specialized human resource in the field of cyber security.

Currently NCCS is working on End Point Security, Internet Security, Digital Forensic and Quantum Cryptography

3.11.2 PRINCIPAL FACULTY FOR THE PROGRAMME

Chairperson

Prof. Dr. Muhammad Ali Ismail

Professors

1. Prof. Dr. Muhammad Ali Ismail
   B.E. (Comp & Info Sys.); M.Engg. (Comp Sys.);
   Ph.D. (High Performance Computing);
   Post Doctorate (ADSE) Romania
2. Prof. Dr. Muhammad Khurram
   B.E. (Comp Sys.); M.Engg. (Comp Sys.);
   Ph.D. (IC Design) New Zealand
3. Prof. Dr. Syed Abbas Ali
   B.E. (Comp Sys.); M.Engg. (Electrical);
   Ph.D. (Automatic Speech Recognition & Machine Learning)

Associate Professors

1. Dr.-Ing. Shehzad Hasan
   B.E. (Comp Sys.); M.Engg. (Comp Sys.);
   Ph.D. (VLSI Testing) Germany
2. Dr. Muhammad Asad Arfeen
   B.E. (Comp Sys.); M.Engg. (Comp Sys.);
   Ph.D. (Computer Networks Engineering) New Zealand
3. Dr. Majida Kazmi
   B.E. (Elect.); M.Engg. (Elect.);
   Ph.D. (Digital System Design)

Assistant Professors

1. Dr. Shahab Tahzeeb
   B.E. (Comp Sys.); M.Engg. (Comp Sys.);
   Ph.D. (BioInformatics)
2. Dr Syed Zaffar Qasim
   B.E. (Comp Sys.); M.Engg. (Comp Sys.);
   Ph.D. (Multiobjective Optimization)
3. Ms. Anita Ali
   B.E. (Comp Sys.); M.Engg. (Comp Sys.);
   Ph.D. (In progress)
4. Ms. Hina Danish Khan
   B.E. (Comp & Info. Sys.); M.Engg. (Comp Sys.);
   Ph.D. (In progress)
5. Dr Maria Waqas
   B.E. (Comp Sys.); M.Engg. (Comp Sys.);
   Ph.D. (Computational Biology)
6. Dr Urooj Ain Uddin
   B.E. (Comp Sys.); M.Engg. (Comp Sys.);
   Ph.D. (Computational Biology)
7. Mr. Gul Munir Ujjan
   B.E. (Comp Sys.); M.Engg. (Comp Sys.);
   Ph.D. (In progress)
8. Dr Zareen Sadiq
   B.E. (Comp & Info. Sys.); M.Engg. (Comp Sys.);
   Ph.D. (Processor Design)
9. Dr Saad Qasim Khan
   B.E. (Comp & Info. Sys.); M.Engg. (Comp Sys.);
   Ph.D. (Neuromorphic Hardware Design)
10. Ms. Sumayya Zafar
    B.E. (Comp & Info. Sys.); M.Engg. (Comp Sys.);
    Ph.D. (In progress)
11. Dr Syed Aqeel Haider
    B.E. (Electronics); M.Engg. (Comp Sys.);
    Ph.D. (Multimodal Biometric System)
12. Dr Hameeza Ahmed
    B.E. (Comp & Info. Sys.); M.Engg. (Comp Sys.);
    Ph.D. (Big Data Computing)

In addition to regular faculty members, qualified personnel from other universities and industry may be engaged for post-graduate teaching.

Applications in response to the advertisement for Master of Engineering (Computer Systems) shall be duly completed and submitted, personally or by registered post to:

The Chairman
Department of Computer & Information Systems Engineering
NED University of Engineering & Technology
Karachi 75270, Pakistan
Phone No. 92-021-99261261-8
E-mail: chaircsd@neduet.edu.pk

3.12 DEPARTMENT OF ELECTRONIC ENGINEERING

The Department of Electronic Engineering, established in 1998 has well-established infrastructure and facilities to satisfy student needs. The undergraduate programme in Electronic Engineering is accredited by Pakistan Engineering Council.

The Department of Electronic Engineering started its Master of Engineering Programme in Electronic Engineering in January 2004 with two specialisations namely (i) Micro System Design and (ii) Industrial Electronics. The Master of Engineering programmes offered in the department are fulfilling the local industry demands to produce the highly skilled man- power.

In addition to above-mentioned Master's Programmes, the department is offering PhD programme in allied fields since spring 2014. Currently there are thirty-five (35) PhD Scholars enrolled in the department working on variety of research areas.

3.12.1 Departmental Facilities

The Department of Electronic Engineering is located in the J-3 Block, a newly constructed building of the University. The Department contains twelve class rooms and eleven Electronics laboratories with latest equipment, two computer centers, one conference room, three research labs, eighteen faculty offices, one departmental library, one departmental office and one Instrumentation Center.

Laboratories of department of electronic engineering are: Basic Electronics, Electronic Devices and circuits, Integrated Circuits, Digital Electronics, Power & Industrial Electronics, Amplifiers & Oscillators, Programmable & Logic Controllers, VLSI, PCB Fabrication Laboratory and Project Laboratory, Industrial Automation, and Autonomous Lab.

Computing Facilities

Air-conditioned computer laboratories of Department of Electronic Engineering are equipped with 35 Computers running licensed operating systems plus other licensed software.

There is access to email, internet, intranet and other online sources of information and services. Access to the internet is provided via a high speed connection through fiber-optic network. Printing and scanning facilities in the laboratories have been provided for the facilitation of students. In addition the department has procured various types of software and a software library is available to students for multipurpose engineering needs.

Electronic Design Center

Electronic Design Center consists of two researches Labs: Device Characterization Lab (DC Lab) and Radio Frequency Lab (RF Lab). The Device Characterization (DC) Lab is a multi-purpose laboratory for DC Characterization of semiconductor devices and Integrated circuits. The Radio Frequency (RF) Lab is Equipped with advanced equipment for measurement of RF and microwave circuits. Besides these two Labs, Circuit level and device level simulation tools, software packages and libraries are also available at EDC.

Research Interests

Faculty and the postgraduate students of the department are actively engaged in the research under the umbrella of a multi-disciplinary research group named "Emerging Technologies Research Group (ETRG)" in all allied areas such as (but not limited to):

- Solid State Devices system
- VLSI Design and Fabrication, test and Reliability
- Microfabrication
- Micro-electro-mechanical system
- Optoelectronics Integrated circuits
- Laser and optical fiber
- Instrumentation and Calibration
- Mechatronics
- Power Electronics, Industrial Electronics
- Embedded System Design
- Digital and Analog Signal Processing
- Fuzzy Logic and Intelligent Control Systems
- Radio Frequency Integrated Circuits
- Optical Devices and networks
- Communication Networks
- Point of care devices
- Robotics
- Internet of Things

3.12.2 Principal Faculty for the Programme

Chairperson (Acting)

Prof. Dr. Muhammad Imran Aslam

Professor

Prof. Dr. Ghous Bakhsh
B.E.(Electronic), MUET; M.Engg(Electronic), NED UET; Ph.D.(Electrical), USA

Associate Professors

1. Dr. Sadia Muniza Faraz
   B.E. (Electrical) NED UET; M.Engg (Electronic) NED UET;
   Ph.D. (Electronic) NED UET
2. Dr. Hashim Raza Khan
   B.E. (Electrical) NED UET; M.Sc. (Communication), Germany;
   Ph.D. (Electronic) NED UET

Assistant Professors

1. Dr. Syed Riaz-un-Nabi Jafri
   B.E. (Industrial Electronic), IIEE, NED;
   M.Engg. (Electronic) NED UET; Ph.D. (Robotics), Italy
2. Mr. Shahzad Siddiqi
   B.E. (Electrical) NED UET;
   M.Engg. (Telecommunications) NED UET
3. Mr. Safi Ahmed Zakai
   B.E. (Electrical) NED UET; MBA (Marketing), IBA Karachi;
   M. Engg. (Telecommunications) NED UET;
   M.Phil. (Management), UoK
4. Dr. Sana Arshad
   B.E. (Electronic) NED UET; M.Engg. (Electronic) NED UET; Ph.D. (Electronic) NED UET
5. Dr. Yawar Rehman
   B.E. (Electronic), MUET;
   M.Engg. (Telecommunication), Hamdard University;
   Ph.D. (Electronics & Communication), South Korea
6. Dr. Amna Shabbir
   B.E. (Telecommunication) NED UET;
   M.Engg. (Telecommunication) NED UET;
   Ph.D. (Telecommunication) NED UET
7. Dr. Saleha Bano
   B.E. (Electronic) NED UET; M.Engg. (Electronic) NED UET;
   Ph.D. (Electronic) NED UET
8. Dr. Tariq Rehman
   B.E. (Industrial Electronic), IIEE, NED UET;
   M.Engg. (Electronic) NED UET;
   Ph.D. (Electronic), Malaysia
9. Dr. Muhammad Faizan Shirazi
   B.E. (Electronic) NED UET;
   M.S (Electronic), Republic of Korea;
   Ph.D. (Electronic), Republic of Korea
10. Mr. Abdul Raheem Qureshi *(On Study Leave)*
    B.E. (Electronic) NED UET;
    M.Sc. (Communications), Sweden;
    Ph.D. (In Progress), Netherlands
11. Dr. Saba Javed *(On Study Leave)*
    B.E. (Industrial Electronics) IIEE, NED UET;
    MS (Electronics), PAF-KIET;
    Ph.D. (Electronics), PAF-KIET
12. Dr. Danish Mahmood Khan
    B.E. NED UET; M.C.S, UoK;
    M.Engg. NED UET;
    Ph.D. Universiti Teknologi Petronas Malaysia

In addition to regular faculty members, the qualified faculty members available in other departments and in the city are engaged for the graduate teaching.

Applications are invited in response to the advertisement for the admission in the following programmes offered by the department should be duly completed and submitted, personally or by registered post to the below mentioned address.

(i) Master of Engineering (Electronic Engineering) with specialisation in Micro System Design

(ii) Master of Engineering (Electronic Engineering) with specialisation in Industrial Electronics

The Chairperson
Department of Electronic Engineering
NED University of Engineering & Technology
Karachi 75270, Pakistan
Ph. No: +92-21-99261261-68 Ext: 2270
Fax No: +92-21-99261255
Email: cld@neduet.edu.pk

3.13 DEPARTMENT OF TELECOMMUNICATIONS ENGINEERING

The Department of Telecommunications Engineering, is currently administering undergraduate as well as postgraduate programmes in Telecommunications Engineering. The department has well-established infrastructure and facilities to fulfill student needs in these areas. The undergraduate programmes in Telecommunications Engineering are accredited by Pakistan Engineering Council under OBE based accreditation.

NED University started Bachelor of Engineering (Telecommunications) programme in 2002. The programme was initially started and administrated by Department of Electrical Engineering up to year 2007. Later the administrative control was shifted to Department of Electronic Engineering which administered the programme up to year 2021. NED University established an independent Department of Telecommunications Engineering in year 2021. Now the BE (Telecommunications) programme is being administered by Department of Telecommunications Engineering. In addition, the Department is also administering the Master of Engineering (Telecommunications) programme to fulfill the local industry needs to produce the highly skilled man-power. Considering the increasing market demands, the department bifurcated M.Engg (Telecommunications) in two stream namely RF Engineering and Telecommunication Networks.

Starting from fall 2017 semester, the Department is also offering weekend programme of Master of Science (M.S.) in Telecommunication Systems. Candidates coming from the non-engineering background are also eligible to get admission in the M.S. programme.

In addition to above mentioned Master's Programmes, the department's faculty is also supervising PhD research in allied fields. Currently there are thirteen (13) PhD Scholars pursuing PhD studies in variety of research areas under supervision of Telecommunications faculty.

3.13.1 Departmental Facilities

The Department of Telecommunications Engineering contains four class rooms, six laboratories with latest Telecommunications related equipment, one computer center, one conference room, four faculty office and one departmental office.

Laboratories of department of Telecommunications Engineering include PHS/WLL, Advanced Telecommunications, Antenna & Microwave Engineering, Telematics, Optical Fiber Communications and Radio Engineering Laboratory. These laboratories are equipped with the state-of-the-art equipment such as network analyzer, high frequency oscilloscopes and software defined radio boards.

Computing Facilities

Air-conditioned computer laboratory of Department of Telecommunications Engineering is equipped with 34 Computers running licensed operating systems plus other licensed software. There is an access to email, internet, intranet and other online sources of information and services. Access to the internet is provided via a high-speed connection through fiber-optic network. Printing and scanning facilities in the laboratory have been provided for the facilitation of students. In addition, the department has procured various types of software and a software library is available to students for multipurpose engineering needs.

Research Interests

Faculty and the postgraduate students of the department are actively engaged in the research in all allied areas including but not limited to:

- Digital and Analog Signal Processing
- Fuzzy Logic and Intelligent Control Systems
- Radio Frequency Integrated Circuits
- Wireless Communications
- Cognitive radios
- Antenna arrays
- Optical Devices and networks
- Communication Networks
- Microwave Systems
- Point of care devices
- Robotics
- Internet of Things
- Body Sensor Networks

3.13.2 Principal Faculty for the Programme

Chairperson

Prof. Dr. Muhammad Imran Aslam

Professor

Prof. Dr. Muhammad Imran Aslam
B.E. (Electrical) NED UET; M.Engg. (Electrical) NED UET;
Ph.D. (Electrical), USA

Assistant Professors

1. Dr. Amir Zeb
   B.E. (Electrical) NED UET;
   M.Engg. (Telecommunications) NED UET;
   Ph.D. (Wireless Communication/Cognitive Radio) NED UET

2. Dr. Tahir Malik
   B.E. (Electrical) NUST;
   M.Sc. (Telecommunications & Info. System), UK;
   Ph.D. (Electrical & Electronic), New Zealand

3. Ms. Nida Nasir *(On Study Leave)*
   B.E. (Electronic) NED UET;
   M.Engg. (Telecommunications) NED UET;
   Ph.D. (In Progress) Malaysia

4. Ms. Saba Ahmed
   B.E. (Electrical) NED UET;
   M. Engg. (Telecommunications) NED UET ;
   Ph.D. (In Progress) NED UET

5. Dr. Sunila Akbar *(On Ex-Pakistan Leave)*
   B.E. (Electrical) NED UET;
   M.Engg. (Telecommunications) NED UET;
   Ph.D. (Telecommunications), UK

6. Dr. Uzma Afsheen
   B.E. (Electrical) NED UET;
   M.Engg. (Telecommunications) NED UET;
   Ph.D. (Electrical and Electronics), New Zealand

7. Dr. Fahim Ull Haque
   B.E. (Telecommunications) NED UET
   M.Engg. (Telecommunications) NED UET;
   Ph.D. (Electrical), Sweden

8. Dr. Rizwan Aslam Butt
   B.E. (Electronic) NED UET; MCIT, NED UET;
   M.Engg. (Telecommunications) NED UET;
   Ph.D. (Communication Engineering), Malaysia

9. Dr. Sundus Ali
   B.S. (Telecommunications), FAST-NU;
   M.Engg. (Telecommunications), Hamdard University;
   Ph.D. (Telecommunications) NED UET

10. Dr. Hira Mariam
    B.E. (Telecommunications) NED UET;
    M.Engg. (Telecommunications) NED UET;
    Ph.D. (Electronics) NED UET

11. Dr. Komal Masroor
    B.E. (Telecommunications) NED UET;
    M.Engg. (Telecommunications) NED UET;
    Ph.D. (Telecommunications) NED UET;

In addition to regular faculty members, the qualified faculty members available in other departments and in the city are engaged for the graduate teaching.

Applications are invited in response to the advertisement for the admission in the following programmes offered by the department should be duly completed and submitted, personally or by registered post to the below mentioned address.

(i) Master of Engineering (Telecommunications Engineering) with specialisation in RF Engineering.
(ii) Master of Engineering (Telecommunications Engineering) with specialisation in Telecommunication Networks.
(iii) Master of Science (Telecommunication Systems) Weekend programme.

The Chairperson,
Department of Telecommunications Engineering
NED University of Engineering & Technology
Karachi 7 5270, Pakistan
Phone No: +92-21-99261261-68 Ext: 2670
Fax No: +92-21-99261255
Email: ctc@neduet.edu.pk

3.14 DEPARTMENT OF BIOMEDICAL ENGINEERING

Biomedical Engineering, a discipline at the confluence of physical and biological sciences has uncovered new horizons for solving complex biological problems by exploiting engineering principles and techniques. It is the fastest growing field in the world that has evolved from being an interdisciplinary specialisation to establishing itself as an independent field. The purpose of Biomedical Engineering remains well-grounded in refining the standard of living of individuals', and more comprehensively extends to breakthroughs in improved diagnostic and therapeutic tools, design of medical instruments and prostheses, micro and nano implants; from regenerative cell tissue modalities to tailor made drugs employing the human genome, to gene therapies addressing genetic diseases.

Addressing present day intricacies and keeping at pace with the world, NED University of Engineering & Technology has taken an imperative step in establishing Biomedical Engineering Department at LEJ campus with the aim to produce healthcare professionals who through their in-depth understanding of living systems and technology essentials will not only be able to address existing problems but will also transform the health industry with innovative ventures.

In Pakistan, Biomedical Engineering is generally regarded as an extension of Electronics Engineering and doctors in large also subscribe to this view. The reality is very different. Almost all branches of engineering have a share in the development of this new field.

The Masters Programme is being offered to essentially raise the level of knowledge in Biomedical Engineering. The courses offered would have strong inclination towards research and development in this field. The type of courses offered would enable medical professionals to teach and carry out research alongside with engineers.

3.14.1 Departmental Facilities

The department is equipped with following laboratories:

1. Computing Laboratory
2. Gait Laboratory
3. Robotics Laboratory
4. Anatomy Laboratory
5. Physiology Laboratory
6. Biochemistry Laboratory
7. Bioinstrumentation Laboratory
8. Biomechanics Laboratory
9. Neuro-computation Laboratory
10. Biomaterials Laboratory

Research Fields

The current research interests of the department are as follows:

- Clinical Gait Analysis
- Rehabilitation
- Biomaterials & Tissue Engineering
- Bioinstrumentation
- Prosthetics & Orthotics
- Bioinformatics
- Neuromodulation
- Physiological Systems Modeling
- Biomechanics

3.14.2 Principal Faculty for the Programme

Chairman

Dr. Engr. Eraj Humayun Mirza

Associate Professors

1. Dr. Engr. Eraj Humayun Mirza
   B.S. (Biomedical); SSUET
   M.S. (Biomedical); University of Dundee, UK
   Ph.D. (Biomedical); University of Malaya, Malaysia
2. Dr. Muhammad Abul Hasan
   B.E. (Electronics); NEDUET
   M.Engg. (Industrial Electronics); NEDUET
   Ph.D. (Biomedical); University of Glasgow

Assistant Professors

1. Dr. Syed M. Wasim Raza
   M.B.B.S., PGDPA, MAS Sindh Medical Collage, UoK
   Ph.D. (Biomechanics, Orthopedic & Motion Analysis); University of Dundee, UK
2. Dr. Bilal Ahmed Usmani (on Leave)
   M.Sc. Mathematics; M.Phil. (Mathematics); UoK
   Ph.D. (Mathematical Modeling and Simulation of Biological Systems); University of Glasgow, UK
3. Ms. Rehana Kousar
   BSc. (Biology); Shah Abdul Latif University Khairpur
   MSc. (Biological Science); Quaid-e-Azam University, Islamabad
   M.Phil. (Development Biology); Quaid-e-Azam University, Islamabad
4. Dr. Muhammad Danish Mujib
   B.S. (Biomedical); SSUET; M.E. (Industrial Control and Automation); UIT, Hamdard; PhD. (Biomedical); NEDUET
5. Dr. Syed Faraz Jawed
   B.E. (Biomedical); NEDUET; M.E. (Biomedical); NEDUET
   PhD. (Biomedical Materials); Edith Cowan University, Australia
6. Dr. Ahmed Zahid Rao
   B.E. (Biomedical); NEDUET; M.S. (Biomedical); New Jersey Institute of Technology, USA; PhD (Biomedical); NEDUET
7. Mr. Riaz Uddin(on leave)
   B.S. (Biomedical); SSUET; M.S. (Biomedical); SSUET
   MBA, IBA, Karachi; PhD (in progress); University of Auckland, New Zealand
8. Dr. Saima Kashif
   B.E. (Biomedical); NEDUET; M.E. (Biomedical); NEDUET
   PhD (Biomaterials); University of Edinburgh, Scotland
9. Dr. Madeeha Sadia
   B.S. (Biomedical); SSUET; M.E. (Electronics); NEDUET
   MBA, IBM, Karachi
   PhD (Biomedical); University of Technology, Malaysia

In additional to regular faculty members, qualified personnel in the city are engaged for postgraduate teaching.

Applications in response to advertisement for Master of Engineering (Biomedical) shall be duly completed and submitted, personally or by registered post to:

The Chairman
Department of Biomedical Engineering
NED LEJ Campus
81-A, Block-3, Memon Cooperative Housing Society, Karachi-74800
Phone: 99230602; 99230604
Fax: 99230602
Email: cbm@neduet.edu.pk

3.15 DEPARTMENT OF SOFTWARE ENGINEERING

The Department of Software Engineering, NED University, takes pride in being one of the highest ranking departments of the University. It aims to provide quality education and various areas of research, providing in- depth learning of not only tools and techniques for advancements, but skills to build and test proficient software using these technologies, in order to prepare students with the latest emerging fields for various development and research positions in the market or for higher education and to provide solutions to real world problems.

It inculcates a sense of service and leadership in its graduates. Their foundation is such that they can be life- long learners due to the department's strong emphasis on promoting research in emerging fields such as artificial intelligence, robotics, machine learning, big data, etc. Our graduates are well perceived and sought after by the industry where they have been successful in securing suitable positions.

The department facilitates students and to enhance their practical knowledge has provided 6 highly equipped computer laboratories. These laboritories are accessible at all times to both students and the faculty and are also linked through the state of the art network environment.

- Database Lab
- General Purpose Computer Lab
- Graphics Lab
- AI Lab
- Networks Lab
- Project Lab

3.15.1 Principal Faculty for the Programme

Chairperson

Prof. Dr. Shehnila Zardari

Professor

Prof. Dr. Shehnila Zardari
B.E. (Software), MUET;
M.E. (Communication Systems & Networks), MUET;
Ph.D. (Computer Science), UK

Associate Professors

1. Engr. Dr. Sh. Muhammad Wahabuddin Usmani
B.E. (Electronics), DCET;
M.Sc. (Computer Science) NED UET;
Ph.D. (Computer Science) NED UET

2. Engr. Dr. Raheela Asif
B.E. (Computer & Information Systems Engineering) NED UET;
MS (Computer Science & Information Technology) NED UET;
MS (Software Engineering), SSUET;
Ph.D. (Computer Science) NED UET

Assistant Professors

1. Engr. Dr. Kashif Mehboob Khan
BS (Computer Engineering), SSUET;
MS (CSIT) NED UET;
Ph.D. (Computer Science) NED UET

2. Engr. Dr. Mustafa Latif
B.E. (Computer & Information Systems Engineering) NED UET;
M. Engg. (Computer Systems) NED UET;
Ph.D. (Computer Systems Engineering) NED UET

3. Engr. Dr. Muhammad Faraz Hyder
B.E. (Computer & Information Systems Engineering) NED UET;
M. Engg. (Computer Systems) NED UET;
M. Engg. (Telecommunications) NED UET;
Ph.D. (Computer Systems Engineering) NED UET

4. Engr. Asma Khan
B.E. (Computer Systems), MUET;
M.E. (Information Technology), MUET

5. Engr. Shumaila Ashfaq
B.E. (Computer & Information Systems Engineering) NED UET;
M. Engg. (Computer Architecture & System Design) NED UET

6. Engr. Simra Najm
B.E. (Computer & Information Systems Engineering) NED UET;
M. Engg. (Computer Systems) NED UET

In addition to regular faculty members, qualified professionals from other Departments and organizations are also engaged for post- graduate teaching.

Applications in response to advertisement for Master of Engineering (Software) Programme shall be duly completed and submitted, personally or by registered post to:

The Chairperson
Department of Software Engineering
NED University of Engineering & Technology
University Road, Karachi-75270, Pakistan
Ph. No. +92-21-99261261-8 Ext. 2399
Fax No. +92-21-99261255
E-mail: cse@neduet.edu.pk

3.16 DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

NED University, responding to the growing demand for computer professionals, introduced in 1985 a postgraduate programme leading to the degree of M.Sc. in Computer Science under the Department of Mathematics & Basic Sciences. Furthermore, to address the rapidly evolving technology and human resource requirements, a four-year Bachelor of Computer Science & Information Technology (BCIT) programme was also introduced in 1998. Realizing the importance of advancement in Computer Science and Information Technology and meeting the requirements of the fast-growing field, the Department of Mathematics & Basic Sciences was bifurcated in 2002 and a separate department, the Department of Computer Science & Information Technology (CS & IT) was established.

The first batch of the BCIT programme passed out in 2003. Our graduates are well perceived and sought after by the industry where they have been successful in securing suitable positions. Good numbers have obtained admission to Master's programmes in foreign universities. The demand for Computer Science graduates in the flourishing IT industry continues to multiply, providing excellent prospects for those with high-quality skills. To augment this academic level and to improve the quality of IT skills, the postgraduate programme Master of Computer Science and Information Technology (MCIT) was initiated in 2003 by the CS & IT department.

The MCIT programme covers the state-of-the-art technology in Computing and IT industries, the strong computing and software engineering foundations of the discipline and the ability to contribute in large software engineering projects. It is designed to meet the needs of students who want to improve core computing skills, or who are working IT professionals and want to strengthen their computing foundations with a view towards new and emerging technologies. In 2014, the MCIT programme was renamed as MS Computer Science & IT - MS(CSIT) for batches 2014 and onwards. Additionally, a new specialisation streams was initiated in the MS programme, thus two specialisation streams are offered; Computer Science and Information Technology i.e. MS (CSIT), and Information Security i.e. MS (IS).

The MS (IS) specialisation stream was conceived as a result of rapidly increasing challenges to the security of national information systems and frequently occurring incidents of cybercrime in national and international horizons. To meet these challenges, the shortage of cybersecurity professionals available in the country is getting worse. Commenced from Fall-2014 semester, the MS (IS) stream enables students to attain in-depth knowledge of system and managerial aspects of information security, so that they can actively contribute to the prevention of IT infrastructures from latest security threats, and the development of secured systems.

Realizing the growing demand of data scientists in the global IT industry a new specialisation stream MS (Data Science) – MS (DS) was launched under the CS & IT department from Fall-2019 semester. This new specialisation equips students to transform data into actionable insights that enable one to make complex business decisions, process large and complex data sets through computational, statistical and machine learning techniques. This program provides exposure to the latest trends and technologies in data science and thus producing the manpower to fuel national and international emerging market of data science products.

In today's world, Spatial Science and Geographic Information have become integral to our daily lives, thanks to the widespread availability of Global Navigation Satellite System (GNSS) based devices at our fingertips. GNSS and GIS have bestowed us with invaluable benefits, ranging from free navigation systems to early earthquake warning systems and geo-location-based services such as online taxi services, food/grocery delivery services and countless others. Recognizing the escalating demand for experts in geospatial data analysis, the Department of Computer Science and Information Technology has launched a specialized track within the MS Data Science program: Geospatial Data Science – MS DS (GDS) from Spring 2024.

All four specialisations are offered both as evening and weekend programmes.

3.16.1 Departmental Facilities

The Department has the following physical resources:

Infrastructure:

The Department is housed in three blocks:

1. Chairman and Faculty Offices
2. Lecture rooms
3. Laboratories

Computing Facilities:

The Department currently possesses six spacious computer laboratories, equipped with latest state of the art resources which are constantly upgraded with evolving trends and emerging technologies as needed.

Computer laboratories are equipped with the following:

1. Server Machine (Dell PowerEdge T130 Tower Server)
2. Desktop Machines (Dell OptiPlex 7050 Minitower (MT)
3. Tower PCs (HP EliteDesk 800 G3 Tower PC Intel Core i7-7700)
4. Huawei Networking Laboratory with latest routers, switches and firewalls.
5. Project Lab with computers of special specifications for students projects.
6. High quality laser printers and scanners.
7. Multimedia projectors and other audio visual facilities.
8. Various simulators and software for specific purposes.
9. High speed wired and wireless LAN connectivity to all computer labs.
10. High speed Internet facility.
11. UPS and standby generators.

3.16.2 Eligibility requirement

For admission in MS (CSIT) and MS (IS) candidates must have HEC recognized degree with First division or CGPA 2.4 / 4.0 in any of the following:

a) BS (CSIT) or equivalent
b) Any Engineering/ Architecture degree or equivalent
c) BS Electronics / Telecommunications / Software Engineering
d) M.Sc / BS Applied Mathematics/ Applied Physics/Statistics

For admission in MS (DS) students having a degree of BS (CS) or equivalent as per HEC curriculum or 16 years of education in the domains of Information Technology, Software Engineering, Computer Engineering, Electrical Engineering, Statistics, or Mathematics and other relevant disciplines with at least First Division or 2.4 / 4.0 CGPA are eligible to apply, provided they take deficiency courses where applicable.

For admission in MSDS (GDS) students having a degree of BS (CS) or equivalent as per HEC curriculum or 16 years of education in the domains of Information Technology, Software Engineering, Computer Engineering, Electrical Engineering, Statistics or Mathematics, Remote Sensing & GIS, and other relevant disciplines with at least First Division or 2.4 / 4.0 CGPA are eligible to apply, provided they take deficiency courses where applicable.

3.16.3 Principal Faculty for the Programme

Chairman

Prof. Dr. Muhammad Mubashir Khan

Professors

1. Prof. Dr. Muhammad Mubashir Khan
   Postdoctorate (Quantum Information), (Leeds, UK)
   Ph.D. (Computer Science) (Leeds, UK)
   MCIT (by Research) NED
   MSc. (Telecom), Univ. of Sindh

2. Prof. Dr. Najeed Ahmed Khan
   Ph.D. (Computer Science) (Leeds, UK)
   MSc. (Computer Science)
   MSc. (Maths,) (Gold Medal)

3. Prof. Dr. Shariq Mahmood Khan
   Ph.D. (Brunel, UK);
   MCIT (NED); BCIT (NED)

Associate Professors

Dr. Saman Hina
Ph.D. (Computer Science) (Leeds, UK);
MCIT (NED); BS (Computer Science) SSUET

Assistant Professors

1. Dr. Waseemullah.
   Ph.D. (Computer Science) NED;
   MCIT (NED); BCIT (NED)

2. Dr. Muhammad Umer Farooq.
   Ph.D. (Computer Science) NED;
   MCIT (NED); BCIT (NED)

3. Dr. Maria Andaleeb Siddiqui
   Ph.D. (Computer Science) NED;
   ME (Computer Networks and Performance Evaluation) NED;
   BE (Telecom) NED

4. Dr. Murk Marvi.
   Ph.D. (NED);
   ME (Computer System and Networks) MUET;
   B.E. (Telecommunication) MUET

5. Dr. Usman Amjad.
   Ph.D. (University of Karachi);
   MS (University of Karachi);
   BS (CS). (University of Karachi)

6. Dr. Abdul Karim Kazi.
   Ph.D (NED); MCIT (NED);
   MCS (University of Karachi);
   BCS (University of Karachi)

7. Dr. Muhammad Kamran.
   Ph.D (NED); MCIT (NED);
   BS (Computer Science) (University of Karachi)

In addition to regular faculty members, qualified and experienced personnel in other departments of NED University of Engineering and Technology, and in the city may be engaged for graduate teaching.

Applications in response to advertisement for all four specialisations shall be submitted in person or by registered post to:

The Chairperson
Department of Computer Science & Information Technology
NED University of Engineering & Technology
Karachi 75270, Pakistan
Phone No.92-21-99261261-8 Ext: 2399
Fax No. 92-21-99261255
E-mail: chaircsit@neduet.edu.pk

3.17 DEPARTMENT OF MATERIALS ENGINEERING

The evolution and development of materials had led to the development of human cultures and industries. Every product is an aggregate of materials made in various types. Materials Engineering is an interdisciplinary field that addresses the structure, processing, and property relationships in materials for engineering applications. Basic principles of chemistry and physics are applied to provide an understanding of the structure of materials and the manner in which the structure determines the properties. Engineering processing methods are then applied to yield the necessary properties, which then can be integrated with, and designed to accommodate the needs of modern technology. In particular, as an academic field with great industrial fundamentality and importance, it has a large ripple effect on all industries as well as a very broad and intensive scope of study.

The Department of Materials Engineering was established in 2006 at NED University, and is offering programmes for the award of Bachelors, Masters and Ph.D. degree in the field of Materials Engineering. The Masters programme is offered with specialisation in many innovative fields of Materials Engineering. The structure of the programme is designed to provide an interesting and stimulating learning experience to study the manufacturing, processing and characterisation of not only conventional iron and steels but also new innovative materials made with advanced properties.

The curriculum for Master's degree is specifically designed to commensurate with the need of the industry and R&D at home and keeping in view of the recent research trends abroad in the field to impart quality education at standards equal to that of any international university in the field of materials. The Masters degree is awarded after successful completion of 30-credit hour's course work. The Ph.D. programme in various advanced fields of the Materials Engineering is by full time research.

3.17.1 Departmental Facilities

The Department of Materials Engineering has modern teaching facilities and state of the art laboratories having equipment related to every field of materials engineering to complement its extensive in-class teaching, such as, but not limited to Processing and Characterisation of aterials and its synthesis etc.

The department has following fully functional state of the art laboratories:

1. Composite and Ceramics Processing Lab (CCPL)
2. Manufacturing and Thermal Treatment Lab (MTTL)
3. Materialography Lab (ML)
4. Optical Microscopy Lab (OML)
5. Computer Modeling and Simulation Lab (CMSL)
6. Destructive and Non Destructive Lab (DNDL)
7. Advanced Materials Characterization Lab (AMCL)
8. Electro Ceramics Lab (ECL)
9. Hydrogen Generation Lab (HGL)
10. Corrosion Lab (CL)
11. Nano Lab (NL)
12. Scanning Electron Microscopy Lab (SEML)

Research Areas

Department of Materials Engineering offers Master's Program M. Engg. (Materials) and Ph.D. Program in following research areas of materials engineering:

- Advanced Steel
- NDT
- Functional Materials
- Nano-materials
- Advanced Coatings
- Biomaterials
- Composite Materials
- Magnetic Materials
- Corrosion
- Superalloys
- Superconducting Materials
- Failure Analysis of Materials
- Aerospace Materials

3.17.2 Principal Faculty for the Programme

Chairperson (Materials Engineering)

Prof. Dr. Fayaz Hussain

Professors (Materials Engineering)

1. Prof. Dr. Fayaz Hussain
   B.E. (Metallurgical Engg.) MUET
   M. Engg. (Materials Engg.) NEDUET
   Ph. D. (Functional Materials and Devices)
   The University of Sheffield, United Kingdom.

2. Prof. Dr. Muhammad Sohail Hanif
   B.E. (Industrial Manufacturing Engg.) NEDUET
   M. Engg. (Materials Engg.) NEDUET
   Ph. D. (Advanced Laser), KAIST, South Korea.

Assistant Professors (Materials Engineering)

1. Dr. Muhammad Sajid Ali Asghar
   B.E. (Metallurgy and Materials Engg.) MUET
   M. Engg. (Materials Engg.) NEDUET
   Ph. D. (Nano Materials),
   The University of Sheffield, United Kingdom.

2. Dr. Faaz Ahmed Butt
   B.E. (Metallurgical Engg.) NEDUET
   M. Engg. (Materials Engg.) NEDUET
   Ph. D. (Nano Materials for Energy Application)
   KOC University Istanbul, Turkey.

3. Dr. Sajida Shaikh
   B.E. (Materials Engg.) NEDUET
   M. Engg. (Materials Engg.) NEDUET
   Ph. D. (Materials & Metallurgical Engg.) NEDUET

4. Engr. Abdul Rauf Jamali
   B.E. (Metallurgy and Materials Engg.) MUET
   M.Sc. (Materials Engg.), Germany
   Ph. D. (In Progress), NEDUET

5. Engr. Muhammad Faizan (on study leave)
   B.E. (Materials Engg.) NEDUET
   M. Engg. (Materials Engg.) NEDUET
   Ph. D. (In Progress), South Korea.

Chairperson (Metallurgical Engineering)

Prof. Dr. Ali Dad Chandio

Professors (Metallurgical Engineering)

1. Prof. Dr. Ali Dad Chandio
   B.E. (Metallurgical and Materials Engg.) MUET
   M. Engg. (Materials Engg.) NEDUET
   Ph. D. (High Temperature Materials for Aero-engine applications), United Kingdom.

2. Prof. Dr. Shahid Hussain
   B.E. (Metallurgy and Materials Engg.) MUET,
   M. Engg. (Materials Engg.), NED UET,
   Ph. D. (Nano and Functional Materials), South Korea

Associate Professor (Metallurgical Engineering)

Dr. Nafis-Ul-Haque
B.E. (Metallurgy and Materials Engg.) MUET
M.Engg. (Materials Engg.), NED UET
Ph. D. (Metallurgy), University of Leeds, UK

Assistant Professors (Metallurgical Engineering)

1. Dr. -Ing. Iftikhar Ahmed Channa
   B.E. (Metallurgy and Materials Engg.) MUET
   M.Engg. (Materials Engg.), NED UET
   Ph. D. Renewable Energy/Organic Photovoltaic (Germany)

2. Dr. Aqeel Ahmed Shah
   B.E. (Metallurgy and Materials Engg.) MUET
   M.S. (Nanotechnology) (Fine Chemical Engineering) South Korea
   Ph. D. (Materials & Metallurgical Engg.) NED UET

3. Dr. -Ing. Laraib Sarfraz Khanzada
   B.E. (Metallurgy and Materials Engg.) MUET
   M. Engg. (Materials Engg.), NED UET
   Ph. D. (Inorganic Photovoltaic Materials) (Germany)

4. Dr. Muhammad Ali Siddiqui
   B.E. (Metallurgical and Materials Engg.) MUET
   M. Engg. (Materials Engg.) NED UET
   Ph. D. (Materials Science and Engineering) China

5. Dr. Muhammad Samiuddin
   B.E. (Materials Engg.), NED UET
   M.Engg. (Materials Engg.) NED UET
   Ph. D. (Materials Processing Engineering), Northwestern Polytechnical University, China

6. Dr. Waseem Khan
   B.E. (Metallurgical Engg), NED UET
   M.Engg. (Materials Engg.), NED UET
   Ph. D. (Materials & Metallurgical Engg.), NEDUET

7. Dr. Muhammad Rizwan
   B.E. (Materials Engg.), NED UET
   M. Engg. (Materials Engg.) NED UET
   Ph. D. (Bioceramic Composite), University of Malaya, Malaysia

8. Dr. Shafaq Asrar
   B.E. (Materials Engg.), NED UET
   M. Engg. (Materials Engg.), NED UET
   Ph. D. (Materials & Metallurgical Engg.) NEDUET

9. Dr. Ambreen Azmat
   B.E. (Materials Engg.), NED UET
   M. Engg. (Materials Engg.), NED UET
   Ph. D. (Materials & Metallurgical Engg.), NEDUET

10. Dr. Zubia Kamran
    B.E. (Metallurgical Engg.), NED UET
    M. Engg (Materials Engg.), NED UET
    Ph. D. (Materials & Metallurgical Engg.), NEDUET

In addition to regular faculty members, qualified personnel from other departments of NED University, industry and R&D organisations in the city are also engaged for post-graduate teaching.

Applications in response to advertisement for Master of Engineering (Materials) Programme should be duly completed are required to be submitted, personally or by registered post to:

The Chairperson
Department of Materials Engineering,
NED University of Engineering and Technology,
Karachi-75270, Pakistan.
Ph. No: + 92-21-99261261-8, Ext: 2388
+ 92-21-99261251
Fax No: + 92-21-99261255
Email: cmm@neduet.edu.pk

3.18 DEPARTMENT OF CHEMICAL ENGINEERING

Chemical Engineering retains a special position of great importance in modern economies; along with its role in the older industries, such as heavy chemicals, hydrocarbon processing, petrochemicals etc., it has emerged as discipline of key importance in new technologies including life sciences/bio-technology, food processing, plastics and polymers, fibers, ceramics, metals, glass and specialty chemicals. In addition, with concern over environmental degradation, the skills of chemical engineers are increasingly important for private business, government and international institutions.

Chemical Engineers with graduate qualifications contribute immensely to the establishment of industrial projects at several stages including product market studies, evaluation and selection of feedstock's, process design, basic and detailed engineering, plant installation, testing, commissioning, and operation. There is an ever increasing place for post graduate chemical engineers in research.

Realizing the importance of Chemical Engineering, the department of Chemical Engineering was established under Mega Project. At present we are offering both Undergraduate and Postgraduate Programmes.

The Postgraduate Programme is an evening Programme designed to accommodate working graduate engineering professional who are seeking to broaden their knowledge and deepen their technical skills to solve problems of local chemical and processing industries with greater responsibility. Students will apply their new skills immediately in their workplace environments. The Programme is also aimed to produce quality researchers and faculty members for local universities and institutions.

3.18.1 Departmental Facilities

Department of Chemical Engineering has fully equipped laboratories. Computer lab has the latest state-of-the-art software. The infrastructure consists of multimedia facilities, computer laboratories, software and related facilities

Research Fields

The research interests of the department are mainly in the fields of CFD, Bio-Diesel Technology, Fuel Cell Technology, Fluidized Bed Reactors, Coal Gasification and Liquefaction of Synthetic gas to synthetic Diesel. Engineering application of Artificial Intelligence and Machine Learning, and Intelligence control in process plants.

3.18.2 Principal Faculty for the Programme

Chairperson

Prof. Dr. Saud Hashmi

Professor

Prof. Dr. Saud Hashmi
B.E (Chemical Engg), MUET;
M.E. (Environmental) NEDUET;
Ph.D (Chemical Engg), Chonkbuk Uni, South Korea

Associate Professor

1. Dr. Fahim Uddin
   B.E (Chemical), NED;
   M.Engg. (Chemical) NED;
   Ph.D. (Chemical) University Teknologi Petronas,Malaysia.
2. Dr. Syed Ali Ammar Taqvi
   B.E (Chemical), NED;
   M.Engg. (Chemical) NED;
   Ph.D. (Chemical), University Teknologi Petronas, Malaysia
3. Dr. Faizan Raza
   B.E. (Chemical, UoK)
   MS leading to Ph.D (Chemical, Hanyng Uni, South Korea

Assistant Professor

1. Mr. Rizwan Ahmed Qamar
   M.Engg. (Chemical, NED)
   B.E. (Chemical, IET, BZU-Multan)
2. Dr. Sajid Muhbat
   B.E. (Chemical, Mehran Uni)
   M. Engg. (Chemical) NEDUET;
   Ph.D. (Chemical) NEDUET;
3. Dr. Saad Nadeem
   B.E. (Chemical, DUET)
   M.Engg. (Chemical, NEDUET)
   Ph.D. (Chemical) Malaysia;

In addition to regular faculty members, qualified personnel from the other departments and in the city may be engaged for graduate teaching.

Applications in response to advertisement for Master of Engineering (Chemical) should be duly completed and submitted, personally or by registered post to:

The Chairperson
Department of Chemical Engineering,
NED University of Engineering & Technology,
Karachi-75270, Pakistan.
Ph. No. +92-21-99261261-68 Ext: 2286
Fax No. +92-21-99261255
Email: cec@neduet.edu.pk

3.19 DEPARTMENT OF POLYMER & PETROCHEMICAL ENGINEERING

Polymer engineering is a multidisciplinary and extremely important discipline in the current scenario of Pakistan's industries. Polymers (plastics & composites) being the frontier materials for today's civilization. The course curriculum is especially designed to fulfill the current needs of the polymer industry, research institutes and academia. It covers the practical problems of manufacturing, processing, and characterization of polymeric materials & composites. The main objective of the course on polymer engineering is to improve the knowledge of the undergraduate students to get better jobs in the relevant field or even start up their own business and produce quality researchers and faculty members for local and international universities and institutes.

The Department of Polymer & Petrochemical Engineering was established in 2007 at NED University. The department is offering Bachelors and Masters programme in the field of Polymer & Petrochemical Engineering. The department has started Ph. D programme from Fall 2021. The Masters programme is offered with specialisation in many advanced fields of the polymer engineering. As the programme is offered in evening it can easily accommodate working engineering professionals who want to broaden their knowledge and deepen their technical & computing skills notably related to the polymer industries.

3.19.1 Departmental Facilities

The department has in-house laboratory facilities in addition to the laboratory facilities available from the other departments of the NED University. Following laboratories are presently accessible to the department:

- XRD and Crystallography Lab
- Optical and Scanning Electron Microscopy Labs
- Advanced Materials Processing Lab
- Thermal Analysis Lab
- Mechanical Testing Lab
- Advanced Coatings Lab
- Nano Materials Lab
- Computer Modeling and Simulation Lab

Research Fields

- Polymeric Hollow Capsules for Controlled Released Applications
- Polymerization in Confined Spaces
- Controlled Radical Polymerization (RAFT)
- Polymer Rheology and Implication of Structure Development
- Polymer (Nano)Composites
- Bio-Polymers
- Polymeric Membranes

3.19.2 Principal Faculty for the Programme

Chairperson (Acting)

Prof. Dr. Saud Hashmi

Associate Professor

Dr. Asim Mushtaq
B.E. (Chemical), NED UET;
M.Engg. (Environmental) NED UET;
Ph.D. (Chemical), Malaysia

Assistant Professors

1. Engr. Raza Muhammad Khan
   B.E. (Polymer), Hamdard University;
   M.Sc. (Advanced Materials Engineering), UK;
   Ph.D. (In Progress) NED UET

2. Dr. Rafiq Ahmed
   B.Sc. (Applied Chemistry);
   M.Sc. (Applied Chemistry);
   Ph.D. (Polymer Technology), Netherlands

3. Engr. Nadia Khan
   B.E.(Chemical) NED UET;
   M.Engg. (Chemical) NED UET

In addition to the regular faculty members qualified personnel from other departments of NED UET, industry and R & D organizations in the city are also engaged for post-graduate teaching.

Applications in response to the advertisement for Masters of Engineering (Polymer) programme should be duly completed and submitted personally or by registered post to:

The Chairperson
Department of Polymer & Petrochemical Engineering
NED University of Engineering & Technology,
Karachi-75270, Pakistan
Ph. No.: 021-99261261-8 Ext. 2404
Fax No.: 021-99261255
Email: cpp@neduet.edu.pk

3.20 DEPARTMENT OF ARCHITECTURE AND PLANNING

The NED University has remained the foremost institution in professional education in engineering and related disciplines. In its working, the university had developed a regulatory, academic and administrative framework for architecture and planning education which today provides a useful opportunity for appropriate education in these disciplines. The working strength of architects is much less than what is practically needed. Given the vast professional sphere in which the architects operate, the numerical strength is simply minimal. A technically sound and socially responsive breed of architects and planners need to be produced to fill this widening gap. Architecture and Planning Department at NED University has been attempting to address these and several other related challenges in the professional domain.

The creation of a Department of Architecture and Planning has been a part and parcel of NED's Master Plan. The present resources, facilities, spaces and technological backup are ample and adequate to support this purpose. Besides, the presence of various disciplines at the university act as a supportive factor for the Architecture Department. Ever since its creation in 2000, the Department has undertaken numerous research and outreach activities. The Journal of Research in Architecture and Planning, launched in 2001, has now been regularly published on bi-annual basis and is listed in HJRS (HEC) as Y Category Journal. The Department has been part of various collaborative research and development exercises with local as well as international universities of repute. Few of the recent research collaborations are with Cardiff University and London School of Economics. These collaborations are based around urban and solid waste researches.

The department was a collaborative partner with four international universities from Europe and South Asia in the European Commission funded Asia-Link and Asia-Urbs Programmes between 2004 and 2007. This linkage produced several research outputs in the field of urban design. Besides, the Department is the Secretariat of International Council of Monuments and Sites (ICOMOS). The Department collaborated with the United Nations Centre for Human Settlements (UNHABITAT) for preparation of City profiles and plans of Larkana, Kech-Turbat, Sialkot, Gilgit, Mingora, Mansehra, Landi Kotal and Muzzaffarabad (in Azad Jammu and Kashmir) in 2011-12. The department collaborated with International Institute of Environment also and Development (IIED) to undertake Karachi Land Study published as a monograph in 2013. The Department has been conducting a Master of Urban and Regional Planning Programme since 2002. This programme was launched with the active assistance from University of Western Sydney, Australia. A significant need, was also found for the initiation of Master of Architecture Programme due to diversifying job market, enhanced demand of specialised capacity in the domains of theoretical and applicational spheres and development of teaching faculty in architectural theory and design pedagogy. Master of Architecture Programme, initiated in 2009, is aimed at serving a need of the country. Recently the UNESCO Chair on sustainable Urban Regions has been established at the University in which Department of Architecture is one of the contribution.

3.20.1 Principal Faculty for the Programme

Chairperson

Prof. Dr. Anila Naeem

Co-Chairperson

Dr. Saeed Ud Din Ahmed

Professors

1. Prof. Dr. Noman Ahmed
   B. Arch., DCET/NED UET; M.C.P., Turkey;
   Ph.D. (Civil and Building Engineering), UK; MPCATP
2. Prof. Dr. Anila Naeem
   B. Arch., DCET/NED UET;
   M.S. (Restoration and Preservation of Historical Monuments), Turkey;
   Ph.D. (Urban Design - Historic Preservation), UK; MPCATP

Associate Professors

1. Ms. Fariha Amjad Ubaid
   B.Arch., NCA, Lahore; MCPUD, Turkey; MPCATP
2. Dr. Saeed Ud Din Ahmed
   B.Arch., NED UET; MURP, NED UET;
   Ph.D. (City and Regional Planning), UK; MPCATP

Assistant Professors

1. Dr. Fahmida Bano Shaikh
   B.Arch., MUET; MURP, NED UET;
   Ph.D. NED UET; MPCATP
2. Dr. Ravindar Kumar Ravi
   B.Arch., DCET/NED UET; MUD, DCET/NED UET;
   Ph.D. NED UET; MPCATP
3. Mr. Salman Manzoor Hasan
   B.Arch., NCA, Lahore; M.Arch. NED UET; MPCATP
4. Dr. Masooma Mohib Shakir
   B.Arch. IVSAA, Karachi; M.Arch., Belgium;
   Ph.D. (Urban Heritage)*, Germany; MPCATP*
5. Ms. Saadia Bano
   B.Arch. NED UET; MEM (Construction Management) NED UET; MPCATP
6. Dr. Rabela Junejo
   B.Arch., MUET; M.S. (History of Architecture), Turkey;
   Ph.D. (History of Architecture Program), Turkey; MPCATP
7. Ms. Farida Abdul Ghaffar
   B.Arch., DCET/NED UET; MURP, NED UET; MPCATP
8. Ms. Sarah Ather Khan
   B.Arch., NED UET; MURP, NED UET; MPCATP

The Chairperson
Department of Architecture and Planning
NED University of Engineering & Technology
(City Campus)
Maulana Din Mohammad Wafai Road
Karachi-74200, Pakistan.
Ph. No. +92-21-99332078
+92-21-32620793
+92-21-32210225
Email: crd@neduet.edu.pk

3.21 DEPARTMENT OF MATHEMATICS

The Department of Mathematics & Sciences was established along with the engineering departments at NED University. In 2010 an independent Department of Mathematics was established to cater the requirements of Mathematics in all the disciplines being taught at the University, and furthermore, to initiate its own degree programme. In July 2011 the Department has launched a Master's degree programme in Applied Mathematics with the objective of imparting strong knowledge by utilising both analytical and software tools for mathematical applications in different professions.

Realising the requirements of educational and professional institutions / organisations, mathematician with computing skills would be an attractive proposition to potential employers. The structure of the programme has been designed in a manner that the applicants have the option to completing this programme through course work only / course work and an individual study project / course work with dissertation.

The MS in Applied Mathematics is an evening / weekend programme beneficial to both engineering and science graduates. The motivation in initiating the programme is to encourage multi-disciplinary research by offering opportunities for higher studies to fresh graduates as well as experienced graduates employed in industry and other professional sectors, and to provide a route towards a Ph.D degree to those desiring to do so.

3.21.1 Principal Faculty for the Programme

Chairman

Prof. Dr. Mirza Mahmood Baig

Professors

Dr. Mirza Mahmood Baig
M.Sc. (Mathematics) (UoK); MS (Comp. Sc.) NEDUET
Ph.D (Comp. Sc.) NEDUET; Member KMA

Assistant Professors

1. Mr. Javed Ahmed Siddiqui
   B.Sc. (Hons) UoK; M.Sc. (Mathematics) (UoK)
2. Ms. Razia Shaheen
   B.Sc. (Hons) UoK; M.Sc. (Mathematics) UoK;
   M.Phil UoK
3. Dr. Muhammad Jamil
   B.Sc. (Hons) UoK; M.Sc. (Mathematics) UoK;
   M.Phil UoK; Ph.D. (Mathematics)
   G.C. University, Lahore
4. Dr. Fareed Ahmed
   B.Sc. (Hons) UoK; M.Sc. (Mathematics) UoK;
   MS (Comp. Sc.) NEDUET; Ph.D. (Comp. Sc.) NEDUET
5. Dr. Azam Khan
   M.Sc. (Maths) UoK;
   Ph.D. (Linkoping University, Sweden)
6. Ms. Shumaila Usman
   B.Sc. (Hons) UoK; M.Sc. (Statistics) UoK;
   MS (Comp. Sc.) NEDUET
7. Dr. Fahim Raees
   B.Sc. (Hons) UoK; M.Sc. (Mathematics) UoK;
   Ph.D. (Computational Fluid Dynamics);
   TU Delft, The Netherlands
8. Dr. Kamran Zakaria
   M.Sc. (IBM) UoK; (DAE CS); (DAE Java Programme)
   Ph.D. (Mathematics) FUUAST
9. Mr. Zakir Hussain Khan
   B.Sc. (Hons) UoK; M.Sc. (Statistics) UoK
   MS. (Applied Mathematics) NEDUET
10. Dr. Faqiha Sultan
    B.Sc. (Hons) UoK; M.Sc. (Mathematics) UoK;
    Ph. D. (Applied Mathematics) UoK
11. Dr. Syed Tauqeer Ahmed Hashmi
    B.Sc. (Hons) UoK; M.Sc. (Statistics) UoK
    MS (Applied Mathematics) NEDUET
    Ph.D. (Applied Mathematics); NEDUET
12. Mr. Sohail Ahmed
    B.Sc. (Hons) UoK; M.Sc. (Statistics) UoK
    MS (Applied Mathematics) NEDUET
13. Dr. Muhammad Yousuf Tufail
    B.Sc. (Hons) (Mathematics) UoK;
    M.Sc. (Mathematics) Uok
    Ph.D. (Mathematics) Massey University Newzeland
14. Dr. Ubaida Fatima
    B.E. (Bio-Medical) NEDUET;
    MS (Applied Mathematics) NEDUET
    Ph.D. (Applied Mathematics) NEDUET
15. Dr. Saima Gul
    B.Sc (Hons); M.Sc (Mathematics) UoK
    Ph.D (Mathematics) Massey University, New Zealand
16. Dr. Muhammad Samad Khan
    B.E. (Electrical) NEDUET; MS (Applied Mathematics);
    Ph.D. (Applied Mathematics) NEDUET

In addition to regular faculty members qualified personnel in other departments and in the city may be engaged for graduate teaching.

Applications in response to advertisement for MS in Applied Mathematics shall be duly completed and submitted, personally or be registered post to:

The Chairperson
Department of Mathematics
NED University of Engineering & Technology
Karachi 75270, Pakistan
Phone No. +92-21-99261261-8 Ext:2609
Fax No. +92-21-99261255
E-mail: cdm@neduet.edu.pk

3.22 DEPARTMENT OF PHYSICS

The Physic has been essential in under standing the every day world and the interaction of matter, force and energy. The subject covers the unseen subatomic particles, their constituents, electromagnetic field and also the un believably vast Universe.

Physic play a vital role in the development of technologies such as the microchip, information technology, data storage, fibre-optic communication, satellite navigation and mobile phones which are transforming the infrastructure of the society.

The modern world is enjoying the benefits of, robotics, automation, semiconductors and optical devices, Medical Physics, navigational and broadcasting system, Advanced medical technology in diagnostics & Therapeutics etc. This tremendous growth in science and technology in the last few decades is in one way or the other, related to or based on fundamental principals of Physics.

The Department of Physics was established as an independent department in 2010. Initially it was serving as a supporting department which offered both theoretical and practical courses in Physics to undergraduate level of engineering students.

In addition to its importance to technology and industry, Physics plays a fundamental role in shaping the attitude and behaviour of society. Realising the importance of Physics in the development of new technologies, MS programme in Physics was launched in 2013. The purpose of this programme is to produce scientifically and technologically motivated graduates (a) to promote interdisciplinary research among the students and the faculty and (b) to enhance their employability in industry and other related fields. The structure of the programme has been designed in such a manner that research-orientated graduates can undertake research projects. The MS in Physics is an evening programme for which the engineering and science graduates, having completed sixteen years of education are eligible. MS Physics programme has been divided into three specialisations:

i) Physics
ii) Optics
iii) Medical Physics

Out graduates, equipped with knowledge of Physics and relevant skills are proving themselves a valuable asset for their hiring organizations.

3.22.1 Departmental Facilities

The department of physics have three well established laboratories with following facilities:

1. Fourier-Transform Infrared Spectroscopy (FTIR) (NICOLET IS50)
2. Weather Station Data Logger
3. XRD Unit Phywe 4.0
4. He-Ne Laser based setup
5. Spectrophotometer
6. Vacuum System
7. Falling Ball Viscometer
8. Hall Effect Apparatus for Semiconductors
9. Ultrasonic Bath
10. Hot Plate with Magnetic Stirrer
11. Precession Michelson Interferometer

3.22.2 Research Fields:

Students of MS in Physics are doing research in the following field:

1. Optics
2. Material Science
2. Space Physics
3. Electronics
4. Quantum Computing
5. Medical Physics
6. Theoretical / Experimental Physics & Relevant Fields.

3.22.3 Principal Faculty for the Programme:

Chairperson

Dr. Irfan Ahmed

Associate Professor

Dr. Irfan Ahmed
B.E. (Electrical) NED; M. Engg. (Electrical) NED;
Ph.D. (Electrical) Michigan Tech., USA

Assistant Professors

1. Dr. Iqbal Tariq
B.Sc. (Hons.) UoK; M.Sc. (Physics) UoK;
Medical Physics (P.A.E.C. and D.N.S.R.P);
Ph.D. (Medical Physics / Radiation Physics) USM Malaysia

2. Dr. Saba Javaid
B.Sc. (Hons.) UoK; M.Sc. (Physics) UoK;
MS (Physics)UoK; Ph.D. (Spectroscopy, Physics) UoK.

3. Dr. Roohi Zafar
B.Sc. (Hons.) UoK; M.Sc. (Physics) UoK;
MS (Physics)UoK; Ph.D. (Spectroscopy, Physics) UoK

4. Mr. Junaid Kareem Khan
B.Sc. UoK; M.Sc. (Applied Physics) UoK;
M.Phil. (Renewable Energy, ISPA) UoK;
Ph.D. (In Progress)

5. Dr. Hira Ashfaq Lodhi
B.Sc. UoK; M.Sc. (Applied Physics) UoK;
MS (Applied Mathematics) NEDUET;
Ph.D. (Modeling and simulation, Applied Mathematics) NEDUET

6. Dr. Uzair Majeed
B.Sc. UoP; M.Sc. (Physics) FUUAST;
Ph.D. (Material Physics); University Tun Hussein Onn Malaysia (UTHM)

7. Dr. Syed Talib Abbas Jafri
BE (Electronics) PAF-KIET; MS (Electronics) NEDUET;
Ph.D. (Electronics),NEDUET

In addition to the regular faculty members, qualified personnels from the other departments in the university, as well as professionals working in the city may be engaged for graduate teaching.

Applications in response to advertisement for MS in Physics shall be duly completed and submitted, personally or by registered post to:

The Chairperson
Department of Physics
NED University of Engineering & Technology
University Road, Karachi - 75270, Pakistan
Ph.: (92-21) 99261261-8 Ext: 2209
Fax: (92-21) 99261255
Email: cdp@neduet.edu.pk

3.23 DEPARTMENT OF CHEMISTRY

Introduction

The Department of Chemistry has been established as an in Department of Electronic dependent full-fledge department from Department of Mathematics and Basic Sciences in 2010. Since its establishment as an independent department, it was felt that it is the right moment to start the MS programme in Industrial Chemistry.

Chemistry is very important in modern science and technology and essential for the material progress of the world. Chemistry products are used in one form or another in practically every other industry before eventually emerging as part of our daily lives. After realizing the vital role of chemistry as an applied science in diverse areas that influence human society, the department is now offering a MS degree programme in Industrial Chemistry. Industrial chemistry focuses on the development, optimization and monitoring of fundamental chemical processes used in industry for transforming raw materials and precursors into useful commercial products for society.

MS programme is designed to fill the gap between academic studies and expectations of industry. Graduates of this programme would be able to conduct qualitative and quantitative chemical analysis after having sound knowledge of modern instrumental techniques for quality and/or process control. The theoretical aspects of the programme ensure a strong grounding in the different areas of chemistry.

The "MS in Industrial Chemistry" is a five semester evening programme encompassing the engineering and science graduates, having completed sixteen years of education. The graduates are likely to join the respective industries both locally and abroad. They will be finding employment in manufacturing and processing industries, as well as in industries related to paint, chemical, pharmaceuticals and agrochemicals. Education and research would also be open to them if they preferred employment in these professions. The graduate of this programme will also be able to pursue higher studies if they desire to do so.

3.23.1 Departmental Facilities

Department of Chemistry is a newly established Department. It is housed in two buildings.

- Chairman Office
- Laboratories

Department has three chemistry laboratories well equipped with all necessary practical facilities. Extensive computing facilities may also be accessible to the students.

3.23.2 Principal Faculty for the Programme

Chairperson

Dr. Nuzhat Arshad

Associate Professors

1. Dr. Nuzhat Arshad
   M.Sc. (Chemistry) UoK;
   Ph.D. Karl-Franzens University of Graz. Austria.
2. Dr. Kashif Ahmed
   M.Sc. (Chemistry) UoS; Ph.D. (FUUAST).
3. Dr. Amtul Qayoom
   M.Sc. (Chemistry) UoS; Ph.D. UOK
4. Dr. Saeeda Nadir Ali
   M.Sc. (Chemistry) Uok, Ph.D. Uok.

Assistant Professors

1. Syed Ghazanfar Hussain
   M.Sc. (Chemistry) UoK; M.Phil. (In Progress).
2. Mr. Muhammad Ansar Khan
   M.Sc. (Applied Chemistry) UoK,
   M.E. (Chemical Engg.) USA.
3. Dr. Anjum Ayub
   M.Sc. (Chemistry) FUUAST, Ph.D. (ICCBS) UOK
4. Dr. Shazia Perveen
   M.Sc. (Chemistry) Uok, Ph.D. Uok.
5. Dr. Rafia Usman
   M.Sc. (Applied Chemistry) UoK;
   M.S. (Chemistry) Murray State University, KY, USA.
   Ph.D. Kagoshima University, Japan.

In addition to the regular faculty members, qualified personnels from other departments in the university, as well as professionals working in the related industries may be engaged for graduate teaching.

Applications in response to advertisement for MS in Industrial Chemistry shall be duly completed and submitted, personally or by registered post to:

The Chairperson
Department of Chemistry
NED University of Engineering & Technology
University Road, Karachi - 75270, Pakistan
Ph: (92-21) 99261261-8
Fax : (92-21) 99261255
Email : cdc@neduet.edu.pk

3.24 DEPARTMENT OF ENGLISH LINGUISTICS & ALLIED STUDIES

The Department of English Linguistics & Allied Studies (EL&AS) erstwhile Department of Humanities (since 1977), at NED University administers MS Applied Linguistics Program. The department has expanded remarkably over the last decade in terms of its scope of academic programs, research, and outreach – a sign of a vibrant academic system and culture prevailing at the department because of a dynamic professional community of teachers and researchers leading the program with a clear vision translated carefully in the programs and aligned with the university vision and mission and the coherence with the 21st century milieu.

The department in 2013 initiated master's programme in Applied Linguistics fulfilling a gap of a professional degree programme in the discipline and in 2015 and 2016 launched bachelor's and doctoral programmes in English Linguistics and Applied Linguistics respectively to complete the academic progression and continuity essential for students and faculty to contribute towards the outcomes related with the disciplinary education, training and research.

The department offers undergraduate courses university wide (three campuses and one constituent college) across engineering and information technology, basic sciences, management and social sciences, development studies, and architecture programmes. Both compulsory and elective courses are offered in diverse subject areas including: English Language, Academic Reading and Writing, Communication Skills, Sociology, Anthropology, Business and Organizational Communication, Logic and Critical Thinking, and Engineering and Professional Ethics, Foreign languages (Chinese, French, German, Turkish) and Community Service. Besides the core academic programs and courses department has implemented several youth building , community development projects focusing language development, academic literacy, STEAM education, communication skills, ICT skills, employability skills, creative writing and many others involving national and international donors. The department's pride is its competent and qualified teaching faculty that is driven by continual development, impact through teaching and research, and values based education and training of the future teachers and professionals.

MS in Applied Linguistics Programme

The **MS Applied Linguistics programme** offered at the EL&AS department **has completed 10 successful years since its inception in 2014 and has thus far produced around 150 graduates who are serving different gainfully employed and also pursuing successfully further education. Of these 80 students completed their degrees with a research thesis.** The programme was accorded NOC by Higher Education Commission from the first batch inducted then (2014). The programme was conceived and launched considering the serious shortage of qualified and competent English Language Teachers (ELTs) and language and applied linguistics professionals needed in variegated academic, career, and societal domains. The Department prepares students as ELT/TESOL practitioners and as Applied Linguistics researchers. The Department has strategically developed the expertise and the resources essential for initiating and sustaining academic, professional, and research-related education, and training. The programme blends theoretical concepts with activities planned around modern pedagogical outlook: problem-based-learning, strategy-instruction, experiential-learning, evidence and outcome-based-learning approach vital for inducing quality in the applied linguistics programme as a result the graduates have been well placed in different organizations within and beyond Pakistan.

The department has an active applied linguistics research group that consistently produces contextualized empirical research related to English Language. This has ultimately helped the department and the core language faculty create a distinct niche in the Applied Linguistics and English Language community and have a major presence in the published literature especially international-peer refereed publications. Through active professional networks with individuals and organizations, the department collaborates on mutually beneficial projects and strengthens its outreach.

MS Applied Linguistics Programme Details

The MS Applied Linguistics Programme is in line with HEC criteria for admission and award of degree and was accorded NOC from the first batch / first semester 2014.

MSAL is an Evening Program considering the fact that in service ELT/TESOL teachers are the targeted audience for pursuing this applied study programme. The programme is structured around **30 credits to be completed through courses (24 credits) and research (6 credits thesis) and one non-credit course in minimum five to maximum eight semesters.**

3.24.1 Eligibility Criteria for Seeking Admission

Applicants interested in pursuing this programme must have acquired 16 years of education in English in the relevant area or equivalent in the relevant fields with second division and above in annual system of education/minimum 2.4/4.0 CGPA in semester system education.

- Candidates with BS English 4 years
- Candidates with MA English (Language/Linguistics)
- Candidates with MA English (Literature & Linguistics) *
- Candidates with MA (Literature)*

**candidates are required to complete Customised Courses. This requirement is not to complete certain number of credit hours for 16 years education rather it is to ensure their background knowledge in theoretical*

linguistics which may vary across programmes offered at different universities.

3.24.2 Research Fields

The current fields of research encompass Second Language Teaching & Learning, Teaching English as a Lingua Franca, English for Academic/Specific Purposes (EAP/ESP), Writing Instruction and Evaluation, Teacher Cognition, Genre Analysis, Language Pedagogy, Needs and situation Analysis, Language Anxiety, CALL, Curriculum and syllabus designing, Materials Writing, Language Testing and Evaluation, Language Teacher Education, Multilingualism, Code-switching, Language Identity, Language Contact, World Englishes, Language variation, Corpus and Computational approaches to language analysis and description, Critical Discourse Analysis, Pragmatics, Language Policy, Teacher and Learners' personality traits and language teaching-learning, AI and language learning and teaching, Natural Language Processing.

3.24.3 Principal Faculty for the Programme

Chairperson

Prof. Dr. Sajida Zaki

Professor

Prof. Dr. Sajida Zaki
HEC Approved PhD Supervisor
M. A. English (Linguistics) KU;
PhD (Applied Linguistics) HU

Associate Professor

1. Dr. Muhammad Fareed
   HEC Approved PhD Supervisor
   M. A. English (Lit. & Linguistics) NUML;
   M. Phil, Edu. (English Language Teaching) IU;
   PhD, Edu. (English Language Teaching) IU
2. Dr. Najeeb us Saqlain Durrani
   M. A. English, KU; M. Phil (Education), IU;
   PhD (English as a Second Language), IU

Assistant Professor

1. Dr. Rahila Huma Anwar
   M. A. English (Linguistics), KU;
   M. Phil (Applied Linguistics), HU;
   PhD (Applied Linguistics), NEDUET
2. Dr. Muhammad Asim Khan
   M. A. English (Lit. & Linguistics), KU;
   MS (Applied Linguistics), KU;
   PhD (Applied Linguistics), NEDUET
3. Ms. Almas Ashraf
   M. A. English (Linguistics), JUW
   MS (Applied Linguistics), NEDUET
4. Ms. Hina Manzoor
   M. A. English (Linguistics), KU; MS (Applied Linguistics), KU
   PhD Fellow (Applied Linguistics), SU

Applications in response to advertisement for Master's in Applied Linguistics should be duly completed and submitted personally or by registered post to: The Chairperson

The Chairperson
Department of English Linguistics & Allied Studies
NED University of Engineering & Technology
University Road, Karachi-75270, Pakistan.
Ph: 021-99261261-68 (Ext. 2208)
Fax:021-99261255
Email: cel@neduet.edu.pk

3.25 DEPARTMENT ECONOMICS & MANAGEMENT SCIENCES

MS in Economics and Finance Programme

One of the major issues being faced by the business world is globalization and global competition. Even new challenges due to, globalization have placed additional demands on businesses. In the wake of globalization, economic integration and competition, only those individuals can hold positions of responsibility that have the capacity to analyze complex problems and make intelligent decisions. The MS Economics and Finance program helps students to think logically and improve their ability to use economic and financial concepts to analyze "real world" problems and opportunities. This is a unique program that emphasizes a qualitative and quantitative approach to dealing with economic and financial problems in both the public and private sectors. This program has been designed to meet the desires of a wide range of university graduates who are willing to specialize in economics and finance for practical purposes. The MS Economics and Finance (MSEF) is a comprehensive professional program that can offer rewarding careers in the public and private sector corporations, banks, investment companies, insurance companies, leasing companies, educational and research organizations, etc.

Programme Structure

The candidates will have the following two options to earn MS in Economics and Finance degree:

1) The candidate has to complete total thirty (30) credit hours for qualifying MS Economics and Finance programme. There will be five (5) compulsory and five (5) elective courses of three (3) credit hours each.

2) The candidates may also fulfil the requirement of thirty (30) credit hours by completing twenty-four (24) credits hours by courses and six (6) credit hours by Thesis.

Admission Requirements

The candidate possessing 16 years of education in the relevant area or equivalent in the relevant field, as categorized below, with first division and above or minimum 2.4/4.0 CGPA may apply to this programme:

a) Candidates with BS (4 years programme) with Economics, Management, Mathematics, Statistics, Commerce or BBA from any university as recognized by the NED University.

b) Candidates with MA/MSc with (Economics, Mathematics, Statistics) /MBA/M.Com/BE from any recognized university may also apply for admission to the programme or equivalent from any HEC recognized programme.

3.25.1 Principal Faculty for the Programme

Chairperson

Prof. Dr. Raza Ali Khan

Professor

Prof. Dr. Raza Ali Khan
DAE (Civil), SEZIT; PGD (Public Administration), UoK;
M.A. (International Relations), UoK;
M.A. (Economics), UoK; M.S./M.Phil. (Economics), SZABIST;
Ph.D. (Construction Economics Management), Malaysia

Assistant Professors

1. Dr. Mirza Faizan Ahmed
   MBA (Finance), UoK; MAS (Applied Economics), UoK;
   Ph.D. (Applied Economics), AERC-UoK
2. Dr. Muhammad Shahid Iqbal
   PGD (Statistics) UoK; MA (Economics) UoK;
   MA (International Relations) UoK;
   M.S. / M.Phil. (Applied Economics), AERC-UoK;
   Ph.D. (Economics), UoK
3. Dr. Hina Mubeen
   M.B.A. (Human Recourse Management), BU
   M.S. (Management Sciences) SZABIST;
   Ph.D. (Management Sciences) SZABIST;
4. Dr. Faheem Akhter
   L.L.B., S.M. Law College, UoK
   M.A (International Relations) UoK;
   M.B.A. (Management), IBA UoS;
   Ph.D.(Public Administration) UoK;
5. Dr. Farhan Ahmed
   M.A. (Economics), SALU; MBA (Finance) SZABIST;
   Ph.D. (Management Sciences), SZABIST
6. Dr. Manzoor H. Memon
   PGD (CIS), UoK; M.Sc. (MIBM), UoK;
   M.Phil (Economics), AERC-UoK;
   Ph.D. (Applied Economics), AERC-UoK
7. Dr. Shabbir Ahmed Baqai
   M.Sc. (Economics), UoK;
   M.Phil (Applied Economics), AERC-UoK;
   Ph.D. (Applied Economics), AERC-UoK

In addition to regular faculty members professionals from industry are engaged as adjunct and visiting faculty for teaching and research.

Applications in response to advertisement for Masters in Economics & Finance should be duly completed and submitted personally or by registered post to:

The Chairperson
Department of Economics & Management Sciences
NED University of Engineering & Technology
University Road, Karachi-75270, Pakistan
Ph: 021-99261261-68 (Ext. 2226)
Fax:021-99261255
Email: cem@neduet.edu.pk

3.26 Panjwani-Hisaar Water Institute (PHWI)

The Panjwani-Hisaar Water Institute (PHWI) is a collaborative effort of NED University, Panjwani Charitable Foundation (PCF) and Hisaar Foundation (HF). PHWI is designed to play a pivotal role in new ways of thinking about water, developing theory and practice, doing applied research, and undertaking scientific investigations in the age of rapid climate change and environmental degradation.

PHWI aims to stimulate and inculcate innovative water education, research, and training that is interdisciplinary and multidisciplinary in nature, and integrates the currently isolated nodes of engineering, water sciences, economic and social sciences in Pakistan's water sector. PHWI also recognizes all the linkages between water users, water uses and different stakeholder groups to promote informed policy and actions at all levels.

The multidisciplinary approach to water education, research and training at PHWI integrates information, data, techniques, tools, perspectives, concepts and theories from many disciplines to advance fundamental understanding of the complexities of water challenges and their solutions. It brings together the engineering stream which includes hydrology, hydraulics and infrastructure, the water science stream that includes hydrology, geography, geology and environmental sciences, the macro and micro economics stream, and the social sciences stream which includes sociology, social work, politics, and community-based approaches. The link between use of water in society, and change in psychological behavior, as it affects water use, water rights, and water entitlements, is also being explored at PHWI.

3.26.1 Departmental Facilities

Laboratories

PHWI offers research and academic programs for Postgraduate degree, short diploma courses, and certificate courses designed specifically for industry, agriculture, and the built environment. The Institute has **five laboratories** which are being fully equipped with the latest technologies related to water. These laboratories are:

Water Ecology & Remediation

The first of its kind lab in Pakistan, will perform both static and dynamic toxicological experiments as well as chemical and bio-remedial materials. This lab is directly linked to Water Quality Testing Lab. Pollutants and pathogens found through testing will be treated in ecology and remediation lab through nature-based solutions.

Coastal & Riverine Hydraulics

Coastal and Riverine Hydraulics lab is designed as a facility for river, delta, lake and coastal modeling, dynamics and hydraulics. This lab will support various types of research and learning including seawater testing, coastal engineering, studying mangroves, and coastal environments and deltaic distributary modeling. Equipment includes Long wave flumes, wave basin, river simulator flumes, Rotating fluids table, water channels, electronic measuring devices for stress, strain and pour water pressure etc.

Water Psychology & Behavioral Sciences

Water Psychology & Behavioral Sciences lab is one of the innovations that PHWI will bring to the water sector in Pakistan and first of its kind laboratory, to change the way people think about water. Lab research will focus on studying social sciences, human behavior and psychology. Studies will be conducted on water use behavior and how it could be moderated to bring changes in water-related in our daily lives, in industry, agriculture, municipal and cultural uses.

Total Water Quality (a range of water testing facilities)

This lab is the center piece of PHWI in terms of testing, standards, functionality and usage, and will provide a 360° solution for water testing under one roof, perform standard water quality testing for bacteria (coliform), ppm, dissolved solids, chemicals and heavy metals. In addition, the Lab also specializes in the detection and quantification of contaminants including pesticides, antibiotics, veterinary pharmaceuticals and steroid hormones. This lab is directly linked to Water Ecology and Remediation lab.

Water Data Analytics and Water Modelling (Digital Water Lab)

Water Data Analytics and Water Modelling lab will generate real-time primary data, and carry out heavy processing of information, data and analysis using the latest technology such as data cubes, data sets, MIS and GIS. This lab has capability of simulating different models including surface water modeling, coastal hydrodynamic and morpho dynamic models, and groundwater models.

3.26.2 Programme Structure

The PHWI currently offers two specialisations in the Masters of Engineering Management (MEM) stream: Climate Change Management (CCM) and Urban Water Management (UWM). Both specialisations are offered as weekend program; where the students get the options of completing their degree requirements in a

minimum duration of 1.5 years through coursework only. Classes for both the streams are conducted on Saturdays and Sundays during daytime.

3.26.3 Principal Faculty for the Programme

Director

Prof. Dr. Syed Imran Ahmed,

Professor

Prof. Dr. Syed Imran Ahmed,
Ph.D. (Bio Systems Engg.) Iowa State University, USA
M.S. (Bio Systems Engg.) Iowa State University, USA
M.S. (Bio Resource Engg.) Oregon State University, USA
B.E. (Agri. Engg.) Sindh Agriculture University

Associate Professor

Engr. Haris Akram Bhatti,
Pursuing Ph.D. from NED University, Karachi
M.E (Research) (Civil) NED
B.E (Civil) NED

Assistant Professor

Dr. Areba Syed,
Ph.D., Iowa State University USA
MEM (Water Resources Management)
B.E (Urban Engineering), NED University.

In addition to regular faculty members professionals from industry are engaged as adjunct and visiting faculty for teaching and research.

Applications in response to advertisement for Masters in (a) Urban Water Management (b) Climate Change Management should be duly completed and submitted personally or by registered post to:

The Director
Panjwani-Hisaar Water Institute (PHWI)
NED University of Engineering & Technology
University Road, Karachi-75270, Pakistan
Ph: 021-99261261-68 (Ext. 2382)
Fax:021-99261255
Email: managerphwi@neduet.edu.pk

4. COURSES OFFERED UNDER THE FACULTIES

4.1 Master Programme in the Faculty of Civil and Petroleum Engineering

4.1.1 M.Engg. in Civil Engineering

(a) Structural Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CE-501	Advanced Structural Analysis	3	CE-504	Advanced Engineering Mathematics	3
CE-502	Mechanics of Solids	3	CE-511	Structural Dynamics	3
CE-503	Advanced Reinforced Concrete	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CE-505	Prestressed Concrete Design	3	EQ-521	Displacement Based Seismic Design	3
CE-506	Finite Element Method	3	EQ-522	Performance Based Seismic Design	3
CE-507	Advanced Concrete Technology	3	EQ-523	Seismic Design of Steel and Composite Structures	3
CE-508	Computer Methods in Structural Analysis	3	EQ-524	Seismic Design and Assessment of Masonry Structures	3
CE-509	Theory of Plates and Shells	3	EQ-525	Loss Estimation and Hazard Mitigation	3
CE-510	Structural Stability	3	EQ-526	Fundamentals of Fire Dynamics	3
CE-512	Bridge Analysis and Design	3	EQ-527	Seismic Vulnerability Assessment of Bridges	3
CE-513	Seismic Analysis and Design	3	EQ-528	Finite Element Method	3
CE-514	Design of Tall Structures	3	EQ-529	FRP Reinforced Concrete Design	3
CE-515	Design of Steel Structures	3	EQ-530	Fracture Mechanics of Concrete	3
CE-516	Repair Maintenance And Strengthening of Reinforced Concrete Structures	3	EQ-531	Structural Fire Engineering	3
CE-517	Performance-based Seismic Design	3	EQ-532	Fire Safety and Management	3
CE-519	Advance Cementitious Materials	3	CE-5022	Forensic Engineering	3
CE-5002	Thesis	6			

(b) Geo-technical Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CE-531	Advanced Soil Mechanics	3	CE-534	Soil Investigation & Testing	3
CE-532	Foundation Engineering	3	CE-540	Earth Retaining Structures	3
CE-533	Soil-Foundation Dynamics	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CE-535	Earth Structures	3	CE-541	Computer Applications in Geo-technical Engg	3
CE-536	Soil Stabilisation	3	CE-542	Geo-environmental Engineering	3
CE-537	Rock Mechanics	3	CE-543	Transportation Geotechnics	3
CE-538	Groundwater and Seepage	3	CE-5002	Thesis	6
CE-539	Subsurface Hydrology	3	CE-5022	Forensic Engineering	3

(c) Transportation Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CE-561	Urban Transportation Planning	3	CE-564	Probability and Statistics	3
CE-562	Geometric Design of Highways	3	CE-569	Pavement Analysis & Design	3
CE-563	Advanced Traffic Engineering and Management	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CE-565	Traffic Flow Theory	3	CE-571	Waterway Transportation	3
CE-566	Highway Materials & Construction	3	CE-572	Transportation Systems Evaluation	3
CE-567	Public Mass Transportation	3	CE-573	Road Maintenance Management System	3
CE-568	Airport Planning & Design	3	CE-575	Railway Track Engineering	3
CE-570	Transportation Economics	3	CE-5002	Thesis	6
			CE-5022	Forensic Engineering	3

(d) Coastal and Water Resources Engineering

Coastal Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs
CE-521	Introduction to Ocean and Coastal Engg.	3
CE-518	Mathematical Methods for Engineers	3
CE-555	Design of Marine Structures	3
CE-523	Coastal Processes	3
CE-524	Coastal Management	3

Elective Courses

Course No.	Course Title	Credit Hrs
CE-522	Port Planning and Design	3
CE-525	Soil Mechanics in Coastal Engineering	3
CE-551	Marine Geology	3
CE-552	Marine Dredging	3
CE-553	Off-shore Engineering Analysis	3
CE-554	Computational Hydraulics	3
EN-520	Marine Pollution and Control	3
CE-5002	Thesis	6
CE-5022	Forensic Engineering	3

* *The degree will be offered in two streams i.e. Coastal Engineering and Water Resources Engineering.*

\+ *Offered in collaboration with Panjwani-Hisaar Water Institute (PHWI)*

Water Resources Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs
CE-580	Applied Hydrology	3
CE-518	Mathematical Methods for Engineers	3
CE-579	Water Quality Management	3
CE-577	Irrigation System Design and Management	3
CE-583	Groundwater Engineering	3

Elective Courses

Course No.	Course Title	Credit Hrs
CE-556	Water Resources Planning and Management	3
CE-557	Legal & Financial Aspects of Water Resources	3
CE-558	Sustainable Water Resources Management (SWRM)	3
CE-559	Remote Sensing in Water Resources	3
CE-560	Reservoir Operations	3
CE-578	Ground Water Resource Management	3
CE-581	Hydro climatology	3
CE-582	Water Resources Modelling	3
CE-584	Drainage Engineering	3
CE-585	Advanced Hydraulic Engineering	3
EN-528	Urban Water Supply and Sewer System Design	3
CE-5002	Thesis	6
CE-5022	Forensic Engineering	3

(e) Construction Engineering Law

Compulsory Courses

Course No.	Course Title	Credit Hrs
CE-5011	Fundamentals of Law and Legal Structures	3
CE-5012	Intellectual property (IP) protection and Professional Ethics	3
CE-5013	Construction Contracts and Procurement Law	3
CE-5014	Construction Claims Preparation and Analysis	3
CE-5015	Construction Disputes	3

Elective Courses

Course No.	Course Title	Credit Hrs
CE-5016	Fundamentals of Environmental Laws for Construction Industry	3
CE-5017	Construction Specifications writing and Documentation	3
CE-5018	Construction Law Case Studies	3
CE-5019	Building Codes and Regulations	3
CE-5020	Construction Law and Risk Management	3
CE-5021	International Perspectives of Construction Law	3
CE-5022	Forensic Engineering	3
CE-5024	Tort in Engineering	3
CE-5025	Public-Private Partnerships	3
CE-5002	Thesis	6

4.1.2 M.Engg. in Structural Earthquake Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs
EQ-501	Structural Dynamics	3
EQ-502	Fundamentals of Earthquake Engineering	3
EQ-503	Seismic Design of RC Building	3
EQ-504	Advanced Structural Analysis	3
EQ-505	Structural Reliability Analysis	3

Elective Courses

Course No.	Course Title	Credit Hrs
EQ-521	Displacement Based Seismic Design	3
EQ-522	Performance Based Seismic Design	3
EQ-523	Seismic Design of Steel and Composite Structures	3
EQ-524	Seismic Design and Assessment of Masonry Structures	3
EQ-525	Loss Estimation and Hazard Mitigation	3
EQ-526	Fundamentals of Fire Dynamics	3
EQ-527	Seismic Vulnerability Assessment of Bridges	3
EQ-528	Finite Element Method	3
EQ-529	FRP Reinforced Concrete Design	3
EQ-530	Fracture Mechanics of Concrete	3
EQ-531	Structural Fire Engineering	3
EQ-532	Fire Safety and Management	3
EQ-5002	Thesis	6

4.1.3 M.Engg. in Petroleum Engineering

Non-Credit Courses

Course No.	Course Title	Credit Hours
PE-101	Fundamentals of Petroleum Engineering	NC
PE-202	Petroleum Geology	NC
PE-207	Drilling Engineering	NC
PE-302	Reservoir Fluid Properties	NC
PE-304	Reservoir Engineering-1	NC
PE-306	Subsurface Production Engineering	NC

Compulsory Courses

Course No.	Course Title	Credit Hours
PE-501	Advanced Reservoir Engineering	3
PE-502	Advanced Drilling Engineering	3
PE-503	Advanced Production Engineering and Flow Assurance	3
PE-504	Applied Mathematics in Petroleum Engineering	3
PE-505	Health, Safety and Environment	3

Elective Courses

Course No.	Course Title	Credit Hours
PE-506	Thermodynamics and Phase Behaviour of Hydrocarbon Systems	3
PE-507	Formation Evaluation	3
PE-508	Advanced Reservoir Simulation	3
PE-509	Advanced Well Testing	3
PE-510	Enhanced Oil Recovery	3
PE-511	Fractured Reservoir	3
PE-512	Carbonate Reservoir Characterization	3
PE-513	Petroleum Resources and Reserves Estimation	3
PE-514	Drilling Fluid Engineering	3
PE-515	Underbalanced and Managed Pressure Drilling	3
PE-516	Offshore Drilling	3
PE-517	Well Control	3
PE-518	Petroleum Production Operations	3
PE-519	Production Optimization	3
PE-520	Stimulation Design	3
PE-521	Special Topics in Natural Gas Engineering	3
PE-522	Advanced Petrophysics and Well Logging	3
PE-523	Unconventional Reservoirs	3
PE-524	Petroleum Geomechanics	3
PE-525	Petroleum Economics	3
PE-526	Advanced Petroleum Geology	3
PE-527	Seismic Data Acquisition, Processing and Interpretation	3
PE-528	Applied Petroleum Project Planning and Management	3
PE-5002	Thesis	6

4.1.4 M.Engg. in Environmental Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs
EN-515	Air Pollution and Control	3
EN-523	Analysis of Env. Contaminants	3
EN-524	Wastewater Engineering	3
EN-525	Physico Chemical Processes	3
EN-526	Solid Waste Management	3

Elective Courses

Course No.	Course Title	Credit Hrs
EN-501	Introduction to Environmental Engineering	3
EN-502	Environmental Applied Sciences	3
EN-503	Advanced Mathematics	3
EN-508	Environmental Impact Assessment	3
EN-509	Modeling in Environmental Engineering	3
EN-510	Process Dynamics in Environmental Systems	3
EN-511	Environmental Management	3
EN-513	Industrial Waste Treatment and Disposal	3
EN-514	Water Resources Management	3
EN-518	Sustainable Development & Appropriate Tech	3
EN-519	Introduction to Ocean and Coastal Engg.	3
EN-520	Marine Pollution and Control	3
EN-521	Special Topics in Environmental Engineering	3
EN-527	Environmental Health and Sanitation	3
EN-528	Urban Water Supply and Sewer System Design	3
EN-5002	Thesis	6

4.2 Master Programme in the Faculty of Mechanical and Manufacturing Engineering

4.2.1. M.Engg. in Mechanical Engineering

(a) Design

Compulsory Courses

Course No.	Course Title	Credit Hrs
ME 501	Engineering Design	3
ME 502	Advanced Stress Analysis	3
ME 503	Computer Aided Design	3
ME 504	Finite Element Analysis	3
ME 505	Mechanical Vibrations	3
TE 505	Advanced Statistics	3

Elective Courses

Course No.	Course Title	Credit Hrs
ME 506	Acoustics	3
ME 507	Power Plant Design	3
ME 508	Kinematics and Rigid Body Dynamics	3
ME 511	Material Science	3
ME 512	Fracture Mechanics	3
ME 513	Creep	3
ME 514	Advanced Metallurgy	3
ME 521	Automation & Controls	3
ME 522	Computer Aided Manufacturing	3
ME 523	Operations Research	3
ME 524	Reliability & Quality Engineering	3
ME 527	Human Factor Engineering	3
ME 530	Maintenance Engineering	3
ME 587	Building Services Engineering	3
EM 504	Project Management Framework and Tools	3
MS 552	Applied Mathematics-II	3
MS 553	Computer Applications	NC
ME 5002	Thesis	6

(b) Energy Systems

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
ME 555	Advanced Thermodynamics	3	ME 548	Advanced Fluid Mechanics	3
ME 544	Advanced Heat Transfer	3	ME 560	Energy Management & Conservation	3
ME 545	Renewable Energy	3	TE 505	Advanced Statistics	3

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
ME 504	Finite Element Analysis	3	ME 552	Turbulence Modeling	3
ME 507	Power Plant Design	3	ME 558	Energy Modelling & Forecasting	3
ME 523	Operations Research	3	ME 562	Photovoltaic Systems	3
ME 524	Reliability & Quality Engineering	3	ME 563	Wind Energy: Design & Integration	3
ME 543	Combustion Engineering	3	ME 587	Building Services Engineering	3
ME 546	Energy Planning	3	EM 504	Project Management Framework and Tools	3
ME 547	Advanced Air-Conditioning & Refrigeration	3	MS 552	Applied Mathematics-II	3
ME 549	Desalination	3	MS 553	Computer Applications	NC
ME 550	Numerical Methods in Heat Transfer	3	ME 5002	Thesis	6
ME 551	Introduction to Computational Fluid Dynamics	3			

(c) Renewable Energy

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
ME 555	Advanced Thermodynamics	3	ME 558	Energy Modelling and Forecasting	3
ME 556	Renewable Energy Systems	3	ME 559	Process and Energy Integration	3
ME 557	Energy Economics, Policy and Assessment	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
ME 560	Energy Management & Conservation	3	ME 569	Tidal and Wave Energy	3
ME 561	Solar Thermal Energy Systems	3	ME 570	Hydrogen & Fuel Cell Technology	3
ME 562	Photovoltaic Systems	3	ME 571	Energy Storage	3
ME 563	Wind Energy: Design and Integration	3	ME 572	Optimization Techniques	3
ME 564	Design of Wind Turbines	3	ME 573	Energy and Environment	3
ME 565	Geothermal Energy	3	ME 574	Fluid Dynamics	3
ME 566	Biomass Power Generation	3	ME 575	Power Plant Engineering	3
ME 567	Bio Fuels	3	EM 504	Project Management Framework & Tools	3
ME 568	Hydro Power Plants	3	ME 5002	Thesis	6

(d) Mechatronics

Non-Credit Courses for Mechanical & Allied Disciplines

Course No.	Course Title	
MC-501	Electrical and Electronic for Mechanical Engineers	NC
MC-502	Introduction to A.I & Computer Architecture	NC
MC 513	Control Theory & Systems	NC

Non-Credit Courses for Electrical & Allied Disciplines

Course No.	Course Title	
MC 503	Elements of Machine Dynamics & Design	NC
MC 504	Mechanics of Materials & Processes	NC
MC 505	Thermo Fluidics	NC

Compulsory Courses

Course No.	Course Title	Credit Hrs
MC 511	Sensors and Actuators	3
MC 514	Kinematics & Rigid Body Dynamics	3
MC 515	Industrial Automation & Robotics	3
MC 546	Data Acquisition and Microcontroller	3
MC 547	Mechatronics System Design	3

Elective courses

Course No.	Course Title	Credit Hrs
MC 512	Computer Aided Mechanical Design	3
MC 521	Advanced Industrial Process Control	3
MC 531	Computer Aided Manufacturing	3
MC 523	Mechanical Design of Mechatronics Systems	3
MC 525	Electrical Machines & Power Electronics	3
MC 527	Microprocessor and Interfacing Applications	3
MC 529	Mathematical Modelling & Simulation	3
MC 533	Artificial Intelligence and Neural Networks	3
MC 537	Reliability Engineering	3
MC 539	Micro-& Nano-Electromechanical Systems	3
MC 541	Digital Image Processing & Machine Vision	3
MC 543	Applied Programmable Logic Control	3
MC 545	Advanced Robotics	3
MC 548	Special Topics in Mechatronics Engineering	3
ME 504	Finite Element Analysis	3
EE 512	Advanced Digital Signal Processing	3
CT 562	Machine Learning	3
MC 5002	Thesis	6

4.2.2 M.Engg. in Manufacturing Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
ME 521	Automation & Controls	3	ME 524	Reliability & Quality Engineering	3
ME 522	Computer Aided Manufacturing	3	ME 525	Advanced Manufacturing Processes	3
ME 523	Operations Research	3	TE 505	Advanced Statistics	3

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
ME 503	Computer Aided Design	3	MS 553	Computer Applications	0
ME 504	Finite Element Analysis	3	IM 505	Automated Manufacturing Systems	3
ME 511	Materials Science	3	IM 506	Business Process Reengineering	3
ME 526	Advanced Metal Forming	3	IM 513	Six Sigma Methodologies	3
ME 527	Human Factor Engineering	3	IM 515	Agile & Lean Manufacturing	3
ME 528	Computer Integrated Manufacturing	3	IM 525	Design For Manufacturing	3
ME 529	Management Information System (MIS)	3	IM 526	Facilities Planning and Layout	3
EM 504	Project Management Framework & Tools	3	IM 527	Intelligent Manufacturing Systems	3
MS 552	Applied Mathematics II	3	ME 586	Health Safety & Environment	3
			SE 512	Research Methodology	0
			IM 5002	Thesis	6

4.2.3 M.Engg. in Textile Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
TE 501	Textile Quality Assurance	3	TE 504	Automation & Control	3
TE 502	Textile Printing	3	TE 505	Advanced Statistics	3
TE 503	Processes for Cotton Dyeing	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
TE 506	Fibre Engineering Science	3	TE 513	Advanced Weaving Engineering	3
TE 507	Fibre Forming Polymers	3	TE 515	Technical Textiles	3
TE 508	Advanced Finishing Processes	3	TE 516	Supply Chain Design & Management	3
TE 509	Colour Physics & Measurement	3	EM 504	Project Management Framework and Tools	3
TE 510	Engineering in Textile Colouration	3	TE 5002	Thesis	6
TE 511	Physico-Chemical Processes in Textiles	3	**Note:**	One course on Computer Applications (MS 553) may be recommended by the Chairman as a non-credit course.	
TE 512	Advanced Yarn Engineering	3			

4.2.4 M.Engg. in Automotive Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
AU-500	Advanced Automotive Engineering	3	AU-503	Automotive Control Systems	3
AU-501	IC Engine Thermodynamics	3	AU-504	Automotive Materials & Manufacturing	3
AU-502	Advanced Vehicle Dynamics	3	TE-505	Advanced Statistics	3

Elective Courses

(a) Automotive Design			(b) Automotive Manufacturing		
Course No.	**Course Title**	**Credit Hrs**	**Course No.**	**Course Title**	**Credit Hrs**
AU-520	Automotive Powertrains	3	IM-505	Automated Manufacturing Systems	3
ME-551	Introduction to Computational Fluid Dynamics	3	IM-501	Supply Chain Management	3
ME-503	Computer Aided Design	3	IM-515	Agile and Lean Manufacturing	3
AU-521	Vehicle Aerodynamics	3	IM-503	Maintenance Management	3
AU-522	Mechatronics in AE	3	ME-524	Reliability & Quality Engineering	3
AU-523	Emissions and Exhaust Control	3	EM-504	Project Management Framework & Tools	3
ME-504	Finite Element Analysis	3	IM-513	Six Sigma Methodologies	3
AU-525	Noise, Vibrations and Harshness	3	ME-527	Human Factor Engineering	3
AU-526	Sensors and Actuators	3	MM-539	Corrosion Engineering	3
AU-527	Fluid Power Systems and Control	3	MM-538	Polymer Engineering	3
AU-528	Lubrication	3	MM-540	Modern Composites Materials	3
AU-5002	Thesis	6	AU-5002	Thesis	6

4.2.5 MS in Textile Management

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
TM-551	Apparel & Merchandizing Management	3	EM-501	Organization Systems	3
EM-504	Project Management Framework & Tools	3	TS-516	Supply Chain Design and Management	3
EM-502	Accounting & Financial Management	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
TS-508	Advanced Finishing Processes	3	TS-556	Research Methodology	3
TS-515	Technical Textile	3	EM-503	Strategic Planning & Decision Making	3
TS-517	Advanced Fabric Forming Processes	3	EM-505	Operation Research	3
TS-552	Textile Computer Integrated Enterprise	3	EM-511	Total Quality Management	3
TS-553	Textile Brand Management & Marketing	3	TS-5002	Thesis	6
TS-554	Health Safety & Environment Management	3			

4.3 Master Programme in the Faculty of Electrical and Computer Engineering

4.3.1 M. Engg. in Electrical Engineering

(a) Control Systems

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EE-501	Linear Control Systems	3	EE-504	Adaptive Control Systems	3
EE-502	Optimal Control Systems	3	EE-505	Digital Control System	3
EE-503	Random Variables & Stochastic Processes	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EE-506	Linear Multivariable Control Theory	3	EE-524	Electrical Power Distribution System Engg.-I	3
EE-507	Non Linear Control Systems	3	EE-525	Electrical Power Distribution System Engg.-II	3
EE-508	Stochastic Processes in Electrical Engg.	3	EE-526	Electrical Power Transmission System Engg.	3
EE-509	Estimation Theory	3	EE-529	Power System Reliability	3
EE-510	Stochastic Control Systems	3	EE-5002	Thesis	6
EE-511	Graph Theory	3			
EE-512	Advanced Digital Signal Processing	3			

(b) Electrical Power Systems

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EE-521	Power System Analysis – I	3	EE-524	Electrical Power Distribution System Engg.-I	3
EE-522	Power System Analysis – II	3	EE-526	Electrical Power Transmission System Engg.	3
EE-523	Power System Protection	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EE-525	Electrical Power Distribution System Engg.-II	3	EE-501	Linear Control Systems	3
EE-527	Power System Stability	3	EE-505	Digital Control System	3
EE-528	Computer Methods in Power System Analysis	3	EE-512	Advanced Digital Signal Processing	3
EE-529	Power System Reliability	3	EE-543	Solid State DC Drives	3
EE-530	Power System Protection using Static Relays	3	EE-544	Solid State AC Drives	3
EE-531	Embedded Power Generation	3	EE-5002	Thesis	6
EE-532	Reactive Power Control	3			

(c) Electrical Machines & Drives

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EE-541	Power Electronics – I	3	EE-544	Solid State AC Drives	3
EE-542	Power Electronics – II	3	EE-545	Electrical Machines Design	3
EE-543	Solid State DC Drives	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EE-546	Special Electrical Machines	3	EE-505	Digital Control System	3
EE-547	Unified Theory of Electrical Machines	3	EE-524	Electrical Power Distribution System Engg.-I	3
EE-548	Elements of Machine Control	3	EE-525	Electrical Power Distribution System Engg.-II	3
EE-549	Electrical Machines Protection System	3	EE-526	Electrical Power Transmission System Engg.	3
EE-501	Linear Control Systems	3	EE-5002	Thesis	6

(d) Smart Grid

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EE-570	Advanced Electrical Power Systems	3	EE-573	Smart Grid Technologies and Applications	3
EE-571	Advanced Power Electronics	3	EE-574	Data Analytics for Smart Grid	3
EE-572	Synchrophasor Technology	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EE-501	Linear Control System	3	EE-578	Renewable Energy Integration with Electrical Network	3
EE-505	Digital Control System	3			
EE-512	Advanced Digital Signal Processing	3	EE-579	Smart Grid System Security	3
EE-523	Power System Protection	3	EE-580	Power System Reliability	3
EE-531	Embedded Power Generation	3	EE-581	Electrical Load Forecasting	3
EE-532	Reactive Power Control	3	EE-582	FACTS Devices and HVDC System	3
EE-575	Electricity Markets	3	EE-583	Energy Management Systems	3
EE-576	Communication System for Smart Grid	3	EE-5002	Thesis	6
EE-577	Energy Storage Systems	3			

4.3.2 M. Engg. in Computer Systems Engineering

(a) Computer Architecture and Systems Design

Non-Credit Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CS-401	Introduction to Programming Systems Design	NC	CS-405	Logic Design and Switching Theory - I	NC
CS-402	System Design using Microprocessors	NC	CS-406	Introduction to Artificial Intelligence	NC

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CS-506	Advanced Computer Systems Architecture	3	CS-531	Advanced Operating Systems	3
CS-513	Artificial Intelligence	3	CS-537	Advanced Switching Theory	3
CS-524	Distributed Computer Systems	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CS-502	Advanced Microprocessor-based Design	3	CS-521	Introduction to Robotics	3
CS-505	Advanced Digital Signal Processing	3	CS-525	Embedded Systems	3
CS-508	Real Time Computer Systems	3	CS-526	Advanced VLSI Systems Design	3
CS-510	Diagnosis and Design of Reliable Computer Systems	3	CS-527	Current Topics in Computer Systems Engineering	3
			CS-5002	Thesis	6
CS-511	Interconnecting Networks	3			
CS-512	Computer Aided Design of Digital Systems	3			

(b) Computer Network & System Security

Non-Credit Courses

Course No.	Course Title	Credit Hrs
CS-403	Introduction to Computer Networks	NC
CS-404	Computer Systems Architecture and Organization	NC
CS-407	Computing Essentials	NC

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CS-506	Advanced Computer Systems Architecture	3	CS-540	Computer Network Protocols	3
CS-531	Advanced Operating Systems	3	CS-541	Stochastic Processes for Computer Networks	3
CS-539	Computer Security	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CS-503	Queuing Theory for Performance Modeling of Computer Systems	3	CS-543	Internet Security	3
			CS-544	Vulnerability Assessment and Ethical Hacking	3
CS-504	Design and Analysis of Computer Communication Networks	3	CS-545	Cloud Computing & Security	3
			CS-546	Carrier and ISP Network	3
CS-514	Performance Evaluation of Computer Systems	3	CS-572	Internet Traffic Engineering & Management	3
CS-517	Digital Communication Theory	3	CS-573	Network Security	3
CS-523	Routing and Switching	3	CS-5131	Advanced Multimedia Computing	3
CS-524	Distributed Computer Systems	3	CS-5132	IT Project Management	3
CS-538	Information Theory and Cryptography	3	CS-5135	Blockchain Technology	3
CS-542	Cyber Security	3	CS-5002	Thesis	6

4.3.3 M.S. in Data Engineering and Information Management

1- M.S. students may be required to study Non-Credit (NC) courses, in case they have not studied them at undergraduate level. All Non-Credit Courses are essentially required to be taken as soon as they offered.
2- All the admitted students to M.S. Programme in Data Engineering will be required to take 10 courses in total including five compulsory along with other five courses from electives.

Non-Credit Courses

Course No.	Course Title	Credit Hrs
CS-551	Computer Systems Fundamentals	NC
CS-552	Data Structures and Databases	NC

Compulsory Courses

Course No.	Course Title	Credit Hrs
CS-551	Advanced Database Systems	3
CS-552	Data Analytics	3
CS-553	Information Systems Management	3
CS-554	Data Security and Audit	3
CS-555	Distributed Systems	3

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CS-561	Advanced Internet Computing	3	CS-571	Information Systems Auditing	3
CS-562	Big Data Computing	3	CS-572	Internet Traffic Engineering and Management	3
CS-563	Business Intelligence	3	CS-573	Network Security	3
CS-564	Cloud Computing	3	CS-5131	Advanced Multimedia Computing	3
CS-565	Data Encryption	3	CS-5132	IT Project Management	3
CS-566	Data Mining	3	CS-5133	Scientific Data Visualization	3
CS-567	Data Warehousing	3	CS-5135	Blockchain Technology	3
CS-568	Decision Support Systems	3	CS-5136	Information Retrieval and Web Search	3
CS-569	E-Business Management	3	CS-5002	Thesis	6
CS-570	Enterprise Resource Planning	3			

4.3.4 M.S. in Artificial Intelligence

Non-Credit Courses

Course No.	Course Title	Credit Hrs
CS-408	Introduction to Artificial Intelligence	NC
CS-491	Programming Fundamentals for Artificial Intelligence	NC

Compulsory Courses

Course No.	Course Title	Credit Hrs
CS-5101	Advanced Artificial Intelligence	3
CS-5103	Mathematics for Artificial Intelligence	3
CS-5104	Intelligent Systems Design	3
CS-5137	Machine Learning	3
CS-5138	Deep Learning	3

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CS-5106	Natural Language Processing	3	CS-5123	Multi-agent & Complex Adaptive Systems	3
CS-5107	Computer Vision	3	CS-5124	Pattern Recognition	3
CS-5108	Embedded Intelligence	3	CS-5125	Knowledge Representation & Reasoning	3
CS-5109	Heuristics and Optimization	3	CS-5126	Semantic Web	3
CS-5110	Sentiment Analysis	3	CS-5128	Artificial Neural Networks	3
CS-5111	Augmented and Virtual Reality	3	CS-5129	Internet of Things	3
CS-5112	Automatic Speech Recognition	3	CS-5130	Serious Games	3
CS-5113	Visual Computing	3	CS-5131	Advanced Multimedia Computing	3
CS-5114	Neuro-computation	3	CS-5132	IT Project Management	3
CS-5115	Advanced Image Processing	3	CS-5133	Scientific Data Visualization	3
CS-5116	Human-Robot Interaction	3	CS-5134	Computational Game Theory	3
CS-5117	AI in Cybersecurity	3	CS-5136	Information Retrieval and Web Search	3
CS-5118	Advanced Tools and Frameworks for AI	3	CS-552	Data Analytics	3
CS-5119	Ethics in Artificial Intelligence	3	CS-562	Big Data Computing	3
CS-5120	Deep Reinforcement Learning	3	CS-563	Business Intelligence	3
CS-5121	Computational Creativity	3	CS-566	Data Mining	3
CS-5122	Probabilistic Graphical Models	3	CS-5002	Thesis	6

4.3.5 M.Engg. in Electronic Engineering

Non-Credit Courses

Course No.	Course Title	Credit Hrs
EL-402	Introduction to Mechatronics	NC
EL-403	Introduction to Power Electronics	NC

Note: Non-Credit (NC) courses may be offered to those students who have not studied these courses at undergraduate level.

Compulsory Courses

Course No.	Course Title	Credit Hrs
EL-501	Solid State Materials &Devices	3
EL-502	Analog Integrated Circuits	3
EL-503	Advanced Digital Electronics and Interfacing Techniques	3
EL-504	Electronic Design Automation	3
EL-507	Fuzzy Logic and Intelligent Electronics Control Systems	3

Elective Courses

(a) Micro System Design

Course No.	Course Title	Credit Hrs
EL-511	Digital VLSI Design	3
EL-512	Analog VLSI Design	3
EL-513	Micro Fabrication Processes	3
EL-514	Light Wave Engineering	3
EL-515	High Speed Semiconductor Devices and Circuits	3
EL-516	Introduction to Micro-electro-mechanical Systems	3
EL-517	Selected Topics in Micro System Design	3
EL-5002	Thesis	6

(b) Industrial Electronics

Course No.	Course Title	Credit Hrs
EL-521	Measurement & Calibration of Electronic System	3
EL-522	Intelligent Measurements and Instrumentation	3
EL-523	Industrial Control Systems	3
EL-524	Advanced Power Electronics	3
EL-525	Sensors and Systems	3
EL-526	Robotics and its Application of Industrial Electronics	3
EL-528	Selected Topics in Industrial Electronics	3
EL-543	Solid State DC Drives	3
EL-544	Solid State AC Drives	3
EL-5002	Thesis	6

4.3.6 M.Engg. in Telecommunications Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs
TC-501	Probability and Random Processes	3
TC-502	Information Theory	3
TC-503	Digital Communication Theory	3
TC-504	Advanced Communication Systems	3
TC-511	Communication Networks	3

Elective Courses

(a) RF Engineering

Course No.	Course Title	Credit Hrs
TC-510	Telecommunication Management	3
TC-512	Microwave Systems	3
TC-513	Principles of Radar	3
TC-514	Mobile Telephone System	3
TC-515	Advanced Digital Signal Processing	3
TC-516	Satellite Communication	3
TC-518	Advanced Optical Communication Systems	3
TC-519	Antenna Theory	3
TC-531	RF Electronics	3
TC-532	Wireless Transceiver Design	3
TC-533	Ultra Wideband Communication	3
TC-534	Advanced Wireless Systems	3
TC-535	Digital Design for Wireless	3
TC-536	Software Defined Radios	3
TC-537	Advanced Engineering Electromagnetics	3
TC-5005	AI in Telecommunications	3
TC-5002	Thesis	6

b) Telecommunication Networks

Course No.	Course Title	Credit Hrs
TC-505	Telecommunications Network Operations	3
TC-510	Telecommunication Management	3
TC-517	Communication Security	3
TC-541	Wireless Networks	3
TC-542	Carrier Grade VoIP	3
TC-543	Network Programming	3
TC-544	Next Generation Networks	3
TC-545	Software Defined Network	3
TC-546	Tele-traffic Engineering	3
TC-547	Optical Networks	3
TC-548	Advanced Multimedia Communication	3
TC-549	Mobile and Pervasive Computing	3
TC-5005	AI in Telecommunications	3
TC-5002	Thesis	6

4.3.7 M.S. in Telecommunication Systems

Non-Credit Courses

Course No.	Course Title	Credit Hrs
TC-401	Mathematical Methods for Telecommunications	NC
TC-402	Signals and Linear Systems	NC

NOTE: Students may be required to take Non-credit (NC) courses to fulfill the deficiency, if any, at the undergraduate level as determined by the department.

Compulsory Courses

Course No.	Course Title	Credit Hrs
TC-501	Probability and Random Processes	3
TC-506	Information Systems	3
TC-507	Analog and Digital Communication	3
TC-508	Data Communication and Networks	3
TC-509	Telecommunication Policies and Regulations	3

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
TC-505	Telecommunications Network Operations	3	TC-524	Optical Communication	3
TC-515	Advanced Digital Signal Processing	3	TC-525	Next Generation Networks	3
TC-516	Satellite Communication	3	TC-526	Broadband Communication Systems	3
TC-521	RF communication Systems	3	TC-527	QoS in Telecommunication Systems	3
TC-522	Data Security	3	TC-5005	AI in Telecommunications	3
TC-523	Wireless Systems and Networks	3	TC-5002	Thesis	6

4.3.8 M.Engg. in Biomedical Engineering

Compulsory Courses

Course Code	Course Title	Credit Hrs.	Course Code	Course Title	Credit Hrs.
BM-450	Anatomy and Physiology for Engineers	NC	BM-544	Mathematical & Computer Modeling of Physiological Systems	3
BM-541	Advanced Biomedical Instrumentation	3			
BM-542	Finite Element Methods	3	BM-568	Regulatory Framework for Medical Devices	3
BM-543	Mechatronics System Design	3			

Elective Courses

Course Code	Course Title	Credit Hrs.	Course Code	Course Title	Credit Hrs.
BM-545	Biomedical Ethics for Engineers	3	BM-557	Cardiovascular Fluid Mechanics	3
BM-546	Digital Control System	3	BM-558	Structural Bioinformatics	3
BM-547	Medical Robotics	3	BM-559	Functional Genomics	3
BM-548	Telemedicine	3	BM-560	Proteomics	3
BM-549	Computer Vision	3	BM-561	Advanced Biochemistry	3
BM-550	Advanced Medical Imaging	3	BM-562	Drug Delivery & Pharmacology	3
BM-551	Prosthetics & Orthotics	3	BM-563	Advanced Digital Signal Processing	3
BM-552	Clinical Gait Analysis	3	BM-564	Advanced Mass Transfer	3
BM-553	Advanced Biomaterials	3	BM-565	Research Methodology	3
BM-554	Design of Implants/Artificial Organs	3	BM-566	Medical Device Design Considerations	3
BM-555	Advanced Biomechanics	3	BM-5002	Thesis	6
BM-556	Design of Experiments	3			

4.3.9 M.Engg in Software Engineering

Customised Courses

Course No.	Course Title	Credit Hrs
CT-491	Operating Systems	NC
CT-494	Introduction to Databases	NC
SE-491	Introduction to Software Engineering	NC

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
SE-501	Advanced Requirements Engineering	3	SE-504	Software Measurement and Metrics	3
SE-502	Advanced Software Systems Architecture	3	SE-510	Advanced Software Project Management	3
SE-503	Software Testing and Quality Assurance	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
SE-505	Component Based Software Engineering	3	CT-527	Image Processing and Computer Vision	3
SE-506	Advanced Formal Methods	3	CT-528	Advanced Database Techniques	3
SE-507	Advanced Human-Computer Interaction	3	CT-529	Object Oriented Databases	3
SE-508	Agile Software Development Methods	3	CT-530	Data Mining	3
SE-509	Empirical Software Engineering	3	CT-532	Information System Audit	3
SE-511	Software Risk Management	3	CT-537	Wireless & Mobile Communication	3
SE-512	Research Methodology	3	CT-558	Distributed Blockchain Technologies	3
SE-513	Software Configuration Management	3	CT-562	Machine Learning	3
SE-514	Reliability Engineering	3	CT-561	Natural Language Processing	3
SE-515	Complex Networks	3	CT-560	Deep Learning	3
SE-516	Agent Based Modelling	3	CT-569	Virtualisation and Cloud Computing	3
SE-517	Internet of Things	3	CT-571	Nature Inspired Optimisation Algorithms	3
CT-519	Business Process Reengineering	3	CT-587	Distributed Computing	3
CT-521	Distributed Intelligence Systems	3	CT-588	Information Retrieval	3
CT-522	Cryptography and Network Security	3	CT-592	Big Data Analytics	3
CT-525	Modelling & Simulation	3	SE-5002	Thesis	6

4.3.10 Courses in MS Streams in the Department of Computer Science and Information Technology

Programme structure: Students have to complete thirty (30) credit hours in any specialisation of the MS programme. There will be customized non-credit courses, four (04) for MS (CSIT)/MS (IS)/ MS DS (GDS) and three (03) for MS (DS) (pre-requisites only for candidates coming from fields other than Computer Science, Computer Engineering and Software Engineering), five (05) compulsory courses and five (05) elective courses of three (03) credit hours each. A departmental admission committee shall decide the deficiency courses (non-credit) that a candidate shall have to take based on his/her previous qualification at the time of admission.

Customised Courses

Course No.	Course Title	Credit Hrs.	Course No.	Course Title	Credit Hrs.
CT-491*	Operating System	NC	CT-493	Data Structure and Algorithm Design	NC
CT-492	Object Oriented Programming	NC	CT-494	Introduction to Databases	NC
			CT-495 **	Fundamentals of Remote Sensing and GIS	NC

** Not applicable for MS (DS) specialisations* *** Applicable only for MS (DS) Geospatial Data Science specialisation.*

Note: A departmental admission committee shall decide the deficiency courses (non-credit) which a candidate shall have to take based on his/her previous qualification at the time of admission.

4.3.10(a) MS in Computer Science and Information Technology

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CT-501	Software Project Management	3	CT-576	Advanced Operating System	3
CT-504	Advanced Numerical Analysis	3	CT-577	Advanced Theory of Automata	3
CT-506	Advanced Analysis of Algorithms	3			

Elective Courses

Course No.	Course Title	Credit Hrs.	Course No.	Course Title	Credit Hrs.
CT-511	Information System Development Methodologies	3	CT-534	Software Quality Assurance	3
			CT-535	Compiler Construction & Techniques	3
CT-512	Principles of Marketing	3	CT-536	Object Oriented Designing for Application Techniques	3
CT-513	Quality Information System	3			
CT-514	Software Development Methodologies using UML	3	CT-537	Wireless & Mobile Communication	3
			CT-538	Introduction to Robotics	3
CT-515	Internet Banking	3	CT-539	Advanced Computer Networking	3
CT-516	Multimedia Communications	3	CT-540	Broadband Networks	3
CT-517	Internet Techniques and their Application	3	CT-558	Distributed Blockchain Technologies	3
CT-518	Web Authoring	3	CT-559	Artificial Neural Networks	3
CT-519	Business Process Reengineering	3	CT-560	Deep Learning	3
CT-520	E-Commerce	3	CT-561	Natural Language Processing	3
CT-521	Distributed Intelligent System	3	CT-562	Machine Learning	3
CT-522	Cryptography & Network Security	3	CT-563	Business Intelligence	3
CT-523	Fuzzy Control & Neural Networks	3	CT-564	Web Intelligence and Big Data	3
CT-524	Knowledge Based Systems	3	CT-565	Computational Journalism	3
CT-525	Modeling & Simulation	3	CT-566	Digital Image Processing	3
CT-526	Logic Programming	3	CT-567	Computer Vision	3
CT-527	Image Processing & Computer Vision	3	CT-568	Soft Computing	3
CT-528	Advanced Database Techniques	3	CT-569	Virtualization and Cloud Computing	3
CT-529	Object Oriented Databases	3	CT-570	Wireless Communication	3
CT-530	Data Mining	3	CT-571	Nature Inspired Optimisation Algorithms	3
CT-531	Theory of Information System Design	3	CT-572	Parallel Computing	3
CT-532	Information System Audit		CT-573	GPGPU Programming	3
CT-533	Information System Management	3	SE-512	Research Methodology	NC
			CT-5002	Thesis	6

4.3.10(b) MS in Information Security

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CT-506	Advanced Analysis of Algorithms	3	CT-574	Information Privacy and Security	3
CT-509	Distributed Systems	3	CT-575	Cryptography	3
CT-539	Advanced Computer Networking	3			

Elective Courses

Course No.	Course Title	Credit Hrs.	Course No.	Course Title	Credit Hrs.
CT-507	Wireless and Mobile Communication Networks	3	CT-551	Fault Tolerance and Reliability	3
CT-532	Information System Audit	3	CT-552	Quantum Cryptography	3
CT-541	Network Security	3	CT-553	Emerging Trends in Information Security	3
CT-542	Information Security Management	3	CT-554	Ethical Hacking	3
CT-543	Database Security	3	CT-555	Cloud Security	3
CT-544	Cyber Crimes and Security	3	CT-556	Intrusion Detection	3
CT-545	Digital Forensics	3	CT-557	Privacy Engineering	3
CT-546	Secure E-Commerce	3	CT-558	Distributed Blockchain Technologies	3
CT-547	Secure Programming	3	CT-571	Nature Inspired Optimisation Algorithms	3
CT-548	Security Testing Theory and Practice	3	SE-512	Research Methodology	3
CT-549	Multimedia Security and Privacy	3	CT-5002	Thesis	3
CT-550	Trusted Computing	3			

4.3.10(c) MS in Data Science

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CT-530	Data Mining	3	CT-583	Tools and Techniques for Data Science	3
CT-562	Machine Learning	3	CT-592	Big Data Analytics	3
CT-581	Statistics & Probability for Data Science	3			

Elective Courses

Course No.	Course Title	Credit Hrs.	Course No.	Course Title	Credit Hrs.
CT-521	Distributed Intelligence Systems	3	CT-588	Information Retrieval	3
CT-524	Knowledge Based System	3	CT-589	Social Media Analysis	3
CT-525	Modeling & Simulation	3	CT-590	Data Visualization	3
CT-527	Image processing & Computer Vision	3	CT-591	Text Processing	3
CT-528	Advance Database Techniques	3	CT-593	Data Warehousing	3
CT-529	Object Oriented Databases	3	CT-594	Optimization Methods	3
CT-559	Artificial Neural Networks	3	CT-595	Pattern Recognition	3
CT-560	Deep Learning	3	CT-596	Web Mining	3
CT-561	Natural Language Processing	3	CT-597	Time Series Analysis & Forecasting	3
CT-563	Business Intelligence	3	CT-598	Financial Data Analysis	3
CT-564	Web Intelligence and Big Data	3	CT-599	Speech Processing	3
CT-569	Virtualization and Cloud Computing	3	SE-512	Research Methodology	NC
CT-582	Numerical Linear Algebra	3	CT-5002	Thesis	6
CT-587	Distributed Computing	3			

4.3.10(d) MS DS (Geospatial Data Science)

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CT-530	Data Mining	3	CT-583	Tools and Techniques for Data Science	3
CT-562	Machine Learning	3	CT-5003	Advanced Principles of Geoinformatics	3
CT-581	Statistics & Probability for Data Science	3			

Elective Courses

Course No.	Course Title	Credit Hrs.	Course No.	Course Title	Credit Hrs.
CT-527	Image processing & Computer Vision	3	CT-5009	Spatial Databases and Data Interoperability	3
CT-590	Data Visualization	3	CT-5010	GIS for Infrastructure Management	3
CT-5004	Advanced Programming in GIS	3	CT-5011	GIS for Emergency Management	3
CT-5005	Spatial Decision Support Systems	3	CT-5012	Emerging Trends in Remote Sensing & GIS	3
CT-5007	Web GIS	3	CT-5002	Thesis	6
CT-5008	Spatial Analytics	3			

4.4 Master Programme in the Faculty of Chemical and Process Engineering

4.4.1 M.Engg. in Materials Engineering.

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
MM-501	Phase Transformations in Solids	3	MM-504	Heat Treatment and Microstructure Evolution in Metals	3
MM-502	Production of Ferrous and Non-Ferrous Materials	3	MM-505	Advanced Materials Characterization Techniques	3
MM-503	Deformation Behaviour and Failure Analysis of Materials	3	MM-506	Practical/laboratory/industrial visits with short reports	NC

NOTE: **If students who are enrolled in Thesis then Non-credit course MM-506 is exempted.**

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
MM-531	Surface Engineering and Coating Techniques	3	MM-539	Corrosion Engineering	3
MM-532	Ceramic Engineering	3	MM-540	Modern Composite Materials	3
MM-533	Electronic and Magnetic Materials	3	MM-541	Computational Materials Engineering	3
MM-534	Nanotechnology	3	MM-542	Production Management and Quality Assurance	3
MM-535	Electron Microscopy	3	MM-5002	Thesis	6
MM-536	Adv. X-Ray Diffraction and Texture Studies	3			
MM-537	Powder Metallurgy	3			
MM-538	Polymer Engineering	3			

4.4.2 M. Engg. in Chemical Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CH-501	Chemical Thermodynamics – III	3	CH-504	Advanced Process Control	3
CH-502	Advanced Reaction Engineering	3	CH-505	Mathematical Methods	3
CH-503	Transport Phenomena	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CH-510	Polymer Science	3	CH-519	Biochemical Engineering	3
CH-511	Polymer Processing	3	CH-520	Advanced Heat Transfer	3
CH-512	Applied Statistics	3	ME-542	Energy Management	3
CH-513	Advanced Composite Materials	3	ME-543	Combustion Engineering	3
CH-514	Petroleum Refining Engineering	3	EN-508	Environmental Impact Assessment	3
CH-515	Computational Fluid Dynamics	3	EM-512	Project Evaluation and Feasibility Analysis	3
CH-516	Advanced Mass Transfer	3	CH-5002	Thesis	6
CH-517	Corrosion	3			
CH-518	Fluidization Engineering	3			

4.4.3 M. Engg. in Polymer Engineering

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
PP-511	Advanced Engineering Mathematics	3	PP-514	Rheology of Complex Fluids	3
PP-512	Advanced Polymer Processing	3	PP-515	Polymer Structure-Property Relationships	3
PP-513	Polymer Reactor Engineering	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
PP-401	Introduction to Polymeric Materials	NC	PP-530	Rubber Technology	3
PP-525	Advanced Polymer Composites	3	PP-531	Polymer Characterization	3
PP-526	Fibre Technology	3	PP-532	Polymer Degradation, Stability and Recyling	3
PP-527	Polymer Adhesives and Coatings	3	PP-533	Process Safety & Loss Preventation	3
PP-528	Polymer Product Design	3	PP-534	Thermodynamics of Polymeric System	3
PP-529	Specialty and Functional Polymer Materials	3	EM-504	Project Management Framework and Tools	3
			PP-5002	Thesis	6

4.5. Mast er of Engineering Management (MEM) Programme

The above programme is offered in the following areas of specialisation.

(i)	Construction Management	offered by Department of Civil Engineering
(ii)	Water Resources Management	offered by Department of Civil Engineering in collaboration with PHWI
(iii)	Transportation Infrastructure Management	offered by Department of Urban and Infrastructure Engineering
(iv)	Energy and Plant Management	offered by Department of Mechanical Engineering
(v)	Industrial Management	offered by Department of Industrial & Manufacturing Engineering
(vi)	Quality Management	offered by Department of Industrial & Manufacturing Engineering
(vii)	Supply Chain Management	offered by Department of Industrial & Manufacturing Engineering
(viii)	Textile Management	offered by Department of Textile Engineering
(xi)	Energy Management	offered by Department of Electrical Engineering
(x)	Chemical and Process Management	offered by Department of Chemical Engineering
(xi)	Environmental Management	offered by Department of Environmental Engineering
(xii)	Urban Water Management	offered by Panjwani-Hisaar Water Institute (PHWI)
(xiii)	Climate Change Management	offered by Panjwani-Hisaar Water Institute (PHWI)

Compulsory Courses

Course No.	Course Title	Credit Hrs
EM-501	Organisational Systems	3
EM-502	Accounting and Financial Management	3
EM-503	Strategic Planning and Decision Making	3
EM-504	Project Management Framework and Tools	3
EM-505	Operations Research	3

Common Elective Courses

Course No.	Course Title	Credit Hrs
EM-511	Total Quality Management	3
EM-512	Project Evaluation and Feasibility Analysis	3
EM-513	Research Methods in Engineering Management	3

Elective Courses

(a) Construction Management

Course No.	Course Title	Credit Hrs
CE-544	Quantitative Tools for Engg. Management	3
CE-545	Construction Claim Management	3
CE-546	Vulnerability Analysis and Hazard Mitigation	3
CE-547	Housing for Developing Countries	3
CE-548	Occupational Health and Safety in Construction	3
CE-549	Value Engineering in Construction	3
CE-550	Construction Productivity Management	3
CE-587	Human Resource Management in Construction Industry	3
CE-588	Leadership in Construction Management	3
CE-589	Supply Chain Management in Construction Industry	3
CE-590	Advanced Topics in Project Management	3
CE-5023	Building Information Modeling (BIM) for Construction Industry	3
CE-591	Cost Engineering and Control	3
CE-592	Decision Making and Risk Management in Construction	3
CE-593	Construction Operations and Development of Tech.	3
CE-594	Bidding Strategy and the Legal Construction Env.	3
CE-595	Technical Entrepreneurship and the Management and Marketing of Construction Services	3
CE-596	Public Infrastructure Management	3
CE-597	Real Estate Management	3
CE-598	Construction Failure Analysis	3
EQ-532	Fire Safety and Management	3
CE-5002	Thesis	6
CE-5022	Forensic Engineering	3

(b) Water Resources Management

Course No.	Course Title	Credit Hrs
CE-556	Water Resources Planning and Management	3
CE-557	Legal & Financial Aspects of Water Resources	3
CE-558	Sustainable Water Resources Management (SWRM)	3
CE-559	Remote Sensing in Water Resources	3
CE-560	Reservoir Operations	3
CE-576	Water Services Management	3
CE-577	Irrigation System Design and Management	3
CE-578	Groundwater Resource Management	3
CE-579	Water Quality Management	3
CE-5002	Thesis	6
CE-5022	Forensic Engineering	3

(c) Transportation Infrastructure Management

Course No.	Course Title	Credit Hrs
UE-501	Urban Transportation Management	3
UE-502	Pavement Asset Management	3
UE-503	Intelligent Transportation Systems	3
UE-504	Road Safety Analysis and Methodologies	3
UE-505	Micro-Scale Traffic Modelling	3
UE-506	Travel Demand Forecasting	3
UE-507	Geospatial Analysis for Transportation Asset Management	3
UE-508	National Transportation Management	3
UE-509	Transportation Systems Asset Management	3
UE-511	Highway Project Management	3
UE-512	Sustainable Urban Transport	3
UE-5002	Thesis	6

(d) Energy and Plant Management

Course No.	Course Title	Credit Hrs
ME 507	Power Plant Design	3
ME 530	Maintenance Engineering	3
ME 557	Energy Economics, Policy and Assessment	3
ME 558	Energy Modeling and Forecasting	3
ME 560	Energy Management & Conservation	3
ME 584	Energy Trading and Distribution	3
ME 585	Reliability and Asset Management	3
ME 586	Health, Safety and Environment	3
IM 501	Supply Chain Management	3
TE 505	Advanced Statistics	3
ME 5002	Thesis	6

(e) Industrial Management

Course No.	Course Title	Credit Hrs
IM-501	Supply Chain Management	3
IM-502	Computer Simulation Methods	3
IM-503	Maintenance Management	3
IM-505	Automated Manufacturing Systems	3
IM-506	Business Process Reengineering	3
IM-515	Agile & Lean Manufacturing	3
IM-526	Facilities Planning and Layout	3
ME-524	Reliability & Quality Engineering	3
ME-527	Human Factors Engineering	3
ME-529	Management Information Systems (MIS)	3
ME-542	Energy Management	3
ME-546	Energy Planning	3
ME-586	Health Safety & Environment	3
SE 512	Research Methodology	0
IM-5002	Thesis	6

(f) Quality Management

Course No.	Course Title	Credit Hrs
IM-506	Business Process Reengineering	3
IM-511	Statistical Quality Control	3
IM-512	Reliability Engineering	3
IM-513	Six Sigma Methodologies	3
IM-514	Quality Planning and Management	3
IM-515	Agile and Lean Manufacturing	3
IM-516	Design and Analysis of Experiments	3
IM-517	Advanced Quality Engineering	3
ME-586	Health Safety & Environment	3
SE 512	Research Methodology	0
IM-5002	Thesis	6

(g) Supply Chain Management

Course No.	Course Title	Credit Hrs
IM-501	Supply Chain Management	3
IM-550	Advanced Principles of Supply Chain Management	3
IM-551	Information Technology for Supply Chain Management	3
IM-552	Logistics Management	3
IM-553	Green Supply Chain Management	3
IM-554	Procurement Management	3
IM-555	Business Process Simulation	3
IM-556	Retail Management	3
IM-557	Managing Supply Chain Inventory	3
IM-558	Change Management	3
IM-559	International Trade	3
IM-560	Process Management	3
IM-561	Principles of Marketing	3
IM-562	New Product and Service Development Management	3
IM-563	Warehouse Management and Physical Distribution Network	3
IM-564	Supplier Relationship Management	3
ME-586	Health Safety & Environment	3
SE 512	Research Methodology	0
IM-5002	Thesis	6

(h) Textile Management

Course No.	Course Title	Credit Hrs
TE-505	Advanced Statistics	3
TE-516	Supply Chain Design and Management	3
TE-551	Apparel and Merchandising Management	3
TE-552	Textile Computer Integrated Enterprise	3
TE-553	Textile Brand Management and Marketing	3
TE-554	Health Safety and Environmental Management	3
IM-503	Maintenance Management	3
TE-5002	Thesis	6

(i) Energy Management

Course No.	Course Title	Credit Hrs
EE-561	Power Generation Economics	3
EE-562	Energy Audits	3
EE-563	Energy Conservation	3
EE-564	Power System Restructuring	3
EE-565	Distributed Generation	3
EE-566	Reliability Engineering	3
EE-567	Energy Planning	3
EE-568	Reactive Power Management	3
EE-5002	Thesis	6

(j) Chemical and Process Management

Course No.	Course Title	Credit Hrs
CH-506	Applied Chemical Thermodynamics	3
CH-507	Thermal Process Engineering	3
CH-508	Process Design Simulation	3
CH-509	Reactor Design and Kinetics	3
CH-521	Process Dynamics and Control	3
CH-522	Advanced Refining and Gas Engineering	3
CH-523	Process Safety Management	3
EM-511	Total Quality Management	3
PP-533	Process Safety and Loss Prevention	3
CH-5002	Thesis	6

NOTE: Non-Credit Course (Prerequisite for the graduates of Petroleum and Textile Engineering)

CH-498	Fundamentals of Chemical Engineering	NC

(k) Environmental Management

Course No.	Course Title	Credit Hrs
EN-523	Analysis of Environmental Contaminants	3
EN-530	Environmental Systems Engineering	3
EN-531	Environmental Quality Management	3
EN-532	Civil Systems and the Environment	3
EN-533	Environmental Risk Management	3
EN-534	Environmental Law and Policy Development	3
EN-535	Ecology and Sustainability	3
EN-537	Water Quality Management	3
EN-538	Principles of Air Quality Management	3
EN-539	Water and Sanitation Infrastructure in Developing Countries	3
EN-540	Health, Safety & Environmental Management	3
EN-541	Remote Sensing in Environmental Management	3
EN-542	Sustainable Waste Management	3
EN-5002	Thesis	6

(l) Urban Water Management

Course No.	Course Title	Credit Hrs
WI-5012	Urban Water Engineering and Management	3
WI-5013	Integrated Urban Water Resources Management	3
WI-5014	Water Services Management	3
WI-5007	Water Resources Planning and Management	3
WI-5008	Legal & Financial Aspects of Water Resources	3
WI-5009	Sustainable Water Resources Management (SWRM)	3
WI-5010	Remote Sensing in Water Resources	3
WI-5011	Water Resources Modelling	3
WI-5020	Water and Sanitation Infrastructure in Developing Countries	3
WI-5021	Urban Water Supply and Sewer System Design	3
WI-5022	Drainage Engineering	3
WI-5023	Water Quality Management	3
WI-5002	Thesis	6

(m) Climate Change Management

Course No.	Course Title	Credit Hrs
WI-5001	Climate science, policy and society	3
WI-5003	Climate Modeling and simulation	3
WI-5004	Climate Change Mitigation And Adaptation Strategies	3
WI-5005	Climate data analysis and visualization	3
WI-5006	Hydro Climatology	3
WI-5007	Water Resources Planning and Management	3
WI-5008	Legal & Financial Aspects of Water Resources	3
WI-5009	Sustainable Water Resources Management (SWRM)	3
WI-5010	Remote Sensing In Water Resources	3
WI-5011	Water Resources Modelling	3
WI-5002	Thesis	6

4.6 Master Programme in the Faculty of Architecture & Sciences

4.6.1 Master of Architecture Programme

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
AR-601	Advanced Architectural Design-I	3	AR-603	Studies in Architectural Research	3
AR-602	Advanced Architectural Design-II	3	AR-604	Architectural Theory	3

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
AR-605:	Architectural Design Project	6	AR-637:	Architecture of Housing	3
AR-606:	Aesthetics in Architecture	3	AR-638:	Advanced Landscape Architecture	3
AR-607:	Theory and Applications of Arts in Architecture	3	AR-639:	Psychological Applications in Architectural Design	3
AR-608:	Green Architecture: Concepts and Applications	3	AR-643:	Entrepreneurship in Architecture	3
AR-609:	Regulatory Considerations in Architectural Applications	3	AR-644:	Stylistic Studies in Architecture	3
AR-610:	Interdisciplinary Issues in Architectural Applications	3	AR-646:	Community Architecture	3
AR-635:	Case Studies in Architectural Conservation and Restoration in Developing Countries	3	AR-647:	Advanced Writing Skills in Architecture	3
AR-636:	Advanced Computer Applications in Architecture	3	AR-648:	Architecture and the City	3
			AR-649:	Advanced Themes in Analysing Architecture	3
			EQ-532	Fire Safety and Management	3
			AR-6002	Thesis	6

4.6.2 Master of Urban & Regional Planning Programme

Non-Credit Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
AR-511	Introduction to Urban Design	NC	AR-515	Introduction to Transportation and Infrastructure	NC
AR-512	Introduction to Urban Sociology	NC			
AR-513	Methods in Physical Planning	NC	AR-516	Basic Communication Techniques in Planning	NC
AR-514	Introduction to Urban Economics	NC			

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
AR-611	Planning Theory	3	AR-614	Infrastructure Planning	3
AR-612	Methods in Urban Planning Research	3	AR-615	Economic Development and Regional Planning	3
AR-613	Landuse Planning and Analysis	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
AR-616	Urbanism: Theory and Practice	3	AR-629	Advanced Urban Sociology	3
AR-617	Advanced Studies in Urban Design	3	AR-630	Project Planning and Management	3
AR-618	Urban Area Conservation	3	AR-631	Development Planning in Pakistan	3
AR-619	Legal and Regulatory Aspects in Planning	3	AR-632	Seminar in Urban Management in Pakistan	3
AR-620	Planning Implementation Methods	3	AR-634	Planning for Sustainable Development	3
AR-621	Advanced Urban Economics	3	AR-640	Design Project in Urban Planning	6
AR-622	Seminar in Planning, Economics and Development	3	AR-641	Regional Planning Studio	3
			AR-642	City Planning Studio	3
AR-623	Computer Applications in Planning	3	EQ-532	Fire Safety and Management	3
AR-624	Real Estate Analysis	3	AR-6002	Thesis	6
AR-625	Statistical Methods in Planning	3	CE-561	Urban Transportation Planning	3
AR-626	Remote Sensing	3	** Offered by Civil Engineering Department.*		
AR-627	Advanced Studies in Housing	3			
AR-628	Urban Management and Administration	3			

4.6.4 MS in Applied Mathematics

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
MT-500	Scientific Computing	NC	MT-503	Applied Statistics	3
MT-501	Differential Equations	3	MT-504	Numerical Methods and Applications	3
MT-502	Linear Algebra	3	MT-505	Operations Research and Optimisation	3

Elective Courses

Course No.	Course Title	Credit Hrs.	Course No.	Course Title	Credit Hrs.
MT-511	Advanced Engineering Mathematics	3	MT-524	Financial Mathematics	3
MT-512	Advanced Discrete Mathematics	3	MT-525	Computation and Simulation in Finance	3
MT-513	Finite Element Analysis	3	MT-526	Economic Theory for Financial Market	3
MT-514	Numerical Methods in Heat Transfer	3	MT-527	Financial Modelling and Risk Management	3
MT-515	Transforms and their Applications	3	MT-528	Finance Theory and Asset Pricing	3
MT-516	Computational Mechanics	3	MT-529	Monte Carlo Techniques for Simulations	3
MT-517	Computational Fluid Dynamics	3	MT-530	Design and Analysis of Experiments	3
MT-518	Computational Methods for Data Mining	3	MT-531	Stochastic Optimisation and Control	3
MT-519	Fuzzy Logic and Neural Networks	3	MT-532	Time Series Analysis and Forecasting	3
MT-520	Graph Theory	3	MT-533	Probability and Stochastic Processes	3
MT-521	Computational Complexity and Applications	3	MT-534	Statistical Method and Data Analysis	3
MT-522	Applied Database Techniques	3	MT-538	Partial Differential Equations	3
MT-523	Simulation and Modelling	3	MT-5002	Thesis	6
			PH-522	Research Methodology	3

4.6.5 MS in Physics

Non-Credit Courses (Common for All Specialisations)

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
PH-400	Classical Mechanics	NC	PH-406	Modern Physics - I	NC
PH-401	Electromagnetic Fields-I	NC	PH-407	Modern Physics - II	NC

The committee headed by Dean (ISH) and two members from the department will determine the eligibility and requirement for customised courses for each individual.

Compulsory Courses (Common for All Specialisations)

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
PH-500	Mathematical Physics	3	PH-503	Advanced Statistical Mechanics	3
PH-501	Advanced Computational Physics	3	PH-504	Electromagnetic Fields –II	3
PH-502	Advanced Quantum Mechanics	3			

a) Specialisation in Physics

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
PH-510	Advanced Material Science	3	PH-519	Optical Properties of Solids	3
PH-511	Magnetic Properties of Materials	3	PH-550	Research Methodology	NC
PH-512	Semiconductor Physics	3	PH-523	Energy and Environmental Physics	3
PH-513	Dielectrics and Their Measurements	3	PH-524	Nanotechnology	3
PH-514	Atomic Structure	3	PH-505	Advanced Experimental Methods in Physics	NC
PH-515	Molecular Structure	3	PH-5002	Thesis	6
PH-516	Electron and Photoelectron Spectroscopy	3			
PH-517	Laser Spectroscopy	3			

b) Specialisation in Optics

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
PH-518	Non Linear Optics	3	PH-531	Optical Imaging and Processing	3
PH-520	Photonic Devices	3	PH-532	Solar Photonics and Non-Imaging Optics	3
PH-521	Optical Physics and Lasers	3	PH-533	Quantum Optics	3
PH-550	Research Methodology	NC	PH-534	Fourier Optics	3
PH-530	Photonic Sensing and Measurements Systems	3	PH-5002	Thesis	6

c) Specialisation in Medical Physics

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
PH-525	Medical Radiation Physics	3	PH-538	LASER Tissue Interaction	3
PH-550	Research Methodology	NC	PH-539	Computing in Medical Physics	3
PH-535	Radiation Interaction & Detection	3	PH-540	Physics of Radiotherapy	3
PH-536	Physics of Radiology	3	PH-541	Health Physics and Radiation Protection	3
PH-537	Physics of Nuclear Medicine	3	PH-5002	Thesis	6

4.6.6 MS in Industrial Chemistry

Customised Courses			Compulsory Courses		
Course No.	**Course Title**	**Credit Hrs**	**Course No.**	**Course Title**	**Credit Hrs**
CY-402	Physical Chemistry	NC	CY-501	Unit Operations	3
CY-403	Instrumental Methods and Techniques	NC	CY-502	Advanced Chemical Kinetics	3
CY-404	Separation Techniques	NC	CY-503	Chemical Thermodynamics	3
CY-415	Mathematics and Statistics*	NC	CY-524	Laboratory Quality Assurance	3
CY-416	General Chemistry	NC	CY-525	Advanced Chemical Analysis	3

* For candidate who hasn't studied Mathematics and Statistics (undergraduate level) course at BS (Four Years)/ M.Sc. level.

The committee headed by Dean (ISH) and two members from the department will determine the eligibility and requirement for customised courses for each individual.

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
CY-505	Advanced Spectroscopic Techniques	3	CY-515	Paint and Surface Coatings	3
CY-506	Electroanalytical Techniques	3	CY-516	Paint Failure Analysis	3
CY-507	Advanced Chromatographic Techniques	3	CY-517	Corrosion Chemistry	3
CY-508	Surface Chemistry and Catalysis	3	CY-518	Agrochemicals	3
CY-509	Mathematical Methods	3	CY-519	Dyes Chemistry	3
CY-510	Applied Statistics	3	CY-520	Soap, Detergent and Cosmetic Industries	3
CY-511	Research Methodology	3	CY-521	Environmental Pollution Chemistry	3
CY-512	Drug and Heterocyclic Chemistry	3	CY-522	Water treatment	3
CY-513	Organic Synthesis	3	CY-523	Nano Chemistry	3
CY-514	Natural Product Chemistry	3	CY-5002	Thesis	--

4.6.7 MS in Applied Linguistics

Customised Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EA-410	Introduction to Linguistics	NC	EA-418	Pragmatics	NC
EA-411	Second Language Acquisition	NC	EA-419	Pedagogical Grammar	NC
EA-412	Language Teaching Methodologies	NC	EA-420	Discourse Analysis	NC
EA-413	Phonetics & Phonology	NC	EA-421	Syllabus Designing & Testing	NC
EA-414	Morphology & Syntax	NC			
EA-415	Semantics	NC			
EA-416	Sociolinguistics	NC			
EA-417	Psycholinguistics	NC			

* The committee comprising Dean ISH and two members from Humanities Department will determine the eligibility and requirement of customised courses for students from English Literature.

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EA-500	Applied Linguistics & Language Studies	3	EA-503	Research Methodology in Applied Linguistics	3
EA-501	Second Language Learning & Language Teaching	3	EA-504	Quantitative Tools for Research	3
EA-502	Curriculum Development in Language Teaching	3	EA-519	Advanced Academic Reading & Writing	NC

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EA-511	English for Specific Purposes	3	EA-526	Materials Development & Adaption in ESL	3
EA-512	Teaching English for Academic Purposes	3	EA-527	Autonomy & Individualization in Language Learning	3
EA-513	Language Testing & Evaluation	3			
EA-514	Globalization and Spread of English	3	EA-528	Technology in Language Teaching & Learning	3
EA-515	Pragmatics & inter- cultural communication	3	EA-529	Corpus Linguistics	3
EA-516	Critical Discourse Analysis	3	EA-530	Using Corpora in Language Teaching	3
EA-517	Language Teacher Education& Development	3	EA-5002	Thesis	6
EA-518	Issues in Syntax	3			

4.6.8 MS in Economics and Finance

Customised Courses

Course No.	Course Title	Credit Hrs
EC-401	Principles of Economics	NC
EC-402	Mathematical Economics	NC
EC-403	Accounting and Financial Mathematics	NC

Compulsory Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EC-501	Microeconomic Theory	3	EC-504	Econometrics	3
EC-502	Macroeconomic Theory	3	EC-505	Financial Accounting	3
EC-503	Mathematics for Economics and Finance	3			

Elective Courses

Course No.	Course Title	Credit Hrs	Course No.	Course Title	Credit Hrs
EC-506	Money and Banking	3	EC-517	Economic Development Planning	3
EC-507	Financial Markets and Institutions	3	EC-518	Analysis of Financial Statements	3
EC-508	International Trade and Finance	3	EC-519	Corporate Finance	3
EC-509	Investment Analysis and Portfolio Management	3	EC-520	Corporate Planning and Performance	3
EC-510	Project Appraisal and Management	3	EC-521	Islamic Banking and Finance	3
EC-511	International Business Strategy	3	EC-522	Business Management	3
EC-512	International Development and Finance	3	EC-523	Entreprenuership	3
EC-513	Multinational Corporations and Finance	3	EC-524	Research Methodology	3
EC-514	Managerial Economics	3	EC-5002	Thesis	6
EC-515	Financial Management and Risk	3			
EC-516	Investment Banking and Management	3			

5 NUMBER OF SEATS, FEES AND DEPOSIT

5(a) NUMBER OF SEATS TO BE OFFERED FOR ADMISSION TO THE PROGRAMME

Number of seats available to candidates in respective department who fulfill the requirements for eligibility as specified in the regulations shall be notified by each Department separately.

5(b) UNIVERSITY FEES AND DEPOSIT

The following are the University fees:

1- Fee Payable at the time of admission to the Programme

(i)	Admission / Re-admission Fee	Rs. 5000.00
(ii)	Enrolment fee (alongwith form fee)	Rs. 2500.00
(iii)	Security Deposit	Rs. 10000.00
(iv)	Documents Verification Fee	Rs. 3000.00

2- Fee Payable in each semester

(i) Tuition & Examination Fee per Course

EVENING

a)	M.Engg. Programme	Rs. 17000.00
b)	MS Programme	Rs. 17000.00
c)	MEM Programme	Rs. 17000.00

WEEKEND

a)	M.Engg. Programme	Rs. 26000.00
b)	MS Programme	Rs. 26000.00
c)	MEM Programme	Rs. 26000.00
(ii)	Library Fee	Rs. 1000.00
(iii)	Registration Fee / Semester	Rs. 1500.00
(iv)	Internet Fee	Rs. 1500.00
(v)	Late Fee, if applicable	Rs. 1500.00
(vi)	Equivalence Fee, if applicable	Rs. 1500.00
(vii)	University Endowment Fund	Rs. 400.00
(viii)	I Grade Examinations Fee (Per Course), if applicable	Rs. 10000.00

6 REGULATIONS FOR THE MASTER DEGREE PROGRAMMES AS OFFERED BY NED UNIVERSITY

6.1.1 Title

These Regulations may be called, 'Regulations for Master's Degrees; NED University of Engineering & Technology.

6.1.2 Commencement

These regulations shall be applicable with immediate effect except otherwise mentioned.

6.1.3 Nature of the Degree

Successful completion of the Masters Programme shall lead to the Master's Degree in discipline / relevant area of specialisation.

6.1.4 Nature of Programme and Number of Seats

Any teaching department of this University may offer Day programme for full time students or Evening/Weekend Programme for part time students; it may also offer both full-time and part-time Programmes simultaneously leading to the degree(s) as appropriate. With approval of the concerned Dean, each department shall specify number of seats in any programme and under each area of specialisation, (wherever applicable).

6.1.5 Criteria and Procedure for Admission

i) A Candidate must be a citizen of Pakistan / resident in Pakistan.

ii) The candidate should possess the following qualifications with CGPA **2.40**/4.0 (For such candidates having been awarded qualifying degree ONLY in 'Division', HEC defined criteria shall be used for conversion to CGPA);

a) For Master of Engineering (M.Engg.) / Master of Engineering Management (MEM) Programme, the candidate must possess Bachelors of Engineering degree or equivalent in the relevant fields.

b) For Master of Urban & Regional Planning (MURP) Programme, the candidate must possess either Bachelor of Architecture or Bachelor of City and Regional Planning or Bachelor of Civil Engg., or Bachelor of Urban Engineering or M.Sc. in Geography or four years B.S Degree in "Geography" or M.A. in "Geography" or four years B.S. Degree in Development Studies.

c) For Master of Architecture (M. Arch) Programme, the candidate must possess Bachelor of Architecture.

d) For Master of Science (MS) in: -

i) Computer Science & Information Technology, the candidate must possess either Bachelors of Computer Science and Information Technology or equivalent, or Bachelor of Architecture or Bachelors of Engineering or Sixteen Years Education in Applied Mathematics or Applied Physics or equivalent.

ii) Applied Mathematics, the candidate must possess Bachelors of Engineering degree or Sixteen years education in Mathematics or equivalent.

iii) Industrial Chemistry, the candidate must possess Bachelors of Engineering degree or Sixteen years education in Chemistry or Applied Chemistry equivalent.

iv) Physics, the candidate must possess Bachelors of Engineering degree or Sixteen years education in Applied Mathematics, Applied Physics, Physics or equivalent.

v) Applied Linguistics, the candidate must possess Bachelors in English or Sixteen years education in English in the relevant area with second division and above / CGPA 2.40/4.0.

vi) Data Engineering and Information Management, the candidate must possess Bachelors of Engineering degree or Bachelors of Computer Science, or Bachelors of Business Administration or sixteen years education in Applied Mathematics or Statistics, or equivalent.

vii) For Master of Engineering Management (MEM in Process Engineering Management) candidates having obtained degree in the disciplines of Chemical, Mechanical, Food, Petroleum, Environmental, Industrial & Manufacturing, Materials, Metallurgy, Polymer/Polymer & Petrochemical Engineering from the institutions as recognized by this university will be accepted for admission.

OR

e) Any other degree in disciplines as approved by Academic Council for any of the above programmes.

i) To be enrolled in any programme Day / Evening / Weekend, the candidate must have attained high degree of scholarship in his/her undergraduate study in relevant or approved discipline and must have demonstrated promise for success in advanced study.

ii) Application for admission shall be made on the prescribed form, and sent to the Chairperson of concerned department, either by hand or by registered post. After

introduction of ONLINE Admissions System, only this platform shall be used for submission of Admission Form. Any application received after the closing date may not be considered. Any applicant who fails to appear in the Admission Test shall stand disqualified for admission.

iii) Admission shall be granted on the basis of merit. Merit list of successful candidates will be prepared in accordance with criteria as under:
   a) Qualifying Examination Result.
   b) Qualifying Pre-Admission Entry Test that includes the University conducted test or any other test recognized by the HEC with minimum 50% cumulative score.
   c) Interview of candidates or short-listed candidates under (a) and (b) above, if required.

iv) Names of all selected candidates shall be displayed on the departmental notice board. Selected candidates shall be required to report to the Chairperson, of the respective Department for verification of their documents, then payment of prescribed fees and complete registration / enrolment documents within the prescribed date as notified.

v) The Dean of each Faculty shall monitor compliance with Regulations by the concerned departments within his/her Faculty.

vi) The Vice-Chancellor can cancel admission of any candidate after giving him a personal hearing.

6.1.6 Medium of Instruction

Instructions in all classes and laboratories and all examinations written or oral shall be carried out in the English language.

6.2 SCHEME OF STUDIES

6.2.1 General

i) Each Programme shall be of thirty (30) credit hours including Thesis where total credits hours for course work are proportionally reduced.

ii) There shall be two semesters in one calendar year, namely; Fall Semester and Spring Semester.

iii) Wherever applicable and in order of merit of selection, each candidate shall have the option to enrol either in the Day or the Evening or the Weekend programme.

iv) Any student enrolled in the Day programme may complete all requirements in three semesters (Thesis being compulsory in the Day programme) or within a maximum of eight semesters (Four Years) including withdrawal; if any. Minimum requirement may be reduced in case of transfer of credits / exemption of courses as defined in 6.2.4 (v)

v) Any student enrolled in the Evening programme may complete all requirements in minimum four semesters whereas for weekend programme minimum period shall be three semesters. In either case, the maximum of eight semesters (Four Years) will be allowed including withdrawal (Semester and Programme withdrawal); if any. Minimum requirement may be reduced in case of transfer of credits / exemption of courses as defined in 6.2.4 (v)

vi) Those students desiring to pursue for PhD, or based on their personal preference/ motivation, if allowed by the concerned Chairperson, may opt for Thesis in place of two optional courses of 3 credit hours each. Thesis shall be administered as described in clause 6.4.

6.2.2 Duration of Course and Time Schedule

i) Each semester shall have at least Fifteen weeks instruction time followed by semester examinations.

ii) In the Day / Weekend programme, courses up to maximum of twelve credit hours and in the Evening programme courses up to maximum of six credit hours shall be allowed in each semester. However, the Chairperson of the concerned department may allow one additional course to any such student who is enrolling for three credit hours of Thesis in a Semester or otherwise might require one more semester to complete thirty credit hours requirement for the degree.

6.2.3 Admission in Any Semester

i) Admission in any semester requires registration either in any course(s) or Thesis.

ii) Registration in course(s) for earning credit hours shall be subject to the following conditions:
   a) Any student having lesser than 2.50 GPA/CGPA shall be allowed registration in courses for earning credits subject to the condition that he/she shall remain on probation during next Semester.
   b) The student shall be required to achieve at least 2.50 CGPA after completion of the course(s) during next / probationary Semester.

iii) Any student who was on probation in any Semester and had not achieved at least 2.50 CGPA shall not be allowed to earn new credits and would be required to repeat /improve earlier courses.

iv) Any student may be allowed to take one course of three credit hours offered under any other area of specialisation in the same Department or in any other Department of the University with the recommendation of concerned Chairperson(s) and approval of the concerned Dean.

v) Registration of students in any course may be subjected to the maximum number of students in the class.

vi) Any student may be allowed to register in any course or change a course or withdraw from any course within three weeks after the date of the commencement of the classes by the Chairperson of the concerned department.

vii) Any students admitted in one particular programme i.e. Day/Evening/ Weekend may desire changing to alternate programme (with same specialisation) shall be allowed by the concerned Dean on the recommendations of concerned chairperson. Such change shall however be allowed provided that there are justified reasons for the request of change in programme.

6.2.4 Transfer of Credits / Exemption

i) Transfer of credit/ exemption of courses(s) may be granted by the concerned Chairperson against courses(s) which the student has passed earlier provided that:

a) Application must be submitted before the completion of first semester of studies.
b) Discontinuation of his/her studies has not exceeded two calendar years.
c) Such course(s) was (were) not counted towards any other degree.

ii) **Transfer of Credits**

Maximum of four credit courses completed during preceding four semesters from this University, including NED Academy, with at least 'B' grade may be credited with transfer of grade(s) as follows;

a) Course(s) listed under the current scheme of specialisation
b) One course from any other specialisation in line with clause 6.2.3(iv), if applicable.

iii) **Exemption of Courses**

Subject to equivalence, exemption may be granted:

a) To a maximum of Six credit hours equivalent courses passed in atleast 'B' grade from any other institution.
b) Any number of non-credit courses from any other institution.
c) Grades of exempted course(s) shall not be counted towards CGPA and the thirty credit hours requirement for the degree shall be reduced accordingly.

iv) In any case the total number of credit courses transferred / exempted shall not be more than FOUR of the programme where the student is admitted.

v) Consequently, maximum period for completion of the Master's Degree Programme may be reduced by one Semester for Day / Weekend Programme and two Semesters for Evening Programme.

Note: Necessary notification towards grant of transfer of credits /exemption shall be issued in each case.

6.2.5 Cancellation of Admission

The admission of any such student will be cancelled if the student is:

i) involved in any breach of discipline as prescribed in Regulations.
ii) fails to register in any semester without being officially allowed withdrawal either from the Semester or from the Programme.
iii) On probation in the second effective semester of his/her studies and on completion of the semester i.e. after taking the exam fails to achieve at least 2.50 CGPA.

a) However, such students who had shown a significant progress i.e. obtained at least 'B' grade in all courses of second effective semester shall not have his/her admission cancelled and will be allowed to continue his/her studies; Clause 6.2.3(iii) shall remain applicable to such students.

6.2.6 Withdrawal from Semester

Permission to withdraw from any semester may be allowed as under:

i. Withdrawal may be given under justified circumstances by concerned Chairperson and shall be notified accordingly.

ii. In any case withdrawal shall only allowed for the second semester provided that the student attended classes and had maintained at least 50% attendance in any one course during the first semester.

iii. Semester withdrawal will be allowed till 3rd week after commencement of Semester. The tuition fee will be adjusted in subsequent semester but semester registration, library fee, internet fee and Endowment fee will

however, be forfeited. Those students who had not yet paid the fees, shall only be allowed withdrawal subject to payment of fees equivalent to semester registration, library fee, internet fee and Endowment fee.

iv. After three weeks withdrawal may be allowed, subject to payment of fees equivalent to semester registration, library fee, internet fee, Endowment fee and tuition fee of one course.

v. If the student fails to report back in subsequent semester, his admission will be liable to cancellation as per Clause 6.2.5 (ii). In such case, adjusted fee will not be refunded.

6.2.7 Withdrawal from Programme

A student, who is unable to continue his/her studies because of justified circumstances on his/her part and desires withdrawal from the Programme, should apply to the Chairperson of the concerned department. If allowed, necessary notification shall be issued. In any case withdrawal shall only be allowed as under:

i. It will be allowed at commencement of second semester provided that the student attended classes and had maintained at least 50% attendance in any one course during the first semester.

ii. Programme withdrawal will be allowed till 3rd week after commencement of Semester. The tuition fee will be adjusted in subsequent semester but semester registration, library fee, internet fee and Endowment fee will, however, be forfeited. Those students who had not yet paid the fees, shall only be allowed withdrawal subject to payment of fees equivalent to semester registration, library fee, internet fee and Endowment fee.

iii. After three weeks withdrawal from programme may be allowed, subject to payment of fees equivalent to semester registration, library fee, internet fee, Endowment fee and tuition fee of one course.

6.2.8 Re-Admission in the Programme

A student who has officially withdrawn from the Programme may be readmitted in the programme provided that the period of absence together with period of study shall not exceed maximum permissible period as given in Clause 6.2.1 (iv & v).

6.3 EXAMINATION

6.3.1 Conduct of Examination

i) There shall be a final examination at the end of each semester asscheduled by the Controller of Examinations.

ii) The maximum marks in each course shall be 100; distributed as 40 marks for the sessional work and 60 marks for the final examination.

iii) The maximum marks in planning and design studio courses shall be 100; distributed as 60 marks for sessional work and 40 marks for final examination.

iv) Thesis shall be assessed as described in clause 6.4

6.3.2 Class Attendance

The students shall be expected to attend the classes regularly and submit thehome- assignment when due. A candidate with less than 75 percent attendance in any course shall not be allowed to take the final examination in that course.

6.3.3 Grade Point Average

The following grades / grade points with the equivalent marks shall be awarded to the students on the basis of their performance in each course of study.

Grade	Grade Point	Marks	Marks
A	4.0	88 – 100	-
A –	3.7	80 – 87	-
B +	3.4	75 – 79	-
B	3.0	70 – 74	-
B –	2.7	67 – 69	-
C +	2.4	64 – 66	-
C	2.0	60 – 63	-
C –	1.7	57 – 59	-
D +	1.4	54 – 56	-
D	1.0	50 – 53	-
F	0.0	Below 50	Fail
S	-	-	Satisfactory (for Thesis)
U	-	-	Unsatisfactory (for Thesis)
P	-	50 – 100	Pass in non-credit course
X	-	-	Exempted
I	-	-	Incomplete
IP	-	-	In Progress
WU	-	-	unofficial withdrawal

Note: IP to be awarded for Thesis after completion of one semester.

6.3.4 Academic Performance

Academic performance shall be determined on the basis of;

i) Grade point average (GPA) to be calculated for the courses completed in any semester or for some selected courses completed in more than one semester.

ii) Cumulative Grade point average (CGPA) to be calculated for all courses completed upto any semester or on completion of thirty credit hours.

iii) GPA and CGPA shall be calculated as:

$$GPA\ and\ CGPA = \frac{Sum\ of\ (credit\ hours\ of\ course\ multiplied\ by\ Grade\ Point\ in\ that\ course)}{Total\ credit\ hours\ of\ courses}$$

***** *Note: In the above calculation, total credit hours of courses (denominator value) include count of course(s) with "F" grade as well.*

6.3.5 Absence from Examination

6.3.5.1 Any candidate, who fails to appear in the final examination of any course shall be awarded grade 'WU' in the course(s):

6.3.5.2 a) If there is any documentary evidence or otherwise there is sufficient ground to justify absence of the candidate accepted as such by the teacher, the chairperson and the dean concerned, the grade WU in the course will be changed to grade 'I'.

b) Such candidate shall be required to appear in the examination of the course as scheduled by the chairperson; if the candidates fail to appear again, for any reason, he/she shall be awarded grade WU as final grade in the course.

6.3.6 Change of Grade/ Improvement

(i) Registration in a course for change of grade/ improvement will be subject to the following conditions:

a) A compulsory course which the student is required to repeat for obtaining a passing grade or a course selected by the student for improvement of his/her CGPA.

b) Any other credit course in lieu of an optional course.

c) Better grade(s), if any, will be considered for determining GPA / CGPA.

(ii) Any student who is eligible for award of degree under Para 6.5 but still desires to improve CGPA for any reason may be allowed by the Chairman of the Department concerned, subject to the following conditions:

a) No provisional certificate/degree has been issued to him/her.

b) Duration of completion for the degree does not exceed the maximum limit described under Para 6.2.1 (iv) and 6.2.1(v).

c) The student requests registration in desired courses within two weeks after announcement of his/her result

6.4 Thesis

Thesis shall be equivalent to six credit hours and shall be required to be completed within duration of two semesters, with three credits hours enrolled in each of the two semesters. Three credits of thesis may include laboratory work. Extension of one semester may, however, be granted by the concerned Chairperson in special circumstances if the student was unable to complete the Thesis requirements in two semesters because of unavoidable circumstances not related to his/ her own lack of commitment. However, in such case, student shall register in Thesis in the additional semester and shall pay fees equivalent to semester registration, library fee, internet fee, Endowment fee and one-fourth fee of one course of the respective programme.

6.4.1 Proposal for Thesis

(i) During the first 4 weeks of the first semester of Thesis enrolment, a proposal on prescribed format should be submitted by the student to the concerned Department through the Supervisor.

(ii) The Thesis proposal is to be evaluated by a Postgraduate Committee comprising of three senior faculty members including Chairperson. This Committee is to be constituted by concerned Dean.

(iii) The proposal would then be submitted to the concerned Board of Studies for approval.

6.4.2 Thesis Assignment and Supervision

(i) Each such student will also be assigned a Supervisor for guidance.

(ii) Depending on the nature of topic for Thesis, Chairperson concerned shall recommend a Supervisor having relevant experience

/expertise in the area of the topic, to guide the student in the enquiry, analysis and/or development work undertaken and it's write-up throughout the period of research. The approval of the supervisor shall be given by the Vice Chancellor. The Supervisor shall be responsible for;

(a) Initial definition /selection of the topic of the research and plan of the research assigned to the candidate.

(b) Guiding the candidate in development of the research proposal, overall monitoring and guidance, thesis writing and other matters related to the programme.

(iii) Thesis shall be allowed only to those students having completed twelve credit hours with CGPA of 3.00.

(iv) Supervisor may recommend a Co-Supervisor to the Chairperson concerned. The approval of the Co-Supervisor will be given by the Vice Chancellor.

(v) A student undertaking research leading towards thesis option shall be allowed to enrol in a maximum of two more courses of three credit hours each during such semester(s) in which he/she enrols for thesis, provided that he / she is able to maintain a CGPA of 3.00 at time of such enrolment.

(vi) Satisfactory performance of the first three credit hours of a thesis shall be based on an Evaluation conducted during first two weeks of second semester of enrolment in thesis. The candidate shall be required to present his/her work in a departmental seminar for such evaluation.

(vii) A student satisfactorily completing the first three credit hours of a thesis shall be allowed to enroll in the remaining three credits in a subsequent semester.

(viii) A student having unsatisfactorily performing in the first three credit hours of a thesis shall not be given any thesis credit and shall be required to undertake regular coursework in lieu of the six credit hours of thesis work.

(ix) A student after successfully completing three credit hours of thesis may opt / be given the option to enroll for regular coursework in lieu of the complete six credit hours of thesis work. No credit, however, shall be given in such a case for any completed thesis credit hours.

(x) A Weekend Programme student desirous in enrolling in thesis may be allowed by the concerned Chairperson to enroll in 12 credit hours in his/ her first semester of studies so as the student be able to complete the degree requirements in 3 semesters. All other conditions will apply.

(xi) Temporarily unable to continue research because of justified circumstances, should file an application to the Chairman of the concerned Department through the Supervisor for temporary suspension from the programme. Such leave of absence shall not exceed twelve months. Upon return after availing the leave, Chairman on the recommendation of Supervisor may allow the student to continue.

6.4.3 Evaluation of Thesis

i) A candidate may be allowed by the Chairperson of the concerned Department to submit the Thesis only after:
   a. Fulfilling all requirements as suggested by the Supervisor.
   b. Pursuing Thesis work for at least two semesters.
   c. Fulfilling all other regulatory requirements prescribed by the University.

ii) A candidate shall submit an application after fulfilling conditions of Section 6.4.3(i), to the Chairperson of the concerned Department for the examination and shall submit three copies of the Thesis for evaluation. This submission should be done by the candidate within two weeks of completion of classes in semester for evaluation / examination. Otherwise, either the candidate may request the Chairperson for award of grade 'I' and extension of one Semester or withdrawal from the Thesis.

iii) The candidate shall be examined orally and will be provided an opportunity to defend his/her Thesis.

iv) The Vice Chancellor of the University, on the recommendation of the Board of Studies (BoS), shall nominate an

Examiner's Committee comprising of at least two examiners including the Supervisor. Examiner (other than the supervisor) may also be from outside the University.

v) The evaluation of Thesis shall be done in the following manner:
   a. Requirement fulfilled without any corrections
   b. Requirement fulfilled contingent to major corrections
   c. Requirement fulfilled contingent to minor corrections
   d. Fail

vi) The Examiner's Committee shall examine and grade the Thesis: 'S' for satisfactory without any corrections or with corrections; otherwise 'U' for unsatisfactory.

vii) In case of result as 6.4.3(v)(b) or 6.4.3(v)(c), the Examiners' Committee shall indicate in what respect the material of the Thesis should be modified and specify period for re- submission. Once re-submitted in due time, one of the members of the Examiner's Committee, as nominated by the Examiner's Committee, shall certify that the corrections are carried out as recommended by the Examiner's Committee. In case of major revision, Committee shall also decide whether to hold subsequent examination or not. Up to the time re-examination is done (if required) and/ or all corrections are certified, the Thesis result of the candidate shall be withheld. Re-examination shall only be allowed once. In case the candidate fails to submit the corrections to the satisfaction of the examiner's committee in due time, a one-time extension may be granted by the Examiner's Committee. This whole process, however, should take no longer than 12 weeks from the date of first oral examination.

viii) In the case of a failure or when a student is unable to meet the requirements as mentioned in 6.4.3 (vii) in case of major or minor corrections, Thesis shall be graded as "Unsatisfactory" and the student shall be required to undertake regular coursework in lieu of the six credit hours of Thesis work.

ix) The Examiner's Committee shall submit the result of the entire examination, immediately after the oral examination, on the prescribed form to the Controller of Examinations.

6.4.4 Submission of Thesis

i) A candidate, having qualified for Thesis, shall submit three copies of the Thesis on a prescribed format to the Chairman of the concerned Department.

ii) The NED University of Engineering & Technology shall have the right to publish the Thesis or any part thereof and/or develop intellectual property out of the same – irrespective of whether or not the project work is completed.

6.5 AWARD OF DEGREE

Any student who has fulfilled following conditions shall be eligible for the award of Masters Degree in the relevant field;

i) Passed all non-credit courses, if required.
ii) Passed all credit courses counted towards degree with minimum 3.00 CGPA within specified time.
   a. Satisfactorily completed Thesis.
iii) Satisfactorily completed all other requirements.

6.6 GENERAL PROVISION

Regulations and rules of the Undergraduate Programme shall not be applicable to any Post-graduate Programme unless otherwise specified by the appropriate authority.

7. SUPPORTING INFRASTRUCTURE

7.1 ENGR. ABUL KALAM LIBRARY

Since its inception in the City Campus, Engr. Abul Kalam Library https://eakl.neduet.edu.pk/ has grown to become one of the leading academic libraries particularly focusing engineering, sciences and technology of the country. The library devotes considerable efforts and resources to the development of an outstanding library collection to meet the needs of the students, faculty members and researchers of the University. Services and facilities of the library are governed by the library regulations. The Library has its Mobile App "AMBITION" available on Google Play Store. It provides the Library OPAC and online library services.

The Library comprises of two buildings adjacent to each other. The reference and administrative building consists of three floors having numerous seating capacity for the library users. The building adjacent to this comprises of with Circulation Section on the ground. Departmental libraries have also been setup in remote campuses; City Campus, LEJ Campus, TIEST Campus as well as selected teaching departments at main campus.

Library collection is the impressive blend of traditional information resources and scholarly electronic resources. The collection includes:

- Textbooks of common interests.
- Reference books including encyclopedias, handbooks, dictionaries, manuals etc.
- Periodicals on current lists of subscription as well as volumes of back issues of local and international scholarly journals; magazine and newspapers.
- Government documents & Archive material including Acts and Ordinances, Services Rules, Statistical reports, Census reports, Survey reports, Planning reports, Budgets etc.
- Non book materials, CD-ROMs, DVDs etc.
- Digital contents including databases of e-books, e-journals, e-thesis, e-dissertations etc.

Reference Section provides reading / reference services to the library patrons. Textbooks and reference materials including audio visual material, periodicals and government documents are restricted to be used within the premises. The collection is secured against theft using state-of-the-art RFID security gates and surveillance CCTV cameras. Library has a separate bag deposit room at the main entrance of the Library.

The library provides book lending services through the Circulation Section to students, faculty members, researchers and other employees of the University as per rules laid down. The section also comprises of Anila Azam Reading Room. However, the Book Bank caters undergraduate students only and provides textbooks on rental basis for entire semester. The library also conducts Library Orientation to new comers and organizes Book Fair annually.

The library keeping pace with emerging technologies has its own Koha: Library Management System including Website, Library OPAC and Portal Services. Wi-Fi access points and Digital Notice Board are also available to facilitate the library users. The Health, Safety, Environment initiatives include fire alarm and emergency exits, wheelchair ramp for disable persons, first aid for people moving in the Library.

A computing facility comprising of latest configuration computers provides digital services to its users such as access to e-books and e-journals through the National Digital Library Program of HEC. All these resources are accessible in the campuses as well as from home through the NED VPN. Further, internet, printing, scanning facilities including copying facility of e-contents of non-book material are also available in the Library.

The library is committed to providing a pleasant, user-oriented learning environment for its users. Its endeavors are to make its resources available and useful to its users and to sustain and preserve a universal collection of knowledge for future generations.

7.2 INFORMATION TECHNOLOGY (IT) DEPARTMENT

The University has its own Internet facility managed by its Information Technology (IT) Department (formerly Internet Centre) established in 1998-99. The Information Technology (IT) Department since its establishment has played a pivotal role in developing the varsity's I.T. infrastructure by providing robust Internet facility to its users within and outside of its campuses. The department is equipped with the state of the art networking equipment and acts as a central IT hub providing services like Internet, CMS, Web, Network Operations and Support Services round the clock. Continuing the expedition in producing the best in the Country, this Department also hosts corporate training for its faculty and staff along with the video conferencing facility enabling its Faculty and Students to join the rest of the Engineering and Technological hubs of the world.

7.2.1 NETWORK & HARDWARE

Internet Facility

Internet as the sole of research and education is also considered the bedrock of learning by NED. Coping up with the ever growing technology standards, the university continuously extends its services and infrastructure. Currently the university boasts a bandwidth of over 750Mbps along with highlighted infrastructure and services as under;

- **Data Centre:** NED University has transformed its network and data services by establishing its state of the art Data Centre. The data Centre comprises of 5 server racks along with 3 network racks. Capable to host 90 servers with 4.8Gbps bandwidth connectivity per rack. The sole aim is to provide efficient services while ensuring high standards.
- **FO LAN:** State of the art Optical Fibre LAN to every facility in the university.
- **Broadband connectivity:** Robust high bandwidth connectivity for every connected user (upto 8 mbps).
- **Smart University:** HEC Smart University campus wide WiFi giving robust secure Broadband connectivity to the

users (students, faculty and staff) to all users of Main campus, LEJ and City Campus.

- **Inter Campus connectivity:** All remote campuses (LEJ, City) and the constituent college TIEST are all connected over VPN to the Main Campus thus providing all Extranet/Intranet facilities as in the Main campus.
- **NEDUET VPN**: VPN for researchers and students giving secure access to HEC Digital Library and NEDUET Portal services.

7.2.2 Online Learning Management System

Pioneering the policy for online higher education; NED has not only transformed its teaching mechanism for online delivery but also played a pivotal role in devising the overall online teaching strategy at the national level through HEC. During the pandemic, turning the problem in to an opportunity the NED had transformed its education system and policies according the demanding situation of online distance learning. A well-orchestrated plan of technology deployment (termed as NEDUET LMS combining GSuite, NED Portal, NED VPN etc.), training and adoption by faculty while focusing on the development quality digital content, its timely delivery in addition to modified examination policies enabled quality education to the students, their proper participation and analysing the overall outcome in terms of examination.

7.2.3 Hardware Maintenance and Inventory

Department also provides hardware and software support services in addition to managing hardware inventory and technical feasibility services.

7.2.4 Video Conferencing Facility

This University has a centrally located Video Conferencing Facility Centre through which NEDUET connects to any part of the world, locally and Internationally to connect and communicate with video and voice facility for the arrangement of virtual classes (online classes), conferences, seminars, Internet meetings (video conferences) among multiple locations, as and when required. This facility is available round the clock.

7.2.5 Information Systems and Software Section

The IT Department focuses on delivering state-of-the-art software using Agile Methodology with Faster Development time and uncompromising integrity, some of them are as follows; Undergraduate and Postgraduate Students Management System, Human Resource Management System, Attendance Information System, Shuttle Pass System, Hostel Management System, LTV Management System, Security Operations Management System, Statutory Bodies Management System, Academic Performance Monitoring System, Scholarships Management System and Internship management system. A part from MIS several web based applications are also developed by IT department which are playing vital role in automation of some core university processes e.g. Online semester registration of undergraduate and postgraduate, online feedback collection of undergraduate and postgraduate and Online Admissions. This comprehensive and sophisticated development effort as a whole is termed as NEDUET Campus Management System (NEDUET-CMS). To access information contained within CMS, Every employee and student on Intranet uses a front end interface known as NEDUET Campus Portal. NEDUET Portal is a 24/7 service. Portal works on the principle of Single sign on for multiple applications with personalized, secure, and robust and role based access management.

With the aim of facilitating Undergraduate students, Portal dedicated online Students Interface is enriched with the following features:

- Availability of Personal and Academic Profile
- Subject wise to-date Attendance Status
- Classes and Examination Schedules
- Special announcements from course Teachers
- Access to study material uploaded by course teacher
- Access to Personal letters issued from Registrar Office
- Availability of Portal Notice Board showing recent notifications and announcements from Registrar Office.
- Option to apply/track/withdraw online for the posted internships
- Semester registration details of regular and backlog courses
- Online feedback of course, teacher and learning resources
- Availability of Admit card and Transcript by integrations with Examination portal.

7.2.6 Research & Development Section

The Research & Development Section of IT Department working with main objective of providing a centralized high performance parallel computing facility to the entire University in particular and to the universities of Pakistan in general, for Research and Development in any of the Engineering disciplines. The facilities are primarily meant to be utilized at the postgraduate and PhD level. It has, therefore, been facilitated with the most advanced hardware and software keeping in view the Research and Development needs of the country in virtually all the engineering disciplines. High-end workstations with excellent graphics support and computational power are available for the researchers to assist them in their research work.

The University has the distinction of being the first Public Sector University of configuring and developing its own Linux based 50 nodes cluster with the technical assistance of its own IT force. The system was developed in the year 2003 and became functional in 2004. The State-of-the-art hardware that includes Intel Xeon processors, Gigabit Ethernet connectivity, high-tech system as well as management software has been used for Cluster development that provides tremendous increase in performance and throughput. The System is capable of executing complex engineering problems efficiently and with great accuracy. This facility has enabled researchers and creative professionals to exploit heavy computational and bandwidth-conscious software like Fluent, Ansys, MATLAB,

Cadence, OPNET etc., and perform heavy simulations and modelling exercises with ease. Recently, one new high performance computing cluster based on 64-bit architecture has been developed. The latest core processors technologies with branded high tech systems are procured. This cluster is now fully functional. With storage capacity of these systems reaching terabyte (TB) and memory capacity in gigabyte (GB), the computation on these are producing fast results.

All facilities available at the Centre can be accessed on campus over the University LAN and it can also be accessed from remote locations. The centre also extends its service to the engineering industry and other professional organizations involved in Research and development work.

The section also has a very large database of multidisciplinary software with a high number of licenses for some distinct software. Several of these softwares have the feature of executing tasks in parallel and utilizing the computing power of our clusters. The software repository will attract the research to pursue their academics research using these softwares under the terms and conditions of NED University. In addition, Research & Development section also has a training facility where seminars and workshops related to different software are conducted throughout the year for the faculty and students of the University.

7.3 INSTRUMENTATION CENTRE

A state-of-the-art Instrumentation Centre is functioning at the University which was established under a grant provided by the Higher Education Commission (HEC). Its capabilities include calibration of multi-meters, energy meters, circuit breaker testing, pressure/ temperature gauges, water quality, etc. The Centre has well equipped facilities and the necessary expertise for performing calibration activities, testing and analysis service, corporate training related to instrumentation, and design services for the local industry as well as other academic institutions in the country. Services of the instrumentation centre are subscribed by multinational and national companies operating in Karachi as well as other universities present across Pakistan. It also provides training to undergraduate and postgraduate students, and assists Undergraduate students in undertaking final year projects of various disciplines. In addition, it assists other University departments in their R&D activities as well. The Centre comprises of various well-equipped Laboratories such as Electronics and Signals Lab, Pressure and Temperature lab, Equipment Testing Lab, Water Quality and Weight Lab and a Virtual Instrumentation Lab. In particular, the Virtual Instrumentation Lab is equipped with world renowned National Instruments' (NI) LabVIEW system which helps engineers in basic data acquisition and signal processing as well as more complex embedded monitoring and control applications. The NED University lays emphasis on efforts in contribution towards research and improvement in quality of its human resource by providing good and up-to-dated facilities for utilisation by its student, academicians and researchers. The Instrumentation Centre is one such effort.

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In particular, the Virtual Instrumentation Lab is equipped with world renowned National Instruments' (NI) Labview system which helps engineers in basic data acquisition and signal processing as well as more complex embedded monitoring and control applications. For formal classroom lectures, a small but well-equipped Training Facility also exists.

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7.4 NED ACADEMY

With the rapid pace of development of knowledge, skills, tools and techniques in engineering, applied sciences and other professions, continuing education of working professionals in industry has become a vital need. To cater educational and professional training needs for continuous upgrading of working professionals, NED University established NED Academy initially as Centre for Continuing Engineering Education (CCEE) in 1998. The initial purpose of CCEE was to provide applied engineering education so as to comprehensively cater the needs of technical work force in their career progression. However, with the changing paradigms of knowledge, education, learning as well as integration of engineering knowledge with managerial & leadership skills, professional ethics, societal harmony, and the goals of sustainability and socio-economic development, a need was felt to form a much larger umbrella of outreach education and training at NED and thus NED Academy was established in 2008 with CCEE working as one of its Centres. Since then, aiming at the goal of professional excellence, NED Academy has embarked on a remarkable journey which promises ambitious learners belonging to any educational background and at any professional level a chance to choose, broaden and enhance their careers. We endeavour to develop profiles in line with the hiring criteria of leading organizations. This aim is achieved with dedicated efforts, planning and execution by the human resources associated with this initiative.

Where NED University stands for quality, NED Academy stands for polishing this quality further on with additional credentials and skills. The opportunities provided through the courses offered by NED Academy ensure professional excellence for anyone who is ambitious with his life goals. NED Academy serves as a symbol of excellence regardless of the field that anyone chooses because it stands for not only technically sound education but also believes in creating profiles which are multi-talented and have the flexibility and depth to be oriented easily toward the ever-changing dynamics of professional deliverance.

The vision of NED Academy has been "Empowering for Professional Excellence" by developing and offering more and more market-based capacity building trainings for different cadres of audience with continuous updating/ improvements as well as an integration with entrepreneurial spirit.

Having a clear goal of "Grooming Professional Leaders for Tomorrow" NED Academy has shown dedicated efforts to provide a platform to engineers and other professionals to learn to be more competent in their fields and to build a capacity to work with techno-managerial skills along with leadership skills to achieve their career goals and organizational development.

The objectives of NED Academy have been as follows:

- Updating professionals with state-of-the-art developments in engineering/sciences / technology/ engineering management / leadership skills/ Digital skills/ soft skills/ CAD & CAE skills/ linguistic/ entrepreneurship etc.
- Providing learning opportunities for working engineers and other professionals to enhance their exposure to knowledge, skills, tools and techniques with the objective of improving their career growth and making them globally competitive.
- Providing hands-on learning opportunities for vocational and technical trainings so as to improve industry employability and growth.
- Offering structured courses, certification programmes, international exam preparations, diploma programmes, postgraduate diplomas, nanodegrees and other programmes in market-oriented disciplines for creation as well as sustainable development of globally competitive human capital.

Key Domains of NED Academy

NED Academy, a name of guaranteed excellence, is well aware of the challenges faced by graduates and professionals in real world. To assist them in conquering these hurdles, NED academy conduct series of programmes in various domains. Some of those are as follows:

- Leadership Trainings
- Managerial Trainings
- Executive Trainings
- Postgraduate Diplomas
- Undergraduate Diplomas
- Short Courses
- Professional / International Certifications
- Software Based Training / CAD / CAE
- Technical Courses /Hands-On Trainings / Diplomas / Vocational Trainings
- Youth Engagement and Development Programmes
- Entrepreneurial Development Trainings
- Undergraduate Trainings
- Soft Skills Trainings
- Corporate (In-House) Trainings

Future Plans of NED Academy

- One of the master plant of NED academy is to incorporate a new wing, a new domain that would enable easy and convenient access to facilities of NED academy. With the advancement of technology, NED academy plan to develop NED Online. NED Online will highlight the reach of NED Academy beyond its boundaries and reach a wider audience by initiating online courses.
- NED Academy is looking forward to collaborate international certifications and skills testing agencies such as PMI, AACE, APICX, etc., in order to have indigenously designed certifications and skills testing mechanisms.
- NED Academy is endeavoring to create career awareness and guidance among youth and young professionals and various level of their professional journeys in order to develop a sustainable and meaningful impact on national economy by generating career insight as per the changing paradise both locally as well as globally.

7.4.1 Centre of Continuing Engineering Education (CCEE)

Centre for Continuing Engineering Education, the most active wing of NED Academy enables professionals to attain higher levels of research, teaching and industrial cooperation for technical leaders for constant learning by empowering them with the relevant knowledge, skills, techniques and technology base to help them outshine in their careers. It brings together new practitioners, new technologies and new experiences for the mutual benefits of all concerned. CCEE regularly conducts short courses to update engineers, professionals with recent development in engineering, management, IT, Sciences. It provides opportunities for working engineers to improve their qualification to meet professional body's registration level after successful completion and to enhance their skills with the objective of improving employability.

7.4.2 Centre of Professional Excellence – CoPE

Centre of Professional Excellence is another wing of NED Academy which has been already very active for the last 2 years and is serving graciously next to CCEE. It has shown great initiative by launching various successful certification programs, seminars and workshops. Initiated in 2016 on the premise that engineers and other professionals are getting challenged to be promoted to senior positions in their organizations because of lack of certain key skills, expertise and knowledge much needed to attain and sustain professional excellence particularly at leadership positions; since then, CoPE has been working to bridge this gap and make professionals equally competent for C-level positions. CoPE has mainly been focusing on accommodating professionals with International Certifications and In-house local Certifications in various disciplines. A large part of this Centre's focus is on providing high quality in-house

certifications for those professionals who can't afford international certifications.

In addition to CCEE and CoPE, NED Academy is now taking initiatives in other pitches which include postgraduate diploma programs, professional certifications, entrepreneurship, vocational and technical trainings, skill-based courses, market-based short courses, industry-academia collaborative courses, thematic workshops and international seminars for enhancement of professional knowledge, skills and capacity in engineering and other fields for career enhancement.

7.5 COWASJEE EARTHQUAKE STUDY CENTRE

Cowasjee Earthquake Study Centre (CESNED) was established in 2001 after the devastating Bhuj earthquake. The Centre is currently administered by the Department of Earthquake Engineering. The objectives of this centre include (a) housing national and global data pertaining to earthquake; (b) to act as a centre for disseminating accumulated knowledge; (c) to respond to the emergency needs; and (d) be able to providing guiding principles for pre and post disaster earthquake mitigation. It has become a hub of the earthquake related activities with time. The vital role played by CESNED after the 2005 Kashmir earthquake led to its recognition as one of the two earthquake study centres in the Country.

7.6 SHAKE TABLE TESTING FACILITY

The Shake Table laboratory is a state-of-the-art facility which is available in the Department of Earthquake Engineering. The facility is used to simulate real time earthquake ground motion to record the dynamic response of a given structure placed on the table.

7.7 ADVANCED MATERIAL TESTING FACILITY

The Advanced Material Testing laboratory is a state-of-the-art facility which is administered by the Department of Earthquake Engineering. The facility is used to conduct full scale static and pseudo dynamic testing of various structural components of buildings and bridges.

7.8 PCB FABRICATION LABORATORY

A PCB fabrication Laboratory is available in the Department of Electronic Engineering. This is primarily for training under-graduate students in PCB fabrication technology. The laboratory is supported by PCB layout design software and auto routing software. The graduating students with this experience are expected to benefit in their professional field. The Laboratory is being used for fabrication of PCB for local requirement and possibilities of taking orders for external agencies is being examined.

7.9 PRODUCT DEVELOPMENT CENTRE

Additive manufacturing technologies, more commonly known as "Rapid Prototyping" or "3D Printing" have been used by design and manufacturing organizations for concept modeling and prototyping as well as for various applications such as jigs, fixtures, check gauges, and even as a bridge-to-tooling and low-volume end-use parts. Emergence of these technologies have led manufacturing organizations to reduce their product development cycle time and improve product quality and customization. Global acceptance and application of these technologies have put the manufacturing industries of Pakistan to face strong challenges in terms of high-quality product development processes.

The Product Development Centre (PDC) of NED University has been equipped with state-of-the-art equipment and tools that enable complete reverse engineering and additive manufacturing of products. The equipment available at PDC includes a Faro Arm and a Laser Scanner for reverse engineering of products and a Fused Deposition Modeling (FDM) machine alongwith a vacuum casting equipment to build parts directly from CAD data (i.e. tool-less manner). Different CAD packages are also used to complete the process of product development.

7.10. DIRECTORATE OF INDUSTRIAL LIAISON

The Directorate of Industrial Liaison (DIL) was established at NED University of Engineering & Technology in 1997. The prime objectives of DIL are to create and enhance the required University-industry Linkages in the form of various activities like activities like internships, study visits, final year projects and job placements.

DIL is since then involved in arranging internships opportunities in vacations for students in different organizations/ industries. Cooperative Education program a combination of classroom-based education with practical work experience. The conventional educational education system has a lack of correlation between the academia curriculum and industrial practices. Many employers train students before hiring as graduate trainee for a specific period of time before of time before they could start their jobs. Proper implementation of the 'Co-op' helps in bridging this gap. Students will be able to undergo industrial training during their studies thereby make a smoother education-to-work transition. As a part of Co-op education program, nominated students from the university on the basis of merit has completed 1st phase of internship successfully & will be doing internships in their (spring/fall) semester breaks from first year till the time of their graduation.

In addition, DIL arranges on perpetual basis study visits for the students and faculty at various industries and organizations to get the practical exposure of the industry. DIL also provides assistance to the organizations/ industries in respect of Research and Expert engineering services through teaching faculty to address their technical problems.

DIL is engaged in collecting the topics of final year projects and arranging technical / practical help from the industries related with the projects. In a number of cases the industries have assigned projects to the University students with competent advisor from their organizations to help the students.

DIL encourages the prospective employers for on-campus hiring and facilitate them to conduct Presentations. Tests and interviews for recruitment. Many multi-national companies, some overseas employers, local business groups and small and medium Enterprises (SME) are availing such facilities on need basis. DIL has explored new ways to minimize the gap between by academia and industry by developing LinkedIn page to facilitate the students by creating a bridge between university with various companies / industries. This online platform will be helpful for both professional networking and career developmentthat allows job seekers to post their CVs and employers to post jobs. DIL also shares Graduate Directories with employers, arranging career fairs and pre-employment orientation programs and online faculty wise in-house / online career counseling session that meets the need of the diverse groups university students by providing, engaging their communication and presentation skills according to their prospective career.

To foster and promote the engineering profession, the Directorate of Industrial liaison represents NED on the Standing Committee on Science Technology of the Federation of Pakistan Chamber of Commerce & Industry (FPCCI) and the Think Tank Committee of the Institution of Engineers Pakistan (IEP).

DIL has also signed Memorandum of Understanding with various Industries organizations, Purpose of these MoU's is to create a long term framework of collaboration, cooperation and development of strong linkage between industry and NED on training, consultancy, research and development or any other activity which is in the interest of both 'Parties'. The industrial collaboration and linkage would provide opportunity to students and faculty of NED for training, consultancy, R&D and exposure of professional practices while industry would be benefited in resolving their technical / managerial issues through local solutions. The collaboration would bring positive impact on environment and society.

7.11 OFFICE OF RESEARCH, INNOVATION AND COMMERCIALIZATION (ORIC)

The Office of Research, Innovation and Commercialization (ORIC) at NED University was established with an aim to provide strategic vision and operational support to the University's research activities. From its inception, ORIC is committed to play an active role in facilitating the University's research and encourage the faculty and students to contribute and share in promoting goal-oriented research activities. ORIC also aims to act as a catalyst for the transformation of knowledge towards invention and innovation and its subsequent commercialization leading to a positive impact on the welfare and well-being of our nation.

7.11.1 Objectives

Since its inception, ORIC has adopted its mandate to enhance the environment for all research commercialization and innovation activities: Following are the core objectives of ORIC:

1. Developing the university's strategic research directions and policies
2. Increasing and diversifying research funding
3. Improving integration of research and education at all levels
4. Strengthening university-industry relationships
5. Promoting entrepreneurship and technology commercialization
6. Protecting University's intellectual property

7.11.2 Initiatives and Activities

In pursuance of the Vice Chancellor's directives for the management of research initiatives and programs, ORIC has worked to re-enforce the existing research and development activities at NED University. Many activities were planned and successfully executed for sustaining and improving the research, innovation and commercialization having an impact for the improvement of areas concerning economic, industrial and academic development and their accelerated advancements for achieving the national objectives. Some of these activities are outlined below:

7.11.3 Organizational Support

In order to maintain an environment conducive for the generation of knowledge and to provide recognition to individual inventors, encouraging the development and dissemination of useful inventions to society, ORIC has prepared drafts of University's Intellectual Property Policy and Collaborative Research Policy. Besides, ORIC has also developed a comprehensive NED-Research Eco System draft which presents a holistic overview of the NEDUET research and innovation activities and provides a guideline for technology development and its subsequent commercialization.

7.11.4 Lab Commercialization

For the commercialization of the laboratory facilities available within NED University, ORIC has launched a Lab Commercialization Program. Under this program ORIC is closely working research labs across the university such as High-Performance Computing Center, Research Center for Artificial Intelligence RCAI, 3D Printing Facility Lab. ORIC has also recently commercialized Scanning Electron Microscope for service provision to industry and students for research purposes.

1) National Center for Artificial Intelligence (NCAI)
2) National Center for Robotics and Automation (NCRA)
3) National Center for Cyber Security (NCCS)
4) National Center for Big Data and Cloud Computing (NCBC)

BIC has been selected in top 5 across the Universities/ Institutes of the country to be the part of National Idea Lab.

7.11.5 Entrepreneurship Development

NED Entrepreneurship Society is operating under the umbrella of ORIC as a student wing that is dedicated to discover, engage and foster creativity and to bring up true entrepreneurial leaders from the university. Several activities took place in the previous year fueling of the entrepreneurial eco system to fully permeate our campus. A renowned campaign "The undiscovered entrepreneurs of NED University" brought NED's silent entrepreneurs into limelight. "From Silicon Valley to NED University", a talk was given by Mr. Idrees Kothari, an NEDian and serial entrepreneur from Silicon Valley. DICE Virtual Innovation Competition is being organized for the last two years in collaboration with DICE Foundation, USA. Various promising projects came up during this event which is now in the process of development and commercialization. TEDx NED University was organized on the themes of capacity building of young innovators and entrepreneurship for Engineers with PEC in 2021 and several workshops and trainings organized within the same lines for the entrepreneurial Development.

7.11.6 Workshops & Training

ORIC organizes several courses and trainings for the students and faculty members. ORIC with its collaborative partners INJAZ Pakistan offered Entrepreneurial Masters classes. ORIC also hosted Unilever Foundry for students offering them opportunities to partner with Unilever brands and functions and help them solve some exciting challenges. Dr. Umar Saif gave a lecture on "Role of Technology in Improving Governance & Entrepreneurial Landscape of Pakistan" and a notable NED's alumni Safwan Shah gave a lecture on Entrepreneurship and explored principles and methods for initiating an entrepreneurial venture. To prepare young engineers with the time management skills, ORIC have been organizing workshops by Time Lenders to improve general skills of organizational behavior. Several workshops and courses are also planned for this year.

7.11.7 Industry Linkages

It is a strong belief of ORIC that Industry-University collaboration can be mutually beneficial by combining the best academic thinking with the expertise of industry. There is a strong intent in the NED faculty and students to participate extensively in collaborative research programs with the industries. In order to establish and strengthen University-Industry collaborations to stimulate industrial research, ORIC has been engaged with different industries, organization and companies bringing projects in the university as per the industry needs for locally manufactured R&D solution and offering students with project apprenticeship.

7.11.8 Business & Technology Incubation

To enhance innovative and entrepreneurial prowess of young graduates and to accelerate and encourage the successful development of entrepreneurial companies, ORIC has established a Business Incubation Center by the name of CINETIC - Center of Innovation, Entrepreneurship, Technology Incubation & Commercialization. Almost 8 startups graduated in the previous year and 11 startups and 6 campus companies operating currently at CINETIC. First batch has been successfully graduated while second batch of startups are in the middle of their process. This strategic step is aimed to facilitate new breed of young entrepreneurs to ensure their participation in the positive economic activities through pursuing startup companies. In addition to generating a higher value addition for the nation's economy, this step will help addressing the rising trends of unemployment and its threat to political stability, social unity and economic growth of our nation.

CINETIC provides its startup incubates with infrastructural support that includes office space, PCs, internet, telephone services apart from the basic printing, scanning and photocopier services. It also provides great networking opportunities, means to the access of financers and lab access services. Excessive mentoring from the board of advisors on matters relating finance, marketing, legal and related matters are the part of the incubation program.

Upon realization of importance of protecting Intellectual Property rights not only for researchers but also for startups, ORIC has its own IP Office that provides consultancy to students and faculty in protect and processing their ideas and research legally.

7.11.9 Campus Companies

Campus Companies is an initiative under ORIC that enables students to operate and establish their businesses in the boundaries of NED University, whilst providing services and products on-campus. In this regard, Cycle Yaari has been operating as an on-campus venture that provides smart and green transportation solution in the premises of NED University in the form of cycles. Open Mic, is another social venture that aims at fostering the culture of public dialogue and social inclusion amongst engineers. Book Cafe is an online bookstore also function as a novel reading library based out of CINETIC building, Students can buy books or take novels on rent. DIYNED Club and Being Student are recent campus companies operating vibrantly adding value to the student life at the campus.

7.11.10 Maker Studio

To provide a platform for thinkers and creators and to facilitate collaboration and sharing of ideas across boundaries of disciplines, ORIC has launched Maker Studio. The initiative aims at creating an environment that fosters creative exploration of ideas. Inspired by MIT's Fab Labs, Maker Studio enables multidisciplinary learning and development for students and faculty alike. The facility is available in the ground floor, CINETIC Building.

7.11.11 Research Internship Program

This is a selective program that provides the interns with the opportunity to work on a research project with NED's leading faculty and researchers in various engineering research domains as well as social sciences.

ORIC seeks outstanding a`pplications for the Research Internship Program in early start of the semester. The student's research interests and competencies are matched with the faculty's research internee need. The program is for a 100 days long period by the end of which ORIC Research Internship experience certificate is awarded to the accomplished internees as well as the supervisors.

7.12 DIRECTORATE OF UNIVERSITY ADVANCEMENT & FINANCIAL ASSISTANCE

Directorate of University Advancement & Financial Assistance was established at NED University of Engineering & Technology in May 2013. This Directorate is housed in Old VC Office (Second Floor). The basic objectives of establishing this Directorate were to:

- Achieve financial stability through fund raising
- Strengthen University Advancement Programme
- Strengthen the quality of academic programme
- Increase and enhance the visibility and awareness of the University to the community at large and to all stakeholders

In addition to above, the UA & FA seeks to help the students, faculty, staff, alumni and friends of the University to have pride and satisfaction in having connections to the University – today, tomorrow and in fact for lifetime.

7.13 MEDICAL DEPARTMENT

Medical Department is located next to Humanities Department of this University. It is administered by Principal Medical Officer, accompanied by a Senior Medical Officer. A Male Medical Officer and a Lady Medical Officer are also performing their duties at Main Campus. Paramedical services are also being provided by one male and two female nurses in the Medical department.

A colony resident qualified female nurse and ambulance service 24/7 are available for students residing in hostels. Two peripheral medical sub centres are located at LEJ City Campuses. Paramedical coverage is available at both campuses.

There are numerous diagnostics & therapeutic modalities available in Medical Department. Emergency / routine Outpatient Department Service (OPD), Pathological, Radiological and Electrocardiographic tests as well as ambulance facilities are available, These services are free of charges for students.

Similarly, therapeutic support in the form of Airway, Breathing and Circulatory (ABC) assistance as well as Outpatient facilities are available at peripheral Medical Sub Centres, i.e. City and LEJ Campus.

The University Authorities reserve the right to make any changes in the University Prospectus without any prior notice

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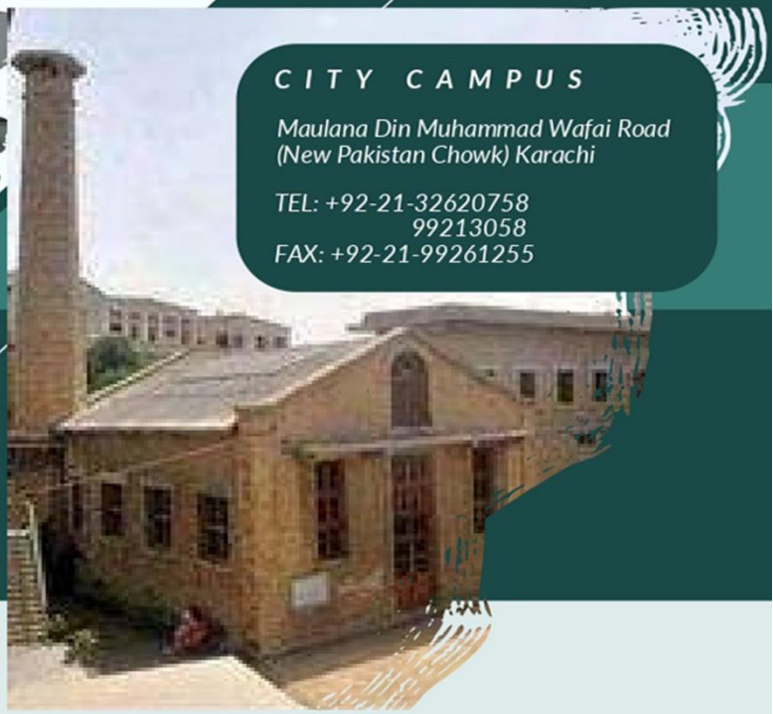

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