NFC IET
MULTAN-PAKISTAN

Post Graduate Programs

2025
Prospectus

www.nfciet.edu.pk

Dr. M. Kamran Liaqat Bhatti
Director Postgraduate Programmes

Post Graduate Studies Program

The Institute started the Post Graduate Studies Program in the year 2016. The program has been asserting very encouraging responses from aspirants since its inception. All the MS programs at the Institute are running with prior approval from the Higher Education Commission (HEC) of Pakistan, and IET is only maintaining all the requirements of HEC to keep the program's validity at all times. The Program aims to educate and train next-generation science and engineering professionals. It provides students with an intellectual stimulus for advanced study courses. The Institute emphasizes creative thinking, problem-solving, and research findings for academics and industrial applications. The Institute specially designs curriculums to enable graduates to become adept in developing and applying research techniques and in interpreting information via data collection derived from research.

Dr. Naeem Aslam
Coordinator MS CS

Dr. Syed Safdar Raza
Coordinator MS EPE

Engr. Dr. Nadeem Amin
Coordinator MS CHEM

Engr. Dr. Syed Nasir Mehdi Gardezi
Coordinator MS MECH

Dr. Shoaib Asim
Coordinator MBA

Dr. Syed Adnan Raheel Shah
Coordinator MS Civil

MS Chemical Engineering

Introduction:

Chemical Engineering involves and comprehends design and maintenance of chemical plants and brings out capabilities of chemical processes for transforming raw materials into valuables. This includes union of knowledge from applied chemistry and engineering for the production of useful products. This branch of engineering is versatile discipline comprehending areas from biotechnology and nanotechnology to mineral processing. It covers various areas in mineral based industries, petrochemical plants, pharmaceuticals, synthetic fibers and petroleum refining plans etc. Because of industrial expansion and scarcity of resources, the scope of chemical engineering is stretched out. The institute is envisioned to furnish human asset thereof which may be demanded for exertion of creating synthetic replacement for limited natural materials and resources. Overall chemical engineers make very important contributions to make life easy for everyone.

After serving the southern Punjab region for more than two decades through undergraduate program in Chemical Engineering and enjoying continued alumni's and employer's satisfaction, department of Chemical Engineering at the institute commenced postgraduate engineering program in Chemical Engineering in 2016. The program was long awaited and its need was manifested by a large inflow of applicants all over the country. The program aims at producing professionals with postgraduate qualification equipped to work in design, operation, academics and research in Chemical Engineering and allied fields.

Objectives:

Objectives of the MS (Chemical Engineering) program offered at the institute are to:

- amalgamate key science and engineering principles to address the technological challenges of the process industry.
- disseminate advanced engineering concepts and skills in addition to improving students' communication skills to enable them to work in versatile industrial and processional environment
- prepare professionals for rapidly changing technological environments with the core knowledge central to multidisciplinary careers.
- instill strong sense of humanistic values and professionalism in students such that they can conduct ethically and knowledgeably regarding technological impact in societal issues
- enable graduates to assume leader positions in defining the social, intellectual, business and technical dimensions of the professional organizations the belong to
- enable graduates to continue their life-long learning process and participate in graduate education to remain as effective professionals in the work place of the future.

Outcomes:

Graduates with MS (Chemical Engineering) degree from the Institute are desired to possess:

- An ability to apply knowledge of mathematics, science and engineering to design and conduct experiments and to analyze and interpret data to solve engineering problems.
- An ability to design components, systems and processes to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- The necessary ability to understand the impact of engineering solutions in a global, economic, environmental, societal context with professional and ethical responsibility.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Potential to enter in both private and public sectors as chemical engineers and to pursue further education.

Research Facilities:

Coal Research Center
Advanced Separation Lab
Advanced Reaction Engineering's Lab
Simulation Lab

MASTER OF CHEMICAL ENGINEERING CURRICULUM

SEMESTER-1			SEMESTER-2		
Code	**Course Title**	**Credit Hrs.**	**Code**	**Course Title**	**Credit Hrs.**
ChE-501	Advance Engineering Mathematics	3+0	ChE-503	Advance Transport Phenomena	3+0
ChE-502	Advance Separation Process	3+1	ChE-504	Advance Chemical Reaction Engineering	3+1
	Specialization-1	2+0		Specialization-2	2+0
	Total Credits	**09**		**Total Credits**	**09**

SEMESTER-3			SEMESTER-4		
Code	**Course Title**	**Credit Hrs.**	**Code**	**Course Title**	**Credit Hrs.**
	Specialization-3	2+1		Research Thesis	06
	Specialization-4	2+1			
	Total Credits	**06**		**Total Credits**	**06**

Approved Specialization Couses offered for MS Chemical Engineering

Ch.E-505	Advance Chemical Reaction Design	2+1
Ch.E-506	Numerical methods in chemical engineering	2+1
Ch.E-507	advanced fluid mechanics	2
Ch.E-508	advanced heat transfer	2+1
Ch.E-509	advanced mass transfer	2+1
Ch.E-510	process dynamic & control	2
Ch.E-511	advance particle dynamics	2
Ch.E-512	process design and optimizaion	2
Ch.E-513	project management	2
Ch.E-514	advance environmental engineering	2+1
Ch.E-515	advance biochemical engineering	2
Ch.E-516	advance process modeling & simulation	2+1
Ch.E-517	advace energy engineering	2
Ch.E-518	process safety and loss prevention	2
Ch.E-519	advanced computer aided design	2+1
Ch.E-520	advance d polymer engineering	2
Ch.E-521	research methodology	2
Ch.E-522	coal preparation and benefication	2+1
Ch.E-523	coal gasification	2+1
Ch.E-524	advanced coal power systems	2+1

MS Electrical Engineering
Specialization in Power System

Introduction

NFC Institute of Engineering and Technology is offering bachelor degree in Electronics and Electrical Engineering since 2001 and has attained excellent feedback from alumni and industry. With this maturity and keeping in view the lack of opportunities for higher degree in Electrical Engineering in southern Punjab, the institute became the second institute in southern Punjab and the only public sector degree awarding institute in Multan to offer MS Electrical Engineering in year 2016. By taking care of the increasing requirement of electrical engineering industry, the institute offers Master of Science (MS) in Electrical Engineering specialization in Power System. A lot of research in areas like renewable energy and efficient utilization of available electrical energy has made this field active worldwide and Pakistan is of no exception.

Objective

The objective of the program is to produce postgraduate professionals with knowledge and skills to find optimal and efficient solutions to real world electrical engineering problems. Graduates are prepared for technically demanding careers in the field of electrical power engineering and for further higher education within the country and abroad. MS Electrical Engineering at the institute is a research based degree motivating students to develop an in-depth knowledge and opportunity to practice real world problems in various related areas such as power system analysis and design, power system protection, analysis and design of renewable energy sources and efficient utilization of electrical engineering systems using modeling and simulation techniques. Students are offered ample choices for selection of postgraduate courses related to their background, interest and area of prospective research.

CURRICULUM

CORE COURSES

CODE	TITLE
EE-501	Power Generation & Plant Operation
EE-502	Power Transmission & Distribution
EE-503	Renewable Energy
EE-504	Modeling & Simulation

Area Elective Courses

CODE	TITLE
EE 505	Advanced Engineering Mathematics
EE 506	Stochastic Processes
EE 507	Power System Analysis
EE 508	Power System Operation and Control
EE 509	Power Electronics
EE 510	High voltage Engineering
EE 511	Power System Planning
EE 512	DC and Flexible AC Transmission
EE 513	Electric Power Quality
EE 514	Generation of sustainable energy system
EE 515	Power System Protection
EE 516	Power System dynamics
EE 517	Power Engineering project management
EE 518	Power System Reliability
EE 519	Power System Stability and Control
EE 520	Advanced Linear Systems
EE 521	Illumination Engineering
EE 522	Power and Energy Economic Policy
EE 523	Energy and Environment
EE 524	Research Methods
EE 525	Combined Cycle Power and Energy Systems
EE 550	MS Thesis

Note:

1. **Each course has three credit of theory and MS thesis has 6 credit.**
2. **Core courses hours are compulsory and four courses from area elective courses should be taken to fulfill requirement of 24 credit of course work.**
3. **From third semester MS thesis is offered.**

Scheme of Study

For the award of degree, candidates are required to complete 30 credit hours of course work or 24 credit hours of course work along with 6 credit hours for research work/thesis. The candidates are encouraged to submit one paper for National/Inter-national Conference/Journal/Magazine to award 6 credit hours of thesis.

The distribution of 24 credit hours of course work is as under:

	Required Courses	**Courses**	**Sub-Total Credits**
Core Courses	To be selected from the core subjects of relevant specialization	4	12
Electives	**Area Elective Course** (From Open electives or cross area i.e. from all the approved courses other than those included in core and major area Electives; it may be a special subject course)	4	12
	Thesis/02 Elective Courses		06
	Total Credits:		30

MASTER OF ELECTRICAL ENGINEERING SPECIALIZATION IN POWER SYSTEM CURRICULUM

SEMESTER-1			SEMESTER-2		
Code	**Course Title**	**Credit Hrs.**	**Code**	**Course Title**	**Credit Hrs.**
EE- EE- EE-	Core Course-I Core Course-II Elective Course-I	3+0 3+0 3+0	EE- EE- EE-	Core Course-III Core Course-IV Elective Course-II	3+0 3+0 3+0
	Total Credits	**09**		**Total Credits**	**09**

SEMESTER-3			SEMESTER-4		
Code	**Course Title**	**Credit Hrs.**	**Code**	**Course Title**	**Credit Hrs.**
EE- EE-	Elective Course-III Elective Course-IV	3+0 3+0	EE-	Thesis/Two Elective Courses	6+0
	Total Credits	**06**		**Total Credits**	**06**

MS Mechanical Engineering

Mission

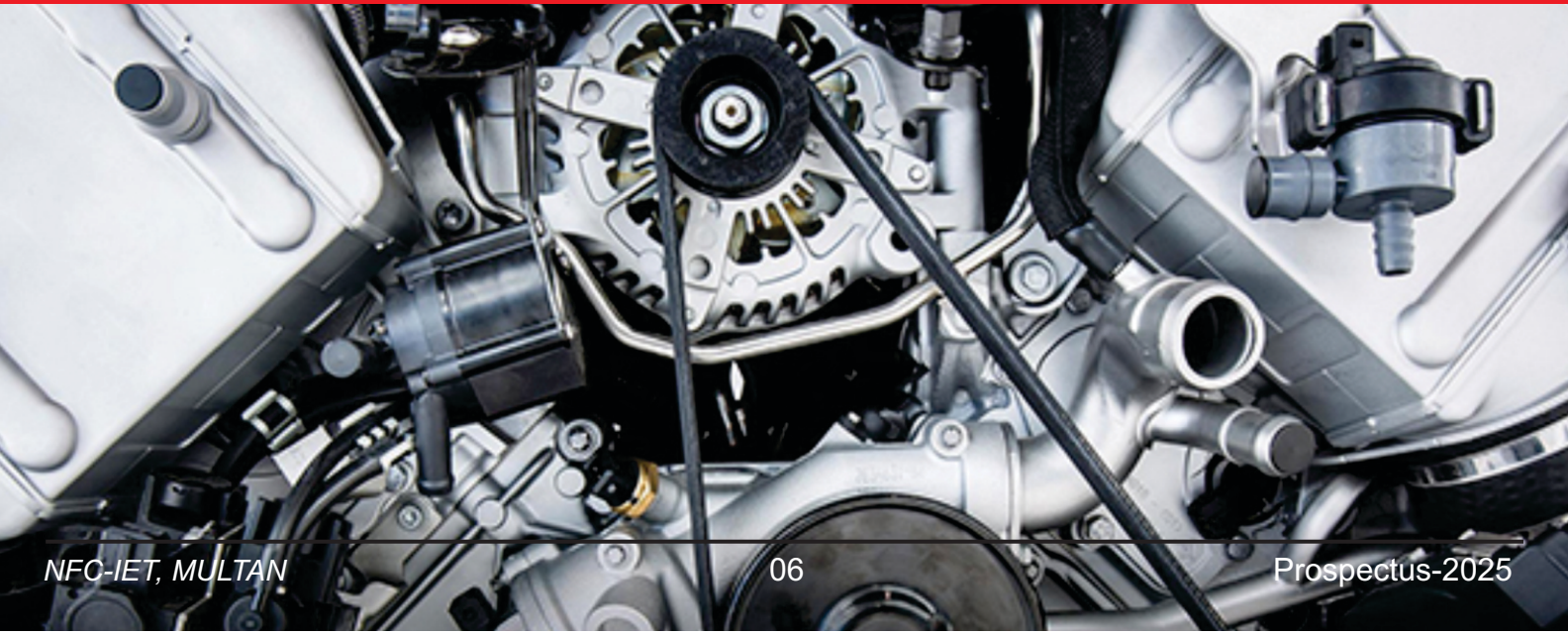
The mission of the MS program in Mechanical Engineering is to impart knowledge in the art and science of mechanical engineering through a comprehensive and advanced curriculum that produces specialized mechanical engineers of high ethics and skill, fully prepared for entry into industry, government, graduate school and private enterprise. The program curriculum major discipline of mechanical engineering with introduction to advanced mathematics and use of computers in engineering. The program is expected to enable the students to research, design, develop, test, evaluate and implement engineering solutions to problems that are of a complexity encountered in professional practice.

Objective

The most important purpose of the MS program at NFC Institute of Engineering & Technology is to train engineers for professional practice in the field of major discipline of mechanical engineering. This program is surely going to develop autonomy, impart knowledge as well as the capacity for progressing professional growth. The graduate program of Mechanical engineering will identify, formulate and solve mechanical design engineering problems.

Scope

In today's fast developing technology, growing industrialization and modernization, “Mechanical Engineering” holds a prominent place. Within the wide boundaries of the engineering profession, there are thousands of challenging activities in areas such as research, development, design, manufacture and operation of products and services. Students can tailor courses to suit them with specialist modules that allow them a deeper understanding of particular areas of engineering that interest them. The wide spectrum of courses enables student creativity not only results in a more exciting and engaging learning experience, it also prepares students fully for the practical demands of the post-graduate studies and workplace.



MASTER OF MECHANICAL ENGINEERING CURRICULUM

SEMESTER-1			SEMESTER-2		
Code	**Course Title**	**Credit Hrs.**	**Code**	**Course Title**	**Credit Hrs.**
ME- ME- ME-	Core Course-I Core Course-II Elective Course-I	3+0 3+0 3+0	ME- ME- ME-	Core Course-III Core Course-IV Elective Course-II	3+0 3+0 3+0
	Total Credits	**09**		**Total Credits**	**09**

SEMESTER-3			SEMESTER-4		
Code	**Course Title**	**Credit Hrs.**	**Code**	**Course Title**	**Credit Hrs.**
ME- ME-	Elective Course-III Elective Course-IV	3+0 3+0	ME-	Thesis/Two Elective Courses	6+0
	Total Credits	**06**		**Total Credits**	**06**

List of Core Courses

Sr. #	Course Code	Course Title	Credit Hours
1.	MTH-601	Advanced Numerical Analysis	3 (3+0)
2.	ME-602	Advanced Manufacturing Process	3 (3+0)
3.	ME-603	Advanced Heat Transfer	3 (3+0)
4.	ME-604	Advanced Stress Analysis	3 (3+0)
5.	ME-699	Thesis	6 (0+6)

List of Elective Courses

Sr. #	Course Code	Course Title	Credit Hours
1.	ME-611	Computational Fluid Dynamics	3 (3+0)
2.	ME-612	Advanced Fluid Mechanics	3 (3+0)
3.	ME-613	Advanced Thermodynamics	3 (3+0)
4.	ME-614	Advanced Turbomachinery	3 (3+0)
5.	ME-615	System Dynamics and Control	3 (3+0)
6.	ME-616	Continuum Mechanics	3 (3+0)
7.	ME-617	Fracture Mechanics	3 (3+0)
8.	ME-618	Advanced Solid Mechanics	3 (3+0)
9.	ME-619	Design Optimization & Analysis Techniques	3 (3+0)
10.	ME-620	Combustion and Environment	3 (3+0)
11.	ME-621	Renewable Energy Systems	3 (3+0)
12.	ME-622	Project Management	3 (3+0)
13.	ME-623	Research Methodology	3 (3+0)

Masters of Business Administration

Introduction:

Considering the growing need of skilled human resources in the field of business management at local and national level NFC- Institute of Engineering and Technology, Multan offers MBA 2 year regular and weekend programs at Department of Business Administration. This program will cater the needs of students to develop the comprehensive knowledge in various disciplines of the business such as Entrepreneurship, Marketing, Finance, Research and Human Resource Management. Moreover, this program will enable the students to build and maintain balance between the targets of economic success and social & environmental responsibility.

With this vision, MBA program is planned to achieve excellence in local and national marketplace by producing knowledgeable graduates capable to work as future executive in different organizations.

The program is open to the students having 16 years of undergraduate level education. This degree program promises the graduates with higher level of employability as management professionals by helping them to nurture their potentials.

The goal of the department is to prepare students for a successful management career. Since its inception, the department has endeavored to give its students an education to enables them to face any challenge in their professional life.

The course structure basically focuses on detailed study of Business Administration involving different aspects of the business functions and operations. It endows students with the latest business knowledge to meet the ever changing requirements of the firms.

Aims and Objectives:

MBA program at Department of Business Administration NFC-IET Multan aims at developing a student's intellectual ability, personality and managerial skills through an appropriate blending of business and general education. The MBA curriculum provides students with a comprehensive management education of globally recognized best practices with flexibility of adaptation to indigenous entrepreneurial and societal context.

The course aims at explaining the business environment in which the public and private sectors operate mainly. It helps students to develop decision making ability in real time business situations. It also focuses on developing operational and analytical skills in students to tackle business problems in different sectors. The students are required to choose a specialization of their interest, which further facilitate them to develop management skills in a particular sector. After MBA program student should be able to

- Take strategic, comprehensive and innovative approaches in making business dictions.
- Identify, analyze, formulate, and solve business problems using appropriate methodologies and tools.
- Have knowledge of the functional areas of organizations.

Admission Eligibility:

The program is open to the students having 16 years of undergraduate education from HEC recognized institution, with minimum 2.50/4.00 CGPA or 60% marks. Candidate must appear in Departmental Entry Test or GAT (Gen) and secure at least 50% marks. Candidates will appear in an interview for the purpose of final selection.

MASTER OF BUSINESS ADMINISTRATION CURRICULUM

SEMESTER-1			SEMESTER-2		
Code	**Course Title**	**Credit Hrs.**	**Code**	**Course Title**	**Credit Hrs.**
MB-501	Financial Accounting	3	MB-507	Managerial Accounting	3
MB-502	Business Math and Statistics	3	MB-508	Pakistan Economy	3
MB-503	Principles of Management	3	MB-509	Organizational Behavior	3
MB-504	Principles of Marketing	3	MB-510	Strategic Marketing	3
MB-505	Business Economics	3	MB-511	Financial Management	3
MB-506	Business Communication	3	MB-512	Production & Operation Management	3
	Total Credits	**18**		**Total Credits**	**18**

SEMESTER-3			SEMESTER-4		
Code	**Course Title**	**Credit Hrs.**	**Code**	**Course Title**	**Credit Hrs.**
MB-513	Advanced Research Method	3	MB-514	Strategic Finance	3
	Elective-1	3		Elective-5	3
	Elective-2	3		Elective-6	3
	Elective-3	3		Thesis/Two Elective Courses	6
	Elective-4	3			
	Total Credits	**15**		**Total Credits**	**15**

Total Credit Hours of Degree is 66

Finance Specialization Elective Courses		
Code	**Course Title**	**Credit Hrs.**
FN-601	Islamic Banking and Finance	3
FN-602	Investment Analysis and Portfolio Management	3
FN-603	Financial Reporting and Analysis	3
FN-604	Corporate Finance	3
FN-605	International Finance	3
FN-606	Financial Risk Management	3
FN-607	Financial Institutions and Markets	3
FN-608	Analysis of Financial Statement	3
FN-609	Cases in Corporate Governance	3
FN-610	Islamic Investment Principles	3
FN-611	Auditing	3
FN-612	Money and Banking	3

Human Resource Management Specialization		
Code	**Course Title**	**Credit Hrs.**
HRM-625	Training and Development	3
HRM-626	Performance Management	3
HRM-627	Recruitment and Selection	3
HRM-628	Compensation and Benefits	3
HRM-629	Knowledge Management	3
HRM-630	Industrial Relations	3
HRM-631	Conflict and Negotiation Management	3
HRM-632	Seminar in HRM	3
HRM-633	Human Resource Development	3
HRM-634	Change Management	3
HRM-635	Cross Cultural HRM	3
HRM-636	Organizational Management	3

Marketing Specialization Elective Courses		
Code	**Course Title**	**Credit Hrs.**
MK-613	Service Marketing	3
MK-614	Retail Management	3
MK-615	Sales Management	3
MK-616	Integrated Marketing Communication	3
MK-617	Marketing Research	3
MK-618	Seminar in Marketing	3
MK-619	Distribution Management	3
MK-620	Industrial Marketing	3
MK-621	Brand Management	3
MK-622	International Marketing	3
MK-623	Seminar in Marketing	3
MK624	Distribution Management	3

Business Elective Courses shall be offered as per availability of faculty.

MS Computer Science

Introduction:
Department of Computer Science at NFC-Institute of Engineering & Technology is dedicated to train and produce graduates possessing comprehensive knowledge in various areas of the field. With this vision, the undergraduate program in computer science was launched in 2008 and has achieved excellent acceptance of graduates in the local and international markets. We have been on the move for the last many years. To further enhance the knowledge and skills of students and to fill the gap of higher education in the field in the Southern Punjab region, the Department of Computer Science at the institute commenced the MS program in Computer Science in 2017. This degree program is aimed to improve theoretical and in-depth knowledge, enabling students to add productive research contributions in the emerging area of computer science. The expected outcome is well-rounded computer scientists ready to fulfill the demand for the industry, research, and academics in the country and abroad.

Program Objectives:
Objectives of the postgraduate program are to:

- enlighten students with advanced theoretical and practical computer science knowledge
- impart research skills in students
- enable students to add useful research contributions in the field of Software Engineering, Bioinformatics, Telecommunication, Data Science, Cloud Computing, Scientific Visualization, and computer vision.
- fill the requirement of trained computer science professionals in the relevant industry within the country & abroad
- produce professionals with knowledge of emerging subfields like bioinformatics (a newer field with a lot of room for research directly related to serving humanity), computer vision and computer networks, etc.

Scope:
Information Technology (IT) field has the potential to play a major role in boosting Pakistan's economy as practiced by other Asian countries.

Computer science graduates start their professional careers just after the completion of their bachelor's degrees. However, after serving 2-3 years in the industry, most of them want a higher degree to take their career to the next higher level. In order to enter in the field of academia, MS, and Ph.D. in the relevant field are required. A limited number of universities in Pakistan offer accredited postgraduate degrees in computer science which is far less than the demand. The institute aims to fill this gap by commencing MS (Computer Science) program in 2017.

This program is ideally designed for students who want to broaden and enhance their knowledge in the field of computer science. Today, with the rapidly increasing market demand, students are found interested in the field of computer science and the requirement is well satisfied by the MS (CS) program offered by the institute. The program aims to dispense necessary and important skills to the students, useful for constructing reliable and advanced software systems.

MS (CS) graduates are very well accepted in the field of computer science both within the country & abroad.

Career Options:
There are many career options available for MS (CS). The degree is specifically designed to sharpen student's skills according to market requirements and to prepare them for a competitive future. Research is considered to be the most important and advanced career option in the field of CS. Moreover, numerous job opportunities available for the students who complete their degree within the time & with honor. Some employment opportunities are as follows:

- Computer and Information Researchers
- Computer and Information Scientists
- Computer Programmers
- Computer Engineers
- Computer Supports Specialist
- Computer Analysts
- Database Administrator
- Computer System Administrators
- Data Communication Analysts

Eligibility:

- 16-year of education, i.e., BS in Computer Science/ BS in Information Technology/ Bachelor of Computer Science (Hons)/ Master of Computer Science/ Master of Information Technology/ M.Sc. (Computer Science) from a recognized institution. However, candidates having Computer Engineering/ Bachelor of Science in Software Engineering/ Bachelor of Engineering in Information Technology/ Bachelor of Engineering (Computer & Information System)/B.Sc. Computer System Engineering (16-year education) from a recognized institution are also eligible but have to qualify a deficiency course(s).
- Candidate must have at least CGPA 2.50 out of 4 or first division
- The candidate is required to pass the entry test conducted by the institute/GAT (with minimum 50% marks).

MS COMPUTER SCIENCE CURRICULUM

SEMESTER-1				SEMESTER-2			
Code	**Category**	**Course Title**	**Credit Hrs.**	**Code**	**Category**	**Course Title**	**Credit Hrs.**
CS-5XX	CS Core	Core Course-I	3	CS-5XX	CS Core	Core Course-IV	3
CS-5XX	CS Core	Core Course-II	3	CS-5XX	CS Elective	Elective-I	3
CS-5XX	CS Core	Core Course-III	3	CS-503	CS Elective	Research Methodology	3
	Total Credits		**09**		**Total Credits**		**09**

SEMESTER-3				SEMESTER-4			
Code	**Category**	**Course Title**	**Credit Hrs.**	**Code**	**Category**	**Course Title**	**Credit Hrs.**
CS-5XX	CS Elective	Elective-II	3	CS-601	Thesis	Thesis-II	6
CS-5XX	CS Elective	Elective-III	3				
	Total Credits		**06**		**Total Credits**		**06**

Core Courses for MS Computer Science

At least four courses must be taken from the following:

Code	Course Title	Code	Course Title
CS-501	Theory of Automata-II	CS-532	Advanced Operating Systems
CS-502	Advanced Analysis of Algorithms	CS-534	Theory of Programming Languages
CS-531	Advanced Computer Architecture		

Credit Hours Distribution

Category or Area	Credit Hours
CS Core	12
CS Electives	12
Thesis	6
Total Credit Hours	**30**

List of Elective Course

Computer Graphics and Image Processing

Sr. No.	Course Code	Title	Credit Hrs.
1	CS-504	Advanced Computer Graphics	3
2	CS-505	Visualization in Medicine	3
3	CS-506	Advanced Image Processing	3
4	CS-507	Computer Vision	3

Software Engineering

Sr. No.	Course Code	Title	Credit Hrs.
1	CS-508	Advanced Software Engineering	3
2	CS-509	Software Quality Assurance	3
3	CS-510	Requirements Engineering	3
4	CS-511	Software Project Management	3

Database

Sr. No.	Course Code	Title	Credit Hrs.
1	CS-512	Advanced Database Systems	3
2	CS-513	Advanced Data Mining	3
3	CS-514	Data Warehousing	3
4	CS-515	Distributed Database	3
5	CS-516	Multimedia Databases	3

Bioinformatics

Sr. No.	Course Code	Title	Credit Hrs.
1	CS-517	Advanced Bioinformatics	3
2	CS-518	Computational Genomics	3
3	CS-519	Computational Proteomics	3
4	CS-520	Computational Drug Design	3

Computer Networks

Sr. No.	Course Code	Title	Credit Hrs.
1	CS-521	Advanced Computer Networks	3
2	CS-522	Network Security	3
3	CS-523	Network Performance Evaluation	3
4	CS-541	Securing the Internet of Things	3

Artificial Intelligence & Intelligent System

Sr. No.	Course Code	Title	Credit Hrs.
1	CS-524	Artificial Intelligence	3
2	CS-525	Artificial Neural Networks	3
3	CS-526	Robotics	3
4	CS-527	Machine Learning	3

System Engineering

Sr. No.	Course Code	Title	Credit Hrs.
1	CS-528	Digital Signal Processing	3
2	CS-529	Control Systems and Robotics	3
3	CS-530	Parallel and Distributed System	3
4	CS-533	Real Time Operating Systems	3

Programming Languages

Sr. No.	Course Code	Title	Credit Hrs.
1	CS-535	Advanced Compiler Design-I	3
2	CS-536	Advanced Compiler Design-II	3

Data Science

Sr. No.	Course Code	Title	Credit Hrs.
1	CS-537	Tools and Techniques in Data Science	2+1
2	CS-538	Big Data Analytics	3
3	CS-539	Distributed Data Processing	3
4	CS-540	Natural Language Processing	3

MS Civil Engineering

Mission

Our mission is to educate, inspire and mentor the young graduate students within the civil engineering domain by providing a progressive research-based education and environment to prepare them to meet the challenges of the 21st century in a sustainable global economy. The program will positively impact and improve the civil engineering profession and society by providing highly qualified and skilled professionals who possess depth in their chosen focus area and are able to develop innovative solutions by using relevant engineering approaches and practice.

Objective

The primary objective of the MS program is to identify, assess, and impart essential knowledge, tools, and skills necessary to enhance the professional qualifications in a particular domain and to develop the leadership and entrepreneurship skills of civil engineers. For this purpose, the program will offer high quality postgraduate civil engineering education and maintain its curriculum, which is consistent with the present and future needs of the civil engineering profession serving in a complex technological society.

Scope

The profession of "Civil Engineering" deals with the design, construction, and maintenance of physical structures, including roads, bridges, buildings, dams, railways, and airports. Within the multiple disciplines of the civil engineering profession, there are still open challenges which seek attention of civil engineers for the most innovative and sustainable solutions for the complex technical problems of our society. The program is tailored to provide students with multi-disciplinary courses in their particular areas of interest and research. The wide spectrum of courses provides students an opportunity to learn and excel their knowledge in their chosen focus area as well as to commence applied research and entrepreneurship for the socio-economic betterment of the society, especially the south-Punjab region, in the form of innovative, affordable and sustainable materials, products, ideas and solutions. The program is designed to prepare graduates for professional practice or further study in the field of expertise. NFC-IET is offering MS degree program with subjects related to following domains: Structural Engineering, Construction Engineering & Management, Geotechnical Engineering, Transportation Engineering, Environmental Engineering and Water Resource & Irrigation Engineering.

Link With Sustainable Development Goals (SDGs)

Civil engineering plays a significant role in achieving several Sustainable Development Goals (SDGs) outlined by the United Nations. Here are some key links between civil engineering and the SDGs:

SDG 9: Industry, Innovation, and Infrastructure: Civil engineering is directly linked to this goal as it involves the planning, design, construction, and maintenance of infrastructure such as buildings, roads, bridges, water supply systems, and transportation networks. Developing sustainable and resilient infrastructure is essential for economic growth, innovation, and improving quality of life.

SDG 11: Sustainable Cities and Communities: Civil engineers contribute to the development of sustainable urban infrastructure, including transportation systems, green buildings, and resilient city planning. They focus on creating inclusive, safe, and resilient cities that provide access to basic services, efficient transportation, and sustainable housing.

SDG 6: Clean Water and Sanitation: Civil engineers play a crucial role in designing and implementing water supply and sanitation systems. They contribute to the development of sustainable water management practices, wastewater treatment facilities, and infrastructure to ensure access to safe drinking water and improved sanitation for all.

SDG 7: Affordable and Clean Energy: Civil engineering is involved in the design and construction of renewable energy infrastructure such as solar and wind power systems, hydroelectric plants, and geothermal energy systems. Civil engineers work towards developing energy-efficient buildings, transportation systems, and smart grid networks to promote clean and affordable energy sources.

SDG 13: Climate Action: Civil engineering plays a vital role in addressing climate change by developing infrastructure and technologies that reduce greenhouse gas emissions, enhance energy efficiency, and promote sustainable practices. Civil engineers contribute to climate adaptation strategies, such as coastal protection, flood management, and sustainable drainage systems.

SDG 15: Life on Land: Civil engineering helps in the conservation and sustainable management of natural resources, including land and forests. Civil engineers contribute to projects related to land reclamation, soil stabilization, and sustainable land development practices, aiming to minimize environmental degradation and protect biodiversity.

SDG 17: Partnerships for the Goals: Achieving the SDGs requires collaboration and partnerships between various stakeholders. Civil engineers often work in multidisciplinary teams, collaborating with governments, communities, NGOs, and the private sector to plan, design, and implement infrastructure projects that align with sustainable development objectives.

Civil engineering is an essential field for sustainable development, as it encompasses the design, construction, and management of infrastructure systems that directly impact communities and the environment. By integrating sustainability principles into engineering practices and considering the social, economic, and environmental aspects of projects, civil engineers can contribute significantly to the achievement of the SDGs.

Admission Eligibility

Candidates having passed a degree of B.Sc. Engineering of duration of 8-10 semesters/124-140 Credit Hours courses securing a minimum of CGPA 2.5 on a scale of 4.0 or 60% marks are eligible to get admission in the MS Civil Engineering program. The applicant is also required to pass an entry test as per HEC criteria arranged by the institute on a specified date or GAT(NTS) by or any other examination specified by HEC for admission to the postgraduate program.

Degree Requirements

There are two options (Subject to approval by committee) available for completion of MS degree:

Option 1: Thesis

- 24 Credit Hours course work (8 courses of 3 Cr. Hrs.)
- 06 Credit Hours Thesis
- Total 30 Credits

Option 2: Non-Thesis

- 30 Credit Hours course work (10 courses of 3 Cr. Hrs. each)

MS CIVIL ENGINEERING CURRICULUM

SEMESTER-1			SEMESTER-2		
Code	Course Title	Cr. Hr	Code	Course Title	Cr. Hr
CE-	Elective Course-I	3+0	CE-	Elective Course-II	3+0
CE-	Core Course-I	3+0	CE-	Core Course-III	3+0
CE-	Core Course-II	3+0	CE-	Core Course-IV	3+0
	Total Credits	**9**		**Total Credits**	**9**
SEMESTER-3			**SEMESTER-4**		
Code	Course Title	Cr. Hr	Code	Course Title	Cr. Hr
CE-	Elective Course-III	3+0	CE-	Thesis/Two Elective Courses	6+0
CE-	Elective Course-IV	3+0			
	Total Credits	**6**		**Total Credits**	**6**

Note:
1. Each course has three credits of theory and MS thesis has 6 credits.
2. Four core courses are compulsory and four courses from electives should be taken to fulfill requirement of 24 credit of course work. (Electives will be offered based on availability of faculty)
3. Four courses and thesis domain will define the domain of degree. In case of course work only, additional courses will define the domain.
4. From third semester, MS thesis will be offered and will be evaluated in 4th semester or onwards based on completion.

List of Core Courses

CORE COURSES		
Code	Course Title	Cr. Hr
CE-5100	Advanced Structural Materials	3(3-0)
CE-5200	Construction Engineering and Management	3(3-0)
CE-5300	Transportation Planning and Engineering	3(3-0)
CE-5400	Advanced Geotechnical Design	3(3-0)
CE-5500	Design of Hydraulic Structures	3(3-0)
CE-5000	Research Thesis	6(0+6)

* Out of Five, four core subjects are compulsory.
** From list of electives, Subject: (Research Methods & Statistics for Civil Engineering) is also compulsory

List of Specialization/Elective Courses

CODE	Courses	Cr. Hr	CODE	Courses	Cr. Hr
Structural Engineering			**Transportation Engineering**		
CE 5101	Advanced Structural Analysis	3(3-0)	CE 5301	Traffic Engineering and Management	3(3-0)
CE 5102	Advanced Reinforced Concrete	3(3-0)	CE 5302	Geometric Design and Highway Safety	3(3-0)
CE 5103	Advanced Concrete Technology	3(3-0)	CE 5303	Pavement Analysis and Design	3(3-0)
CE 5104	Design of Masonry Structures	3(3-0)	CE 5304	Airport Planning and Design	3(3-0)
CE 5105	Prestressed Concrete	3(3-0)	CE 5305	Railway Engineering and Design	3(3-0)
CE 5106	Advanced Steel Structures	3(3-0)	CE 5306	Pavement Evaluation and Rehabilitation	3(3-0)
CE 5107	Non-Linear Structural Analysis	3(3-0)	CE 5307	Planning for Traffic Safety and Injury Prevention	3(3-0)
CE 5108	Finite Element Method	3(3-0)	CE 5308	Pavement Management Systems	3(3-0)
CE 5109	Reliability Based Structural Design	3(3-0)	CE 5309	Highway Construction Materials & Equipment	3(3-0)
CE 5110	Advanced Mechanics of Solids	3(3-0)	CE 5310	Harbor and Dock Engineering	3(3-0)
CE 5111	Fiber Reinforced Composites	3(3-0)	CE 5115	Bridge and Tunnel Engineering	3(3-0)
CE 5112	Structural Fire Engineering	3(3-0)	CE 5312	Asphalt Mix Design and Construction	3(3-0)
CE 5113	Structural Optimization	3(3-0)	CE 5313	Airport Management & Safety	3(3-0)
CE 5500	Design of Hydraulic Structures	3(3-0)	CE 5314	Statistics for Transportation Engineering	3(3-0)
CE 5115	Bridge and Tunnel Engineering	3(3-0)	CE 5315	Application of RS & GIS	3(3-0)
CE 5116	Design of Special Structures	3(3-0)	CE 5316	Transportation Infrastructure Asset Management	3(3-0)
CE 5117	Theory of Plates and Shells	3(3-0)	CE 5317	Advance Unmanned Transportation Systems	3(3-0)
CE 5118	Stability of Structures	3(3-0)	CE 5318	Urban Transport System Evaluation	3(3-0)
CE 5119	Structural Dynamics	3(3-0)	CE 5319	Public Transportation system	3(3-0)
CE 5120	Repair, Maintenance and Strengthening of Structures	3(3-0)	CE 5320	Traffic Management Analysis	3(3-0)
CE 5233	Research Methods & Statistics for Civil Engineering	3(3-0)	CE 5233	Research Methods & Statistics for Civil Engineering	3(3-0)
CE 5122	Building Engineering	3(3-0)	CE 5322	Geotechnical Aspects of Highways	3(3-0)
CE 5123	Durability of Concrete Structures	3(3-0)	CE 5323	Traffic Flow Theory	3(3-0)

CE 5124	Design of Tall Structures	3(3-0)	CE 5324	Intelligent Transportation System (ITS)	3(3-0)
CE 5125	Serviceability of Concrete Structures	3(3-0)	CE 5325	Transportation Economics	3(3-0)
CE 5126	Earthquake Engineering and Seismic Design of Structures	3(3-0)	CE 5326	Waterways Transportation	3(3-0)
CE 5127	Sustainable Development and Construction	3(3-0)	CE 5132	Environmental Impact Assessment	3(3-0)
CE 5128	Computational Modeling of Materials and Structures	3(3-0)	CE 5129	Application of 3D Printing in Civil Engineering	3(3-0)
CE 5129	Application of 3D Printing in Civil Engineering	3(3-0)	CE 5329	Transportation Data Management and Analysis	3(3-0)
CE 5130	Fracture Mechanics	3(3-0)	CE 5330	Infrastructure Systems Management	3(3-0)
CE 5227	Occupational Health and Safety in Construction	3(3-0)	CE 5331	Autonomous and Electric Transportation System	3(3-0)
CE 5132	Environmental Impact Assessment	3(3-0)	CE 5332	Data Science for Mobility	3(3-0)
CE 5133	Application of Artificial Intelligence in Civil Engineering	3(3-0)	CE 5127	Sustainable Development and Construction	3(3-0)
CE 5134	Advanced Reinforced Concrete Design	3(3-0)	CE 5231	Advanced Bidding and Estimation	3(3-0)
CE 5224	Hazards and Disaster Management	3(3-0)	CE 5224	Hazards and Disaster Management	3(3-0)
CE 5231	Advanced Bidding and Estimation	3(3-0)	CE 5334	Railway Planning and Management	3(3-0)
CE 5232	Construction Failure Analysis	3(3-0)	CE 5232	Construction Failure Analysis	3(3-0)
CE 5135	Advanced Infrastructure Asset Management	3(3-0)	CE 5135	Advanced Infrastructure Asset Management	3(3-0)
CE 5136	Sustainable Infrastructure Systems	3(3-0)	CE 5136	Sustainable Infrastructure Systems	3(3-0)
CE 5236	Construction Quality Control and Management	3(3-0)	CE 5236	Construction Quality Control and Management	3(3-0)
CE 5237	Life Cycle Assessment in Structural and Construction Projects	3(3-0)	CE 5237	Life Cycle Assessment in Structural and Construction Projects	3(3-0)
CE 5238	Sustainable Infrastructure Development and Management	3(3-0)	CE 5238	Sustainable Infrastructure Development and Management	3(3-0)
CE 5239	Structural Health Monitoring and Asset Management	3(3-0)	CE 5239	Structural Health Monitoring and Asset Management	3(3-0)

List of Specialization/Elective Courses

CODE	Courses	Cr.Hr	CODE	Courses	Cr.Hr
Construction Engineering & Management			**Geotechnical Engineering**		
CE 5201	Construction Project Administration	3(3-0)	CE 5401	Advanced Soil Mechanics	3(3-0)
CE 5202	Construction Planning, Scheduling and Control	3(3-0)	CE 5402	Foundation Engineering	3(3-0)
CE 5203	Safety Management in Construction	3(3-0)	CE 5403	Deep Foundations	3(3-0)
CE 5204	Contract Management	3(3-0)	CE 5404	Dam Engineering	3(3-0)
CE 5205	Cost Engineering and Control	3(3-0)	CE 5405	Geotechnical Investigation	3(3-0)
CE 5206	Economic Decision Analysis in Construction	3(3-0)	CE 5406	Soil Improvement Techniques	3(3-0)
CE 5207	Leadership in Construction Management	3(3-0)	CE 5407	Rock Engineering	3(3-0)
CE 5208	Construction Equipment Management	3(3-0)	CE 5408	Environmental Geo-techniques	3(3-0)
CE 5209	Engineering Economics and Value Engineering in Construction	3(3-0)	CE 5409	Soil Dynamics	3(3-0)
CE 5210	Human Resource Management in Construction Industry	3(3-0)	CE 5115	Bridge and Tunnel Engineering	3(3-0)
CE 5211	Supply Chain Management in Construction Industry	3(3-0)	CE 5411	Soil Erosion & Watershed Management	3(3-0)
CE 5212	Decision Making and Risk Management in Construction	3(3-0)	CE 5412	Ground Water Engineering	3(3-0)
CE 5213	Construction Operations and Development of Technologies	3(3-0)	CE 5413	Engineering Properties of Soil	3(3-0)
CE 5214	Entrepreneurship in Construction Industry	3(3-0)	CE 5414	Earth Reinforcement	3(3-0)
CE 5215	Construction Claim Management	3(3-0)	CE 5415	Earth Retaining Structures	3(3-0)
CE 5216	Construction Project Management	3(3-0)	CE 5303	Pavement Analysis and Design	3(3-0)
CE 5217	Public Infrastructure Management	3(3-0)	CE 5417	Soil Structure Interaction	3(3-0)
CE 5218	Planning and Management of Housing	3(3-0)	CE 5418	Slope Stability	3(3-0)
CE 5219	Energy Management in Buildings	3(3-0)	CE 5322	Geotechnical Aspects of Highways	3(3-0)
CE 5127	Sustainable Development and Construction	3(3-0)	CE 5420	Design and Construction of Earthen Dam	3(3-0)
CE 5132	Environmental Impact Assessment	3(3-0)	CE 5421	Rock Mechanics	3(3-0)
CE 5514	Water Resources Economics, Planning & Management	3(3-0)	CE 5422	Geo Environmental Engineering	3(3-0)
CE 5223	Policies, Planning and Strategies for Disaster Management	3(3-0)	CE 5233	Research Methods & Statistics for Civil Engineering	3(3-0)
CE 5224	Hazards and Disaster Management	3(3-0)	CE 5224	Hazards and Disaster Management	3(3-0)
CE 5225	Vulnerability Analysis and Hazard Mitigation	3(3-0)	CE 5231	Advanced Bidding and Estimation	3(3-0)
CE 5226	Real Estate Management	3(3-0)	CE 5522	Water Supply and Sewer System Design	3(3-0)
CE 5227	Occupational Health and Safety in Construction	3(3-0)	CE 5427	Municipal Solid Waste Principles and Management	3(3-0)
CE 5228	Total Quality Management (TQM)	3(3-0)	CE 5428	Physico-Chemical Water Treatment Processes	3(3-0)
CE 5229	Project Evaluation and Feasibility Analysis	3(3-0)	CE 5429	Green Engineering Technologies	3(3-0)
CE 5230	Project Management Framework and Tools	3(3-0)	CE 5430	Air Pollution Control Engineering	3(3-0)
CE 5231	Advanced Bidding and Estimation	3(3-0)	CE 5132	Environmental Impact Assessment	3(3-0)
CE 5232	Construction Failure Analysis	3(3-0)	CE 5126	Earthquake Engineering and Seismic Design of Structures	3(3-0)
CE 5233	Research Methods & Statistics for Civil Engineering	3(3-0)	CE 5232	Construction Failure Analysis	3(3-0)
CE 5234	Building Information Modeling for Construction Management	3(3-0)	CE 5127	Sustainable Development and Construction	3(3-0)
CE 5235	Revit for Construction & Contractors	3(3-0)	CE 5534	Membrane Technology for Water and Wastewater Treatment	3(3-0)
CE 5135	Advanced Infrastructure Asset Management	3(3-0)	CE 5135	Advanced Infrastructure Asset Management	3(3-0)
CE 5136	Sustainable Infrastructure Systems	3(3-0)	CE 5136	Sustainable Infrastructure Systems	3(3-0)
CE 5236	Construction Quality Control and Management	3(3-0)	CE 5236	Construction Quality Control and Management	3(3-0)
CE 5237	Life Cycle Assessment in Structural and Construction Projects	3(3-0)	CE 5237	Life Cycle Assessment in Structural and Construction Projects	3(3-0)
CE 5238	Sustainable Infrastructure Development and Management	3(3-0)	CE 5238	Sustainable Infrastructure Development and Management	3(3-0)
CE 5239	Structural Health Monitoring and Asset Management	3(3-0)	CE 5239	Structural Health Monitoring and Asset Management	3(3-0)

CODE	Courses	Cr.Hr
	Water Resource & Irrigation Engineering	
CE 5501	Advanced Fluvial Hydraulics	3(3-0)
CE 5502	Hydropower Engineering	3(3-0)
CE 5503	Irrigation Engineering & Practices	3(3-0)
CE 5504	Applied Hydrology	3(3-0)
CE 5505	Sediment Transport	3(3-0)
CE 5506	Advanced Fluid Mechanics	3(3-0)
CE 5507	Drainage Engineering	3(3-0)
CE 5508	Computer Aided Design of Hydraulic Structures	3(3-0)
CE 5509	River Engineering and Flood Management	3(3-0)
CE 5510	Application of RS & GIS	3(3-0)
CE 5511	Soil Erosion & watershed Management	3(3-0)
CE 5512	Hydrological Systems Modeling	3(3-0)
CE 5513	Water Resources Economics, Planning & Management	3(3-0)
CE 5514	Ground Water Engineering	3(3-0)
CE 5515	Advanced Open Channel Hydraulics	3(3-0)
CE 5516	Computational Hydraulics	3(3-0)
CE 5517	Hydrodynamics	3(3-0)
CE 5518	River Flood Modelling	3(3-0)
CE 5519	Urban Flood Management	3(3-0)
CE 5520	Urban Infrastructure Systems and Management	3(3-0)
CE 5404	Dam Engineering	3(3-0)
CE 5522	Water Supply and Sewer System Design	3(3-0)
CE 5523	Irrigation System Design and Management	3(3-0)
CE 5524	Data Driven Modelling and Real Time Control of Water Systems	3(3-0)
CE 5231	Advanced Bidding and Estimation	3(3-0)
CE 5132	Environmental Impact Assessment	3(3-0)
CE 5420	Design and Construction of Earthen Dam	3(3-0)
CE 5115	Bridge and Tunnel Engineering	3(3-0)
CE 5528	River Basin Modelling	3(3-0)
CE 5529	Climate Change and Hydrological Cycle	3(3-0)
CE 5530	Water Law and Policy	3(3-0)
CE 5233	Research Methods & Statistics for Civil Engineering	3(3-0)
CE 5232	Construction Failure Analysis	3(3-0)
CE 5127	Sustainable Development and Construction	3(3-0)
CE 5534	Membrane Technology for Water and Wastewater Treatment	3(3-0)
CE 5224	Hazards and Disaster Management	3(3-0)
CE 5135	Advanced Infrastructure Asset Management	3(3-0)
CE 5136	Sustainable Infrastructure Systems	3(3-0)
CE 5236	Construction Quality Control and Management	3(3-0)
CE 5237	Life Cycle Assessment in Structural and Construction Projects	3(3-0)
CE 5238	Sustainable Infrastructure Development and Management	3(3-0)
CE 5239	Structural Health Monitoring and Asset Management	3(3-0)

MS RULES AND REGULATIONS

1 General

· There are two regular semesters (i.e. spring and fall) and one optional summer semester in each academic year.

- Duration of spring and fall semesters is 18 weeks each including midterm and end term examinations.
- Summer semester is nine weeks long including midterm and end term examinations.

1.1 Eligibility for Admissions

Candidates who have passed an undergraduate (16 years or equivalent) degree in the relevant area by securing a minimum 60% marks or a CGPA of 2.5 on a scale of 4.0 are eligible for admission. Other scales are converted accordingly. The applicant is also required to pass an entry test arranged by the institute on a specified date or NTS Graduate Assessment Test (GAT) by securing 50% marks or any other examination specified by HEC/PEC for admission to postgraduate program.

1.2 Age Limit

There is no age limit for admission in post graduate Program.

1.3 Maximum Time Limit

- Duration of MS Program is 2 years (minimum) and 4 years (maximum), where the duration is counted from the date of candidate's registration.

1.4 Application Process

- Applications on prescribed form along with first semester/ quarter dues (bank draft/ page order/ bank chalan) in favor of the treasurer, NFC IET and required documents complete in all respects should be submitted to the convener, admission committee, NFC IET on or before the due date
- The admission of foreign qualified students is made on the assessment made by HEC/ BASR on the basis of candidate's academic records and English proficiency. BASR may also ask the candidate to appear for a test and/ or interview.
- Incomplete applications are not entertained.

1.5 Test and Interview

A written test is conducted by the concerned department on the proposed date followed by the interviews of short listed candidates. For admission, a candidate must qualify both the test and the interview.

1.6 Determination of Merit

Admissions are granted strictly on merit and the following criterion is followed to determine the merit:

BSc (16 years degree)	40%
FSc (or equivalent)	10%
Matriculation	10%
Written Test	30%
Interview	10%

1.7 Pre-Requisite Courses

On identification of a deficiency in the courses an applicant studied at undergraduate level, he/she may be directed by the BASR to pass a certain number of pre-requisite under-graduate courses before taking any post-graduate course.

1.8 Displaying List of Successful Candidates

List of successful candidates is displayed in the concerned department with the approval of the head and the same is forwarded to the Registrar office for the registration of newly admitted candidates. No student is admitted after 15 days of the commencement of first semester.

1.9 Migration

Students migrating from other universities/ institutes are not entertained.

1.10 No Objection Certificate (NOC)

A No Objection Certificate (NOC) is required from the students who have completed their B.Sc. (undergraduate) from other universities/ institutes. In addition, all admitted students are required to submit an affidavit stating that neither he/ she is not enrolled in any graduate program in Pakistan or abroad nor will do so until the completion of the degree.

1.11 Credit Hours Requirements

To earn MS Engineering and MS Computer Science degree, a candidate must complete 30 credits with a mandatory 24 credits course work and a 6 credits thesis.

1.12 Contact Hours

Following table describes how 1 credit is translated into contact hours for theory, practical and thesis:

Credit	Contact hours per week	
	Theory	Practical
1	1	3

2 Teaching and Examination

- 75% attendance is mandatory in each course
- Inability to pass a course on the basis of low attendance is treated as failure in that course and the student has to repeat if it is a core course. Otherwise, he/ she can take an alternate course. This, however, doesn't apply on courses withdrawn within allowed course of time
- A student can register a maximum of 4 courses in a semester

2.1 Course Outline and Syllabi

- Course are offered by the concerned department at the start of each semester along with a description of each course containing the information regarding course code, time, day, credits, nature (core or allied) and teacher etc.
- Course details are provided by the teacher containing objective, contents and the schedule of assignments, quizzes and term paper
- Courses are offered by the department keeping in view the availability of teachers and other academic and administrative aspects
- Outline of courses are revised by BASR from time to time on the recommendation of Board of Studies/ syndicate.

2.2 Examination

Performance of a student is measured through a system of continuous testing spread over the entire period of studies. Besides midterm and end term examinations, there are a number of quizzes, presentations and assignments. Student's performance in all these class activities contributes towards his/ her grade. To register for midterm and end term examinations, a student must fulfill the following conditions:

- The student is enrolled in the department, has paid all the necessary dues and has fulfilled all other conditions laid down from time to time

The student has not been debarred for examination under any other rule or regulation

- The student has applied to the controller of examination on a prescribed proforma through concerned head.

Following fee schedule applies:

* Before deadline	Normal fee
* At most six days before midterm	Late fee
* At most 2 days before midterm	Double fee

- No application is entertained after the time limits mentioned above.

Teacher of the subject conducts both midterm and end term examinations and evaluates each student based on his/ her performance. The grades assigned by the teacher are final and can not be challenged at any forum. The scripts of all examinations, except those of end term, are shown to students for their review and feedback. Finally, the scripts are submitted to the controller of examinations within 15 days of the examination. The award lists, however, are forwarded to the controller of examinations within four weeks of the end term examination. Midterm exam is conducted in 9th week of class work and the end term is after 16th week. Following weight is assigned to midterm, end term and sessionals unless and until the departmental examination committee approves any other scheme:

Midterm Exam	30%
Endterm Exam	50%
Sessional Marks	20%

2.3 Award of Letter Grades

- Concerned teacher assigns letter grades to the comprehensive scores in consultation with the head according to the prescribed guidelines
- Comprehensive award list along with letter grades are displayed in the department. Discrepancies are resolved within 3 days
- Comprehensive award list is sent to the

controller of exams with ten days of the end term examination through the head. A copy of the same is retained by the teacher and the head.

- Teacher and the concerned head are responsible for the correctness of the comprehensive award list sent to the controller of examinations.
- Grade point (GP), Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA) are calculated by the controller of examinations at the end of each semester.
- Letter grade i.e. Grade Point (GP) in a subject is allocated as per the following criterion:

Grade	A+	A	B+	B	B-	C+	C	F	W	WF	I
Grade Point (GP)	4	3.7	3.3	3	2.7	2.3	≤2	0	-	-	-

- Grade Point Average (GPA) of a student in semester Sk is calculated as follows:

$$GPA_{S_k} = \frac{\sum_{s \in S_k} GP_s \times CH_s}{\sum_{s \in S_k} CH_s}$$

where s is a subject offered in semester Sk and $1 < k < 4$

- Cumulative Grade Point Average (CGPA) of a student at the end of semester Sk is calculated as follows:

$$CGPA_{S_k} = \frac{\sum_{s \in S_1, \ldots, S_k} GP_s \times CH_s}{\sum_{s \in S_1, \ldots, S_k} CH_s}$$

where s is a subject offered in semester Sk and $1 < k < 4$

- For students less than 20, in numbers, there GPA will be calculated by Ready Reckoner Table by absolute grading.
- A student failing to maintain a GPA of 2.0 at the end of first semester is put on probation.
- A student has the option to repeat a subject in order to improve his/ her CGPA. In that case, the new grade (higher or lower) replaces the previous grades.
- A minimum 2.0 CGPA, with no F grade, is required for the award of degree
- Scripts of both midterm and end term examinations are stored with the controller of examination for two years and then are wasted
- A list of registered students is forwarded to the controller of examination within 15 days of the commencement of each semester
- To pass a course, a student must obtain at least 2.0 GP on a scale of 4
- A departmental exam committee, constituted by the vice chancellor for a period of three year, looks into all matters related to examinations. Decisions taken by the committee are final.

2.4 Duration of Examinations

Duration of examinations for all courses is as follows:

Mid Term	1.5 hours
End Term	2.5 hours

2.5 Home Assignments and Term Papers

Each course carries at least:

- Three home assignments at least one per 5 weeks or One term paper or
- Three quizzes, at least 5 weeks apart

2.6 Evaluation and Time Frame for Theory

- Before end term examination, teacher prepares and displays the interim award list (IAL) according to the depend rules.
- Teacher marks the end term examination scripts and submits comprehensive award list (CAL) to the controller of examinations within stipulated time frame.
- Teacher schedules additional assessment instrument such as assignments, quizzes, presentations, seminars, group discussion, field study and reports etc which carries 20 percent weightage of each subject.

2.7 Evaluation and Time Frame for Practical

- Teacher keeps all his/ her students informed regarding their performance in each class activity
- At the end of each semester and before the end term exam, teacher prepares the displays IAL
- Teacher submits CAL to the controller examinations within stipulated course of time
- For each experiment, jury presentation, design report, project or assignment are considered independent assessment instruments. Relative weight of each these assessment types is determined by the teacher.

2.8 Question Paper

- Questions papers is set by the concerned teacher.
- Teacher is solely responsible for maintaining confidentiality of the question paper.

2.9 Reference Material

Teacher should announce before hand all

the books, handouts and/ or other material that students can refer to during the examination.

2.10 Schedule

Controller examinations announces the schedule of midterm and end term examinations one week before the start of examination. The same is done in consultation with concerned head/ coordinator.

2.11 Conduct of Examination

- Concerned teacher conducts the examination as superintendent.
- Concerned head deputes staff such as deputy superintendent and invigilator.
- Superintendent ensures the following:
- All answer sheets are signed by the superintendent/ deputy superintendent.
- Answer sheets are issued to the invigilator 10 minutes before the start of examination and retrieved at the end of the examination
- A report regarding absent students is forwarded to the concerned head
- Invigilator staff performs the following duties:
- Students taking the examination are identified through their institutional identity cards and roll number slips
- Students are warned against the use of unfair means
- Mobile phones and all other items not allowed during the examination are removed
- No student joins after 30 minutes of commencement of the examination.
- Student found using unfair means or assisting other students can no longer continue. All such cases are taken the departmental examination committee whose decision is final.

2.12 Withdrawing Subjects

- This option is available to the students studying in regular semesters only i.e. Spring and Fall Applications for withdrawal can be launched latest by the fourth week of the commencement of semester
- Withdrawn subjects appear with a letter grade 'W'
- Subjects repeated after withdrawal are awarded grade 'R'
- Throughout the span of the degree, a student can withdraw a maximum 6 credits

2.13 Forced Withdrawal

A student ineligible to continue due to low attendance or due to any other legal implication is awarded 'WF' grade. He /she, on successful repetition, are warded 'R' grade.

2.14 Incomplete Grade

- Students are awarded 'I' grade in unfinished subjects
- If a student with 'I' grade does not improve it in one calendar year, the same is automatically converted
- to 'F' grade

2.15 Repeating Subjects

- In case of failure, a students has to earn a passing grade in that subject within stipulated time if it is a core course
- In case of an elective subject, a student may take some other elective subject
- A student failing a core course has to wait until it is offered again
- The department offers courses as per the availability of teachers and other legal implications

2.16 Dropping Students

A student is dropped if he/ she:

- fails to register two courses in first semester
- fails to register for two consecutive semesters All such cases are taken to BASR whose decision is final.

2.17 Deferring Studies

- A fresh student taking admission in first semester can't apply for deferment
- Deferment doesn't affect maximum allowed time for the completion of degree
- Student seeking deferment needs to apply at least 5 days prior to the final examination. Controller of examination notifies deferment in consultation with concerned head.

2.18 Registering Subjects and Payment of Fee

- A student can register only those subjects offered by the department
- Registration roll in each subject is finalized and dispatched to the controller of examination within fifteen days of the commencement of each semester
- Students need to pay dues twice a year until the completion of degree. These are in addition to the dues of summer semesters (if applicable).
- Deferment seeking students have to pay full dues for the period of deferment

A student carrying outstanding dues for a period of six months are automatically dropped. He/ she can, however, apply to the vice chancellor to be reinstated after paying all outstanding dues. Decision taken by the vice chancellor in all such cases is final.

2.19 Re-admission Policy

- Dropped students can apply for re-admission but the maximum degree completion period is counted from the date of registration
- A student once dismissed due to disciplinary violation is never red-admitted

2.20 Special Provisions

- For situations not addressed by the set rules and regulations, decision of BASR is final
- Interpretation of set rules and regulations done by the authorized officers/ committees is final
- The institute reserves the right to change rules, regulations, fee structure and contents of courses without any prior notice
- No student is allowed to be simultaneously enrolled in any university within the country or abroad except exchange students
- Ignorance of set rules and regulations doesn't absolve students of their responsibilities and is never treated as an excuse

3 Thesis/ Dissertation

- In addition to the regular course wok, a student needs to submit a dissertation/ thesis. Each candidate is assigned a supervisor for his/ her research work. The supervisor must hold a PhD degree in respective discipline. However, an MS qualified teacher can act as a co-supervisor, if required.
- Title of research and name of supervisor is approved by BASR on the recommendation of concerned head
- A student can take thesis after passing four courses. However, he/ she can apply for thesis evaluation only after completing his/ her course work.
- A student needs to submit 4 hard copies of his/ her thesis for evaluation. A copy of the thesis after evaluation is returned to the student
- If a candidate is recommended to revise his/ her thesis, he/ she must submit the revised thesis for re-evaluation within six months.
- In addition to the regular course wok, a student needs to submit a dissertation/thesis. Each candidate is assigned a supervisor for his/her research work. *The supervisor must hold a PhD degree in respective discipline* . However, an MS qualified teacher can act as a co-supervisor, if required.

3.1 Thesis Evaluation

-
- Thesis report being submitted for evaluation must contain plagiarism report as per HEC criteria.
- Thesis report is evaluated by both internal and external examiners. Supervisors' acts as internal examiners and the external examiners are appointed by the Vice-Chancellor on the recommendation of BASR.
- List of external examiners is approved by the Vice Chancellor from the list of proposed examiners submitted by the BOS of the concerned department.
- Final external examiner is picked by head of department in consultation with program coordinator from approved list of external examiners.
- Final report on thesis and viva voce examination is submitted by the examiners on a prescribed proforma.
- In case of difference of opinion, a third

examiner is appointed by the vice chancellor on the recommendation of BASR.
- Thesis are evaluated strictly in accordance with the set rules and regulations.

3.2 Changing Supervisor

Due to valid reasons and after having written consent of present supervisor, a student may change his/ her supervisor with the approval of Board of Studies (BoS) of the department. After that, he/ she has to get himself/ herself registered a fresh with new research proposal/ synopsis prepared in consultation with the new supervisor. However, the candidate can continue his/her previous work in consultation with the new and\old supervisors.

4 Awarding Degree

A student is awarded MS Engineering degree if he/she has:
- CGPA 2.0 on a scale of 4
- No 'F' grade in any subject
- Completed the credit hours requirements
- Completed thesis as per requirements
- At least one research paper submitted to an HEC recognized journal Students eligible for the award of degree are required to submit a degree requirements completion form to their concerned head for onward submission on to the controller of examinations.

Glossary of Terms

- Academic Year' means the span containing consecutive fall, summer (optional) and spring semesters
- BASR' means Board of Advanced Studies and Research
- BoS' means Board of Studies CAL' means Comprehensive Award List Competent Authority' means the vice chancellor of the institute
- Controller of Examinations' means the controller of examinations of the institute
- External Examiner' means a person holding higher qualification in the relevant discipline and is appointed by the competent authority for an examination. Neither a teacher of the institute nor any visiting teacher teaching at the institute can act as external examiner
- Faculty' means the concerned faculty of the institute HEC' means Higher Education Commission of Pakistan

Head' means then head of the concerned department
- IAL' means Interim Award List
- Institute' means NFC Institute of Engineering and Technology, Multan, Pakistan
- Internal Examiner' means a teacher appointed by BASR to teach a subject
- Neutral Examiner' means a person holding higher qualification in the relevant discipline and has not taught the subject for which he/ she is being appointed as a neutral examiner in that very semester. He/ she is generally chosen from the faculty of the concerned department NFC-IET' means National Fertilizer Corporation, Institute of Engineering and Technology, Multan, Pakistan
- PEC' means Pakistan Engineering Council
- Pro Vice Chancellor' means the pro vice chancellor of the institute
- Student' means a bonafide postgraduate student enrolled in concerned department Subject' means prescribed course of study
- Treasure' means the treasurer of the institute Vice Chancellor' means the vice chancellor of the institute

Certificate Distribution of Orientation classes

Faculty & Participants of Orientation classes

DETAIL FEE FOR MS PROGRAMS (CHEMICAL ENGINEERING, ELECTRICAL ENGINEERING, MECHANICAL ENGINEERING, CIVIL ENGINEERING & COMPUTER SCIENCE) FOR ADMISSION OF SESSION 2025

Description	At the time of Admission	After Admission				Total
	1st Semester	1st Semester	2nd Semester	3rd Semester	4th Semester	
Admission	15,000.00	–				**15,000.00**
Processing Fee	2,000.00	–				**2,000.00**
Registration Fee	1,500.00	–				**1,500.00**
Caution Money	5,000.00	–				**5,000.00**
Library Security	5,000.00	–				**5,000.00**
Tuition Fee	45,000.00	–	45,000.00	30,000.00	30,000.00	**150,000.00**
Utilities	4,500.00	–	–	4,500.00	–	**9,000.00**
Internet Charges	1,500.00	–	–	1,500.00	–	**3,000.00**
Students Societies FEE	1,000.00	–	–	1,000.00	–	**2,000.00**
Students Function	1,500.00	–	–	–	–	**1,500.00**
Alumni Contribution	500.00	–	–	–	–	**500.00**
Sports Fee	500.00	–	–	500.00	–	**1,000.00**
Magazine Fee	250.00	–	–	250.00	–	**500.00**
Total	**83,250.00**	–	**45,000.00**	**37,750.00**	**30,000.00**	**196,000.00**
Examination Fee	–	3,000.00	3,000.00	3,000.00	–	**9,000.00**
Thesis Evaluation Fee	–		–	–	10,000.00	**10,000.00**
Grand Total						**215,000.00**

DETAIL FEE FOR MBA PROGRAM FOR ADMISSION OF SESSION 2025

Description	At the time of Admission	After Admission				Total
	1st Semester	1st Semester	2nd Semester	3rd Semester	4th Semester	
Admission	15,000.00	–				**15,000.00**
Processing Fee	2,000.00	–				**2,000.00**
Registration Fee	1,500.00	–				**1,500.00**
Caution Money	5,000.00	–				**5,000.00**
Library Security	5,000.00	–				**5,000.00**
Tuition Fee	30,000.00	–	30,000.00	30,000.00	30,000.00	**120,000.00**
Utilities	4,500.00	–	–	4,500.00	–	**9,000.00**
Internet Charges	1,500.00	–	–	1,500.00	–	**3,000.00**
Students Societies FEE	1,000.00	–	–	1,000.00	–	**2,000.00**
Students Function	1,500.00	–	–	–	–	**1,500.00**
Alumni Contribution	500.00	–	–	–	–	**500.00**
Sports Fee	500.00	–	–	500.00	–	**1,000.00**
Magazine Fee	250.00	–	–	250.00	–	**500.00**
Total	**68,250.00**	–	**30,000.00**	**37,750.00**	**30,000.00**	**166,000.00**
Examination Fee	–	3,000.00	3,000.00	3,000.00	–	**9,000.00**
Thesis Evaluation Fee	–		–	–	10,000.00	**10,000.00**
Grand Total						**185,000.00**

Note:

From 5th Semester and onward Rs.10,000/- per semester will be charged as Semester Registration Fee.
Students opting course work instead of thesis in sixth semester pay additional fee for these courses.

Ph.D. Chemical Engineering

Objectives of PhD Program (Chemical)

The Department of Chemical Engineering offers graduate program i.e. Ph.D. in Chemical Engineering. Program is designed to prepare students to discover, integrate and apply knowledge as well as to disseminate it with high professional caliber. This program is tailored according to the specific needs of research & development in the field of Chemical Engineering. It encompasses areas that are in line with hi-tech industry requirements in the field. The program equips researchers with the knowledge to remain competitive in the area. The department provides a student-centered learning environment and highly qualified faculty, shares their experience and knowledge with students, so the students of the program can:

1. Graduates will have a clear understanding of Chemical Engineering fundamentals and will be able to apply their knowledge to real-world research issues.
2. Graduates will be skilled researchers, with the ability to create, evaluate and effectively communicate a hypothesis to a technologically literate audience.
3. Graduates will be cable of planning, conducting and supervising their own research projects.
4. Graduates of the program will be prepared to fill advanced level research, development and entrepreneurial jobs in the chemical sector, which are in high demand.
5. To provide students with instruction in core and elective Chemical Engineering topics as well as research, design and execution, in order to prepare them for careers in Chemical Engineering that are more focused. As a result, this curriculum will prepare students for a future in academia or industry that involves research.

Scope of PhD Program (Chemical)

Chemical Engineers assist in the design, construction, and operation of processes that transform raw materials into home and industrial goods, such as food processing, gas production, and mineral refinement. Researching and developing new or improved products may also be part of the job description. Chemical Engineering techniques are now used in a variety of industries, including textile, food, plastics, automotive, aerospace, petroleum, oil and gas, biomedical, biotechnology, and pharmaceuticals, to produce usable, high-quality products such as fibres, fabrics, paints, medical drugs, biomaterials, gasoline, and lubricants, among others. Chemical engineers are responsible for the design, maintenance, and operation of large-scale machinery, industrial plants, and chemical processes used in the creation of the aforementioned useable products. As a result, this field is not limited to chemistry. You will be studying a lot of concepts in physics, mathematics, and economics in order to develop the equipment and scale up the products from lab to industrial scale manufacture.

Chemical Engineering's scope has widened as a result of industrial expansion and resource shortages. NFC-objective IET's is to provide such human assets as may be required for the expansion of synthetic replacements for limited natural materials and resources. Overall, our chemical engineers have the potential to make significant contributions to making life more valued and desirable. As a result, PhD research focuses on chemical, pharmaceutical, energy, and refinery supplies, as well as industrial management.

Scheme of Study for Admission in PhD

Standardized scheme of studies for PhD degree programs in the light of uniform semester guidelines and NQF is as follows:**Total No. of Required Credit Hours**18 (Credit Hours of Course Work + a PhD dissertation which must be evaluated by at least two PhD experts from technologically /academically advanced foreign countries in addition to local Committee members)**Semester Duration**Minimum of 16 weeks of teaching excluding examinations**Course Work Duration (Minimum)**1-year, two semesters**Course Duration**Minimum 3 years (including course work duration and Research Dissertation) Maximum 3-8 years (including course work duration) with approval of Director Research/Registrar/Controller of Examinations**Number of Regular Semesters**02***Summer Session**Only for deficiency courses and Research**Course Load per Semester for Regular Full-Time Students**09-12 Credit Hours of Advanced Courses in the field and Research Methods*HEIs falling in long winter vacations to apply according to their own conditions

Semester-ISemester-II Elective course-I03Elective

course-IV03Elective course-II03Elective course-V03Elective course-III03Elective course-VI03**Semester Cr. Hr09Semester Cr. Hr09**

Comprehensive Examination, Proposal DefenseFirst Progressive SeminarSecond Progressive Seminar and Final SeminarDissertation Open Defense and Thesis Viva Voce

Total Credit Hours18

Total Course Credit Hours (Course Work + Research Thesis/Dissertation Defense) = **18**

Scheme of Study for Admission in PhD

Standardized scheme of studies for PhD degree programs in the light of uniform semester guidelines and NQF is as follows:

Total No. of Required Credit Hours	18 (Credit Hours of Course Work + a PhD dissertation which must be evaluated by at least two PhD experts from technologically /academically advanced foreign countries in addition to local Committee members)
Semester Duration	Minimum of 16 weeks of teaching excluding examinations
Course Work Duration (Minimum)	1-year, two semesters
Course Duration	Minimum 3 years (including course work duration and Research Dissertation)
	Maximum 3-8 years (including course work duration) with approval of Director Research/Registrar/Controller of Examinations
Number of Regular Semesters	02
***Summer Session**	Only for deficiency courses and Research
Course Load per Semester for Regular Full-Time Students	09-12 Credit Hours of Advanced Courses in the field and Research Methods

*HEIs falling in long winter vacations to apply according to their own conditions

Semester-I		**Semester-II**	
Elective course-I	03	Elective course-IV	03
Elective course-II	03	Elective course-V	03
Elective course-III	03	Elective course-VI	03
Semester Cr. Hr	**09**	**Semester Cr. Hr**	**09**
Comprehensive Examination, Proposal Defense		First Progressive Seminar	
Second Progressive Seminar and Final Seminar		Dissertation Open Defense and Thesis Viva Voce	
Total Credit Hours		**18**	

Total Course Credit Hours (Course Work + Research Thesis/Dissertation Defense) = **18**

Curriculum for PhD Program in Chemical Engineering

List of Elective Courses for Ph.D. in Chemical Engineering			
Elective Courses			
Sr. No.	**Code**	**Course Title**	**Cr. Hrs**
01	CHE-701	Advanced Engineering Mathematics	3(3,0)
02	CHE-702	Advanced Separation Processes	3 (3,0)
03	CHE-703	Advanced Transport Phenomena	3(3,0)
04	CHE-704	Advanced Chemical Reaction Engineering	3(3,0)
05	CHE-705	Advanced Chemical Reactor Design	3(3,0)
06	CHE-706	Advanced Fluid Mechanics	3(3,0)
07	CHE-707	Advanced Heat Transfer	3(3,0)
08	CHE-708	Numerical Methods in Chemical Engineering	3(3,0)
09	CHE-709	Design of Heat Recovery Systems	3(3,0)
10	CHE-710	Particle Dynamics	3(3,0)
11	CHE-711	Experimental Design and Analysis	3(3,0)
12	CHE-712	Project Management	3(3,0)
13	CHE-713	Fluidization Engineering	3(3,0)
14	CHE-714	Research Methodology	3(3,0)
15	CHE-715	Bio Chemical Engineering	3(3,0)
16	CHE-716	Computational Fluid Dynamics	3(3,0)
17	CHE-717	Computer Aided Process Design	3(3,0)
18	CHE-718	Advanced Chemical Engineering Thermodynamics	3(3,0)
19	CHE-719	Occupational Health and Safety in Process Industries	3(3,0)
20	CHE-720	Process Design and Optimization	3(3,0)
21	CHE-721	Transport Processes	3(3,0)
22	CHE-722	Process Modeling and Simulation	3(3,0)
23	CHE-723	Process Safety and Loss Prevention	3(3,0)
24	CHE-724	Advanced Catalytic Processes	3(3,0)
25	CHE-725	Sol-gel Processing	3(3,0)
26	CHE-726	Solid Waste Engineering	3(3,0)
27	CHE-727	Instrumental Methods of Analysis	3(3,0)
28	CHE-728	Process Dynamics and Control	3(3,0)
29	CHE-729	Waste Water Treatment	3(3,0)
30	CHE-730	Sustainable Energy Engineering	3(3,0)
31	CHE-731	Environmental Engineering	3(3,0)
32	CHE-732	Energy Management and Auditing	3(3,0)
33	CHE-733	Power Plant Engineering	3(3,0)
34	CHE-734	Coal Technology	3(3,0)
35	CHE-735	Coal Preparation and Beneficiation	3(3,0)
36	CHE-736	Production of Biofuels	3(3,0)
37	CHE-737	Polymer Engineering	3(3,0)

38	CHE-738	Explosives and Propellants	3(3,0)
39	CHE-739	Rocket Propulsion Technology	3(3,0)
40	CHE-740	Combustion and Energetic Materials	3(3,0)
41	CHE-741	Advanced Composite Materials	3(3,0)
42	CHE-742	Nano Technology	3(3,0)
43	CHE-743	Materials Engineering	3(3,0)
44	CHE-744	Mechanical and Thermal Behavior of Materials	3(3,0)
45	CHE-745	Carbon Capture and Utilization	3(3,0)
46	CHE-746	Nano Materials and Nano Processing	3(3,0)
47	CHE-747	Thesis and Manuscript Writing Skills	3(3,0)

PhD Faculty in Chemical Engineering Department

Sr. No.	Faculty Name	Designation	Research Area/Specialization
01	Engr. Dr. Sadiq Hussain	HoD, Assistant Professor	Coal Gasification in Circulating Fluidized Bed
02	Engr. Dr. M. Nadeem Amin	Assistant Professor	Catalytic Synthesis, Catalytic Pyrolysis, Low Rank Coals
02	Engr. Dr. M. Rizwan	Assistant Professor	Catalysis, Chemical Reaction Engineering
03	Engr. Dr. Sana Saeed	Assistant Professor	Thermochemical Conversion of ionic Liquid Pretreated SPG
04	Engr. Dr. M. Saleem Khan	Assistant Professor	Resources Recycling, Environmental Engineering
05	Engr. Dr. Saad Saeed	Lecturer	Thermochemical Conversion of ionic Liquids, Pyrolysis
06	Engr. Dr. Hidayatullah Mahar	Assistant Professor	Material Synthesis, Water Treatment

Ph.D. Electrical Engineering

Introduction

Electrical Engineering is a dynamic and ever-evolving field that serves as the backbone of modern technological advancement. From power generation and transmission to embedded systems, artificial intelligence, and renewable energy technologies, electrical engineering plays a vital role in shaping the world's infrastructure and digital landscape. As global challenges increase in complexity, the demand for advanced research and innovation in this field has never been greater.

NFC Institute of Engineering and Technology (NFC-IET), Multan, a prestigious institution in South Punjab, offers a PhD in Electrical Engineering aimed at fostering high-level research, critical thinking, and specialized knowledge to tackle future technological and industrial challenges.

Importance of a PhD in Electrical Engineering

A PhD is the highest academic qualification and represents a significant achievement in research and innovation. In Electrical Engineering, a PhD prepares scholars to contribute to cutting-edge research, develop novel technologies, and influence policy and industrial practices. It opens doors to leadership roles in academia, R&D organizations, and global technology firms.

At NFC-IET, the PhD program is designed to:

- Enable in-depth understanding of advanced concepts in electrical engineering.
- Promote original research contributing to knowledge creation and technological development.
- Equip scholars with the analytical and experimental tools necessary to solve real-world engineering problems.
- Foster collaboration with industry and academia on national and international levels.

Objectives of the Program

The Department of Electrical Engineering offers graduate program i.e. Ph.D. in Electrical Engineering. Program is designed to prepare students to discover, integrate and apply knowledge as well as to disseminate it with high professional caliber. This program is tailored according to the specific needs of research & development tin the field of Electrical Engineering. It encompasses areas that are in line with hi-tech industry requirements in the field. The program equips researchers with the knowledge to remain competitive in the area. The department provides a student-centered learning environment and highly qualified faculty, shares their experience and knowledge with students, so the students of the program can:

1. pursue excellence in education and research.
2. ability to contribute effectively in academic journals.
3. develop curricula to meet national and economy needs.
4. show high professional and research competence.
5. have analytical approach towards problem solving.
6. develop a vivid interface between academia and industry.
7. Skills to find and use available technical information.
8. Ability to grow through life long acquisition of knowledge.
9. demonstrate spirit of nation building, humanistic outlook and ethical rectitude
10. manifest a strong technical knowledge in their field so that they can lead and direct engineering and scientific industry teams in their chosen field of study.
11. enhance the ability to learn independently.
12. understand a strong technical knowledge in their field so that they can lead and direct engineering and scientific industry teams in their chosen field of study.

Scope and Specializations

The PhD program covers a broad range of research areas, including but not limited to:

- Power Systems and Smart Grids
- Renewable Energy and Energy Management
- Control Systems and Robotics
- Signal Processing and Communication
- Microelectronics and Embedded Systems
- Artificial Intelligence in Electrical Engineering
- High Voltage and Insulation Engineering

Students are encouraged to pursue interdisciplinary research and work on contemporary challenges such as climate resilience, energy sustainability, and automation.

Career Opportunities

Graduates of the PhD in Electrical Engineering program at NFC-IET are well-equipped for a variety of prestigious roles across multiple sectors:

- **Academia and Research**: Become university

professors, postdoctoral researchers, or research scientists at leading institutions.

- **Industry**: Take on roles such as R&D engineers, system designers, or technical leads in national and multinational companies.
- **Public Sector**: Contribute as policy advisors, technical consultants, and innovation leaders in government organizations and regulatory bodies.
- **Entrepreneurship**: Launch technology-driven startups or serve as innovation consultants.

Why Choose NFC-IET, Multan?

- Located in the heart of South Punjab, NFC-IET offers access to a growing technological landscape and a vibrant academic environment.
- State-of-the-art laboratories, experienced faculty, and an emphasis on applied research make it an ideal hub for doctoral studies.
- Strong industry linkages and collaborative research opportunities at national and international levels.

Shape the future of technology. Redefine the boundaries of innovation. Begin your research journey with NFC-IET.

For more information, visit: https://www.nfciet.edu.pk

Scheme of Studies

Standardized scheme of studies for PhD degree programs in the light of uniform semester guidelines and NQF is as follows:

Total No. of Required Credit Hours	18 (Credit Hours of Course Work + a PhD dissertation which must be evaluated by at least two PhD experts from technologically /academically advanced foreign countries in addition to local Committee members)
Semester Duration	Minimum of 16 weeks of teaching excluding examinations
Course Work Duration (Minimum)	1-year, two semesters
Course Duration	Minimum 3 years (including course work duration and Research Dissertation)
	Maximum 3-8 years (including course work duration) with approval of Director Research/Registrar/Controller of Examinations
Number of Regular Semesters	02
Summer Session	Only for deficiency courses and Research
Course Load per Semester for Regular Full-Time Students	09-12 Credit Hours of Advanced Courses in the field and Research Methods

Approved Scheme of Studies:

Semester-I		**Semester-II**	
Elective course-I	03	Elective course-V	03
Elective course-II	03	Elective course-VI	03
Elective course-III	03	Elective course-VII	03
Semester Cr. Hr	**09**	**Semester Cr. Hr**	**09**
		Thesis/Dissertation Proposal Defense	
Semester-III		**Semester-IV**	
Comprehensive Examination (C.E) + Thesis/Dissertation Proposal Defense (if C.E passed) and Research Work		Second Comprehensive Exam + 1st Progress Report	
Semester-V		**Semester-VI**	
2nd Progress Report		Research Thesis/Dissertation Defense	

Total Course Credit Hours (Course Work + Research Thesis/Dissertation Defense) =**18**

CURRICULUM FOR PHD PROGRAM IN ELECTRICAL ENGINEERING

(Spring 2025 and onward)

LIST OF ELECTIVE COURSES FOR Ph.D. IN ELECTRICALENGINEERING		
ELECTIVE COURSES		
Sr. No.	**Course Code**	**Course Title**
1	PEE-701	Advanced Engineering Mathematics
2	PEE-702	Statistics in Research
3	PEE-703	Professional Psychology & Organizational Behavior
4	PEE-704	Research Methodology
5	PEE-705	Power system Analysis
6	PEE-706	Power Systems Operation and Control
7	PEE-707	Electrical Transients in Power System
8	PEE-708	High Voltage Engineering
9	PEE-709	Power System Planning
10	PEE-710	Renewable Energy
11	PEE-711	Power generation and plant operation
12	PEE-712	Electric Power quality
13	PEE-713	Power System Protection
14	PEE-714	AC \ DC Drives
15	PEE-715	Power Transmission and distribution
16	PEE-716	Power Engineering project management
17	PEE-717	Power System Reliability
18	PEE-718	Power System Stability and Control
19	PEE-719	Hydro Generation
20	PEE-801	Modern Data Analysis Methods
21	PEE-802	Modeling, Simulation and Optimization Techniques
22	PEE-803	DC and Flexible AC Transmission
23	PEE-804	Integration of distributed generation
24	PEE-805	Design of Electrical Machines

25	PEE-806	Flexible AC transmission
26	PEE-807	Generation of sustainable energy system
27	PEE-808	Power System dynamics
28	PEE-809	Power sector Deregulation
29	PEE-810	Dynamic Modeling of Electric Machines and Controls
30	PEE-811	Advance Topics in Power Systems Engineering
31	PEE-812	Advance Topics in Renewable Energy
32	PEE-813	Energy Resources and Technologies
33	PEE-814	Power and Energy Economic Policy
34	PEE-815	Hybrid Power Systems
35	PEE-816	Energy and storage system
36	PEE-817	Advanced electrical insulation engineering
37	PEE-818	Artificial Intelligence
38	PEE-819	Robotics
39	PEE-820	Advance linear control systems
40	PEE-821	Intelligent control systems
41	PEE-822	Digital image processing
42	PEE-823	Neural and Fuzzy systems
43	PEE-824	Digital control systems
44	PEE-825	Optimization control theory
45	PEE-826	Adaptive Signal Processing
46	PEE-827	Non-linear systems and control
47	PEE-828	DSP hardware and software systems design
48	PEE-829	MOS VLSI circuit design
49	PEE-830	Circuit modelling of solid state device
50	PEE-831	Optical fiber devices and components
51	PEE-832	Laser and optical communication
52	PEE-833	Mixed signal VLSI design
53	PEE-834	Advanced integrated circuits for communication
54	PEE-835	Design of systems on a chip (SoC)

55	PEE-836	Low power analog and mixed signal ICs
56	PEE-837	Semiconductor processing technology
57	PEE-838	Biomedical Engineering, Trends in Electronics
58	PEE-839	Bio Informatics
59	PEE-840	Photovoltaic System Design
60	PEE-841	Solar Power Generation
61	PEE-842	Wind Power Generation
62	PEE-843	Biomass and waste technology
63	PEE-844	Hydrogen and Fuel Cell Technology
64	PEE-845	Geothermal system design
65	PEE-846	Distributed generation
66	PEE-847	Advance topics in Electronics engineering
67	PEE-848	Advance topics in Telecommunication engineering
68	PEE-849	Smart grid and communication networks
69	PEE-850	Smart grid and cyber security
70	PEE-851	Sensors and Transducers
71	PEE-852	Machine Learning
72	PEE-853	Biologically inspired computing
73	PEE-854	Energy Management
74	PEE-855	Energy Policy and Implementation

ADMISSION/ELIGIBILITY CRITERIA

1. Qualification

i. Prior to admission into a PhD program, the student shall have been awarded MS/MPhil or equivalent degree (18 years of education).

OR

ii. Students pursuing MS/MPhil studies and interested in continuing to PhD may be granted provisional admission upon satisfaction with the Admission Committee regarding Statement of Purpose and student's commitment to the PhD program, provided that confirmation of the admission shall be subject to the fulfilment of the following conditions within a period of one year from the date of provisional admission:

a. Award of MS/MPhil degree.

b. Clearance of the admission test.

2. Intra-disciplinary Qualifications

Consistent with best practices internationally (including leading global universities), intra-disciplinary admissions may only be allowed, if:

i. The applicant has a strong interest in pursuing a PhD in a different discipline.

ii. The applicant has passed GRE-Subject/ Equivalent Test with minimum 60% marks in the discipline of admission and is willing to take 6-9 CH of deficiency courses of level 7.

iii. The admission committee is satisfied that applicant's knowledge of the primary area (level 7) has sufficiently prepared him or her to undertake the course of study of the doctoral program (or, in the opinion of the admissions committee, the preparation can be deemed satisfactory by taking a few additional courses after starting the program).

3. CGPA

a) For admission in PhD programs, a minimum CGPA of 3.0 (out of 4.0 in semester system) or 60% (in the annual system) in the MS/MPhil/equivalent degree being considered for admission, is required, whether such degree was obtained from Pakistani or foreign universities.

b) If the CGPA/Percentage is not mentioned on the transcript, the candidate must produce equivalent weightage from the parent university.

c) The students having strong demonstrated interest in obtaining PhD degree, but their CGPA is below 3.00 (out of 4.0 in the semester system) or 60% marks (in the annual system) in the most recent degree obtained, may be admitted to a PhD program after fulfilling the following requirements:

i. Shall study additional courses of 9-12 CH of level 7 taking a zero semester and score minimum 3.00 out of 4.00 GPA in all, and

ii. The admission committee is satisfied that the applicant's knowledge of primary area (level 7) has sufficiently prepared him or her to undertake the course of studies of the doctoral program.

iii. These requirements shall be in addition to any other requirements set for admission to a PhD program.

4. Admission Test

It is mandatory for the applicant to pass the admission test as per following requirements.

a) University will:

i. Conduct the test equivalent to GRE/HAT Subject developed at the University, with the passing score of 60%. OR

ii. Accept a test equivalent to GRE/HAT Subject, conducted by testing bodies accredited by HEC, with a passing score of 60%.

b) In addition to it, the university may conduct subject test for admission in PhD programs, if required, with a passing score of 70%..

5. Statement of Purpose

As part of the application for admission to PhD programs, applicants shall be required to submit a statement of purpose, which shall form an integral part of the application. The admissions committee shall use the information provided to ascertain the preparedness and interest of the candidate in pursuing doctoral studies, and whether the department has the requisite resources to train and supervise the doctoral candidate in the subspeciality in which the applicant is interested. A statement of purpose shall, at least, include the following:

i. Title of the potential research proposal

ii. Clear articulation of the current understanding of the intended field and ideas for potential research

iii. Explanation of the intended impact of the proposed research

iv. The prospective candidates shall demonstrate passion and enthusiasm for the area of research.

Note:

The admission shall be held once a year as per schedule notified by the NFC IET.

There shall be no discrimination on the basis of gender, creed, religion and region.

The admission committee of NFC IET may

refuse admission to any candidate without assigning any reason.

A. Merit determination

Merit shall be determined by the following formula

Academic qualification	=	50 Marks
GRE/GAT/HAT Subject or equivalent	=	30 Marks
Interview	=	10 Marks
Publication/papers	=	10 Marks
Total	=	**100 Marks**

a) Division of Academic qualification will be 30 marks for BS/ MS degree (15 marks each), 10 marks for F.Sc. and 10 marks for matriculation. Marks will be given on percentage basis.

b) Each publication in a HEC recognized journal shall be awarded 5 marks, 2 Marks for publication in National conference and 3 Marks for publication in International Conference. However, the total marks in this category will not exceed 10.

RESEARCH PUBLICATIONS POLICY

For award of PhD degree, a PhD researcher shall be required to publish[1] research articles meeting the following criteria:

i. At least one research article in W category[2] journal or two research articles in X category journals, for Science disciplines.

ii. The PhD researcher shall be the first author of these publications.

iii. The research article shall be relevant to the PhD research work of the PhD researcher.

iv. The article shall be published after approval of the research synopsis.

v. The article shall be published in a relevant research journal.

[1]A research article appearing online with valid DOI on website of an HEC's recognized research journal shall be considered published w.e.f. the date it appeared online with DOI.

[2]As categorized in HJRS at the time of acceptance of the research article.

Comprehensive Examination Policy

i. Following the completion of coursework, every PhD student shall be required to pass the comprehensive examination to be granted candidacy as a PhD researcher, with the provision that the student failing to pass the comprehensive exam, shall be allowed to retake the exam once.

ii. The required coursework, comprehensive exam, and defense of synopsis/research proposals should be completed within the 1st six semesters of the registration into a PhD program. The responsibility in this regard rests collectively with the PhD student and the university. In case of noncompliance, the registration shall be cancelled and transcripts for completion of coursework may be issued to the student.

iii. In an event of force majeure i.e., noncompliance on account of circumstances beyond the control of student, the university may consider the matter in accordance with the procedure prescribed below.

"In case a student is unable to secure a PhD degree within the prescribed time frame and claims for extension in duration, the university may constitute appropriate authority and determine the causes for delay. In event of force majeure i.e., delay on account of circumstance beyond the control of student, the university may grant an extension in the period of award of PhD degree in accordance with the duration limiting factor(s) and shall also take corrective measures in case the delay is caused due to process or administrative reasons".

iv. The following are the guidelines for a conducting Comprehensive Examination:

a. The exam should be based on recapitulation of the conceptual knowledge of the discipline to which the student is admitted.

b. The exam shall cover the courses studied, preferably at the graduate level, conducted on one composite question paper.

c. The evaluation shall be on an aggregate basis, expressed in terms of pass/fail and shall not be graded.

THESIS EVALUATION POLICY

1. Internal Evaluation

The PhD Dissertation must first be examined by the Departmental PhD Committee, which consists of the following members:

- **a.** Head of the Department,
- **b.** Supervisor
- **c.** Program Coordinator, and
- **d.** Any PhD Faculty member from department

After successful internal evaluation, it will be forwarded for external evaluation.

2. External Evaluation

i. The PhD dissertation must be evaluated by:

a. At least two external experts who shall be:

A. PhD faculty member from the world top 500 universities ranked by the Times Higher Education or QS World Ranking in the year corresponding to dissertation evaluation year

OR

B. Pakistan-based Distinguished National Professors, Meritorious Professors from any national university; or professors from top universities ranked by HEC; or professors from any Pakistani University having a minimum H-Index 30 for Sciences as determined by Web of Science.

OR

b. At least one external expert qualifying any one of the aforementioned conditions if the PhD candidate publishes dissertation research in a peer-reviewed journal that is classified by the HEC in category W for Sciences.

ii. The following general guidelines shall, at least, be observed while selecting external evaluator:

a. Relevance of Expertise: in the same or related fields as in the dissertation.
b. No Conflict of Interest: in personal, financial, or professional stakes in a particular decision or outcome.
c. Objectivity: capable of making unbiased evaluations.
d. Diversity: in terms of geography, culture, professional backgrounds etc.
e. Reputation: must be good in the field, with a track record of fair and thorough evaluations.
f. Availability: should have the time and availability to review the dissertation.
g. Professionalism: capable of conducting themselves in a professional and respectful manner throughout the evaluation and defense process(if applicable).
h. Communication: capable of providing clear and constructive feedback on the dissertation.
i. Confidentiality: capable of maintaining confidentiality and protecting the intellectual property of the dissertation.
j. Compatibility: well-versed with the research methodology, approach, and theories used in the dissertation.

Fee Structure for PhD Program at NFC IET

First Semester		Second Semester	Third Semester and Onward Semesters
At the Time of Admission			
Admission Fee Once in a Session	15,000.00	-	-
Registration Fee Once in a Session	2,000.00	-	-
Processing Fee Once in a Session	2,000.00	-	-
Functions Once in a Session	6,000.00	-	-
Welfare Trust Contribution Once in a Session	2,000.00	-	-
Utilities	-	8,000.00	8,000.00
Internet	-	2,000.00	2,000.00
Tuition Fee	63,000.00	63,000.00	56,000.00
Examination Fee	5,000.00	5,000.00	-
Caution Money (Refundable)	10,000.00	-	-
Grant Total	**105,000.00**	**78,000.00**	**64,000.00**
Comprehensive Examination Fee	-	-	4,000.00
Research Proposal Defense Fee	-	-	50,000.00
Thesis Evaluation Fee	-	-	1,000 USD

Faculty: 25% Rebate in Tuition Fee & Admission Fee
Employee Son/Daughter: 50% Rebate in Tuition Fee & Admission Fee
Alumni: 15% Rebate in Tuition Fee & 100 % in Registration Fee

Admission Schedule for MS & PhD Program

(a)	Last date for Receipt of Application Form with dues	08.09.2025
(b)	Entry Test	21.09.2025
©	Interview	24.09.2025 to 28.09.2025
(d)	Display of Merit List	10.10.2024
(e)	Commencement of Class Work	19.10.2024

Email: admission@nfciet.edu.pk

WhatsApp: 0319-666 5706

Hostel Charges for MS & PhD Students

Hostel Fee for one year allotment will be 22,250/- PKR as mentioned below:

(a)	Room Rent (per resident per year)	Rs.	14,400
(b)	Electricity charges (per resident per year)	Rs.	4,800
(C)	Housekeeping Charges (per resident per year)	Rs.	1,700
(d)	Maintenance/Breakage	Rs.	250
(e)	Security	Rs.	700
(f)	Hostel Resident Card	Rs.	100
(g)	Generator Fuel Charges	Rs.	300
	Total:	**Rs.**	**22,250**

CHECK LIST OF

Documents to be attached with the Application Form

1. Attested photocopy of Matric/Equivalent Certificate ☐
2. Attested photocopy of F.Sc./Equivalent Certificate. ☐
3. Attested photocopy of B.Sc./Equivalent Certificate. ☐
4. Recent Passport Size Photograph (3 Nos.) with your name and Form No. on the back of photo. ☐
5. Medical Certificate from a Registered Medical Practitioner declaring the Candidate Fit (physically & mentally) for the course. ☐
6. Attested photocopy of Hafiz-e-Quran Certificate ☐
7. **NOC from employer/organization in case of any employment.** ☐
8. Attested copy of Entry Test Result ☐
9. Attested copy of PEC Registration (applicable only for Engineer) ☐
10. Attested copy of GAT(General)/(Subject) ☐
11. Original Migration Certificate
12. Undertaking on Stamp Paper of worth Rs.50/- ☐
13. Two Academic Reference Letters ☐