Graduate School of
Science & Engineering

Graduate School of Science and Engineering (GSSE)

Research Oriented Programs at GSSE
- PhD Computer Science
- PhD Electronic Engineering
- PhD Management Science
- MS Computer Science
- MS Electronic Engineering
- MS Financial Economics and Econometrics

Industry Oriented Programs at GSSE
- MS Software Engineering
- MS Engineering Management
- MS Management Sciences

Research Culture and Environment
GSSE is committed to the provision of quality facilities and research environment for meeting the stated objectives:
- Full-time highly qualified PhD faculty with recent publications in impact factor research journals. The publications by KIET achieved a high Impact Factor in past three years.
- Funded research projects in the area of embedded systems, signal processing, robotics, electronic devices and data mining (Rs 90 million of external research funds for the years 2012 to 2018)
- Research Fellowships for budding PhD students desirous of pursuing research in a full-time capacity
- Regular workshops on research methodologies, tools and technologies
- Accessibility to a wide range of research archives

Objectives
- To develop a culture of research where faculty and students are involved in investigation and research of the fundamental problems of industry and society
- To produce a real and measurable impact on society and industry by offering scientific and engineering solutions to their problems.
- To generate impact factor research and publish it in quality research journals
- To develop rigorous and intensive MS and PhD research degree programs
- To develop mutually beneficial industrial and academic collaborations

Supervisors

All PhD students must select their supervisor at the start of their program of studies. For MS students, college coordinators will act as their supervisors till such time that they select supervisor of their own choice.

Research Groups

Diversified research groups have been established at GSSE which are headed by mostly foreign qualified PhD faculty members. Group members meet periodically to study, discuss and thrash out relevant research publications, research ideas & proposals.

Group Title	Group Supervisor
Engineering Project Management / DOE (Design of Experiment)	Dr. Muzzaffar Mahmood
Marketing	Dr. Tariq Jalees
Signal Processing	Dr. Imran Naseem
Big Data Analytics	Dr. Khurram Nazir
Software Engg & Future Generation Computing	Dr. Khalid Khan
Embedded Systems	Dr. Husain Parvez
Devices, Circuits and Systems	Dr. Arsalan Jawed,
Smart Networks	Dr. Sameer Qazi
HR / Management	Dr. Muhammad Hanif
Finance & Banking	Dr. Manzoor Khalidi
Intelligent Mobile Robots	Dr. Muhammad Bilal Kadri
Finance	Dr. Abdullah
HR / Management	Dr. Amir Shamsi
HR / Management	Dr. Usman Aleem
Machine Learning/ Data Sciences	Dr. Khurram Junejo
Parallel and Distributed Computing	Dr. Ayaz ul Hassan Khan
Computer Network / Data Mining	Dr. M. Kamran Nishat
Internet of Things	Dr. M. Taha Jilani
Information Security	Dr. Maaz Bin Ahmed
Image and Pattern Recognition	Dr. Ghazanfar Munir
Software Architectures, Design and Testing	Mr. Ayub Latif, Mr. Sohail Imran
Cloud and Volunteer Computing	Dr. Khalid Khan

PhD Programs

Eligibility

Post graduates in Engineering or Sciences from HEC recognized institutions who meet the following criteria:

- A minimum CGPA of 3.00 on a scale of 4.00 or equivalent
- A minimum of eighteen years of schooling that corresponds to MS/M.Phil or equivalent degree from HEC recognized institutions
- Pass test / interview conducted by the Institute.
- GAT subject test conducted by the National Testing Service (NTS) in the relevant discipline is required with the minimum of 60 score
- Meet all other HEC stipulated requirements
- GSSE may stipulate prerequisite courses to be completed by applicants not meeting the relevant academic requirements

PhD Degree Requirements

On acceptance in the PhD program, a Doctoral Committee consisting of the primary supervisor and two other members is constituted to supervise the research and to ensure compliance to the HEC requirements. At least one member of the committee may have expertise in some other area of specialization. PhD students require a minimum of 48 credit hours to complete the PhD degree requirements:

- PhD course work consists of passing six graduate level courses (18 credit hours) with a minimum cumulative GPA of 3.0
- Dissertation work requirements consist of a minimum of 30 credit hours of research work

In addition to credit hours' requirements, a PhD student must complete the following requirements for the award of the PhD degree:

- Pass Comprehensive Exam
- Pass PhD Proposal Defense to be approved by doctoral committee, with one external reviewer
- Acceptance or publication of at least one research paper based on the PhD research work in an HEC approved "X" category journal
- Evaluation of PhD Dissertation by two foreign faculty members from developed countries as per HEC criteria
- Appear in a formal viva - voca at examination as per HEC requirement
- Open defense of PhD dissertation
- Meet any other HEC requirement

PhD Proposal Defense

A student working towards the doctoral degree has to defend the research proposal. The proposal defense is conducted at the completion of student's course work. Advancement to candidacy is contingent on clearing the proposal defense and after qualifing comprehensive exam.

PhD Candidacy

A student after having the PhD Proposal Defense approval is formally admitted as a doctoral candidate. Doctoral candidates must continually register in Research course till they fulfill the PhD degree requirements.

PhD Dissertation

PhD dissertation is a significant contribution to knowledge based on the candidate's own investigations. It must show a mastery of the literature of the subject and be written in scientific literary form. With the approval of the doctoral Committee, GSSE office will submit the Dissertation to two foreign experts for evaluation.

Open Defence of PhD Dissertation

PhD candidate will appear in an Open Defence in which the candidate presents the Dissertation to the Doctoral Committee in which outside researchers and experts are also invited.

MS Programs

Eligibility

Graduates in Engineering, Sciences or Mathematics from HEC recognized institutions that have:

- A minimum CGPA of 2.5 on a scale of 4.00 (or overall 60% marks) or equivalent
- A minimum of sixteen years of schooling or 4 years (at least 130 credit hours) after FA/FSc in the relevant discipline from HEC recognized institutions
- Admission Test / Interview conducted by the Institute
- National Testing Service GAT General test need to be cleared with minimum 50% cumulative score
- Meet all other HEC stipulated requirements
- GSSE may stipulate prerequisite courses to be completed by applicants not meeting the relevant academic requirements

Thesis Option

Students are required to complete 30 credit hours (24 credit hours of coursework and 6 credit hours of thesis work)

- Thesis is a challenging research effort that adds value to the MS degree and distinguishes it from the degree obtained only through course work (taught MS degree)
- Thesis component of this MS degree brings it at par with international research-based MS degree programs offered in USA, and elsewhere and to the M Phil degrees offered in Pakistan
- Thesis experience is different from any other academic activity that MS students may have undertaken as part of their undergraduate or course-based MS degree

Non-thesis Option

Students are required to complete 30 credit hours of course work only.

Continuation of Graduate Studies

Continuation of registration requires students to register for at least three credit hours every regular semester (Spring and Fall).

Courses from Other Institutions

As per HEC policy, currently enrolled graduate students are allowed to take up to two graduate-level courses from other institutions however, the prior approval of the supervisor and the GSSE is to be sought.

MS/PhD - Computer Science

Graduate programs in computer science offer a wide range of courses and research venues leading to the degree of Master of Science (MS) or PhD. These programs give liberty to the students to undertake a desired route of study to match their respective interests. In particular, courses are offered in the ever emerging areas of data mining, networking, software engineering, embedded systems, digital communication and signal processing. The program is not only oriented to strengthen students' ability in the generic sense but is also targeted to deepen their understanding in one or more selected areas of computer science. Particular emphasis is placed on developing research potential, fomenting and promoting original research and professional competence in the field of specialization. The program has a broad scope in the sense that it maintains a balance between scholarly excellence and industrial relevance.

MS Computer Science
Both thesis and non-thesis options are offered for the MS degree. In strict consultation with their supervisors, students must pass ten courses (for non-thesis option), eight courses and two thesis courses (for thesis option). Students are required to take four core courses; remaining courses can be taken from the list of EE/CS graduate courses mentioned below. For thesis option they must take a minimum of six credit hours of thesis courses.

Core Courses
- Advance Algorithms Analysis
- Advance Theory of Computation
- Advance Computer Architecture
- Advance Operating System

PhD Computer Science
Students are required to pass six courses mostly from their relevant research area in strict consultation with their supervisors. Furthermore, they must take a minimum of thirty credit hours of research courses to complete their degree requirement.

Students can take relevant courses offered under various MS programs mentioned in the list of EE/CS graduate courses.

MS/PhD - Electronics Engineering

Graduate programs in electronic engineering offer a wide range of courses and research venues leading to the degree of Master of Science (MS) and PhD. These programs give liberty to the students to undertake a desired route of study to match their respective interests. In particular, courses are offered in the ever emerging areas of signal processing, embedded systems, networking, digital communication, microelectronics and applied controls.

The program is not only oriented to strengthen students' ability in the generic sense but is also targeted to deepen their understanding in one or more selected areas of electronic engineering. Particular emphasis is placed on developing research potential, fomenting and promoting original research and professional competence in the field of specialization. The program has a broad scope in the sense that it maintains a balance between scholarly excellence and industrial relevance.

MS Electronic Engineering
Both thesis and non-thesis options are offered for the MS degree. In strict consultation with their supervisors, students must pass ten (for non-thesis option), eight (for thesis option) courses. For thesis option they must take a minimum of six credit hours thesis courses.

PhD Electronic Engineering
Students are required to pass six courses mostly from their relevant research area in strict consultation with their supervisors. Furthermore, they must take a minimum of thirty credit hours of research courses to complete their degree requirement. Students can take relevant courses offered under various MS programs mentioned below or from the list of EE/CS graduate courses.

EE/CS Graduate Courses

General Courses

GC-7001	Research methods
GC-7002	Probability and Stochastic Processes
GC-7003	Applied partial differential equations
GC-6001	Independent Study - 1
GC-9004	Independent Study - 2
CS-6001	Advanced Computer Programming
CS-6002	Advanced Operating System
CS-6003	Advanced Algorithms & Complexity

Software Engg. and Future Computing

CS-6301	Ontology Engineering
CS-6302	Ubiquitous Computing
CS-6303	Grid Computing
CS-7301	Advanced Semantic Web
CS-7302	Location Based Services
CS-7303	Volunteer Computing
CS-7404	Cloud Computing

Smart Computing and Networks

CS-6501	Network Security
CS-6502	Wireless Networks
CS-6503	Design and Analysis of Protocols
CS-6504	Wireless Ad-hoc Networks
CS-6505	Wireless Sensor Networks
CS-7501	Topics in Networks Research
CS-7502	Latest Research in Network Security

Devices, circuits & systems

EE-6201	Advanced fundamentals of Semiconductors
EE-6805	CMOS VLSI design
EE-6806	CMOS Analog IC design
EE-7809	Microsystems and Smart Sensor Interfaces
EE-6204	Quantum Electronics
EE-6206	Solar cells
EE-8201	Nanoelectronics

Data Mining and Visual Analytics

CS-6401	Advance Analysis of Algorithms
CS-6402	Data Mining
CS-6403	Information Visualization
CS-6404	Advance Graph Theory
CS-6405	Graph Statistics and Metrics
CS-6406	Machine Learning
CS-6407	Information Retrieval and Text Mining
CS-7401	Graph Mining
CS-7402	Computability and Computational Complexity

Embedded System

EE-6801	Embedded Systems Design
EE-6802	Advanced Computer Architecture
EE-6803	FPGA-based Systems Design
EE-6804	Computer Arithmetic
EE-7805	Reconfigurable Computing
EE-7806	ASIC Design CAD flow
EE-7807	Formal Verification Methods

Signal Processing Research Group

EE-6101	Advanced Digital Signal Processing
EE-6102	Advanced Image Processing
EE-6103	Advanced Digital Communication
EE-6104	Multimedia Signal Processing
EE-7101	Computer Vision and Pattern Recognition
EE-7102	Detection and Estimation
EE-9101	Special topics in Signal Processing

Applied Controls and Power

EE-6701	Computer Controlled System
EE-5702	Adaptive and Self Tuning Control
EE-6703	Power Electronics System
EE-6704	Linear System Theory
EE-7705	Applied Artificial Intelligence
EE-7706	Solar Photovoltaic System
EE-9707	Advanced Digital Control
EE-7708	Advanced Process Control
EE-9709	Special Topics in Solar Photovoltaic System
EE-9710	Special Topics in Control

PhD – Management Sciences

Eligibility

a. Eligibility Requirement: 18 Years Education (MS/MPhil in relevant areas. In case of any deficiency, additional coursework may be specified by the admission committee)

b. KIET Admission Test / Interview

c. GAT subject test conducted by the National Testing Service (NTS) in the relevant discipline is required with the minimum of 60 score

Curriculum

6 Courses (18 Credit hours) + Dissertation (30 credit hours)

- Philosophy of Management Research
- Advanced Quantitative Techniques
- Elective 1
- Elective 2
- Independent Study 1
- Independent Study 2

Electives

Marketing

- International Marketing Strategy
- Quantitative Research in Marketing
- Consumer Behaviour and Marketing Strategy
- Seminar in Marketing
- Building Models for Marketing Decisions
- Structural Equation Modelling in Marketing Research

Finance

- Financial Econometrics
- Advanced Corporate Finance
- Financial Derivatives
- Risk Management
- Financial Theory and Corporate Policy Decision
- Corporate Social Responsibility

Human Resource Management

- HRM Strategic Integration and Organizational Performance
- Leadership in Organization: Theory and Practice
- Chance Management and Innovation
- Seminar in Organization Theory
- Seminar in Strategic Management
- Advanced Performance Management
- Structural Equation Modelling in HRM Research

MS – Financial Economics & Economatrics

Eligibility

a. Eligibility Requirement: 16 Years Education. (In case of any deficiency, additional coursework may be specified by the admission committee)
b. KIET Admission Test / Interview
c. GAT subject test conducted by the National Testing Service (NTS) in the relevant discipline is required with the minimum of 60 score

Curriculum

9 Courses (27 Cr. Hrs.) + 1 Thesis (6 Cr. Hrs.)
- Advanced Microeconomics (Prerequisites: ECO102)
- Advanced Macroeconomics (Prerequisites: ECO202)
- Elements of Econometrics
- Advanced Econometrics
- Advanced Research Methodology
- Mathematical Economics (Prerequisites: QT201 & QT203)
- Elective #1
- Elective #2
- Elective # 3

Electives

- Financial Econometrics
- Monetary Economics
- Financial Risk Management
- Financial Mathematics
- Financial Modelling and Forecasting
- Treasury and Funds Management
- Security Analysis
- Portfolio Analysis

- Regulation of Financial Markets
- Commodity Market Analysis
- Investment Banking
- Technical Analysis
- Behavioural Finance
- Fixed Income Securities
- Analysis of Financial Statements
- Capital Adequacy Regulations (Basel I/II/III)
- Public Finance
- Project Evaluation
- Seminar in Economic Policy

Prerequisites for Non Economists and Non Business Graduates
The number of pre-requisite courses will be decided on a case-by-case basis by the Program Director.
- ECO102: Microeconomics
- ECO202: Macroeconomics
- QT201: Advanced Business Mathematics
- QT203: Statistical Inference

MS – Software Engineering

Eligibility

a. Eligibility Requirement: 16 Years Education (BS/ MCS degree, In case of any deficiency, additional coursework may be specified by the admission committee)
b. KIET Admission Test / Interview
c. GAT subject test conducted by the National Testing Service (NTS) in the relevant discipline is required with the minimum of 60 score

Program Structure

Duration: One and half year (typical). Actual duration dependent upon:

- Student's time contribution
- Course load
- Student's performance

Scheme of studies:

- 30 Cr. Hrs. (Minimum requirement) -both thesis and non-thesis options are offered

Course Credits Distribution:

- Core Courses   4 courses (3+0) credits each;   12 Cr Hrs
- Industry Electives   2 courses (3+0) credits each;   6 Cr Hrs
- Research Electives   2 courses (3+0) credits each;   6 Cr Hrs
- Thesis   2 courses (3+0) credits each;   6 Cr Hrs

Total 30 Cr Hrs

Location: City Campus and North Nazimabad Campus

Complete List of Courses

a) Core Courses (Compulsory)

- Software Requirement Engineering
- Software Design & Development
- Software Project Management
- Software Quality Assurance

b) Open Electives

- Formal Methods of Software Engineering
- Advance Software Risk Management
- Simulation & Modeling
- Advanced Data Warehousing
- Advance Design Patterns
- Advance Distributed Systems
- Software Costing and Estimation
- Advance Software Testing
- Enterprise Services and Components
- Seminar in Software Engineering
- Advance DBMS
- Data Mining
- Volunteery Computing
- Cloud Computing
- Social Network Analysis
- Text Mining

c) Thesis

- Thesis Course #1
- Thesis Course #2

MS – Engineering Management

This program will be run by College of Engineering with the support of College of Management Sciences

Eligibility

a. Eligibility Requirement: Graduate engineer (16 years of education in case of any deficiency, additional coursework may be specified by the Admission Committee)
b. KIET Admission Test / Interview
c. GAT subject test conducted by the National Testing Service (NTS) in the relevant discipline is required with the minimum of 60 score

Program Structure

Duration: One and half year minimum and five years maximum
● MS Thesis is offered after the completion of the coursework

Scheme of studies:
● 33 Cr Hrs (Minimum)

Course Credits Distribution:
● Core Courses: 5 courses (3+0) credits each;   15 Cr Hrs
● Elective Courses: 3 courses (3+0) credits each;   9 Cr Hrs
● Independent Study   1 courses (3+0) credits each;   3 Cr Hrs
● Thesis   2 courses (3+0) credits each;   6 Cr Hrs
                                                            Total 33 Cr Hrs

Complete List of Courses

a. Core Courses (Compulsory)
● Project Evaluation & Feasability Study
● Accounting & Financial Management
● Project Management Framework and Tools
● Research Methods
● Strategic Planning & Decision Making

b. Open Electives
● Legal Issues for Engineering Managers
● Managing People and Organizations
● Operation Management
● Maintenance Management
● Supply Chain Design & Management
● B2B Marketing Management
● Total Quality Management

c. Independent Study Courses
● EM 5322 Independent Study Course #1

d. Thesis
● Thesis Phase - I
● Thesis Phase - II

Note: Open elective will be offered on discretion of the College of Engineering