The Engineering Sciences Program is an undergraduate interdisciplinary Engineering program that combines diverse scientific and technical coursework with a complementary concentration of interest resulting in a PEC (Pakistan Engineering Council) accredited Bachelor’s of Science degree awarded by Faculty of Engineering Sciences (FES) at Ghulam Ishaq Khan Institute.

This Engineering program is globally respected and is unique because it provides a broad foundation in the sciences and associated mathematics that underlie engineering and provides students ample opportunities to apply the fundamentals to real world issues and learn about state of art technologies.

Focus areas of study include, but are not limited to, electrical, mechanical, computer systems, bioengineering, and materials. Hence, Engineering Science students achieve both depth and breadth in engineering and science, are able to function across disciplines, and graduate well prepared for professional employment.
CURRICULUM

The curriculum is designed to provide a high quality and broad based coverage of multi-disciplinary Engineering. In addition to basic Engineering courses students study a number of courses related to electronics, computer science and mechanical engineering. They are also required to study general management courses. Along with above mentioned courses, students have a choice to specialize in the following modern streams:

- LASERS & Optoelectronics
- Semiconductors & Superconducting Devices
- Modeling & Simulation

During the senior year, all students also complete a thesis project that integrates the scientific principles of research, design, and analysis to solve technical challenges and design innovative Engineering solutions.

The curriculum of Engineering Sciences has some overlap with the Electronics Engineering (EE), Computer Engineering (CE) and Mechanical Engineering (ME) programs. Due to similarity of courses, Engineering Sciences graduate is a whole package any employer would want as he/she can serve at many places, handling the job perfectly.

<table>
<thead>
<tr>
<th>Phase of Degree</th>
<th>Similar to EE</th>
<th>Similar to CE</th>
<th>Similar to ME</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Degree Requirement</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Core Requirement</td>
<td>43.7%</td>
<td>29.4%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Inter Faculty Electives</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>General Management Requirement</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Overall</td>
<td>43.7%</td>
<td>29.4%</td>
<td>15.4%</td>
</tr>
</tbody>
</table>
INTERDISCIPLINARY

Major Courses at ES

Engineering Sciences aims to connect different streams under one degree program. It brings diversity by offering interdisciplinary courses from different engineering disciplines. Major courses during four-year BS Engineering Sciences at GJIK include the following.

Electronics Engineering
- Instrumentation
- Control Systems
- Cellular and Mobile Communication
- Communication Theory
- Engineering Electromagnetics
- Signals and Systems
- Microcontroller Interfacing
- Digital Logic Design
- Semiconductor Materials and Devices
- Electronics
- Computer Architecture
- Circuit Analysis I & II
- Electricity and Magnetism

Computer Engineering
- Computer Communication & Networking
- Wireless and Mobile Networks
- Computer Graphics
- System Programming
- Operating Systems
- Data Structures
- Intensive Programming
- Introduction to Computing

Mechanical Engineering
- Thermodynamics
- Fluid Mechanics
- Mechanics

Management
- Operation Management
- Project Management
- Total Quality Management
- Technology Management
- Entrepreneurship and Marketing
- Human Resource Management

Semiconductors and Superconducting Devices
- Semiconductor Devices Applications
- Solid State Electronics
- Characterization of Materials
- Magnetic and Superconducting Materials

Modeling and Simulation
- Heat Transfer Modeling
- Optimisation Modeling
- Computer Simulation Methods
- Modeling Processes

Lasers and Optoelectronics
- Optical Communication
- Optoelectronics
- Lasers and Applications
- Optical Engineering
WHY HIRE THE ES GRADUATE?

The Faculty of Engineering Sciences at Ghulam Ishaq Khan Institute produces qualified Engineers who:

- Bring to the workplace integrated knowledge of electronics, computer sciences, and industrial operations, with skills and experience in management areas.
- Are energetic and mobile, equipped with strong analytical capabilities, communication skills, business knowledge and leadership qualities.
- Are able to work across functions where research, planning, design, production, and procurement interface with marketing, operations, information technology, distribution, and management.
- Have a sufficient understanding of the ideas underlying areas such as instrumentation and control, renewable energy, communication and networking and operations research.
- Understand the structure and organization of industry and have relevant industrial experience.
- Can align and commit to the values and norms of the organization.
- Can apply their education to a diverse set of problems.
- Are knowledgeable about contemporary technological and have a capacity to adapt and facilitate the effective deployment of new technologies.
ES GRADUATES EMPLOYMENT SECTORS

A fresh graduate from the Faculty of Engineering Sciences is equipped with multi-disciplinary tools to serve in various segments of industry. Because of diversity in curriculum, graduates are able to pursue multi-functional careers in almost all industries and service sectors.

- Power and Energy
- FMCG
- Oil, Gas & Petroleum
- Pharmaceutical
- Telecommunication & Networking
- Consumer Electronics
- Information Technology
- Food and Beverage Fertilizer Industry
- Chemical Industry
- Packaging and Paper Products
- Software Houses
- Automobile
- Aviation
- Electronics, Integrated Circuits & Electrical Sector
Engineering Sciences graduates are uniquely qualified to function in a variety of employment settings and bring engineering skills to diverse business settings.

Instrumentation:
FES Graduates are responsible for research, design, development, installation, automation and maintenance of instruments and/or control systems, typically in manufacturing facilities and plants. PLC and SCADA implementation.

Industrial Operations and Supply Network
FES Graduates are involved in the technical management, supervision and control of industrial operations. Formulating policies, managing daily operations, and planning the use of materials and human resources through liaison with buyers, marketing and sales staff. Ensuring that goods and services are produced efficiently in correct amount at the right cost and level of quality.

Maintenance
FES Graduates are responsible for the continuous running of equipment and machinery. Using computerized systems to oversee routine maintenance and organize repairs. Controlling and monitoring devices to reduce the incidence of costly breakdowns and develop strategies to improve overall reliability and safety of plant, personnel and production processes.

Quality Control and Assurance
FES Graduates aim to ensure that the given product or service is fit and consistent and meets both external and internal requirements, including legal compliance and customer expectations. Monitoring and advising on the performance of the quality management system, produce data and report on performance, measuring against set standards.

Research and Development
In R&D, FES Graduates are involved in basic and applied research, product development, CAD modeling, or designing and conducting experiments to collect observable physical evidence of natural phenomena. Applying scientific knowledge in creation of new materials and electronic/electrical devices, or develop chemical and mechanical processes required for improved product formulation and manufacturing.
Information Systems and Technology Management
FES graduates design new IT solutions and incorporate new technologies to improve business efficiency and productivity; and meet the particular needs of an organization. Analyzing business challenges and provide the ICT infrastructures by contributing to organizational policy regarding quality standards and strategic planning.

IT and Business Technology Solutions
FES Graduates monitor and maintain the databases, support systems, software applications and networks of an organization. Purchase, install and configure computer systems, diagnose hardware and software faults and solve technical and applications problems. Application based programming and implementation of SAP firewalls and anti-virus packages. They also act as IT trainers.

Communication and Networking
FES Graduates work in telecommunication, internet and computing technologies, and radio while applying technical knowledge to design and deliver solutions to the challenges of network design, radio frequency optimization, mobile communications equipment, data service requirements, and internet and network signaling protocols.

Electronics and Integrated Circuits
Electronics is the technology associated with electronic circuits and systems. FES graduates use scientific knowledge of the behavior and effects of electrons to research, design, develop and test the components, devices and systems, developing the way electricity is used to control equipment.

Software and Application Development
FES graduates translate software requirements into workable programming code by writing specifications and designing, developing, debugging and maintaining applications using programming languages and development tools for use in business. Usually specialized in a specific development field - such as mobile phone applications, accounting software, office suites or graphics software - and have in-depth knowledge of at least one computer language. Also act as multimedia programmer by creating programs, user interfaces or websites that draw together multimedia features such as sound, graphics, 2D/3D modelling, animation and video, according to a designer's specification.

Operations Research
Operations research is an integral part of almost all industries and service sectors including the designing and manufacturing fields. FES Graduates examine an organization’s operations and use tools and knowledge required to design mathematical models of actual and theoretical systems, apply optimization techniques, computer simulation, softwares and other analytical approaches to provide quantitative and qualitative information that will improve managerial decision-making and development of a strategic policy.

Marketing
FES graduates are well equipped to develop marketing campaigns for promotion a product, service or idea. Planning campaigns, advertising, public relations, event organization, product development, distribution, sponsorship and research. The work is often challenging and fast-paced.

Human Resource
FES Graduates develop, advise on and implement policies relating to the effective use of personnel within an organization. Ensuring that the organization employs the right balance of staff in terms of skills and experience, and that training and development opportunities are available to employees to enhance their performance and achieve the employer's business aims.
ENGINEERING SCIENCES ALUMNI

Engineering Sciences alumni have gained high positions in national and multinationals companies across the globe. Many of them are involved in higher studies at reputed universities.

Rabail Wasif, FES
Production Engineer, Polish Oil and Gas (Islamabad)
Thinking back about GIKI only brings a smile on my face. GIKI made me a good engineer and gave my life a new meaning altogether. After graduation I briefly worked with Shell Pakistan, a job I got through the recruitment drive in GIKI. Not long after I got job offers from various oil and gas companies out of which I chose Schlumberger to work as a Field Engineer in Sindh for three years. Currently I am working as a Production Engineer for Polish Oil and Gas, based in Islamabad.

Ahsan Zaheer, FES
Research Assistant at DFKI (German Research Centre for Artificial Intelligence).
Studying from GIKI was the best decision I ever made, it transformed me for my future not just academically but in practical life as well. Being the Vice-President of MediaClub and Liaison Head for Netronix I was able to deal with real life problems during my studies. I was one of the lucky ones to have been offered multiple jobs, even before graduating; I chose to join DeNA, a technological giant in Japan. Currently I’m doing my Master’s degree from a reputable university in Germany, and I’m also working as a research assistant at DFKI.
FINAL YEAR PROJECTS

Thesis projects cover many disciplines within Engineering Sciences, and are inspired by course work, staff research interests, collaboration with companies and original concepts. These projects demonstrate the hard work and innovation that can be found within the FES Students. The projects undertaken by students this year are following:

• Portable wireless solar charges
• Design and implementation of automated vehicular mirror
• Aerodynamic design and analysis of a wind turbine blade
• Fabrication of high temperature superconducting materials and study of their parts
• Unmanned Aerial vehicle with imaging technology
• Fully automated solar energy powered motor vehicle
• Marketing optimizer a social network based demographer and marketing
• Visible light communication (VLC)
• Design and fabrication of a chip
• Design and fabrication of voltage producing glass or “smart glass”
• Phantom Autonomous Quad Copter
• Human Powered Energy Harvesting System

JOB RECRUITMENT

Every year, employers in from Pakistan and overseas hire students from FES for job placements in various functions. Ranging in size from the largest multinational, to the sole trader start up, these employers are convinced of the merits of choosing FES students and come back year after year.

INTERNSHIP PLACEMENT

Internship programs, give students an opportunity to gain relevant work experience while being enrolled in the university. Like other undergraduate degree programs, relevant work experience through internships is a central feature of education at FES. Students from the FES are required to participate in an internship program of practical training in industry or an R&D organization at the end of third year, from June to August, and submit a formal written report.
GET INVOLVED

GIK Institute’s career service office offers a comprehensive service for companies wishing to recruit graduates of the Engineering Sciences as well as providing a crucial link to students from a range of other disciplines. As an employer, you have the opportunity to reach excellent FES students and graduates through availing of the following:

Recruitment Drive
To recruit competent, highly-educated ES students and fresh graduates from relevant courses, you may wish to make presentation on-campus or even conduct interviews here. The GIK Institute’s career service office opportunities for companies to come on campus and advertise their vacancies and meet plenty of enthusiastic students.

Industrial Open House and Career Fair
Industrial Open House and Career Fair takes place every year in April. You may also participate in annual industrial career fair which will allow you to meet up to talented students and graduates. This year Industrial Open House and Career Fair will be held on 7th-8th May, 2015.

Advertising vacancies
GIKI Institute’s career office can email company information on vacancies of relevance to students and graduates directly into the mail accounts of the appropriate students.
To learn about how GIK Institute’s career office can assist you in recruiting high caliber ES graduates, please contact:

Mr. Mohsin Hassan Akhtar
Email: mhakhtar@giki.edu.pk
Phone: +92-938-271858 (2289, 2290)

Funding Student Projects
An interesting way in which companies can raise their profile among graduating students is by putting forward projects which students can work on as part of their course. Companies are also invited to provide in-house support for projects undertaken by students, or to provide financial support for projects assigned to students. There are several benefits to the company, not least of which is the opportunity to get valuable research undertaken that might not be possible within the company due to company commitments.

If you are interested in finding out more about possible collaboration with students of the FES, contact:
Mr. Naveed Ahmed Azam
Email: Naveedzm961@gmail.com
Phone: +92-938-271858 (2569)

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