



SIR SYED C@SE INSTITUTE OF TECHNOLOGY

Recognized by HEC/Federal Chartered
Degree Awarding Institute

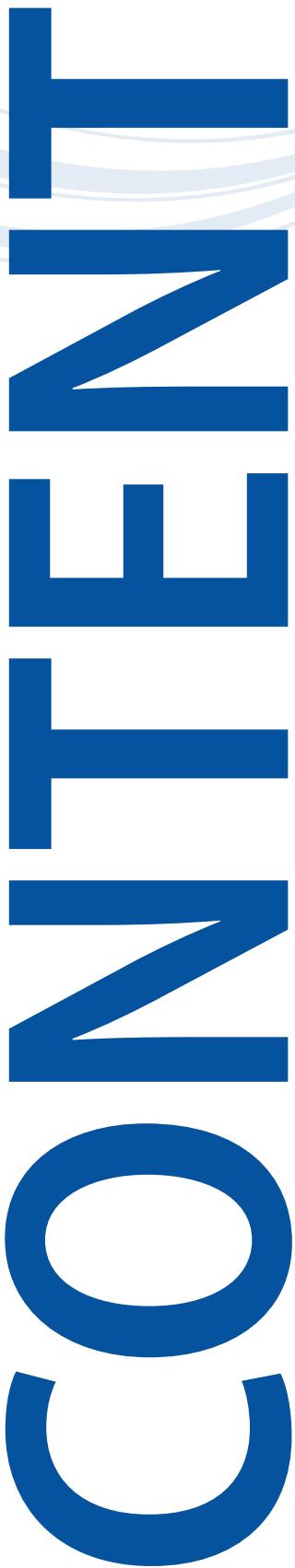


PROSPECTUS 2021

Disclaimer

This prospectus is informational and should not be taken as binding on SS-CASE-IT. Each aspect of the educational setup, from the admission procedure or criteria to the examination regulations or discipline, requires continuing review by the competent authorities.

SS-CASE-IT, therefore, reserves the right to change any rules and regulations applicable to students whenever it is deemed appropriate or necessary.



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MESSAGE FROM ENGINEERING EDUCATION TRUST

Sir Syed CASE Institute of Technology (SS-CASE-IT) is very dear to our hearts and souls. We established Engineering Education Trust (EET) in 2001 with a mandate of producing a high-quality education to our youth and practicing professionals through programs of excellence in teaching and research addressing the national needs for the development in meaningful and sustainable economy with a blend of Islamic teachings and values. As a first step, we established Center for Advanced Studies in Engineering (CASE) in 2001 in affiliation with University of Engineering & Technology Taxila. In a very short period of time, CASE made a prominent and unique position in educational and R&D institutions of Pakistan where we produced more than 3700

graduates including 70 PhDs in the area of engineering, computing, business and management at Bachelor, Masters and PhD levels.

Allah has bestowed on us His blessings to strive for this remarkable cause of disseminating knowledge and wisdom without any self-motive, financial benefits and promotions. We understand that the cause is so vital for the development of our nation that we, as a team, have always been tirelessly working with sincerity of objective, not hesitating to shed toil, tears and sweat to achieve our goals. After the tireless efforts, CASE was finally awarded the Federal Degree Awarding Charter in May, 2018 with a new name Sir Syed CASE Institute of Technology.

We are committed to provide high quality education and research to the

nation. By the grace of Allah, SS-CASE-IT is housed in its own graceful custom built campus in Sector B-17, Islamabad. We have emerged as one of the leading institute in Pakistan providing Online Education during Covid 19 Pandemic situation by developing state-of-the-art virtual class rooms. We have 15 BS, MS and PhD level programs and have also introduced in a systematic way new programs at Bachelor level in Artificial Intelligence, Cyber Security and other Computing programs while accommodating the Pre Medical students.

Once you join this institute, you become part of our family, where we share same values and strive to contribute ourselves to create knowledge based economy for the prosperity and betterment of Pakistan.

We warmly welcome the parents and their children at Sir Syed CASE Institute of Technology.



Dr. Shoab A. Khan (Chairman & Chancellor)



Mr. Mohammad Ejaz (Member)



Dr. Saeed Ur Rehman (Member)



Mr. Naveed Ullah Khan (Member)



Mr. Ghulam Murtaza Bhatti



Mr. Zawar Hussain Shah (Member)



Dr. Farrukh Kamran (Member)



Mr. Baqa Ullah (Member)

MESSAGE FROM VICE CHANCELLOR

SIR SYED CASE INSTITUTE OF TECHNOLOGY



I feel very proud to lead a team of faculty with strong industrial and research linkages, professional staff members and other foreign experts along with our bright and shining students. Since its existence in 2001, SS-CASE-IT has always been an evolving institute making it a National Center of Higher learning in Pakistan. Our faculty members secured a funding of Rs 300 million from various funding organizations in Pakistan and had been on the technological forefront. Through our unique blend with CARE PVT LTD, we have been successful to convert Research into Commercialization as per the need of Pakistan in the area of Health Care, Defense, Telecomm and Power. Our faculty members and alumni have developed various start-ups that have become the Nested Entity of SS-CASE-IT providing a source of Internships for Hi-tech training and grooming them in corporate culture. Our students get the technological edge and the flavor of Entrepreneurship during the course of their studies. We are committed to provide professional leadership training to our students so that our graduates provide a strong leadership role in companies, organizations and institutes in engineering, Computing, Artificial Intelligence, Business and Management Sciences.

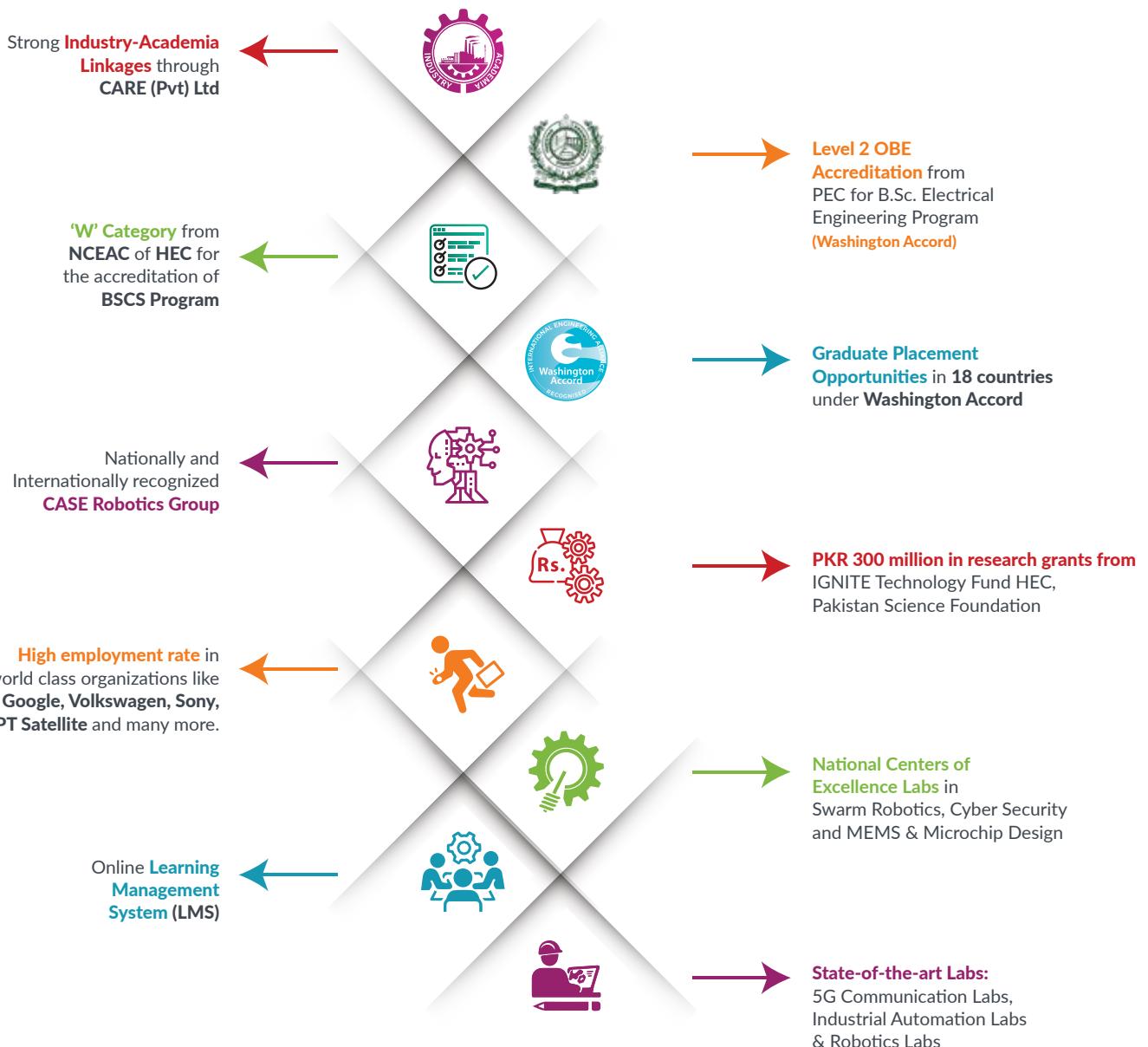
Quality education at SS-CASE-IT is depicted from the fact that we are our Electrical Engineering Program had been accredited under Washington Accord by Pakistan Engineering Council since 2015 paving path for our engineering graduate to directly enter in the job market of Technologically advanced countries. The accreditation of our Computer Science program in category 'W' from HEC is another mark of quality standard education at this Institute.

Our graduates have already taken important positions in various national and multinational organizations. There is a good number of alumni who are doing their own businesses in the area of IT, software development and other engineering and business sectors. We are determined to make this institute a place where our graduates are not only the best choice of the organizations but also develop their own products to create jobs for a knowledge based economy.

I welcome the student to our new custom built campus recently constructed in the vicinity of Margalla hills, inside a beautiful modern housing society in Islamabad.

Dr. Khawaja Shafaat Ahmad Bazaz
Vice Chancellor

BUILDING A TRADITION OF ACADEMIC AND ENTREPRENEURIAL EXCELLENCE



ABOUT SS-CASE-IT

MISSION

Provide a high-quality education to our students and practicing professionals through programs of excellence in teaching and research which will address and support to national needs for the development in meaningful and sustainable ways.

VISION

By disseminating world class Engineering & Management education, we strive to build an institution of learning where the talent is attracted, groomed and developed to take leadership positions in the world. A future of excellence and continuous improvement is our hallmark.

HISTORY

Sir Syed Center for Advanced Studies in Engineering Institute of Technology (SS-CASE-IT) became federally chartered degree awarding institute in year 2018. Providing quality higher education is not something new to SS-CASE-IT. Its history dates back to year 1998. SS-CASE-IT started its journey as an affiliated institute (CASE) with University of Engineering and Technology Taxila (UET Taxila).

In 1998, a research and development organization named Communications Enabling Technologies (CET) Pakistan was established in Rawalpindi. Soon, CET headed by Dr. Shoab Ahmed Khan (Tamgha-e-Imtiaz) attracted some of the best professionals in Pakistan. Dr. Farrukh Kamran (Tamgha-e-Imtiaz), Dr. Saeed Ur Rahman, and Dr. Sohail Naqvi (Former Executive Director, HEC) joined CET in its early days and played a key role in establishing CASE. Later, this group was joined by more outstanding professionals like Dr. Syed Ismail Shah (Ex-Chairman Pakistan Telecom Authority), Dr. Aamer Iqbal Bhatti, Dr. Amir Qayyum, Dr. Imtiaz A. Taj, Dr. Sheikh Muhammad Farhan, Saleem Ahmed Khan, Dr. Mohsin Rahmatullah, Hammad Ahmed Khan, Dr. Zaheer Ahmed and Durdana Habib. Engineering Education Trust (EET) was established in May 2001.

Center for Advanced Studies in Engineering (CASE), had been a project of not-for-profit Engineering Education Trust (EET). It was in the January of 2001 when we formally talked about establishing CASE; an institution of higher technical learning in Pakistan. We debated on its feasibility and gauged our commitment to this national cause and identified the dissemination of advanced knowledge in engineering and management to our professional engineers and scientists as the need of the hour.

UET Taxila granted affiliation of graduate program in Computer Engineering with 60 students. This led to the establishment of CASE on September 11, 2001 at Software Technology Park Islamabad. CASE was inaugurated by then the Federal Minister of Science and Technology Prof. Dr. Atta-ur-Rehman. The institute had the support of an excellent teaching faculty of 10 PhDs and 8 MScs at that time. Later the new programs were established in following order:

- Due to overwhelming demand, CASE took the initiative of establishing the department of Engineering Management in Fall 2002 headed by Dr. Ali Sajid. In that year, 192 students registered in Computer Engineering and 41 students in Engineering Management. CASE programs attracted high quality graduate students

- In 2004, CASE decided to start its undergraduate program in Electrical Engineering with financial support from CARE (PVT) Ltd and got accredited from Pakistan Engineering Council (PEC).

- In fall 2008, BBA program was started to align engineering education with business development.

- After the successful establishment of these programs, CASE gradually introduced various new programs in following years including Bachelor of Science in Computer Science, Masters in Electrical Engineering, Masters in Software Engineering, Masters in Project Management, and Masters in Management.

CASE has not only excelled in education but also on the forefront of research activities. We developed product focused research needs of our society with our partner CARE PVT Ltd providing industrial insights. CASE acquired research funding from CISCO Systems, PTCL and Ignite National Technology Fund, Ministry of IT, Government of Pakistan in last 12 years' worth of Rs 130 million.

Sir Syed CASE Institute of Technology (SS-CASE-IT): By the Grace of All Mighty Allah, Engineering Education Trust (EET) obtained the Federal charter for Sir Syed CASE Institute of Technology (SS-CASE-IT) on May 24, 2018 after tireless struggles of trustees of EET and commendable efforts of all present and past staff and faculty members of CASE.

Brig (R) Iqbal Shafiq (Late), Begum Majida Shafi, Dr Tahir Hussain (Late), Dr Fatima Farhee Rehman, and many old Aligarhians had a vision to transform CASE into Sir Syed CASE Institute of Technology to pass the message of our great leaders of Tehreek e Pakistan (Quaid e Azam, Allama Mohammad Iqbal, Sir Syed Ahmed Khan) to our youth and continue the mission of Sir Syed Ahmed Khan by spreading education in science and technology with a blend of Islamic teachings. Today, this institute is ready to achieve these goals.

CASE, therefore, has achieved a major milestone to enter into new era thus becoming a degree awarding multidisciplinary institute in Islamabad to meet the raising demand of world class university education in engineering, basic sciences and humanities on its campuses, in order to generate highly skilled and innovative young persons. SS-CASE-IT has succeeded CASE and all its programs, human resource and infrastructure are transferred in SS-CASE-IT.

WHY CHOOSE US!

SCHOLARSHIP & FINANCIAL AID

SS-CASE-IT is committed to provide scholarship to those students whose academic performance is very good during the semester. On the other hand, students with family financial crisis, SS-CASE-IT is committed to provide them financial aid in terms of the discount in their fee. In last years, we distributed Rs 20 Million among such students.

SS-CASE-IT ACADEMIC STRUCTURE

Faculties	Departments	Undergraduate Programs	Graduate Programs
Faculty of Engineering	Department of Electrical Engineering	BS Electrical Engineering BS Cyber Security	MS/PhD Electrical Engineering
	Department of Computer Sciences	BS Computer Science BS Software Engineering BS Artificial Intelligence	MS Computer Science MS Mathematics
Faculty of Business and Engineering Management	Department of Management Sciences	Bachelor of Business Administration (BBA) BS Accounting & Finance Associate Degree in Commerce (B.Com 2 years)	MS Project Management MS/PhD Engineering Management

All Bachelor Programs of Department of Computer Sciences and BS Cyber Security are offered for FSc Pre-medical Students also

SS-CASE-IT RESEARCH & FUNDING PORTFOLIO FOR 2019-20

During 2019-2021, SS-CASE-IT Researchers and Scientists attracted R&D funding worth of Rs 300 Million from HEC, Ignite National Technology Fund, Pakistan Science Foundation, NESCOM to establish various state of the art labs. These centers and labs will attract more than top 50 scientists, Ph.D. and MSc scholars, engineers, Students, technicians, professional from management and business on the development of various products of national interest in the area of defence, industrial automation, health care, banking sector and agriculture. SS-CASE-IT Students from Electrical Engineering, Computer Science and Business will have excellent opportunity of working in these labs to hone on their respective skill sets by learning from the state-of-the-art technologies through technology leaders.



NATIONAL CENTER FOR EXCELLENCE AND STATE OF THE ART LABS

NATIONAL CENTER FOR EXCELLENCE LAB IN SWARM ROBOTICS

- **Team Lead:** Dr. Mansoor Shaukat
- **Amount of Funding:** Rs 79 Million
- **Funding Agency:** HEC
- **Research & Development Activities:** To establish a scaling solution for NCRA by providing an application agnostic swarm intelligence platform. The lab is composed of three sub-labs, i.e., Swarm Intelligence Lab, Computer Vision, Artificial Intelligence Lab and Decentralized Communications Labs. The most important aspect of this lab would be to generate a generic scaling solution that would work for any kind of application that is able to benefit from a multi-agent robotic system in an optimal way. Such an undertaking will be achieved using the state-of-the-art swarm intelligence algorithms. Key Application areas are: Disaster Management, Water Quality Monitoring and Intelligent Video Surveillance.

NATIONAL CENTER FOR EXCELLENCE LAB IN MEMS AND MICROCHIP DESIGN

- **Team Lead:** Dr. Shafaat Ahmed Bazaz
- **Amount of Funding:** Rs 75 Million
- **Funding Agency:** HEC
- **Research & Development Activities:** Development of MEMS Based Micro grippers for medical applications, accelerometer and gyroscope for Inertial, Energy Harvesting and Automotive applications. In addition, development of Capacitive to Voltage circuitry, Signal processing and other associated electronics for these MEMS devices. A MEMS cell library will be created to host MEMS and Microchip designs of other Pakistani Universities thus making it a national center of Chip design.

NATIONAL CENTER FOR EXCELLENCE LAB IN CYBER SECURITY

- **Team Lead:** Dr. Najmus Siraj
- **Amount of Funding:** Rs 77 Million
- **Funding Agency:** HEC
- **Research & Development Activities:** Development of High speed security solution for both large and small enterprises. The security solution will provide packet processing and capturing speed up to 10 Gbps. The main activities carried out under the lab will include Deep packet Inspection (DPI) engine, IP data records and L7 context-aware content extraction for Next Generation Firewall (NGFW) that can be deployed at the national internet backbone.

5G AIR INTERFACE TEST-BED FOR SOFTWARE DEFINED RADIO LAB

- **Team Lead:** Dr. M. Danish Nisar
- **Amount of Funding:** Rs 26 Million
- **Funding Agency:** Ignite National Technology Fund
- **Research & Development Activities:** This Project aims to develop the first 5G Air-Interface Testbed in Pakistan. We will be implementing the advanced 5G communication techniques such as filter-bank multi-carrier and massive MIMO processing on high-end digital processing platforms interfaced with 5G-capable multi-antenna RF front-ends. The 5G-SDR project not only instills the passion of applied 5G research in the undergraduate and post-graduate students at SS-CASE-IT, but also in collaboration with CARE – the industrial partner, packages it into a commercially sellable tactical communication waveform for the national and regional defense forces.

DEVELOPMENT OF AUTOMATIC SYRINGE PUMPS FOR INTRAVENOUS INFUSIONS OF COVID-19 PATIENTS IN ICU

- **Team Lead:** Dr Muhammad Umar and Dr Shafaat Ahmed Bazaz
- **Amount of Funding:** Rs 3.0 Million
- **Funding Agency:** Pakistan Science Foundation
- **Development Activities:** We indigenously develop automatic syringe pumps which are not only in low cost but also readily available to the hospitals for Covid-19 patients. These pumps are since integral part of ICU, so can also be used to treat other patients also. These syringe pumps will be developed as per the international safety standards. The dual channel automatic syringe pump prototype will be developed in collaborations CARE PVT. LIMITED. Once approved by the by Drug and Regulatory Authority Pakistan (DRAP), the syringe pumps will be ready for mass production in collaboration with the CARE PVT. LIMITED organization.

Sir Syed **C@SE** Institute of Technology

has so far **Graduated**

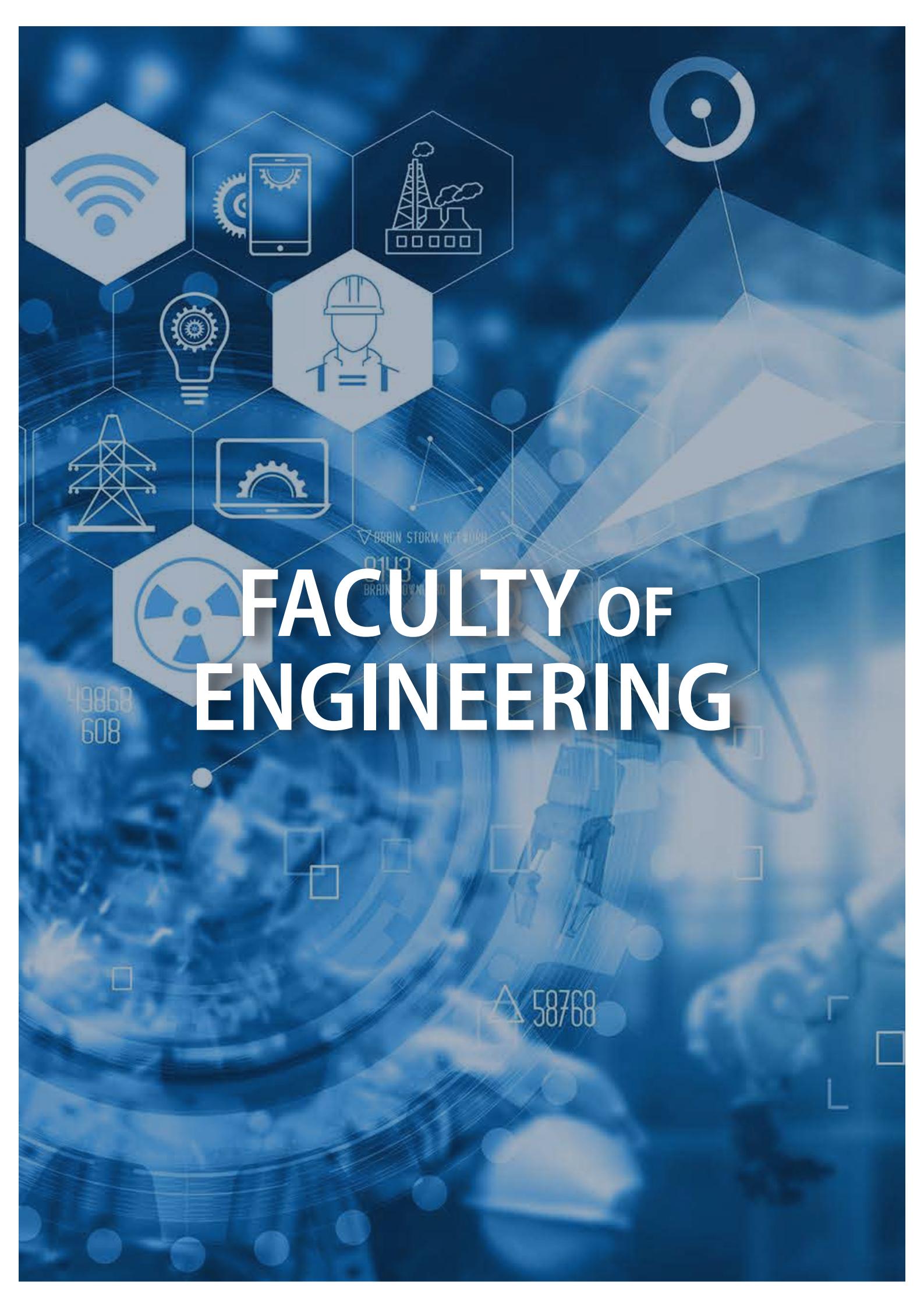


70
PHD DEGREES

2100
MASTERS DEGREES

1550
BACHELORS DEGREES





FACULTY OF ENGINEERING

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608

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DEPARTMENT OF ELECTRICAL ENGINEERING

MISSION STATEMENT

- 1- Provide a high-quality education in electrical engineering, leadership and teamwork skills, the values of commitment to quality, ethical behavior, and respect for others.
- 2- Allow students to create new knowledge and solve real world problems via innovative research, and disseminate this information for the benefit of society.
- 3- Allow the students to engage in effective regional, national or international service and outreach.

DEPARTMENT OFFERS THE FOLLOWING DEGREE PROGRAMS

- Bachelor of Science in Electrical Engineering (BSEE)
- Bachelor of Science in Cyber Security (BSCYS)
- Master of Science in Electrical Engineering (MSEE)
- Doctor of Philosophy in Electrical Engineering (PhD EE)

INTRODUCTION TO BSEE

The Electrical Engineering Program at SS CASE IT has an exceptional blend of theoretical research and extensive practical training to mold students into skillful professionals ready to take up real world challenges in the industry. A strong curriculum is offered by highly qualified engineering faculty with reputable accomplishments in research, academic publications and industrial projects.

Our Electrical Engineering Program is the first Electrical Engineering Program in Pakistan to receive Level 2 Accreditation from Pakistan Engineering Council (PEC) under the new OBE Accreditation System. PEC also has the signatory status for the Washington Accord. Washington Accord is an international agreement among bodies responsible for reciprocal accreditation of engineering degree programs. Among the signatories are Australia, Canada, Japan, Malaysia, Russia, Singapore, South Africa, UK and USA. Graduates of our BSEE Program can directly apply for jobs in these countries.

KEEPING IN LINE WITH THE RECENT AND UPCOMING TRENDS IN TECHNOLOGY, THE BS ELECTRICAL ENGINEERING IS ALSO FOCUSING ON THESE EMERGING TRENDS:

- Computer Engineering specialization now offers extensive courses on Artificial Intelligence, Machine Learning, Autonomous Robots and Cyber security as well as courses related to Internet of Things (IoT).
- The Telecommunication specialization has been reinforced with course offerings focusing on Internet of Things (IoT) communications and intelligent communication systems.
- The Electronic Specialization will also be offering courses targeted for VLSI, MEMS Design and Prototyping.
- Power Engineering Specialization offers courses on Power Generation, Power Transmission, Power Distribution and Utilization, Smart Power Grids, Renewable Energy Systems, Power Electronics and Industrial Drives.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The educational objectives of the Bachelor of Science in Electrical Engineering program are to graduate students who have the following attributes five years after their graduation:

- 1- The graduates are competent to solve technical problems using engineering principles, tools and practices in an ethical and responsible manner.
- 2- The graduates are able to think critically and creatively, especially about the use of technology to address local and global problems.
- 3- The graduates are able to communicate effectively and have the necessary skills to lead and engage in a globally competitive world.
- 4- The graduates are able to utilize formal and informal learning opportunities to maintain and enhance technical, personal and professional growth.

PROGRAM LEARNING OUTCOMES (PLOs)

The list of PLOs for the Bachelor of Science in Electrical Engineering Program is:

Engineering Knowledge:

An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

Problem Analysis:

An ability to identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

Design/Development of Solutions:

An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

Investigation:

An ability to investigate complex engineering problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.

Modern Tool Usage:

An ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations.

The Engineer and Society:

An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solution to complex engineering problems.

Environment and Sustainability:

An ability to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

Individual and Team Work:

An ability to work effectively, as an individual or in a team, on multifaceted and /or multi-disciplinary settings.

Communication:

An ability to communicate effectively, orally as well as in writing on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project Management:

An ability to demonstrate management skills and apply engineering principles to one's own work, as a member and/or leader in a team, to manage projects in a multi-disciplinary environment.

Lifelong Learning:

An ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING (BSEE)

Eligibility Criteria

The admission criteria for Students intake is set as per requirement of PEC. The minimum criteria for the eligibility of the entering student are

1. The candidate must have passed the Higher Secondary School Certificate (HSSC) (Pre-Engineering) Examination with Chemistry, Mathematics and Physics with at least 60% marks from a recognized Board of Intermediate and Secondary Education of Pakistan or an equivalent examination as recognized by IBCC.
2. All foreign equivalent examinations like Cambridge Overseas Higher School Certificate Advanced Level (with Physics, Chemistry and Mathematics), British General Certificate of Education (Ad Level with Physics, Chemistry and Mathematics), American High School Graduation Diploma (HSG Diploma) etc. must provide a certificate of equivalence with HSSC (Pre-Engineering) issued by IBCC.
3. Diploma of Associate Engineer (DAE) in the relevant discipline (Electrical/Electronic or as prescribed by PEC) from a recognized Board of Technical Education obtaining at least 60% unadjusted marks.
4. Rounding off percentage figure to make it 60% will not be considered towards eligibility. This criterion is in-line with the guidelines from Pakistan Engineering Council (PEC).



Selection Criteria

- | | |
|------------------|-----|
| • Matric | 20% |
| • HSSC/A-level | 40% |
| • Admission Test | 40% |

Duration

- Minimum: 4 Years
- Maximum: 6 Years (With One Year Extension)

Degree Requirement

To earn a Bachelor's degree in Electrical Engineering, a student must successfully complete the course work as outlined in degree plans (133 CH) including six credit hours of Senior Design Project and a Summer Internship of 6 to 8 weeks (non-credited). A student has to attain a minimum CGPA of 2.0 out of 4.0 to be eligible for the degree.



Study Plan for BSEE

Semester-I

Course Code	Title	Credit Hours	Pre-Requisite
CS1801	Introduction to Computing	1+1	FS
HU1011	Functional English	2+0	FS
MT1XXX	Inter Disciplinary Engineering Elective-I	3+0	FS
SC1101	Calculus and Analytical Geometry	3+0	FS
EE1001	Electrical Workshop	0+1	FS
SC1301	Applied Physics	3+0	FS
	Total	12+2	

Semester-II

Course Code	Title	Credit Hours	Pre-Requisite
CS1802	Programming Fundamentals	3+1	CS1801
HU1101	Islamic Ideology	2+0	FS
EE1101	Linear Circuit Analysis	3+1	SC1301
HU1012	Communication Skills	2+0	HU1011
SC1102	Differential Equations	3+0	SC1101
EE1002	Engineering Drawing	0+1	FS
	Total	13+3	

Semester-III

Course Code	Title	Credit Hours	Pre-Requisite
CS2803	Algorithms and Data Structures	3+1	CS1802
EE2102	Electric Network Analysis	3+1	EE1101
EE2401	Digital Logic Design	3+1	SPS
EE2301	Electronic Devices & Circuits	3+1	EE1101
SC2104	Complex Variables and Transforms	2+0	SC1101
	Total	14+4	

Semester-IV

Course Code	Title	Credit Hours	Pre-Requisite
EE2201	Signals and Systems	3+1	SC2104
SC2105	Multivariable Calculus	2+0	SC1101
EE2402	Introduction to Embedded Systems	3+1	EE2401
EE2103	Electrical Machines	3+1	EE1101
SC2103	Linear Algebra and Numerical Analysis	3+0	SPS
	Total	14+3	

Semester-V

Course Code	Title	Credit Hours	Pre-Requisite
EE3502	Communication Systems	3+1	EE2201
EE3XXX	Depth Elective-I	3+1	APSC
EE3XXX	Breadth Core-I	3+1	APSC
MS30XX	Management Elective-I	3+0	JS
EE3001	Probability Methods in Engineering	3+0	SC1101
	Total	15+4	

Semester-VI

Course Code	Title	Credit Hours	Pre-Requisite
EE3XXX	Breadth Core-II	3+1	APSC
EE3501	Electromagnetic Theory	3+0	SC2105
HU1102	Pakistan Studies	2+0	JS
EE3XXX	Depth Elective-II	3+1	APSC
EE3202	Linear Control Systems	3+1	EE2201
	Total	14+3	

Semester-VII

Course Code	Title	Credit Hours	Pre-Requisite
EE4901	Senior Year Design Project-I	0+2	Earned 92 Credit Hours or more
HU30XX	Social Science Elective-I	2+0	JS
EE4XXX	Depth Elective-III	3+0	APSC
MT3XXX	Inter Disciplinary Engineering Elective-II	3+1	JS
EE4XXX	Depth Elective-IV	3+1	APSC
HU3013	Technical Writing	3+0	HU1012
	Total	14+4	

Semester-VIII

Course Code	Title	Credit Hours	Pre-Requisite
EE4902	Senior Year Design Project-II	0+4	EE4901
HU30XX	Social Science Elective-II	2+0	JS
EE4XXX	Depth Elective-V	3+1	APSC
HU30XX	Social Science Elective-III	2+0	SS
MS30XX	Management Elective-II	3+0	SS
	Total	10+5	

FS = Freshman Standing, SS = Senior Standing , JS = Junior Standing, SPS = Sophomore Standing , APSC = As per specific Course

Telecommunication Engineering Electives

Breadth Core

EE3302	Electronic Circuit Design	3+1	EE2301
EE3503	Computer Communication Networks	3+1	JS

Depth Core Electives

Focus Area: Internet of Things (IoT)

EE2419	Introduction to IoT	3+1	SS
EE4519	Introduction to Security for IoT	3+0	SS
EE4521	Mobile and Cloud Computing	3+0	CS1802
EE4520	Intelligent Adhoc and Cognitive Networks	3+0	S
EE3203	Digital Signal Processing	3+0	EE2201
EE4522	Advanced Topics in IoT	3+0	SS

Focus Area: Next Generation Cellular and Wireless Networks

EE4506	Digital Communication	3+1	EE3001
EE4507	Antenna Design and Wave Propagation	3+1	EE3501
EE4511	Optical Communication	3+0	EE3502
EE4509	Wireless and Mobile Communications	3+0	EE4506
EE4510	Satellite Communication	3+0	EE3502
EE4514	Emerging Wireless Technologies and RF Planning	3+0	SS
EE4599	Advanced Topics in Telecommunications Engineering	3+0	SS

Computer Engineering Electives

Breadth Core

EE3403	Operating Systems	3+1	CS2803
EE3503	Computer Communication Networks	3+1	JS

Depth Core Electives

Focus Area: Computer Networks and Cyber Security

EE3404	Introduction to Network and Cyber Security	3+0	SS
EE4409	Network and System Programming	3+1	EE3503
EE4516	Network Protocols and Standards	3+0	EE3503
EE3414	Database Management Systems	3+1	CS2803
EE4414	Secure Software Design and Development	3+1	SS
EE4415	Malware Analysis	3+1	SS
EE4416	Cyber Law & Cyber Crime	3+0	SS
EE4498	Advanced Topics in Computer Networks and Cyber Security	3+0	SS

Focus Area: Robotics and Artificial Intelligence

EE4206	Digital Control Systems	3+1	EE3202
EE3412	Introduction to Artificial Intelligence	3+1	CS2803
EE4417	Swarm and Robotics Intelligence	3+0	SS
EE3109	Sensors and Actuators	3+0	SS
EE4418	Natural language processing	3+1	CS1802
EE4419	Real-time operating systems	3+0	EE3403
EE3203	Digital Signal Processing	3+1	EE2201
EE3413	Human Computer Interface	3+0	SS
EE3411	Digital System Design	3+1	EE2401
EE4499	Advanced Topics in Computer Engineering	3+0	SS

Electronic Engineering Electives

Course Code	Title	Credit Hours	Pre-Requisite
Breadth Core			
EE3302	Electronic Circuit Design	3+1	EE2301
EE3303	Power Electronics	3+1	EE2301
Depth Core Electives			
Focus Area: MEMS and Chip Design			
EE4304	Integrated Electronics	3+0	EE2301
EE4330	MEMS and Micromachining	3+0	SS
EE4305	Microelectronics Technology	3+0	EE2301
EE4306	Optoelectronics	3+0	EE2301
EE4307	VLSI Design	3+1	EE2301
EE4399	Advanced Topics in Electronic Engineering	3+0	SS
Focus Area: Embedded Systems			
EE4309	Introduction to Nanotechnology	3+0	SC1301
EE3104	Instrumentation and Measurements	3+1	EE1101
EE4312	Digital Electronics	3+0	EE2301
EE4310	Solid State Devices	3+0	EE2301
EE4204	Digital Control	3+1	EE3202
EE3411	Digital System Design	3+1	EE2401
EE3308	Industrial Electronics	3+1	EE3303
EE3203	Digital Signal Processing	3+1	EE2201
EE4398	Advanced Topics in Embedded Systems	3+1	EE2402
EE3307	Sensor Interfacing and Single Board Computer	3+1	SS
EE4313	IoT System Application	3+0	SS

Power Engineering Electives

Course Code	Title	Credit Hours	Pre-Requisite
Breadth Core			
EE3601	Power System Analysis	3+1	EE2301
EE3602	Power Distribution and Utilization	3+1	EE1101
Depth Core Electives			
Focus Area: MEMS and Chip Design			
EE4608	Renewable Energy Systems	3+0	EE3601
EE4610	Smart Grid	3+0	SS
EE4105	Advanced Electrical Machines	3+1	EE2103
EE4603	Power Generation	3+0	SS
EE4604	Electrical Power Transmission	3+1	SS
EE3303	Power Electronics	3+1	EE2301
EE4607	High Voltage Engineering	3+1	SS
EE3104	Instrumentation and Measurements	3+1	EE1101
EE4107	Industrial Drives	3+1	EE3601
EE4609	FACTS and HVDC Transmission	3+1	SS
EE4699	Advanced Topics in Electrical Power Engineering	3+0	SS
EE3203	Digital Signal Processing	3+1	EE2201

Social Science and Management Electives

Course Code	Title	Credit Hours	Pre-Requisite
HU3031	Professional Ethics	2+0	JS
HU3032	Sustainable Development and Environment	2+0	SS
HU3033	Ethical and Legal Dimensions of Engineering	2+0	JS
HU3034	Society and Engineer	2+0	JS
MS3051	Entrepreneurship	3+0	SS
MS3052	Introduction to Engineering Project Management	3+0	JS
MS3053	Total Quality Management	3+0	SS
MS3054	Critical Thinking and Leadership	3+0	JS

Inter Disciplinary Engineering Electives

Course Code	Title	Credit Hours	Pre-Requisite
SE4420	Machine Learning	3+1	SS
SE3401	Mobile and Web Development	3+1	CS1802
SE3801	Ethical Hacking	3+1	SS
ME2102	Introduction to Robotics	3+0	SS
ME1101	Mechanics	3+0	FS
ME2201	Thermodynamics	3+0	FS
CE1101	Strength of Material	3+0	FS
ME3103	Industrial Automation	3+1	JS
CE2301	Hydraulics	3+0	JS

BACHELOR OF SCIENCE IN CYBER SECURITY (BSCYS)

Introduction to BS Cyber Security

As Organizations and businesses across all domains increase their online and network footprint, Cyber threats are becoming more critical than ever before. The BS Cyber Security program is designed to meet the today's business requirements while focusing on designing secure infrastructure and developing hands on experience and problem solving capabilities among students. The BS Cyber Security program offered at SS-CASE-IT has been designed as per the guideline of HEC/NCEAC to meet current needs of today's Job market in Cyber and Information Security. The program focuses on both the theoretical and practical dimensions of preparing students for software and engineering industry. In addition, the specially designed BS Cyber Security curriculum meet the changing landscape of secure computing, which involves not only computers, but also network enabled devices such as smart phones, tablet devices, and Internet of Things (IoT).

Summer Training (Pass/Fail grade; NIL credits): Every student is required to participate in a summer training program and submit a formal written report during the summer of Junior Year.

Pre-Medical Students can also apply in BS Cyber Security

National Computing Education & Accreditation Council (NCEAC) of HEC has approved the admissions in Computing programs for those students who have done intermediate education in Pre-Medical with minimum of 50% marks. The Pre Medical Students can now be admitted directly in Bachelor of Science in cyber security. They do not require to appear in Intermediate & Secondary Board to pass Part1 and Part 2 Mathematics as additional courses. These two mathematics courses will be taught during the first semester of this program.

Degree Requirements

- Minimum of 131 credit hours including a senior design project of 6 credit hours, with minimum CGPA of 2.00
- Minimum of 137 credit hours including a senior design project of 6 credit hours for pre-medical students, with minimum CGPA of 2.00.

Duration

- Minimum Duration: 4 years.
- Maximum Duration: 6 years (with 1 year extension)

THIS PROGRAM
IS ALSO OFFERED
FOR FSc, A-LEVEL
PRE-MEDICAL
STUDENTS



Study Plan for BS (Cyber Security)

Semester-I

Course Code	Course Title	Pre-Requisite	Credit for Non Medical	Credit for Medical
CS1501	Introduction to Information and Communication Technologies	FS	1+1	1+1
CS1001	Programming Fundamentals	FS	3+1	3+1
SC1001	Calculus & Analytic Geometry	FS	3+0	NA
SC1211	Applied Sciences	FS	3+0	3+0
HU1002	English Composition & Comprehension	FS	3+0	3+0
PSC1001	Pre-Mathematics-I	FS	NA	3+0
PSC1002	Pre-Mathematics-II	FS	NA	3+0
	Total		13+2	16+2

Semester II

Course Code	Course Title	Pre-Requisite	Credit for Non Medical	Credit for Medical
SC1001	Calculus & Analytic Geometry	FS	NA	3+0
CS2003	Data Structures & Algorithms	CS1001	3+1	3+1
CS1502	Digital Logic and Design	FS	3+1	3+1
SC1005	linear algebra	FS	3+0	NA
SC1004	Probability & Statistics	FS	3+0	3+0
HU1003	Communication & Presentation Skills	HU1002	3+0	3+0
	Total		15+2	15+2

Semester -III

Course Code	Course Title	Pre-Requisite	Credit for Non Medical	Credit for Medical
CS2005	Object Oriented Programming	CS1001	3+1	3+1
CS2406	Information Security	SPS	3+0	3+0
CS2503	Computer Org. & Assembly Language	CS1502	3+1	3+1
CS2201	Introduction to Database Systems	SPS	3+1	3+1
CS2301	Discrete Structures	SPS	3+0	3+0
	Total		15+3	15+3

Semester - IV

Course Code	Course Title	Pre-Requisite	Credit for Non Medical	Credit for Medical
CS2401	Computer Communication and Networks	JS	3+1	3+1
HU2101	Islamic ideology	SPS	2+0	2+0
SC2003	Differential equations	SC1001	3+0	3+0
CY2801	Introduction to Cyber Security	CS2406	3+0	3+0
SC1005	linear algebra	FS	NA	3+0
CS2008	CYS Elective-1	APSC	3+0	3+0
	Total		14+1	17+1

Semester - V

Course Code	Course Title	Pre-Requisite	Credit for Non Medical	Credit for Medical
SE2101	Software Engineering	SPS	3+0	3+0
CS2303	Artificial Intelligence	CS2003	3+1	3+1
CY3816	Information Assurance	SPS	3+0	3+0
CS2005	Design & Analysis of Algorithms	CS2003	3+0	3+0
CS3504	Operating System	CS2003	3+1	3+1
	Total		15+2	15+2

Semester - VI

Course Code	Course Title	Pre-Requisite	Credit for Non Medical	Credit for Medical
CS3407	CYSElective-2	APSC	2+1	2+1
CY3802	Network Security	CY2801	2+1	2+1
	UniversityElective-1	APSC	3+0	3+0
CY3817	Secure Software Design and Dev.	CY2801	2+1	2+1
CY3818	Vulnerability Assessment &Reverse Engg.	CY2801	2+1	2+1
HU4004	Technical & Business Writing	HU1003	3+0	3+0
	Total		14+4	14+4

Semester - VII

Course Code	Course Title	Pre-Requisite	Credit for Non Medical	Credit for Medical
CY4111	Final Year Project - I	SS	0+2	0+2
	CYSElective-3	APSC	2+1	2+1
HU3102	Pakistan Studies	SPS	2+0	2+0
CY3815	Digital Forensics	CY2801	2+1	2+1
CS4405	Parallel & Distributed Computing	CS3504, CS2005	2+1	2+1
	University Elective-2	APSC	3+0	3+0
	Total		11+5	11+5

Semester - VIII

Course Code	Course Title	Pre-Requisite	Credit for Non Medical	Credit for Medical
CY4112	Final Year Project - II	CY4111	0+4	0+4
	CYSElective-4	APSC	3+0	3+0
	UniversityElective-3	APSC	2+0	2+0
	CYSElective-5	APSC	2+1	2+1
	UniversityElective-4	APSC	3+0	3+0
	Total		10+5	10+5

FS = Freshman Standing, SS = Senior Standing , JS = Junior Standing, SPS = Sophomore Standing , APSC = As per specific Course

BS Cyber Security Electives (Must be any five courses)

Course Code	Course Name	Pre-Requisite	Course Code	Course Name	Pre-Requisite
CY3706	Cyber Security for smart cities	SS	CY3803	Network Protocols and Standards	CS2401
CY2702	Embedded Systems	CY2701	CY3804	Network and System programming	CS2401
CY2801	Web Engineering		CY3806	Cloud computing Security	CY2805
CY3901	Wireless and Mobile communication	JS	CY3807	Security in Big data	CS2201
CY3902	Intelligent Adhoc and Cognitive Networks	CY3901	CY3808	Penetration Testing / ethical hacking	CY2801
CY3903	Wireless and Mobile Security	CY3901	CY3809	Cyber Law & Cyber Crime (Cyber Warfare)	CY2801
CY2802	Mobile Computing	SS	CY3810	Cryptanalysis	CS2406
CY2703	Computer Architecture	CS1502	CY3811	Health care security	SS
CY2704	Advance Digital Logic Design	CS1502	CY3712	Hardware Security	SS
CY2805	Cloud Computing	SS	CY3711	Industrial System Security	CY2702
CY2707	Introduction to IoT	SS	CY3710	Control System Security	CY2709
CY2709	Control System	SS	CY3812	Advanced Topics in Cyber Security I	SS
CY3708	Introduction to Security for IoT	CY2805	CY3813	Advanced Topics in Cyber Security II	SS
CY3705	Embedded Systems Security	CY2702	CY3814	Malware Analysis	SS

University Electives (Select any 4 Courses from the following List)

Course Code	Course Name	Course Code	Course Name
MS3801	Entrepreneurship & Technology	MS3811	Quality Control and Engineering Standards
MS3802	Quality Improvement Tools and Methods	MS3812	Quality Assurance and Management Systems
MS3803	Leadership & Team Management	MS3813	Quality Improvement Tools and Methods
MS3804	Total Quality Management	HU3201	Psychology
MS3805	Project Scheduling and Costing	HU3202	Life Science
MS3806	Production and Operation Management	HU3203	Philosophy
MS3808	Human Resource Management	MS3820	Financial Accounting
MS3809	Marketing	MS3821	Financial Management
MS3810	Economics	EE1001	Electronics

GRADUATE PROGRAMS IN ELECTRICAL POST ENGINEERING

The following postgraduate programs are being offered in Electrical and Computer Engineering Department:

- Master of Science in Electrical Engineering (MSEE)
- Doctor of Philosophy in Electrical Engineering (PhD EE)

The Department of Electrical and Computer Engineering has the pride of winning multiple grants from HEC and ICT R&D in multiple areas for development of research labs. They include

- MEMS (Micro Electromechanical Systems)
- Cyber Security
- Artificial Intelligence and Robotics
- 5G Test Bed Development

These research labs will enable our students to perform high level research in cutting edge technologies. Our post graduate programs have been geared to maximize the utilization of these labs by offering courses around the research themes being followed in these labs.

Our students will benefit in learning state of the art technologies from faculty members renowned for their research in these areas specifically.



MS AND PHD PROGRAMS IN ELECTRICAL ENGINEERING

We offer MS and PhD Programs in Electrical Engineering with strong foundation in theory to equip students with the skills necessary to grasp and develop new technologies and trends in the electrical engineering and allied fields. The Electrical Engineering Program at SS CASE IT is tailored to the specific needs of modern industry and R&D organizations. It encompasses areas that are in line with hi-tech industry requirements in the field. The program equips technical managers with the knowledge to remain competitive in this area. The curriculum has been designed with the aim of providing breadth and depth of knowledge in key areas that evolve with societal needs. Our faculty is also actively engaged in research and has won grants from HEC and Ignite National Technology Fund worth PKR 180 million in the areas of Robotics, Cyber Security, Chip Design, 5G Communication Technologies, and Intelligent Systems.

FOCUS RESEARCH AREAS

The Department of Electrical and Computer Engineering is offering MS and PhD in Electrical Engineering in the following research areas:

- Communication Systems and Networks
- Electrical Power and Energy Engineering
- Robotics and Control Systems
- Computer Networks and Cyber Security
- Digital Design and Embedded Systems
- Intelligent Systems

ELIGIBILITY CRITERIA

MS in Electrical Engineering	Qualification and CGPA/percentage requirement	BE/BSc/BS Engineering in relevant discipline recognized by HEC and registered with PEC or 16 years of education in relevant discipline recognized by HEC having obtained either minimum CGPA of 2.0/4.0 or First Division for annual system.
	Admission Test	As per prevalent HEC/Institute policy
PhD in Electrical and Computer Engineering	Qualification and CGPA /percentage requirement	MS/MSc/MPhil degree in the relevant discipline (Total 18 years of formal education) recognized by HEC having obtained a minimum CGPA of 3.0/4.0 or First Division on the basis of which degree is being sought.
	Admission Test	As per prevalent HEC/Institute policy

DURATION

MSEE Program:

Minimum duration for completion of MSEE degree is 1.5 years or 3 regular semesters and a maximum of 3.5 years with a maximum of 6 months extension.

PhD EE Program:

Minimum duration for completion of PhD EE degree is 3 years and a maximum of 6 years with 1 year extensions (twice).



MS DEGREE REQUIREMENTS

The student has to take three core courses from the following list of six courses:

SN	Course Code	Core Subjects
1	EE6510	Advanced Computer Networks
2	EE6201	Linear Control Systems
3	EE6501	Wireless Communications
4	EE6610	Power System Steady State Analysis
5	EE6430	Artificial Intelligence And Neural Computing
6	EE6205	Advanced Digital Signal Processing

In addition, each MS student has to select one area of specialization for which at least three courses (9 CH) of the chosen specialization need to be passed.

In general, a student has to complete a minimum of 30 credit hours' worth of courses (for non-thesis) and 24 credit hours' worth of courses and 6 credit hours of thesis work (for thesis option).

A student has to attain a minimum CGPA of 2.5 to earn the degree.

1. The students need to take:
 - a. 8 courses and a Research Thesis (Thesis Option)
 - b. 10 courses (Non-thesis option)
2. All courses carry 3 credit hours and the Research Thesis carries 6 credit hours.
3. The general structure of the MS Electrical Engineering program with thesis option is as following:

Core option 1	3 CH
Core option 2	3 CH
Core option 3	3 CH
A Mathematics Elective	3 CH
Two courses from Program Electives	6 CH
Two University Electives	6 CH
Research Thesis	6 CH

4. The general structure of the MS Electrical Engineering program with non-thesis option is as following:

Core option 1	3 CH
Core option 2	3 CH
Core option 3	3 CH
A Mathematics Elective	3 CH
Four courses from Program Electives	12 CH
Two University Electives	6 CH

PHD DEGREE REQUIREMENTS

PhD in Electrical Engineering requires the student to pass a minimum of 6 courses in any of the specializations within the department with a minimum CGPA of 3.0. In addition to courses the student is required to take a research thesis worth of at least 30 credit hours. Student is also required to publish at least one paper from the research in an HEC recognized journal.

The student may take any post graduate level course on the advice of the supervisor .

Courses offered in Electrical Engineering Program

Computer Networks and Cyber Security

Code	Course Title	Code	Course Title
EE6510	Advanced Computer Networks	EE8522	Software Defined Networks (SDN)
EE6511	Cryptography and Network Security	EE8513	Intrusion Detection and Prevention
EE6523	Computer and Network Forensics	EE8514	Vulnerability Exploitation and Defence
EE6514	IoT Network Architecture and Protocols	EE8515	Cellular and Mobile Networks Security
EE6516	Network Routing and Switching	EE8516	Malware Analysis and Reverse Engineering
EE6517	Electronic Warfare-Principles and Techniques	EE8517	Advanced Cryptography
EE6519	Computer Security	EE8518	Selected Topics in Computer Networks
EE6520	Network and System Programming	EE8519	Selected Topics in Cyber Security
EE6521	Advanced Operating System	EE8520	Selected Topics in Information Security Management
EE8503	Advanced Network Security	EE8909	MS Research Thesis
EE8504	Cloud Computing & Security	EE8999	PhD Thesis
EE8521	Simulation, Modelling, and Performance Analysis of Computer Networks		

Digital Design and Embedded Systems

Code	Course Title	Code	Course Title
EE6410	Real Time Embedded Systems	EE8414	Computer Arithmetic
EE6411	Reconfigurable Computing	EE8415	Alternative Computing Technologies
EE6415	Advanced Computer Architecture	EE8416	Digital Integrated Circuits
EE6522	Adhoc & Sensor Networks	EE8417	Advanced VLSI Design
EE8208	Statistical Signal Processing	EE8418	Advanced Digital Design
EE8410	Fault-tolerant Digital Design	EE8419	MEMS Design and Micromachining
EE8411	Parallel and Distributed Computing	EE8432	Machine Learning
EE8412	Computer Aided Design Algorithms for ASICs and FPGAs	EE8420	Advanced Topics in Computer Engineering
EE8413	System on Chip Architecture	EE8909	MS Research Thesis
EE8209	Multirate Signal Processing and Filter Banks	EE8999	PhD Thesis
EE6412	Advanced operating systems		



Communication Systems and Networks

Code	Course Title	Code	Course Title
EE6501	Wireless Communications	EE8501	Advanced Wireless Communications
EE6502	Cellular Communication Systems	EE8502	Information & Coding Theory
EE6512	Optical Communication Systems	EE8511	Software Defined Radios (SDR)
EE6513	IoT Communication Devices and Protocols	EE8512	Technology Analysis of a Smartphone
EE6503	Satellite Communication and Navigation Systems	EE8521	Simulation, Modelling, and Performance Analysis of Computer Networks
EE6515	Radar System Engineering	EE8522	Software Defined Networks (SDN)
EE6504	Cryptography and Secure Communications	EE8531	Antenna Design and Applications
EE6510	Advanced Computer Networks	EE8505	Special Topics in Communications (Contemporary Buzzwords)
EE6522	Adhoc & Sensor Networks	EE8529	Special Topics in Networking (Contemporary Buzzwords)
EE6531	RF and Microwave Engineering	EE8909	MS Research Thesis
EE6205	Advanced Digital Signal Processing	EE8999	PhD Thesis
EE8208	Statistical Signal Processing		

Electrical Power and Energy Engineering

Code	Course Title	Code	Course Title
EE6610	Power System Steady State Analysis	EE8629	Power Systems Signal Processing for Smart Grids
EE6670	Power Electronic Circuits	EE8671	Power IC Design
EE6650	Power System Protection	EE8631	Wind Energy Conversion and Grid Integration
EE6620	Power Distribution Engineering	EE8640	Distributed and Renewable Energy Systems
EE6621	Power Transmission Engineering	EE8683	Electric Power Quality
EE6651	Industrial Power System Design	EE8684	Electric and Magnetic Fields in Electric Power Engineering
EE8680	Optimization Techniques in Power Systems	EE8660	Smart Grids
EE8610	Power Systems Operation and Control	EE8685	Artificial Intelligence Tools for Power System
EE8681	Electric Power Quality	EE8690	Power System Management and Electricity Markets
EE8611	Power System Stability	EE8615	Characterization & Planning of Small-Scale Multi-Generation Systems
EE8612	Power System Planning	EE8691	Engineering, Economics and Regulation of the Electric Power Sector
EE8613	Power System Reliability and Security	EE8621	Electrical Load Management, Forecasting & Control
EE8614	Power System Dynamics	EE8600	Special Topics in Power Engineering I
EE8682	Power System Transients	EE8601	Special Topics in Power Engineering II
EE8650	High Voltage Engineering	EE8606	Special Topic in Power Electronics I
EE8620	Power Distribution Control and Automation	EE8607	Special Topic in Power Electronics II
EE8630	Electric Machinery Analysis	EE8909	MS Research Thesis
EE8670	Dynamics and Control of Electric Machine Drives	EE8999	PhD Thesis

Robotics and Control Systems

Code	Course Title	Code	Course Title
EE6201	Linear Control Systems	EE8203	Networked Control and Multi-agent Systems
EE6202	Digital Control Systems	EE8204	Artificial Intelligence for Control Engineering
EE6203	Nonlinear Systems & Control	EE8205	Deep Learning
EE6204	System Modelling and Identification	EE8206	Robust and Optimal Control Systems
EE6205	Advanced Digital Signal Processing	EE8207	Computer Vision
EE6206	Audio Signal Processing	EE8432	Machine Learning
EE6207	DSP for Controls and Power Systems	EE8210	Special Topics in Control Engineering
EE8208	Statistical Signal Processing	EE8909	MS Research Thesis
EE8201	Distributed and Autonomous Robotic Systems	EE8999	PhD Thesis
EE8202	Stochastic Control and Fault Diagnostics		

Intelligent Systems

Code	Course Title	Code	Course Title
EE6435	Foundations of Artificial Intelligence	EE6467	Probabilistic graphical models
EE6431	Introduction to Natural Language Processing	EE6468	Decision support systems
EE8432	Machine Learning	EE8419	Machine Learning for Signal Processing
EE8433	Digital Image Processing	EE8435	Pattern Recognition
EE8434	Computer Vision	EE8490	Advanced Topics in Intelligent Systems
EE8441	Data Mining	EE8436	Swarm Intelligence
EE6450	Bioinformatics	EE8909	MS Research Thesis
EE6460	Design and Analysis of Algorithms	EE8999	PhD Thesis

Mathematics based Elective Courses (COMMON TO ALL SPECIALIZATIONS)

Students have to take a minimum of one math course being offered.

Code	Course Title	Code	Course Title
SC8101	Optimization Techniques	SC6106	Real Analysis
SC6102	Integral Equations and Transforms	SC8107	Computational Linear Algebra
SC6103	Complex Analysis	SC8110	Special Topics in Mathematics
SC6104	Finite Element Methods	EE8901	Research Methodology
SC8105	Numerical Methods		

FACULTY PROFILE

Permanent Faculty:

Dr. Shafaat Ahmed Bazaz (Acting Dean and Professor)

PhD: Controls and Automation (1998), Institut National des Sciences Appliquées (INSA) Toulouse, France.

Masters: Automation, Controls and Production Engineering (1994), Université de FrancheComté, Besancon, France.

BS: Avionics (1989), NED University Karachi.

Specialization: Micro electromechanical Systems(MEMS), Hospital Management and Intelligent Diagnostic System, Tele-Medicine Systems, Development of MEMS based Inertial Sensors, NeuralProbes for Brain Implants, Micro Grippers for biomedical applications

Dr. Noaman A. Khan (Chairman)

Associate Professor PhD: Electronic & Electrical Engineering (1996), University of Strathclyde, Glasgow, UK

BSc: Electrical Engineering (1986) NWFP UET,Peshawar

Specialization: Digital Signal Processing

Research Areas: Radar Signal Processing, Filter Design and Implementation, Biomedical Signal and Image Processing.

Engr. Mian Jehanzeb (Head of Department)

Assistant Professor

MSc: Wireless Communication, Brunel University, UK

BSc: Electrical Engineering, COMSATS, Islamabad

Specialization: Wireless Communication and Communication Systems

Dr. Abdul Khalid (Professor)

PhD & MS: Electrical Engineering (1995, 1992)Georgia Institute of Technology, USA

BSc: Electrical Engineering (Hons) (1990) UET,Peshawar

Specialization: Power Systems and Control

Research Areas: Utility Planning, Dynamic Security Control and Optimization of Large Scale Systems. Control Applications.

Dr. Saeed-ur-Rehman

Professor, Trustee EET

PhD & MS: Electrical Engineering (1996, 1993)Georgia Institute of Technology, USA

BSc: Electrical Engineering (1989), UET, Lahore

Specialization: Control Systems

Research Areas: Control System, Digital System Design and Real-Time Embedded Systems

Dr. Farrukh Kamran (Professor, Trustee EET)

PhD & MS: Electrical Engineering (1995, 1992)Georgia Institute of Technology, USA

BSc: Electrical Engineering, UET, Lahore Specialization: Electronics/ Digital System Design

Research Areas: Power Electronics, NetworkingCommunication& Control Systems

Dr. Danish M. Nisar (Associate Professor)

PhD: Electrical and Communication Engineering, TUMunich, Germany

MS: Communication Engineering, TU Munich,Germany.

BE: Electrical Telecommunication, NUST, Islamabad

Research Areas: Signal processing for communications, Optimization and Robust optimization, Cooperative Communications, Massive MIMO, Interference coordination and suppression, Design and simulation of advanced wireless systems (4G, 5G) physical layer

Dr. A. Mahmood (Associate Professor)

PhD: Control Systems, University of Arkansas, USA

MS: Applied Mathematics, University of Arkansas, USA

BSc: Electronic Engineering, GIK Institute, Topi

Research Areas: Biomechanical models, Dynamicalsystems, Robust and optimal control systems, Bond graph modeling & simulation, intelligent control systems, Active vibration control

Dr. Muhammad Saleem (Assistant Professor)

PhD: Mathematics, CIIT, Islamabad **MS:** Mathematics,CIIT, Islamabad

MSc: Applied Mathematics, University of Punjab, Lahore

Research Areas: Methods in Computational Fluid Dynamics

Dr Malik Najms Siraj (Assistant Professor)

PhD: Computer Engineering, CASE, Islamabad

MSc: Computer Engineering, CASE, Islamabad

BSc: Electrical Engineering, CASE, Islamabad

Specialization: Digital Design and Computer Architecture

Engr. Muhammad Ishaq (Sr. Lecturer)

MSc: Computer Engineering, CASE, Islamabad

BSc: Electrical Engineering, UCET, Mirpur

Specialization: Electronics, Linear & Nonlinear Control Systems

Engr. Hafiz Muhammad Ahmad (Senior Lecturer)
MS: Electrical Engineering, CASE, Islamabad
BSc: Electrical Engineering, CASE, Islamabad
Specialization: Digital Signal Processing, Signals & Systems

Ms. Summayya Jamal (Senior Lecturer)
MSc: (Mathematics), Quaid-i-Azam University, Islamabad
Specialization: Computational Mathematics

Mr. Muhammad Saeed Akbar (Lecturer)
LLB: Law, University of Peshawar, Peshawar
MA: Islamyat, University of Peshawar, Peshawar
Specialization: Islamyat and Pakistan Studies

Engr. Muhammad Ejaz Naveed (Lecturer)
MS: Electrical Engineering, CASE, Islamabad
BSc: Electrical Engineering, UET, Taxila
Specialization: Electrical Machines, Power Electronics

Engr. Sana Ata Qureshi (Junior Lecturer)
MS: Electrical Engineering, CASE, Islamabad
BSc: Electrical Engineering, CASE, Islamabad
Specialization:
Engineering Drawing, Computer Architecture

Lab Engineers:
• Engr. Safdar Munir
• Engr. UnbulBanin

On Study Leave
Engr. Waqas Hassan (Lecturer)
MS: Electrical Engineering, CASE, Islamabad
BSc: Electrical Engineering, CASE, Islamabad
Specialization:
Power Electronics Circuits, Electrical Energy& Control

Adjunct Faculty:

- Dr. Tahir Zaidi
- Dr. Zaheer Ahmed
- Dr. M. MohsinRehmatullah
- Dr. Sheikh M. Farhan
- Dr. Syed Ismail Shah
- Dr. Aamer Iqbal Bhatti
- Dr. Muhammad Qaisar Shafi
- Dr. Aneesullah



DEPARTMENT OF COMPUTER SCIENCE

Mission Statement

Prepare Future Computer Scientist to achieve excellence in the core competencies of computer science that enable them to effectively develop software solutions for challenges faced in industry and research with highest level of integrity.

Department offers the following degree program:

- Bachelor of Science in Computer Science (BSCS)
- Bachelor of Science in Software Engineering (BSSE)
- Bachelor of Science in Artificial Intelligence (BSAI)
- Master of Science in Computer Science (MSCS)
- Master of Science in Mathematics (MS MATHEMATICS)

Pre medical students can also apply for undergraduate programs.

Accreditation of BSCS from HEC

- Accreditation from National Computing Education Accreditation Council (NCEAC)
Category X for two years (2011-2012) Category W for three years (2013-2015) Category W for three years (2016-2018)

FSc, A Level or Equivalent Premedical Students can also apply in Bachelors Programs

National Computing Education & Accreditation Council (NCEAC) of HEC has approved the admissions in Computing programs for those students who have done intermediate education (FSC, A Level or equivalent in Pre-Medical) with minimum of 50% marks.

The Pre Medical Students can now be admitted directly in Bachelor of Science in Computer Science/ Artificial Intelligence /Software Engineering as per their choice/merit. The Pre Medical students do not require to appear in Intermediate & Secondary Board to pass Part1 and Part 2 Mathematics as additional courses. These two mathematics courses will be taught in the first semester of these three degree Programs.

Career Benefits for Pre Medical Students

Students with Pre-Medical background have large no of career opportunities in main stream computing. But in addition, they can also explore their careers in Diagnostics of disease through Medical Imaging and Artificial Intelligence, Genomics and Genetics Sciences, Laboratory Computing, Hospital Information Systems, Computer Assisted Therapy, Virus Patterns like Corona family of viruses, Clinical Computing, Bioinformatics Systems etc.

Programme Learning Outcomes (PLOs)

1. **Academic Education:** To prepare graduates as computing professionals.
2. **Knowledge for Solving Computing Problems:** Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the 16 abstractions and conceptualization of computing models from defined problems and requirements.
3. **Problem Analysis:** Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.
4. **Design/ Development of Solutions:** Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental.
5. **Modern Tool Usage:** Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.
6. **Individual and Team Work:** Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.
7. **Communication:** Communicate effectively with the computing community and with society at large about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
8. **Computing Professionalism and Society:** Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.
9. **Ethics:** Understand and commit to professional ethics, responsibilities, and norms of professional computing practice.
10. **Life-long Learning:** Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional.

BACHELOR OF SCIENCE IN COMPUTER SCIENCE (BSCS)

Introduction to BSCS

The program focuses on encouraging students to develop and use abstract models in addition to applying the respective technologies in practical situations. This program focuses on establishing a strong mathematical foundation, basic aspects of computing, and advanced technical electives covering areas like Intelligent Systems, Software Engineering & Net Centric, Data Sciences, Information Security, E-commerce and Biomedical.

Special emphasis is placed on developing project management, business development and communication skills so that the graduates are able to lead and develop the software industry with excellent entrepreneurship knowledge. The program is dynamic and flexible enough to align with the latest scientific and technological developments in the field. The courses are tailored according to international standards to nurture capacity building and original thinking in our graduates.

Summer Training (Pass/Fail grade; NIL credits): Every student is required to participate in a summer training program and submit a formal written report during the summer of Junior Year.

Degree Requirements

- Minimum of 131 credit hours including a senior design project of 6 credit hours, with minimum CGPA of 2.00
- Minimum of 137 credit hours including a senior design project of 6 credit hours for pre-medical students, with minimum CGPA of 2.00.

Duration

- Minimum Duration: 4 years.
- Maximum Duration: 6 years (with 1 year extension)

Pre medical
students can also
apply for
undergraduate
programs.



Semester-I:**Study Plan for BSCS**

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
SC1201	Applied Physics	FS	3+0	3+0
SC1001	Calculus & Analytic Geometry	FS	3+0	N/A
HU1002	English Composition & Comprehension	FS	3+0	3+0
CS1501	Introduction to Information and Communication Technologies	FS	1+1	1+1
CS1001	Programming Fundamentals	FS	3+1	3+1
PSC1001	Pre-Mathematics-I	FS	N/A	3+0
PSC1002	Pre-Mathematics-II	FS	N/A	3+0
	Total	FS	13+2	16+2

Semester-II:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
HU1003	Communication & Presentation Skills	FS	3+0	3+0
CS1502	Digital Logic and Design	FS	3+1	3+1
HU1101	Islamic Studies	FS	2+0	2+0
SC1002	Multivariate Calculus	SC1001	2+0	N/A
HU1102	Pakistan Studies	FS	2+0	N/A
CS2301	Discrete Structures	FS	N/A	3+0
CS1002	Programming Techniques	CS1001	1+1	1+1
SC1001	Calculus & Analytic Geometry	FS	N/A	3+0
	Total		13+2	15+2

Semester-III:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
CS2503	Computer Organization & Assembly Language	SPM	3+1	3+1
CS2003	Data Structure and Algorithms	CS1001	3+1	3+1
SC2003	Differential Equations	SC1001	3+0	3+0
HU1102	Pakistan Studies	FS	N/A	2+0
CS2301	Discrete Structures	FS	3+0	N/A
SC1002	Multivariate Calculus	SC1001	N/A	2+0
CS2004	Object Oriented Programming	CS1001	3+1	3+1
	Total		15+3	16+3

Semester-IV:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
	CS Elective-I	APSC	3+1	3+1
CS2201	Introduction to Database Systems	CS2003	3+1	3+1
CS2504	Operating Systems	CS2003	3+1	3+1
SC2004	Probability and statistics	SPS	3+0	3+0
CS2101	Software Engineering	SPS	3+0	3+0
	Total		15+3	15+3

Semester-V				Semester-VI			
Course Code	Course Name	Pre-Requisite	Credit Hours	Course Code	Course Name	Pre-Requisite	Credit Hours
	CS Elective – II	APSC	3+0	CS3401	Computer Communication and Networks	JS	3+1
CS4303	Artificial Intelligence	CS2003	3+1		CS Elective-IV	APSC	3+1
	CS Elective-III	APSC	3+0	SC3006	Numerical Computing	JS	2+0
CS3005	Design & Analysis of Algorithms	CS2003	3+0	HU3004	Technical & Business Writing	JS	3+0
SC3005	Linear Algebra	JS	3+0		University Elective-I	APSC	3+0
CS3302	Theory of Automata and Formal Languages	CS2301	3+0		Total		14+2
Total			18+1				

Semester-VII				Semester-VIII			
Course Code	Course Name	Pre-Requisite	Credit Hours	Course Code	Course Name	Pre-Requisite	Credit Hours
	CS Elective-V	APSC	3+0		CS Elective-VI	APSC	3+0
CS4006	Compiler Construction	CS3302	3+0	CS4406	Information Security	SS	3+0
CS4405	Parallel & Distributed Computing	CS 2504	3+0	CS4112	Senior Design Project-II	CS4111	0+4
CS4111	Senior Design Project-I	SC	0+2		University Elective- III	APSC	3+0
	University Elective-II	APSC	3+0		University Elective- IV	APSC	3+0
Total			12+2		Total		12+4

FS = Freshman Standing, **SS** = Senior Standing , **JS** = Junior Standing, **SPS** = Sophomore Standing , **APSC** = As per specific Course

Computer Science Elective Courses (Any 6 courses from following list)

Course Code	Course Name	Pre-Requisite	Course Code	Course Name	Pre-Requisite
CS2007	Visual Programming	CS1002	CS3109	Software Project Management	CS2101
CS3008	Web Engineering	CS1002	CS3110	Object Oriented Software Engineering	CS2101
CS3009	System Programming	CS2504	CS4121	Software Design Project-I	SS
CS3010	Video Game Programming	CS2004	CS4122	Software Design Project-II	CS4121
CS3011	Real-Time Programming	CS1002	CS4113	Advanced Software Engineering	CS2101
CS3012	Principles of Programming Languages	CS1002	CS4114	Computer Law	SS
CS3013	Modern Programming Language	CS1002	CS4115	Design Pattern	CS2101
CS3014	Advance Object Oriented Programming	CS2004	CS4116	Principles of Software Development	CS2101
CS2102	Software Design & Architecture	CS2101	CS2117	Business Process Engineering	SPS
CS3103	Smart Application Development	CS2004	CS2118	Formal Methods in Software Engineering	SPS
CS3104	Simulation and Modeling	SC2004	CS3119	Software Construction & Development	CS2102
CS3105	Human Computer Interaction	JS	CS3120	Software Re-Engineering	CS3119
CS3106	Game Design and Development	CS2101	CS2312	Stochastic Processes	SPS
CS3107	Software Quality Assurance	CS2101	CS2121	Software Requirements Engineering	CS2101
CS3108	Software Testing & Quality Engineering	CS2101	CS3202	Data Mining and Data Warehousing	CS2201

Course Code	Course Name	Pre-Requisite	Course Code	Course Name	Pre-Requisite
CS3203	Advanced Database	CS2201	CS3314	Biostatistics	SS
CS3204	Big Data Analytics	CS2201	CS3315	Biosensors	SS
CS3205	Distributed Database Systems	CS2201	CS3316	Proteomics	JS
CS4303	Artificial Intelligence	CS2003	CS3317	Ethical and Legal Issues in Bioinformatic	SS
CS3304	Digital Image Processing	CS2003	CS3318	Special Topics in Bioinformatics	SS
CS3305	Computer Graphics	SC3005	CS3402	Network Programming	CS3401
CS3306	Advanced Intelligent Robotics	CS4303	CS4403	Cryptography & Network Security	CS3401
CS3307	Experts Systems	CS4303	CS3404	Cloud Computing	CS3401
CS3308	Artificial Neural Network	SC2004	CS4405	Parallel & Distributed Computing	CS 2504
CS3309	Computer Vision	JS	CS4406	Information Security	SS
CS3310	Computer Animation	JS	CS3407	Mobile Computing	CS3401
CS3311	Bio Informatics	JS	CS3408	Wireless Networks	CS3401
CS3312	Bioinformatics Computing	SS	CS3409	Network Analysis and Design	CS3401
CS3313	Genomics	JS	CS3410	Special Topics in Computing	SS
			CS3423	Advanced Topics in Computing	SS

University Electives (Select any 4 Courses from the following List)

Course Code	Course Name	Course Code	Course Name
MS3801	Entrepreneurship & Technology	MS3810	Economics
MS3802	Quality Improvement Tools and Methods	MS3811	Quality Control and Engineering Standards
MS3803	Leadership & Team Management	MS3812	Quality Assurance and Management Systems
MS3804	Total Quality Management	MS3813	Quality Improvement Tools and Methods
MS3805	Project Scheduling and Costing	HU3201	Psychology
MS3806	Production and Operation Management	HU3202	Life Science
MS3807	Operation Research	HU3203	Philosophy
MS3808	Human Resource Management	MS3820	Financial Accounting
MS3809	Marketing	MS3821	Financial Management

BACHELOR OF SCIENCE IN SOFTWARE ENGINEERING (BSSE)

Introduction to BSSE

Pakistan is among the most preferred software outsourcing destination across the globe. The blooming software industry of Pakistan is providing quality services in terms of software codes and designs. Software Engineering is the engineering discipline that utilizes a systematic approach to the development, production, operation, and maintenance of software. The primary mission of Bachelor of Science in Software Engineering program is the education of students who can define, design, develop, deliver and maintain high quality software systems within resource constraints and to prepare students for careers as software engineers in industry and research.

Bachelor of Science in Software Engineering at SS CASE IT is designed while considering the current state of the art trends in the software industry. Through challenging curricula, high quality knowledge transfer and a technical emphasis, students learn and apply practices, tools, and techniques in real-world. This program is designed to produce future agents of change individuals who will lead and improve the Software Engineering related industrial and academic practices and the state of the practice in the years to come. Our faculty provides guidance and mentoring based on years of industry experience in Software Engineering and/or related disciplines. Their expertise ranges from software architecture and software process improvement to managing people and risk.

Summer Training (Pass/Fail grade; NIL credits): Every student is required to participate in a summer training program and submit a formal written report during the summer of Junior Year.

Degree Requirements

- Minimum of 131 credit hours including a senior design project of 6 credit hours, with minimum CGPA of 2.00
- Minimum of 137 credit hours including a senior design project of 6 credit hours for pre-medical students, with minimum CGPA of 2.00.

Duration

- Minimum Duration: 4 years.
- Maximum Duration: 6 years (with 1 year extension)

Pre medical students can also apply for undergraduate programs.



Study Plan for BSSE

Semester-I:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
CS1501	Introduction to Information and Communication Technologies	FS	1+1	1+1
CS1001	Programming Fundamentals	FS	3+1	3+1
SC1001	Calculus & Analytic Geometry	FS	3+0	N/A
SC1201	Applied Physics	FS	3+0	3+0
HU1002	English Composition & Comprehension	FS	3+0	3+0
PSC1001	Pre-Mathematics-I	FS	N/A	3+0
PSC1002	Pre-Mathematics-II	FS	N/A	3+0
Total			13+2	16+2

Semester-II:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
HU1003	Communication & Presentation Skills	FS	3+0	3+0
CS2301	Discrete Structures	FS	3+0	3+0
HU1101	Islamic Studies	FS	2+0	N/A
HU1102	Pakistan Studies	FS	2+0	2+0
CS1002	Programming Techniques	CS1001	1+1	1+1
SE2101	Software Engineering	FS	3+0	3+0
SC1001	Calculus & Analytic Geometry	FS	N/A	3+0
Total			14+1	15+1

Semester-III:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
CS2003	Data Structure and Algorithms	CS1001	3+1	3+1
SC2005	Linear Algebra	SPS	3+0	3+0
CS2004	Object Oriented Programming	CS1001	3+1	3+1
SE2119	Software Requirement Engineering	SE2101	3+0	3+0
	University-Elective- I	SPS	3+0	3+0
Total			15+2	15+2

Semester-IV:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
CS2201	Introduction to Database Systems	CS2003	3+1	3+1
CS2504	Operating Systems	CS2003	3+1	3+1
SC2004	Probability and statistics	SPS	3+0	3+0
SE2102	Software Design and Architecture	SE2119	2+1	2+1
	University-Elect.-II	APSC	3+0	3+0
Total			15+2	15+2

Semester-V:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
	SE-Elective-I	APSC	3+0	3+0
	SE-Elective-II	APSC	3+0	3+0
	SE-supporting-I	APSC	3+0	3+0
SE3117	Software Construction and Development	SE2102	2+1	2+1
	University Elective-III	APSC	3+0	3+0
CS3008	Web Engineering	JS	3+0	3+0
	Total		17+1	17+1

Semester-VI:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
CS3401	Computer Communication and Networks	JS	3+1	3+1
HU3106	Professional Practices	JS	3+0	3+0
	SE-Supporting-II	APSC	3+0	3+0
SE3107	Software Quality Engineering	SE2101	3+0	3+0
SE3118	Software Re Engineering	SE3117	3+0	3+0
HU3004	Technical & Business Writing	JS	3+0	3+0
	Total		18+1	18+1

Semester-VII:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
CS3105	Human Computer Interaction	JS	3+0	3+0
	SE-Elective- III	APSC	3+0	3+0
	SE-Elective-IV	APSC	3+0	3+0
SE4111	Senior Design Project-I	SS	0+2	0+2
SE3109	Software Project Management	SE2101	3+0	3+0
HU1101	Islamic Studies	FS	N/A	2+0
	Total		12+2	14+2

Semester-VIII:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
CS4406	Information Security	SS	3+0	3+0
	SE-Elective-V	APSC	3+0	3+0
SE4112	Senior Design Project-II	SE4111	0+4	0+4
	SE-Supporting-III	APSC	3+0	3+0
	University-Elective-IV	APSC	3+0	3+0
	Total		12+4	12+4

FS = Freshman Standing, **SS** = Senior Standing , **JS** = Junior Standing, **SPS** = Sophomore Standing , **APSC** = As per specific Course

Software Engineering Supporting Courses (Any 3):

Course Code	Course Name	Pre-Requisite	Course Code	Course Name	Pre-Requisite
SE2131	Business Process Engineering	FS	SE3104	Simulation and Modeling	JS
SE2132	Formal Methods in Software Engineering	FS	SE2302	Stochastic Processes	FS
SE2133	Operations Research	FS			

Software Engineering Elective Courses (Any 5 courses from following list):

Course Code	Course Name	Pre-Requisite	Course Code	Course Name	Pre-Requisite
SE3120	Agent Based Software Engineering	SE2101	CS3202	Data Mining and Data Warehousing	SE2201
SE3121	Global Software Development	SE2101	SE3203	Advanced Database	SE2201
SE3122	Software Engineering Economics	SE2101	SE3204	Big Data Analytics	SE2201
SE2123	Software Metrics	SE2101	SE3205	Distributed Database Systems	SE2201
SE2124	Topics in Software Engineering	FS	CS3304	Digital Image Processing	SE2003
CS4303	Artificial Intelligence	CS 2003	SE3305	Computer Graphics	SC2005
SE3125	Real Time Systems	JS	CS3308	Artificial Neural Network	SC 2004
SE3127	E-Commerce	JS	SE3309	Computer Vision	JS
SE3128	Information Systems Audit	JS	SE3310	Computer Animation	JS
SE3129	Management Information Systems	JS	SE3311	Bio Informatics	JS
CS2007	Visual Programming	CS 1002	CS3312	Natural Language Processing	JS
SE4121	Software Design Project-I	SS	SE3402	Network Programming	CS3401
SE4122	Software Design Project-II	SE4111	SE4403	Cryptography & Network Security	CS3401
SE3009	System Programming	SE2504	SE3404	Cloud Computing	CS3401
SE3010	Video Game Programming	CS2004	CS4405	Parallel & Distributed Computing	CS 2504
SE3011	Real-Time Programming	SE1002	SE3402	Network Programming	CS3401
SE3012	Principles of Programming Languages	SE1002	SE3407	Mobile Computing	CS3401
SE3013	Modern Programming Language	SE1002	SE3408	Wireless Networks	CS3401
SE3014	Advance Object-Oriented Programming	SE2004	SE3409	Network Analysis and Design	CS3401
SE4115	Design Pattern	SE2101	SE3410	Multimedia Communication	JS
SE4116	Principles of Software Development	SE2101	SE3407	Mobile Computing	CS3401
			SE3408	Wireless Networks	CS3401

University Electives (Select any 4 Courses from the following List)

Course Code	Course Name	Course Code	Course Name
MS3801	Entrepreneurship & Technology	MS3808	Human Resource Management
MS3802	Quality Improvement Tools and Methods	MS3809	Marketing
MS3803	Leadership & Team Management	MS3810	Economics
MS3804	Total Quality Management	MS3811	Quality Control and Engineering Standards
MS3805	Project Scheduling and Costing	MS3812	Quality Assurance and Management Systems
MS3806	Production and Operation Management	MS3813	Quality Improvement Tools and Methods

BACHELOR OF SCIENCE IN ARTIFICIAL INTELLIGENCE (BSAI)

Introduction to BSAI

The BS(AI) program gives the students an in-depth knowledge they need to transform large and complex scenarios into actionable decisions. The program and its curriculum focuses on how complex inputs such as knowledge, vision, language and huge databases can be used to make decisions to enhance human capabilities. The curriculum of the BS(AI) program includes coursework in computing, mathematics, automated reasoning, statistics, computational modelling, introduction to classical artificial intelligence languages and case studies, knowledge representation and reasoning, artificial neural networks, machine learning, natural language processing, vision and symbolic computation. The program also encourages students to take courses in ethics and social responsibility, with the opportunity to participate in long term projects in which artificial intelligence can be applied to solve problems that can change the world for the better in areas like agriculture, defence, healthcare, governance, transportation, e-commerce, finance and education.

Summer Training (Pass/Fail grade; NIL credits): Every student is required to participate in a summer training program and submit a formal written report during the summer of Junior Year.

Degree Requirements

- Minimum of 132 credit hours including a senior design project of 6 credit hours, with minimum CGPA of 2.00
- Minimum of 138 credit hours including a senior design project of 6 credit hours for pre-medical students, with minimum CGPA of 2.00.

Duration

- Minimum Duration: 4 years.
- Maximum Duration: 6 years (with 1 year extension)

Pre medical
students can also
apply for
undergraduate
programs.



Study Plan for BS (Artificial Intelligence)

Semester-I:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
CS 1501	Introduction to Information and Communication Technologies	FS	1+1	1+1
CS 1001	Programming Fundamentals	FS	3+1	3+1
SC 1001	Calculus & Analytic Geometry	FS	3+0	N/A
AI 1201	Applied Sciences	FS	3+0	3+0
HU 1002	English Composition & Comprehension	FS	3+0	3+0
PSC1001	Pre-Mathematics-I	FS	N/A	3+0
PSC1002	Pre-Mathematics-II	FS	N/A	3+0
Total			13+2	16+2

Semester-II:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
CS 1002	Programming Techniques	CS 1001	1+1	1+1
CS 2003	Data Structures & Algorithms	CS 1001	3+1	3+1
AI 1502	Digital Logic Design	FS	3+1	3+1
SC 1005	Linear Algebra	FS	3+0	N/A
SC 1004	Probability & Statistics	FS	3+0	3+0
HU1003	Communication & Presentation Skills	SC1001	3+0	3+0
SC 1001	Calculus & Analytic Geometry	FS	N/A	3+0
Total			16+3	16+3

Semester-III:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
CS 2004	Object Oriented Programming	CS 1001	3+1	3+1
AI 2007	AI Elec 1 (Ex:Advance Statistics)	SC 1004	3+0	3+0
AI 2303	Artificial Intelligence	CS 2003	3+1	3+1
CS 2301	Discrete Structures	SPS	3+0	3+0
AI 2201	Database Systems	CS 2003	3+1	3+1
Total			15+3	15+3

Semester-IV:

Course Code	Course Name	Pre-Requisite	Credits for Non-Medical	Credits for Medical
AI 2202	Machine Learning	AI 2303	3+1	3+1
AI 2503	Computer Org. & Assembly Language	SPS	3+1	3+1
SE 2101	Software Engineering	SPS	3+0	3+0
AI 2504	Differential Equations	SC 1001	3+0	3+0
AI 2203	Knowledge Representation & Reasoning	AI 2303	3+0	3+0
Total			15+2	15+2

Semester-V:

Course Code	Course Name	Pre-Requisite	Credit for Non-Medical	Credit for Medical
CS 3504	Operating System	CS 2003	3+1	3+1
AI 3204	Artificial Neural Networks	AI2303	2+1	2+1
AI 3005	Analysis Of Algorithms	CS 2003	3+0	3+0
	UnivElec 1 (Ex:Economy Related)	APSC	3+0	3+0
AI 3008	AI Elective 2. (Ex: Theory of automata/ intelligent web design and development)	APSC	3+0	3+0
SC 1005	Linear Algebra	SPS	N/A	3+0
	Total		15+1	18+1

Semester-VI:

Course Code	Course Name	Pre-Requisite	Credit for Non-Medical	Credit for Medical
HU 3101	Islamic Studies/Ethics	SPS	2+0	2+0
AI 3206	Computing vision	AI 3204	2+1	2+1
AI 3401	Computer Networks	CS 2004	3+1	3+1
AI 3207	AI Elec 3 (Ex: Data Mining)	AI 2201	2+1	2+1
AI 3208	AI Elec 4 (Ex: Deep Learning)	AI 3204	3+0	3+0
AI 3205	Natural Language Processing	AI 3204	3+0	3+0
	Total		16+2	16+2

Semester-VII:

Course Code	Course Name	Pre-Requisite	Credit for Non-Medical	Credit for Medical
AI 4111	Final Year Project-I	SS	0+2	0+2
CS 4406	Information Security	SS	3+0	3+0
	University Elective-2 (Ex: Management Rel.)	APSC	3+0	3+0
HU 4004	Technical & Business Writing	SS	3+0	3+0
AI 4405	Parallel & Distributed Computing	AI 3504	2+1	2+1
HU 3102	Pakistan Studies	SS	2+0	2+0
	Total		13+3	13+3

Semester-VIII

Course Code	Course Name	Pre-Requisite	Credit for Non-Medical	Credit for Medical
AI 4112	Final Year Project-II	AI 4111	0+4	0+4
	University Elective- 3(Ex:Management Rel.)	APSC	3+0	3+0
HU 4005	Professional Practices	SS	3+0	3+0
	University Elective- 4(Ex: Management Rel.)	APSC	3+0	3+0
	Total		9+4	9+4

FS = Freshman Standing, **SS** = Senior Standing , **JS** = Junior Standing, **SPS** = Sophomore Standing , **APSC** = As per specific Course

Artificial intelligence elective courses (Must be any four courses or 12 credit hours)

Course Code	Course Name	Pre-Requisite	Course Code	Course Name	Pre-Requisite
AI2007	Advance Statistics	SC 2004	AI 3215	Knowledge Based Systems	AI 2303
AI 2008	Theory of Automata & Formal Languages	AI 2301	AI3311	Bio Informatics	JS
AI 3008	Intelligent web design and development	AI 1001	AI3312	Bioinformatics Computing	SS
AI 3207	Data Mining	AI 2007	AI3313	Genomics	JS
AI 3208	Deep Learning	AI 5204	AI3314	Biostatistics	SS
AI 3209	Speech Processing	AI 5204	AI3315	Biosensors	SS
AI 3210	Reinforcements Learning	AI 5202	AI3317	Ethical and Legal Issues in Bioinformatics	SS
AI 3211	Fuzzy Systems	AI 2303	AI3318	Special Topics in Bioinformatics	SS
AI 3212	Evolutionary Computing	AI 2303	AI 3321	Special Topics in Artificial Intelligence-I	SPS
AI 3213	Swarm Intelligence	AI 2303	AI 3322	Special Topics in Artificial Intelligence-II	SS
AI 3214	Agent Based Modeling	AI 2303			

University Electives (Select any 4 Courses from the following List)

Code	Course Title	Code	Course Title
MS3801	Entrepreneurship & Technology	MS3811	Quality Control and Engineering Standards
MS3802	Quality Improvement Tools and Methods	MS3812	Quality Assurance and Management Systems
MS3803	Leadership & Team Management	MS3813	Quality Improvement Tools and Methods
MS3804	Total Quality Management	HU3201	Psychology
MS3805	Project Scheduling and Costing	HU3202	Life Science
MS3806	Production and Operation Management	HU3203	Philosophy
MS3808	Human Resource Management	MS3820	Financial Accounting
MS3809	Marketing	MS3821	Financial Management
MS3810	Economics		

MASTERS OF SCIENCE IN COMPUTER SCIENCE (MSCS)

Institutional Factor

SS CASE IT has a mission to contribute in the industrial sector by producing computer experts both in hardware and software who can lead the industry by introducing best professional practices. SS CASE IT is significantly contributing in today's engineering industry by providing knowledge to technical personnel at undergraduate level (Electrical & Computer Engineering, Computer Science) and at the graduate level (Software Engineering, Information Security, and Electrical and Computer Engineering) keeping in view the requirement of skilled manpower for the local industry. To fill the gap of software part in the existing engineering programs, SS CASE IT intends to launch Master of Science in Computer Science degree at the Graduate level.

Objectives

The MS in Computer Science provides intensive preparation in the concepts and techniques related to the design, programming, and application of computing systems. Students are provided a deep understanding of both advanced and important current issues in computer science so that they may either obtain productive employment or pursue advanced research.

The MS in Computer Science program requires the student to take a broad spectrum of courses, while simultaneously allowing for emphasis in desired areas of specialization close to software technologies, systems and networks, multimedia, visual computing, embedded systems, information security engineering, software engineering and information systems.

Learning outcomes

The graduates of this program can enter the work force by planning, organizing, developing, managing and maintaining informatics systems. For the most capable and determined students, in particular, who will continue with a doctorate, management careers will come available, because a solid competence on the principles of complexity and problems solving goes together with the ability to interact, of team-work and innovative proposals. Last but not the least, individual capabilities are of the maximum importance: computer science is still a field where newly created innovative companies created by enterprising young people, often can top consolidated enterprises on time and quality.

Eligibility Criteria for MS Computer Science

Degree in relevant subject, earned from a recognized university after 16 years of education with at least 60% marks or CGPA of at least 2.0 (on a scale of 4.0).

The following courses are recommended to be completed as prerequisite against core courses of the program if required:

- | | | | |
|----|--|----|----------------------|
| 1. | Design and Analysis of Algorithms | 6. | Database Systems |
| 2. | Assembly Lang. / Computer Architecture | 7. | Operating Systems |
| 3. | Computer Networks | 8. | Software Engineering |
| 4. | Computer Programming | 9. | Theory of Automata |
| 5. | Data Structures | | |

These prerequisite courses will be shown in the transcript as non-credit courses. The student will be admitted in the program as per recommendations of Academic Affairs Committee.

To become eligible for award of MS degree, a student must satisfy the following requirements:

Courses breakdown for thesis option

Code	Course Title	Credit Hours
	Four (04) Core Courses	12
	Research Methodology	3
CS6901	Thesis	6
	Two (02) Courses from the program electives	6
CS6902	Two (02) Courses from the university electives	6
	Total	33

(*Must have earned CGPA (Cumulative Grade Point Average) of at least is CGPA of 2.5)

Courses breakdown for non-thesis option

Code	Course Title	Credit Hours
	Four (04) Core Courses	12
	Three (03) Courses from the program electives	9
	Three (03) Courses from the university electives	9
	MS Project	3
	Total	33

(*Must have earned CGPA (Cumulative Grade Point Average) of at least is CGPA of 2.5)

Registration in “MS Thesis - I” is allowed provided the student has

- a) Earned at least 18 credits
- b) Passed the “Research Methodology” course; AND
- c) CGPA is equal to or more than 2.5.

Core Courses for MS (Computer Science)

At least four courses must be taken from the following:

- | | | | |
|----------|--------------------------------|----------|---------------------------------|
| • CS6001 | Advanced Theory of Computation | • CS6004 | Advanced Computer Architecture |
| • CS6002 | Advanced Algorithm Analysis | • CS6005 | Theory of Programming Languages |
| • CS6003 | Advanced Operating Systems | | |

Elective Courses (Each Course with 3 Credit Hours)

Net-Centric Computing:

- CS6101 Advanced Computer Networks
- CS6102 Simulation Modeling and Analysis of Computer Networks
- CS6103 Simulation Modeling and Evaluation of Mobile Networking
- CS6104 Data Compression
- CS6105 Network Performance Evaluation
- CS6106 Network Security
- CS6107 Cluster Computing Systems
- CS6108 Cloud Computing
- CS6109 Distributed Computing Systems
- CS6110 Advanced Topics in Computer Networking
- CS6111 Advanced Topics in Net-Centric computing

Intelligent Systems & Information Management:

- CS6201 Adaptive & Intelligent Control
- CS6202 Machine Learning
- CS6203 Deep Learning
- CS6204 Artificial Intelligence & Neural Computing
- CS6205 Computer Vision
- CS6206 Digital Image Processing
- CS6207 Data Mining
- CS6208 Parallel and Distributed Database Systems.
- CS6209 Distributed Data Processing
- CS6210 Data Warehousing
- CS6211 Object Oriented Databases
- CS6212 Data Visualization
- CS6213 Big Data Analytics
- CS6214 Bayesian Data Analysis
- CS6215 Social Network Analysis
- CS6216 Time Series Analysis and Prediction
- CS6217 Natural Language Processing
- CS6218 Semantic Web
- CS6219 Advanced Database Management Systems
- CS6220 Advanced Topics in Intelligent Systems
- CS6221 Advanced Topics in Information Management

Programming Language Design and Translators:

- CS6501 Advanced Compiler Design
- CS6502 Programming Language Design
- CS6503 Cryptography and Network Security

Software Engineering:

- CS6301 Advanced Software Engineering
- CS6302 Statistics for Software Engineering
- CS6303 Object Oriented Software Engineering
- CS6304 Software Quality Management
- CS6305 Software Development Process
- CS6306 Information Systems
- CS6307 Software Project Management
- CS6308 Systems Engineering
- CS6309 Advanced Topics in Software Engineering

Graphics and Visual Computing:

- CS6401 Advanced Computer Graphics and visualization
- CS6402 Multimedia Communications
- CS6403 Virtual Reality
- CS6404 Geographical Information Systems
- CS6405 Computer Animation
- CS6406 Advanced Topics in Graphics and Visual Computing

Computer Architecture and Organization:

- CS6601 Real Time Embedded Systems
- CS6602 Parallel Processing: Architecture & Algorithms
- CS6603 Reconfigurable Computing

Systems Engineering:

- CS6701 Digital Signal Processing
- CS6703 Advanced Digital Systems Design
- CS6704 Special Topics in Control Systems
- CS6706 Linear Systems and Controls
- CS6707 Real Time Operating Systems
- CS6708 Real time Embedded System

Information Security:

- CS6801 Information and Coding Theory
- CS6802 Cryptography & Network Security
- CS6803 Information Security Strategies & Policies
- CS6804 Computer System Security
- CS6805 Advanced Cryptography & Cryptanalysis
- CS6806 Advanced Topics in Information Security
- CS6807 Cyber Forensic Analysis

FACULTY PROFILES

Dr. Shafaat Ahmed Bazaz (Acting Dean and Professor)

PhD: Controls and Automation (1998), Institut National des Sciences Appliquées (INSA) Toulouse, France.

Masters: Automation, Controls and ProductionEngineering (1994), Université de FrancheComté, Besancon, France.

BS: Avionics (1989), NED University Karachi.

Specialization: Micro electromechanical Systems(MEMS), Hospital Management and Intelligent Diagnostic System, Tele-Medicine Systems, Development of MEMS based Inertial Sensors, NeuralProbes for Brain Implants, Micro Grippers for biomedical applications

Dr. Muhammad Qaisar Shafiq

(Chairman & Assistant Professor)

PhD: Information Security, NUST, Islamabad

MS: Information Security, NUST, Islamabad

Specialization: Network and Communication Security, Internet of Things, Fog and Cloud Computing, Software Defined Networking

Dr. Samman Riaz (HoD Artificial Intelligence)

Assistant Professor

PhD: Computer Science and Technology

M Phil: Applied Mathematics

Specialization: Data mining, artificial intelligence, machine learning and big data

Mr. Adeel Shabbir (HoD Computer Science)

Assistant Professor

MS: Information Security, CASE Islamabad.

BS: Computer Science, IIU Islamabad.

Specialization: Network Security, Programming, Optimization

Dr. Iqra Shahzadi (Assistant Professor)

PhD: Peristaltic Flows, Quaid-i-azam University, Islamabad

MS: Applied Mathematics, Quaid-i-azam University, Islamabad

Specialization: Peristaltic and blood flow problems, Mathematical Biology, Nanofluids

Dr. Nabeel Ahmed Awan (Assistant Professor)

PhD: Knowledge Engineering, NUST, Islamabad

MS: Databases, NUST, Islamabad

Specialization: Information Retrieval, Natural Language Processing, Linked Open Data, Cyber Security

Brig (R) Rafiuddin (Assistant Professor)

MSc: Digital Systems with Distinction from University of Hertfordshire, Hatfield, UK.

BSc: Electrical (Communication) from UET, Lahore.

Specialization: Microprocessor based design, computer architecture, digital systems and electronics

Mr. Tahir Akram Assistant Professor

PhD: COMSATS (continued)

MS: Electrical Engineering , CASE Islamabad.

BS: Electrical Engineering ,University of AJK

Specialization: Digital Image Processing, Machine Learning, Deep Learning

Ms. Aiman Nazeer (Lecturer)

MSSE: NUST Islamabad

BSCS: International Islamic University Islamabad

Specialization: Software Engineering, Natural Language Processing, Machine Learning

Mr. Waqas Ahmed (Senior Lecturer)

MS: Computer Engineering, CASE Islamabad

BSC: Electrical Engineering (Telecomm) CASE

Specialization: Computer Engineering

Mr. Umer Farooq (Lecturer)

MSCS: University of Lahore 2019

BSCS: HITEC University 2016

Specialization: Data Science, Natural Language Processing, Machine Learning

Ms. Saira Qamar (Lecturer)

MSCS: Fast-Nuces Islamabad

BSCS: International Islamic University Islamabad 2016

Specialization: Natural Language Processing, Machine Learning, Multi-agent Systems

Mr. Rana Muhammad KaleemUllah (Lecturer)

MS: Software Engineering, CEME NUST, Islamabad

BS: Computer Engineering, CEME NUST Islamabad

Specialization: Data Science

Ms. Iram Hina (Lecturer)

MS: Software Engineering, CEME NUST

BS: Software Engineering, FJWU Rawalpindi

Specialization: Artificial Intelligence, Programming, android mobile development

Ms. Mamoona Bilal (Lecturer)

MS: Computer Science, FAST Islamabad.

BS: Computer Science, FJWU Rawalpindi.

Specialization: Artificial Intelligence, Energy, Optimization, Machine Learning.

Engr. Sidra Ashraf (Junior Lecturer)

BSc: Electrical Engineering UET,Taxila (2013).

Specialization: Embedded System

Mr. Muhammad Sulaman (Lecturer)

MS: Applied Mathematics, AWKUM.

MSc: Mathematics, Hazara University Mansehra.

Optimization: Applied mathematics

Specialization: Optimization, Applied mathematics

Ms. Samina Manzoor (Junior Lecturer)

BSCS: Computer Science, Center for Advance Studies in Engineering, Islamabad (2017).

Specialization: Computer Science

Ms. Hira Tahir (Junior Lecturer)

BSCS: Computer Science, CASE

Specialization: Computer Science

MASTER OF SCIENCE IN MATHEMATICS

Motivation and Mission

The main goal of this program is to provide an intensive preparation in the concepts and techniques related to the design and solution of application problems in the field of applied mathematics in general and in the field of engineering, computing, Finance and applied sciences in particular. In addition to that it would also yield the manpower with better built capacity for challenging R&D projects in their respective areas. The curriculum has been designed with the aim of providing breadth and depth of knowledge in key areas that evolve in applied, engineering and computational Mathematics to open new job opportunities for these graduates.

Program Objectives

- Graduates should demonstrate the ability to, solve, analyze, investigate and model engineering and applied science problems using the existing scientific design and solution tools that would enhance their research capabilities and broaden their professional, research and academic perspectives.
- Graduates should have awareness of the interdisciplinary research culture among the science, engineering and mathematical science disciplines that would enable them to explore the emerging research areas of engineering and applied mathematical sciences in their respective fields of study.
- Graduates should understand their professional needs and requirements, ethics and social responsibilities at their academic and institutional levels, so that they are able to work willingly as an individual, a team member and as a leader of multidisciplinary teams, and be competent enough to effectively communicate and demonstrate knowledge.

Learning Outcomes

Graduates should be able to

1. Apply knowledge of mathematics and science to the solution of advanced problems involved in different engineering and applied science areas.
2. Design mathematical models and solution strategy for problems arising in application areas such as data sciences, electrical and computer engineering, computer Science, Software Engineering, Finance, business and actuarial sciences.
3. Demonstrate ability to communicate, Mathematical ideas with clarity and coherence, both written and verbally, effectively on mathematical activities with the scientific community, and with society at large, such as being able to comprehend and write effective project reports and design documentation like dissertation, and make effective presentations, and give and receive clear instructions.
4. Perform research in conjunction with others as well as individually, that is be able to perform research as an individual through his own work, as a member and leader in a team, and manage projects/reports in individual and multidisciplinary environments.

Eligibility Criteria for MS Mathematics

Qualification

Four years BS Mathematics with Minimum CGPA 2.00 out of 4.00 or Minimum second division in M. Sc. or equivalent Grade by HEC recognized University / DAI (16years of education in relevant discipline from Institution recognized by HEC.)

Admission Test

GAT-General conducted by the National Testing Service with a minimum cumulative score of 50% or GRE (International). Subject Test with 50 % percentile score will be required at the time of admission, or local HAT test as per prevalent HEC / Institute policy.

Duration

Minimum duration for completion of MS Mathematics degree is 1.5 years or 3 regular semesters and Maximum duration of 3.5 years with a maximum of 6 months extension.

MS Degree Requirements

In general, a student must complete a minimum of 30 credit hours and has to obtain a minimum CGPA of 2.5 to earn the degree.

Along with completion of thesis, the student must complete 24 Credit Hours course work with $\text{CGPA} \geq 2.5$.

Focus Research Areas

The Department of Computer Science is offering MS in Mathematics with the following specializations:

- Pure Mathematics
- Applied Mathematics
- Computational Mathematics

Credit Hours Requirement

Category	Credit Hours (CH)
Core Courses	12
Optional Courses	12
Thesis	6

Course structure

Core Courses:		Specialization 1: Pure Mathematics	
Code	Courses	Code	Courses
MT6003	Integral Equations	MT8103	Advanced Group Theory
MT6 004	Functional Analysis	MT8104	Algebraic Number Theory
MT8005	ODEs and Computational Linear Algebra	MT8105	Fixed Point Theory and Applications
MT6005	Partial Differential Equations	MT8106	Optimization Theory
MT8006	Advanced Mathematical Physics	MT6109	Advanced Convex Analysis
MT6006	Group Theory	MT8107	Real and Mathematical Analysis
		MT8108	Matrix Theory
Optional Courses		Specialization 3: Computational Mathematics	
Specialization 2: Applied Mathematics			
MT8206	Group Theoretic Methods	MT6305	Mathematical Modeling I
MT8207	Operation Research	MT6306	Numerical Solution of Partial Differential Equations
MT8209	Fuzzy Logic and Neural Networks	MT6308	Monte Carlo Techniques for Simulations
MT8210	Advanced Number Theory	MT6309	Time Series Analysis and Forecasting
MT6205	Mathematical Biology	MT6311	Financial Modeling and Management
MT6206	Probability and Stochastic Process	MT6312	Financial Mathematics I
MT6208	Simulation and Modeling	MT6313	Numerical Solution of Ordinary Differential Equations
MT6209	Finite Element Methods	MT6314	Computer Graphics
MT6210	Methods in Digital Image Processing	MT8304	Mathematical Modeling II
MT6211	Non Linear Dynamics and Control theory	MT8305	Graph Theory
MT6212	Design of Experiments	MT8307	Advanced Mathematical Statistics
MT6213	Fourier Analysis with Applications	MT8308	Discrete Mathematical Systems
MT8211	Cryptography and its applications	MT8309	Financial Mathematics II
MT8212	Machine Learning Algorithms	MT8310	Advanced Numerical Methods
MT8214	Fluid Dynamics	MT8311	Big Data Analysis Techniques
MT8215	Boundary Layer Theory: Applications And solutions	MT8312	Computational Fluid Dynamics
MT8217	Optimization Techniques	MT8313	Special Topics in Mathematics
MT8219	Methods of Scientific Research	Project/Thesis	
		MT8400	MS Thesis

Dr. Muhammad Saleem (Assistant Professor)
PhD: Mathematics, CIIT, Islamabad **MS:** Mathematics, CIIT, Islamabad
MSc: Applied Mathematics, University of Punjab, Lahore
Research Areas: Computational Mathematics, CFD, Optimization and machine Learning, AI

Ms. Summayya Jamal
Senior Lecturer
MS: COMSATS University Islamabad
MSc: (Mathematics), QAU Islamabad
Area of Interest: Competitive Mathematics, Image Inpainting using Digital Image Processing

Dr. Iqra Shehzadi
Assistant Professor
PhD: Mathematics, QAU, Islamabad **MS/Mphil:** Mathematics, QAU, Islamabad
MSc: QAU Islamabad
Research Areas; Peristaltic and blood flow problems, Mathematical Biology, Nanofluids

Mr. Muhammad Sulaman
Lecturer
MS/Mphil: AWKUM
Area of Interest; Optimization Technique in Engineering, Data Science

Shared Faculty:
Dr. Samman Riaz

Adjunct Faculty:
Dr. Abdul Khaliq
Dr. Muhammad Umer
Dr. Qaisar Shafi
Dr. Najum us Siraj



FACULTY OF MANAGEMENT SCIENCE

Vision

To produce Job Creators and Change Agents capable of creating impact through effective utilization of business knowledge and technology management skills.

Mission Statement

The department of Business and Engineering Management (B&EM) is dedicated to create impact through knowledge transfer. We are focused towards giving our under-studies (ranging from undergraduate students to graduate scholars) a skill set which has a deep knowledge base yet it is practical enough to generate self-empowered Business Leaders and Entrepreneurs.

Introduction

Welcome to one of the best management degree programs that provides state-of-the art education in the field of Business and Engineering Management. The commitment and above all adherence to standards of academic excellence, have contributed immensely to the faculty's enviable reputation. For the last many years, our flagship post graduate Engineering Management related degree programs have been the leading choice of scholars pursuing MS and PhD degrees within Pakistan.

The Faculty has produced several PhD and MS students and is considered one of the best when it comes to professional business / management education within the country. Our faculty comprises of Pakistan's leading trainers, professionals having strong linkages with industry. Students are not only given cognitive understanding of the subject area, rather specific focus is laid on development of their skills in total.

Undergraduate Programs

- Bachelors in Business Administration (BBA- 4 years)
- Bachelors of Science in Accounting and Finance (BSAF-4 years)
- Associate Degree in Commerce (2 years)

Post-Graduate Programs (MS)

- Master of Science in Engineering Management (MSEM)
- Masters of Science in Project Management (MSPM)

Doctoral Programs (PhD)

- Ph.D. Engineering Management



BACHELOR IN BUSINESS ADMINISTRATION (BBA) 4 YEARS

Introduction

BBA Program is tailored for the students who have completed 12 years of education (HSSC or equivalent) and are looking for career education in Business Administration or Management profession. BBA degree holders will be eligible for admission in MBA or MS/M.Phil programs. Our 4 Years BBA Program consists of 133 credit hours in line with the policy of HEC.

Program Mission Statement

The mission of SS-CASE-IT undergraduate Business Administration program which goes by the title of Bachelors of Business Administration (BBA) is to equip students with strong analytical skills so that they find themselves prepared for any business specific field with great deal of responsibility in a dynamic business world.

Objectives

Learning Environment Objectives

To prepare students for the challenging business environment so that they may efficiently manage and work for any kind of enterprise.

Intellectual Contributions Objectives

To apply such innovative teaching methods and practices that may brighten both academic and professional growth of faculty.

Service Objectives

To serve society, academia and business world through active participation and dynamic leadership.

Program Eligibility

- At least 40% marks in HSSC or an equivalent examination.

Program Selection Criteria

Admission on the basis of:

- Merit List calculations are based upon 20% for matric/O levels marks, 40% for intermediate (F.A, F.Sc. I.Com or A levels) marks and 40% of NAT or SS-CASE-IT Admission Test.
- Cut-off marks to be determined by the University.

Program Degree Requirements

For the award of BBA degree, a student must have:

- Passed courses totaling at least 133 credit hours.
- Obtained a CGPA of at least 2.00
- Completed business internship of 6-8 weeks

Program Duration

- Minimum: 4 years (8 semesters)
- Maximum: 6 Years (With One Year Extension)

Semester-wise Breakup of BBA (Bachelors in Business Administration)

Semester I			Semester II		
Code	Title	Credit Hours	Code	Title	Credit Hours
HU-1001	Freshmen English - I	3	HU-1002	Freshmen English - II	3
MS-1401	Computer Applications to Business	3	HU-1202	Sociology	3
HU-1101	Pakistan studies and Islamic Studies	3	HU-1203	Business Economics – I	3
HU-1201	Psychology	3	AF-1102	Financial Accounting	3
AF-1101	Principles of Accounting	3	MS-1102	Principles of Management	3
SC-1401	Business Mathematics – I	3	SC-1402	Business Statistics – I	3
Total Credit Hours		18	Total Credit Hours		18

Semester III			Semester IV		
Code	Title	Credit Hours	Code	Title	Credit Hours
HU-2401	Oral Communication	3	HU-2402	Business Communication	3
MS-2301	Principles of Marketing	3	HU-2205	Pakistan Economy	3
HU-2204	Business Economics – II	3	AF-2201	Fundamentals of Finance	3
SC-2403	Business Statistics – II	3	MS-2302	Marketing Management	3
AF-2103	Cost Accounting	3	MS-2201	Organizational Behavior	3
SC-2404	Business Mathematics – II	3	Total Credit Hours		15
Total Credit Hours		18			

Semester V			Semester VI		
Code	Title	Credit Hours	Code	Title	Credit Hours
HU-3206	Business Ethics	3	AF-3301	Money & Banking	3
HU-3207	Business Research Methods	3	MS-3102	Strategic Management	3
AF-3202	Financial Management	3	HU-3209	Language	3
MS-3303	Consumer Behavior	3	Elective Course – I		3
MS-3202	Human Resource Management	3	Elective Course- II		3
HU-3208	Internship - I	1	Total Credit Hours		15
Total Credit Hours		16			

Semester VII			Semester VIII		
Code	Title	Credit Hours	Code	Title	Credit Hours
MS-4103	Operations Management	3	HU-4104	Entrepreneurship	3
MS-4402	Management Information System	3	MS-4902	Final year Project - II	3
MS-4901	Final Year Project - I	3	Elective Course – V		3
Elective Course – III		3	Elective Course – VI		3
Elective Course – IV		3	HU-4212	Business Law	3
HU-4211	Internship 2	1	MS-4903	Viva Voce	2
Total Credit Hours		16	Total Credit Hours		17

Electives Semester VI			Electives Semester VII		
Code	Title	Credit Hours	Code	Title	Credit Hours
HUMANITIES			ACCOUNTING		
HU-3213	Philosophy & Critical Reasoning	3	AF-4105	Auditing	3
HU-3214	Environment Management	3	AF-4204	International Financial Management	3
ACCOUNTING			AF-4205	Corporate Finance	3
AF-3104	Analysis of Financial Statements	3	AF-4206	Financial Risk Management	3
FINANCE			AF-4207	Financial Modeling	3
AF-3203	Islamic Banking & Finance	3	MARKETING		
MARKETING			MS-4307	Web Based Marketing	3
MS-3304	Supply Chain Management	3	MS-4308	International Marketing	3
MS-3305	Advertising	3	MS-4309	Brand Management	3
MS-3306	Marketing Research	3	MANAGEMENT		
MANAGEMENT			MS-4110	International/Global Management	3
MS-3105	Total Quality Management	3	MS-4111	Knowledge Management	3
MS-3106	Project Management	3	MS-4112	Hospital Management	3
MS-3107	NGO Management	3	HRM		
MS-3108	Leadership	3	MS-4206	Training & Development	3
MS-3109	Corporate Social Responsibility	3	MS-4207	Performance Management	3
HRM			MS-4208	Organizational Development	3
MS-3203	Strategic Human Resource Management	3	BANKING		
MS-3204	Change Management	3	AF-4304	International Banking	3
MS-3205	Employee Relations	3	AF-4305	Credit Management	3
BANKING			IT		
AF-3302	Banking Law & Practices	3	MS-4604	Systems Analysis & Design	3
AF-3303	Consumer Banking	3	Electives Semester VIII		
ACCOUNTING			FINANCE		
AF-4106	Taxation	3	AF-4208	Investment & Portfolio Management	3
MARKETING			AF-4209	Treasury Management	3
MS-4310	Sales Management		HRM		
MS-4311	Export Marketing		MS-4209	Career Management	3
MS-4312	Services Marketing		MS-4210	Compensation Management	3
MANAGEMENT			IT		
MS-4113	Waste Management	3	MS-4605	Expert systems & Artificial Intelligence	3
MS-4114	Management Sciences	3	MS-4606	Seminars in MIS	3
MS-4115	International Business Management	3	BANKING		
MS-4116	Corporate Strategy	3	AF-4306	Seminars in Banking	3

BACHELOR OF SCIENCE IN ACCOUNTING & FINANCE (BSAF)

Introduction

BSAF Program is tailored for the students who have completed 12 years of education (HSSC or equivalent) and are looking for Certifications of Professional accounting bodies, as well as for industry and public accounting practices. BSAF degree holders will be eligible for admission in MBA or MS/M. Phil programs. Our 4 Years BSAF Program consists of 133 credit hours in line with the policy of HEC.

Program Mission Statement

The mission of Bachelors of Science in Accounting and Finance (BSAF) is to strength students' academic level by enhancing required skillset while making them understand their Professional Responsibility. Students will get an insight into real world scenarios/SS-CASE-IT studies which are hall mark of our academic excellence.

Objectives

Learning Environment Objectives

To prepare students for Certifications of Professional accounting bodies, as well as for industry and public accounting practices.

Intellectual Contributions Objectives

To apply such innovative teaching methods and practices that may brighten both academic and professional growth of faculty.

Service Objectives

To serve society, academia and business world through active participation and dynamic leadership.

Program Eligibility

At least 40% marks in HSSC or an equivalent examination..

Program Selection Criteria

Admission on the basis of:

- Merit List calculations are based upon 20% for matric/O levels marks, 40% for intermediate (F.A, F.Sc. I.Com or A levels) marks and 40% of NAT or SS-CASE-IT Admission Test.
- Cut-off marks to be determined by the University.

Program Degree Requirements

For the award of BSAF degree, a student must have:

- Passed courses totaling at least 133 credit hours.
- Obtained a CGPA of at least 2.00
- Completed business internship of 6-8 weeks

Program Duration

- Minimum: 4 years (8 semesters)
- Maximum: 6 Years (With One Year Extension)

Semester-wise Breakup of BSAF (Bachelors of Science in Accounting and Finance)

Semester I			Semester II		
Code	Title	Credit Hours	Code	Title	Credit Hours
HU-1201	Mercantile Law	3	AF-1103	Principles of Taxation	3
HU-1001	Functional English – I	3	HU-1101	Islamic Studies and Ethics	3
HU-1202	Introduction to Psychology	3	HU-1203	Introduction to Economics	3
SC-1401	Introduction to Quantitative Techniques	3	SC-1402	Advanced Quantitative Techniques	3
AF-1101	Fundamentals of Accounting	3	AF-1102	Financial Accounting	3
MS-1401	Introduction to IT	3	HU-1204	Company Law	3
	Total Credit Hours	18		Total Credit Hours	18
Semester III			Semester IV		
Code	Title	Credit Hours	Code	Title	Credit Hours
HU-2401	Presentation Skills	3	AF-2108	Management Accounting	3
AF-2104	Financial Reporting - I	3	AF-2109	Financial Reporting - II	3
AF-2105	Introduction to Audit	3	HU-2402	Report Writing	3
AF-2106	Cost Accounting	3	HU-2205	Pakistan Economy	3
AF-2107	Intermediate Taxation	3	AF-2110	Advanced Audit	3
MS-2101	Fundamentals of Management	3	HU-2403	Business Communication	3
	Total Credit Hours	18		Total Credit Hours	18
Semester V			Semester VI		
Code	Title	Credit Hours	Code	Title	Credit Hours
HU-3206	Intermediate Economics	3	AF-3202	Financial Management	3
MS-1301	Principles of Marketing	3	MS-3202	Human Resource Management	3
AF-3201	Introduction to Business Finance	3	AF-3114	Internal Control Systems	3
MS-3201	Organizational Behavior	3	AF-3112	Advanced Financial Reporting-2	3
AF-3111	Advanced Financial Reporting-I	3		Elective Course -I	3
HU-3207	Research Methods	3	AF-3113	Advance Taxation - I	3
	Total Credit Hours	18		Total Credit Hours	18
Semester VII			Semester VII		
Code	Title	Credit Hours	Code	Title	Credit Hours
MS-4102	Project Management	3	MS-4104	Strategic Management	3
MS-4103	Entrepreneurship	3	HU-4102	Pakistan Studies	3
	Elective Course -2	3		Elective Course-4	3
	Elective Course -3	3		Elective Course-5	3
AF-4115	Advance Taxation 2	3	HU-4209	Advance Company Law 2	3
HU-4208	Advance Company Law 1	3	HU-4210	Business Ethics	3
	Total Credit Hours	18		Total Credit Hours	18
Elective Semester VI			Elective Semester VII		
Finance			Accounting		
AF-3203	Investment and Portfolio Management		AF-4117	Advance internal Control	3
AF-3204	Financial Econometrics	3	AF-4118	Accounting Applications With SAP/Oracle	3
AF-3205	Financial Modeling	3	AF-4119	Forensic Accounting	3
	Elective Semester VIII	3	AF-4120	Business Analysis and Decision Making	3
Finance			Finance		
AF-4209	Corporate Governance Law		AF-4206	Strategic Financial Management	3
AF-4210	Corporate Finance	3	AF-4207	Financial Derivatives	3
AF-4211	Hedge Funds and Alternative	3	AF-4208	Case Studies in Financial Management	3
	Investments	3			

ASSOCIATE DEGREE IN COMMERCE (B.COM-2 YEARS)

Introduction

Associate Degree in commerce is tailored for the students who have completed 12 years of education (HSSC or equivalent) and are looking for career education in business management. It is primarily offered for the students who are unable to join four (4) years BS Programs due to certain constraints.

Associate degree holders will be eligible for continuing their education by taking admission in fifth semester of four years degree program or 16 years M.Com program as is allowed by HEC. The curriculum is designed in line with the policy of HEC while taking care of the need of the industry. Hence ensuring complete employability of the graduates while taking care of the accreditation of the degree.

Program Mission Statement

The mission of Associate degree in commerce is to develop excellent critical and analytical skills amongst students while boosting their communication skills. The Program targets to prepare students for real life challenges within a short span, by inculcating financial and business acumen.

Objectives

Learning Environment Objectives

To prepare well rounded business professionals willing to go extra miles by working diligently into their field of specialization.

Intellectual Contributions Objectives

To apply such innovative teaching methods and practices that may brighten both academic and professional growth of faculty.

Teaching students using a combination of theory based lecturing while developing professional insight in students through inculcating case based teaching methodology in curriculum.

Services Objectives

To serve the nation through nurturing a breed of business leaders willing to work hard and ready to go extra mile for providing ethical and sustainable solutions to the problems of modern world.

Program Eligibility

At least 40% marks in HSSC or an equivalent examination.

Program Selection Criteria

Admission on the basis of:

- Merit List calculations are based upon 20% for matric/O levels marks, 40% for intermediate (F.A, F.Sc. I.Com or A levels) marks and 40% of NAT or SS-CASE-IT Admission Test.
- Cut-off marks to be determined by the University.

Program Degree Requirements

For the award of B-Com degree, a student must have:

- Passed courses totaling at least 64 credit hours.
- Obtained a CGPA of at least 2.00
- Completed business internship of 4-6 weeks

Program Duration

- Minimum: 2 years (4 semesters)
- Maximum: 3 Years (With One Year Extension)

Program Structure of Associate Degree in Commerce

Semester I			Semester II		
Code	Course Name	Credit Hours	Code	Course Name	Credit Hours
HU-1226	Business Law	3	AF-1127	Principles of Taxation	3
HU-1004	Functional English	3	HU-1106	Islamic Studies and Ethics	2
SC-1408	Business Mathematics & Statistics	3	HU-1227	Business Economics	3
AF-1126	Fundamentals of Accounting	3	AF-1221	Introduction to Business Finance	3
MS-1408	Computer Application to Business	3	AF-1128	Financial Accounting	3
	Total Credit Hours	15	HU-1228	Corporate Law	3
				Total Credit Hours	17

Semester III			Semester IV		
Code	Course Name	Credit Hours	Code	Course Name	Credit Hours
HU-2406	Presentation Skills	3	AF-2134	Management Accounting	3
AF-2132	Cost and Management Accounting	3	HU-2229	Report Writing	3
AF-2131	Introduction to Audit	3	MS-2314	Principles of Marketing	3
AF-2130	Financial Reporting	3	AF-2136	Advanced Audit	3
HU-2107	Pakistan Studies	2	HU-2407	Business Communications	3
MS-2121	Fundamentals of Management	3		Total Credit Hours	15
	Total Credit Hours	17			



MS ENGINEERING MANAGEMENT

Introduction

This unique program combines several modules from traditional business & management program with courses bringing the latest techniques and concepts in 'Engineering Management' including but not limited to Project Management, Decision Making, Engineering Optimization and Management for Technical Organizations.

The mix of management, engineering and technical concepts focused in this Program are meant to prepare working professionals to thrive in the increasingly complex managerial environment of today's technology-based organizations.

Objectives of the Program

This THIRTY credit hours graduate program is conducted in the evening and weekends and has specifically been designed to accommodate working engineers and technical professionals, who are seeking to advance to positions of a greater managerial and technical responsibility. It is purposely designed to benefit top executives such as CEOs, MDs, and DGs, Production/Operation Managers, GMs, Technocrats, Manufacturers, Consultants, Entrepreneurs, Engineers, Technological Experts, Scientists and Technical Managers.

Scope regarding Market, Social and Employment Prospects

This program is unique as it prepares the future technical leadership of Pakistan for challenging roles throughout the technical domains. Be it Government organizations or private corporate technical concerns, you always require a blend of sound technical knowledge and savvy business acumen to steer the organizations forward. The role of technocrats in Pakistan is now swiftly changing from mere technical management to providing leadership and vision to Pakistani industry. This course has a proven track record of nearly two decades which speaks of its alumni being currently serving at key decision making positions throughout Pakistan and abroad.

Entry / Admission Requirement of the Program

1. The candidate must have a Cumulative Grade Point Average (CGPA) of at least 2.00/4.00 or 55% aggregate marks in BSc/BE/B.Tech in any Engineering, Computer Science, Architecture, Engineering Technology, B.Tech (Hons) Disciplines (sixteen years of schooling or 4 year education after FSc), recognized by PEC/NCEAC/PCATP/NTCP or any relevant body recognized by HEC.
2. GAT (Gen)/GRE (General) passed with minimum 50% marks or SS CASE IT Test as per GRE pattern (50% minimum passing marks) required for the admission in MS Engineering Management.
3. All candidates must complete any other requirement of HEC and SS CASE IT for admission.

Duration of the Program

1. Minimum: 1.5 years (3 semesters)
2. Maximum: 3.5 years (extendable to 6 month) (Total 4 Years)

Credit Hours Requirement

Category	Credit Requirement (With Thesis Option)	Credit Requirement (With Non- Thesis Option)
Core Courses	15	15
Optional Courses	09	15
Postgraduate Research Thesis	06	0
Total Hours Required	30	30

The Students of MS Programs of the department may register maximum 15 credit hours of courses (other than core courses) in any MS or PhD level course within the university.

Degree Requirements with Thesis Options

1. Completion of course work with minimum 2.5 CGPA.
2. Successful MS Final Defense of thesis written in the prescribed format.

Non-Thesis Option

Completion of 30 credits hours of course work with minimum 2.5 CGPA.

Curriculum of the Program

All courses other than research thesis carry 3 credit hours; Research Thesis carries 6 credit hours

Core Courses

Course No.	Course Title (All courses are of three credit hours)
EM-6101	Research Methodology for Engineering Managers
EM-6102	Total Quality Management
EM-6103	Engineering Project Management
EM-6104	Finance for Technical Managers
EM-6105	Technology Management

Optional Courses

Course No.	Course Title (All courses are of three credit hours)
EM-6106	Quantitative Decision Making & Problem Solving
EM-6107	Human Resource Management
EM-6108	Engineering Economic Decision Analysis
EM-6109	Energy Resources Management & Utilization
EM-6110	Marketing Management
EM-6111	Entrepreneurship and Innovations for Engineers
EM-6112	Reliability and Maintenance Management
EM-6113	Manufacturing Strategy
EM-6114	Telecom Business Management
EM-6115	E-Commerce Tools Productivity

Course No.	Course Title (All courses are of three credit hours)
EM-6116	Knowledge Management
EM-6117	System Safety Engineering
EM-6118	Environmental Engineering Management
EM-6119	Global Supply Chain Management
EM-6120	Logistics Management
EM-6121	Engineering Business Law
EM-6122	Production and Operation Management
EM-6123	Strategic Management
EM-6124	Operations Management
EM-6999	MS Research Thesis

MASTER OF SCIENCE (MS) IN PROJECT MANAGEMENT

Introduction

This program focuses distinctly on individual's Project Management capabilities, skill building and conceptual understanding from basic to advanced level concepts (related to Project Management).

This thirty credit hour graduate program is conducted in the evening and weekends. Various organizations rely heavily on project managers so that projects flow seamlessly and the timeline, scope, and budget goals are met. With the increase in project-based work methods to accomplish tasks, experienced project managers are in higher demand. When you earn a master's degree in project management, you possess a skill set necessary for project management valued by companies in virtually every industry. The purpose of the program thus is to produce high quality project managers for various local and international industries and to enable the students to develop solid base for doctoral level education in Project Management discipline.

Eligibility Criteria

1. This program is open for students with 16 years of formal education in any discipline from a HEC recognized university with 2.00 CGPA or 55% marks.
2. A minimum score of 50% in local test conducted by SS-CASE-IT or NTS GAT with 50% score is compulsory for acceptance to the program.
3. All candidates must complete any other requirement of HEC and SS-CASE-IT for admissions.
4. The SS-CASE-IT Admission Committee will forward the admission cases to registration branch for obtaining the Enrolment/Registration Number.

Credit Hours Requirement

Category	Credit Requirement (With Thesis Option)	Credit Requirement (With Non-Thesis Option)
Core Courses	15	15
Optional Courses	09	15
Postgraduate Research Thesis	06	0
Total Hours Required	30	30

The Students of MS Programs of the department may register maximum 15 credit hours of courses (other than core courses) in any MS or PhD level course within the university.

Duration

1. Minimum: 1.5 years (3 semesters)
2. Maximum: 3.5 years (extendable to 6 months) (Total 4 Years)

Degree Requirements with Thesis Options

1. Completion of course works with minimum 2.5 CGPA.
2. Qualifying MS Thesis Proposal Defense.
3. Successful MS Final Defense of thesis written in the prescribed format.

Non-Thesis Option

Completion of 30 credits hours of course work with minimum 2.5 CGPA.

Core Courses

Course No.	Course Title (All courses are of three credit hours)
PM - 6101	Computer Applications in Project Management
PM - 6102	Human Resource Management for Project Managers
PM - 6103	Advanced Project Management
PM - 6104	Financial Analysis of Projects
PM - 6105	Research Methodology for Managers

Optional Courses

Course No.	Course Title (All courses are of three credit hours)
PM - 6106	Telecom Business Management
PM - 6107	Technology and Entrepreneurship
PM - 6108	Technology Management
PM - 6109	Transfer of Technology
PM - 6110	Business Process Re-Engineering
PM - 6111	Quality Management in Projects
PM - 6112	Contract Management in Projects
PM - 6113	Project Management Maturity Model
PM - 6114	Consumer Relationship Management
PM - 6115	Corporate Social Responsibility
PM - 6116	Enterprise Resource Planning
PM - 6117	Production and Operations Management
PM - 6118	Supply Chain in Project Management
PM - 6119	Managing Organizational Change in Technical Organizations
PM - 6120	Data Mining
PM - 6121	Knowledge Management
PM - 6122	Conflict Management in Projects
PM - 6123	Operations Management
PM - 6124	Problem Solving and Decision Making
PM - 6125	Construction Management

Course No.	Course Title (All courses are of three credit hours)
PM - 6126	Advanced Strategic Management
PM - 6127	Design of Experiment
PM - 6128	Mathematical Modeling and Optimization
PM - 6129	Organization Behavior
PM - 6130	Quantitative and Qualitative Methods
PM - 6131	Project Management Risk & Quality Management
PM - 6132	Program and Portfolio Management
PM - 6133	Software/IT Project Management
PM - 6134	Project Monitoring Evaluation and Control
PM - 6135	Management of Government Projects
PM - 6136	Project Manager Competency Development
PM - 6137	Business Studies in Marketing
PM - 6138	Business and Commercial Law
PM - 6139	Professional Ethics
PM - 6140	Business Studies in Finance
PM - 6141	Project Management and Industrial Engineering Economics
PM - 6142	Cost Benefit Analysis in Project Management
PM - 6143	Economics of Project Management
PM - 6144	Statistical Process Control
PM - 6999	MS Thesis



DOCTOR OF PHILOSOPHY IN ENGINEERING MANAGEMENT (PHD-EM)

Introduction

This PhD program at SS CASE IT is an extensive program that requires the student to exhibit outstanding research capabilities. The degree program specially focuses on finding intellectual solution (both industrial and academic) with distinct knowledge contributions in the field of 'Engineering Management'. Students aspiring to be researchers in this program must have exceptional research capabilities with strong academic and industrial knowledge. The program ensures highest level of original research contributions by enforcing exceptional quality measures at various program milestones such as admission, course work completion, doctoral qualifying exam, proposal defense, final defense, publications fulfillment and various formal and informal reviews.

Objectives of the Program

The objective of Ph.D. Engineering Management Program is to establish national level research eco-system capable of holding engineering management related challenges. This objective is fulfilled through harvesting novel yet applied ideas to create impact in our society.

Scope Regarding Market, Social and Employment Perspective of Program:

This program is unique as it prepares the future researchers who are promptly focused towards applied aspects of engineering management and result oriented research. While our PhD program in Engineering Management is always inclined towards conducting and publishing high quality research in world renowned journals, we are nevertheless inclined to create impact rather than merely impact-factor. We have been able to produce world-class PhDs in Engineering Management and are proud of our heritage as a pioneering institute in Pakistan capable of harnessing the research potential of working professionals and directing it towards real time problem solving approach through applied and novel research.

Entry/Admission Requirements of the Program

1. The candidate must possess at least a four year Bachelor's degree in BSc/BE/B.Tech in any Engineering, Computer Science, Architecture, Engineering Technology, B.Tech (Hons) Disciplines (sixteen years of schooling or 4 year education after FSc), recognized by PEC/NCEAC/PCATP/NTCP or any relevant body recognized by HEC.
2. MS degree in Engineering Management or relevant discipline (minimum 18 years of formal education) from an HEC recognized university.
3. A minimum 3.00/4.00 (or 75% marks) in the MS degree is required.
4. Higher Education Aptitude Test (HAT-I) passed with minimum 70% marks or SS CASE IT test as per GRE pattern with 70% minimum passing marks required for the admission in PhD Engineering Management. Result is to be submitted at the time of application in case of HAT-I as prescribed by the University.
5. All candidates must complete any other requirement of HEC and SS CASE IT for admission in the PhD Program.
6. Final selection is made by Board of Advanced Studies at SS CASE IT.

Duration of the Program

1. Minimum: 3 years (6 semesters)
2. Maximum: 6 years

Semester Wise Break-up of Credit Hours

Semester	Credit Requirement
Spring	09 (Maximum)
Fall	09 (Maximum)

Credit Hours Requirement

Category	Credit Requirement
Core Courses	09
Optional Courses	09
Postgraduate Research Thesis	30 (Minimum)
Total Hours Required	48 (Minimum)

Degree Requirements

1. Completion of course works with 3.5 CGPA (18 Credit Hours after PhD admission).
2. Passing Qualifying / Comprehensive Examination.
3. Qualifying Proposal Defense.
4. At least one publication in ISI INDEXED IMPACT FACTOR JOURNAL from HEC recognized list OR two publications:
 - One in HEC recognized journals
 - Second in Scopus indexed journals.
5. Successful Pre-Final Defense of thesis before foreign evaluation
6. Satisfactory reviews from two experts from technologically / academically advanced countries.
7. Successful Final Defense of thesis written in the prescribed format.

Curriculum of the Program

All courses other than research thesis carry 3 credit hours

Core Courses

Course Codes	Course Title (All courses are of three credit hours)
EM-8101	Quantitative and Qualitative Methods
EM-8102	Research Methodology for Engineering Managers
EM-8103	Academic Writing for Engineering Managers
EM-8999	Postgraduate Research Thesis (Compulsory)

Optional Courses

Course Codes	Course Title (All courses are of three credit hours)
EM-8104	Operation Research & Optimization
EM-8105	Total Quality Management
EM-8106	Advanced Engineering Statistics & Design of Experiment
EM-8107	Big Data Analysis & Knowledge Management

FACULTY PROFILE

Dr. Nadeem Ehsan (Dean Faculty of Business & Engineering Management) Professor

PhD: Construction Engineering and Management (University of Michigan, Ann Arbor, USA)

MSc: Construction Engineering and Management (University of Michigan, Ann Arbor, USA)

MSc: Materials (University of Michigan, Ann Arbor, USA)

BSc: Civil Engineering (CAE-NUST)

Dr. Muhammad Umer (Chairman)

Assistant Professor

PhD: Industrial and Manufacturing Engineering(2015),

NUST MS: Engineering Management (CASE Islamabad)

BE: Aeronautical Engineering (NUST Islamabad)

Muhammad Farooq Baloch (Head of the department)

Assistant Professor, PhD continue

MS/Mphil: Accounting and Finance (University of Lahore)

MBA(Finance): Islamia University, BWP

Dr. Memoona Rauf Khan

Professor Emeritus

PhD: Production Economics (Michigan State University, USA) MA: International Trade and Development Economics (Yale University, USA)

M.Sc: Economics (QAU, ,Islamabad)

BA: Economics (Kinnaird College, Lahore)

Dr. Nadeem Qureshi

Associate Professor

PhD: Engineering Management (CASE Islamabad)

MS: Engineering Management (CASE Islamabad)

BE: Mechanical Engineering (NED, Karachi)

Dr. Irfan Zafar

Assistant Professor

PhD: MIS-IT Management, PIMSAT, Karachi

M.Sc: Digital Electronics (Radio & Communications Engineering)

King's College London, University of London

Dr. M. Omar Farooq

Assistant Professor

MSC: Engineering Management (UET Taxila)

PhD: Engineering Management (UET Taxila)

Mr. Noor Ahmed

Assistant Professor

MS: Finance, SZABIST

MBA: Finance, International Islamic University, Islamabad

Mr. Ali Javed Pirzada

Sr. Lecturer

MS Project Management, UET Taxila. M.Sc Computer Engineering, UET Taxila. BSc. Telecommunication Engineering, (UAJK)

Mr. Jamal Khaliq

Lecturer

MS: Management, UET Taxila

MBA: HRM, Mohammad Ali Jinnah University, Islamabad

Asifa Muhammad Sabir

Lecturer

MS/MPhil: Logistics and Supply Chain Management (Abaysn University)

BBA: NUML

Hira Ayaz

Lecturer

MS/Mphil: English Literature and Linguistics (Air University)

M.A: English Literature and Linguistics (NUML)

Adjunct Faculty

Dr. Usman Mustafa

Dr. Aamir Ahmed

Dr. Irfan Ul Arfeen

Dr. Farrukh Jaleel

Dr. AhsenMaqsoom

Dr. Faheem Qaisar Jamal

Dr. AfshanNaseer

Dr. Yasir Ahmed

Dr. Sohail Anwer malik

Dr. Osama Waleed Qazi

ADMISSION AND REGISTRATION

General Rules of Admission and Registration

The Bachelor's degree programs are spread over four calendar years. Each academic year consists of two regular teaching semesters, i.e. Fall and Spring with a duration of 17-18 week (15 week of instruction +2 to 3 weeks of exam). There is also a summer semester of eight to eleven weeks of instructions plus one week of examinations which is an accelerated one primarily for those students who want to repeat certain courses to make up for their academic deficiencies or are motivated enough to develop expertise in specific technical/professional skills. For postgraduate programs, the academic year at SS-CASE-IT consists of two regular length teaching sessions, i.e. Fall and Spring semesters.

Following are typical Semester Timelines

1. Fall: September to December (16 to 18 Weeks)
2. Spring: January to May (16 to 18 Weeks)

Academic Calendar

1. Each Academic Year consists of one sequence of a Fall Semester followed by a Spring Semester and a Summer Semester. The word "term" may refer to a Fall Semester, a Spring Semester, or a Summer Semester.
2. The Office of the Registrar shall publish the official Academic Calendar for each semester. Due to variations in the yearly calendar and the need to balance the dates of campus events, gazette holidays, and unforeseen situations, the Registrar uses discretion, as appropriate, to set dates on the Academic Calendar. The calendar will include the following information:
 - (a) Semester starting date.
 - (b) Holidays during the semester.
 - (c) Semester termination date.
 - (d) Mid-Term exam week
 - (e) Final exam week.
 - (f) Result notification and transcript issues dates. Each transcript will have course grades, semester Grade point average (SGPA) and cumulative GPA (CGPA).
 - (g) Controller of Examinations will be responsible for issuing the transcripts (and degree supplement form on request) to students and their faculty advisors in a timely manner to facilitate enrollment for the next semester or graduation.
3. In addition to the standard Academic Calendar, some programs may be offered on other schedules. All such off-cycle offerings are subject to the approval of the Vice Chancellor. With approval, such programs may operate under different academic rules, such as credit hour limits or withdrawal dates than those specified for standard academic terms. Academic Calendar for such off-cycle semester will be notified by the Registrar Office.
4. In case a university is closed due to unusual circumstances, then special makeup classes must be arranged converting weekends or holidays to working days to cover the lapsed period of the students.
5. The students shall be responsible to meet the requirements and deadlines published for each semester in the Academic Calendar.

Admission Eligibility

1. Admission to Institute is open to all qualified students based on merit irrespective of their gender, age, religion or nationality.
2. A candidate for admission in any Degree must fulfill the criteria prescribed by the Institute / Pakistan Engineering Council (PEC) / Higher Education Commission Islamabad (HEC), as amended from time to time. It shall be the candidate's own responsibility to get the equivalence established through Inter Board Committee of Chairman (IBCC), Islamabad, where required.
3. Result awaiting candidates will be considered for provisional admission, and conditional offers will be made to successful candidates. Admitted candidates must submit their final results / certificates at earliest after announcement of their respective result. Failure to do so may lead to admission cancellation.
4. For admission eligibility refer to the relevant faculty pages of this prospectus

How to Apply for Admission at SS-CASE-IT

1. Fill our online admission form by visiting our website, www.case.edu.pk
2. Deposit application processing fee Rs. 1,500/- (Except PhD) in any branch of Askari Bank Limited using the prescribed challan form which can be printed after completing online admission form. Processing fee of PhD program is Rs. 5000/-

Admission Form Requirement

Submit two sets of following attested documents:

- a. Admission form
- b. Paid challan form of application processing fee.
- c. Marks-sheet/Certificates of SSC and HSSC for undergraduate candidates
- d. Certificates of SSC, HSSC and graduation for postgraduate candidates
- e. In case of both O/A level, IBCC Equivalence Certificate.
- f. Appropriate entrance test score NAT/ GAT etc. (if required)
- g. 04 passport size photographs
- h. CNIC / Form-B
- i. Certificate of relevant body registration for postgraduate candidates (if required)

Admission Test

Applicants are needed to have a valid NAT/GAT/HAT Test score as given in detailed admission eligibility of respective academic program at the time of admission. Those applicants who do not have a valid Test Score are required to appear for entrance test to be conducted by SS-CASE-IT. The schedule of entrance test shall be announced on our website and in newspapers.

Merit List

The lists are uploaded on SS-CASE-IT website as per announced schedule and admission offer letters are also sent to the successful candidates. The candidates are required to deposit fee and reserve their admission according to the given deadline.

The Admission Acceptance

The selected candidates are required to accept their provisional admission by paying the prescribed fee to any branch of Askari Bank Limited. After depositing fee the candidates are required to provide its proof to Student Affairs Dept within the given deadline.

Semester Registrations

Students register themselves for courses offered in a semester according to the dates given in the Academic Calendar which is notified in each semester and available on SS-CASE-IT website / Student Affairs department and notice boards. The course registration in each semester is mandatory. If a student fails to register for a regular semester, till one month after start of semester, he will be treated as suspended from the Institute. The students are required to register their courses through their web portal and submit hard copies of registration forms to Student Affairs Department after depositing fee to any branch of Askari Bank. The registration for the first semester (undergraduate programs only) shall be made by Student Affairs Office.

Late Registration

The registration should not be late by more than two weeks of the normal registration deadline, inclusive of holidays, if any. The approvals of late registration must be granted by concerned department chair. If approval is granted the student must deposit a late fee (as per Academic Calendar).

International Students

SS-CASE-IT welcomes international students to all its programs. The presence of students from different countries and cultures helps in creating a stimulating multicultural environment. Applicable eligibility criteria is the same for international students.

Merit, Need based and Kindship Scholarship

SS-CASE-IT provides Merit based scholarship to those students whose academic performance is very good during the semester for all programs. Student has to maintain certain level of Semester and Cumulative Grades (SGPA & CGPA). Detail information about Merit based scholarship is available at our website (www.case.edu.pk).

Students with financial crisis, SS-CASE-IT provides them financial aid under Need based scholarships in terms of the discount in their fee.

1. The student must submit the prescribed financial aid form to the Student Affairs Department at the time of semester registration.
2. The financial aid committee meets in the beginning of each semester to take decisions on such applications for that particular semester.

Kinship scholarships are also awarded to the students having more than one siblings studying at SS-CASE-IT. The scholarship amount varies between 25% - 35% of the semester fee depending on some conditions for one sibling.

Fee Refund Policy of New Students

Fee will be refunded to the students who desire to withdraw/discontinue/migrate the studies according to the following rules:

1. Fee refund will only be considered if full fee has been paid.
2. Admission fee shall not be refunded in any case.

Students who are given provisional admission while waiting for the results of exams, will be refunded less admission fee if they subsequently fail to qualify and do not meet prerequisites for admission.

If the students, who have been newly admitted and want to cancel their admission by the admission withdrawal date (which is usually 2-3 weeks before the commencements of the classes and announced at the time of admission) will be refunded the fee less the admission fee.

If application of admission cancellation is submitted after admission withdrawal date the fee shall be refunded according to the following rules:

- Security deposit + 100% of tuition fee, if applied till end of 1st week of commencement of classes.
- Security deposit and 50% of tuition fee, if applied till end of 2nd week of commencement of classes.
- No fee (except securities) shall be refunded if admission is withdrawn after second week of commencement of classes.

Fee Refund Policy for Existing Students:

If a student does not show up and remains absent for three weeks, his/her admission will be cancelled and no fee refund will be allowed.

The students of undergraduate programs who apply for admission cancellation shall be refunded securities + fee of the course which they have already paid but did not register. The course fee of graduate students shall only be refunded if they have dropped the course according to the refund dates of academic calendar of a semester.

Attendance Requirement

The student is eligible to appear in the final examination if he/she has obtained a maximum of 75 % of the total number of lectures delivered, the laboratory periods held and practical work done in a course during the semester for which the examination is being held. A further 10% relaxation can be given by the Department Chairman. The student can appeal to the respective Dean in case of any grievance against the decision. The Department will forward the notification of any relaxation given to the student to the controller of Examination.

Course Add Policy

Students can add course(s) before the end of the first week of the semester. They must submit printed and signed copy of online Course Add Form along with the proof of payment of the new course(s) fee. In case of undergraduate students, the Add Form must be signed by the respective academic advisor.

Course Drop Policy

After the initial registration students may drop courses in the period specified in the academic calendar by submitting signed copy of online course Drop Form. After a certain deadline, students cannot drop or change a course. It is the students' responsibility to check their latest course enrollment. The SS- CASE-IT management will not be responsible for any confusion due to incorrect course codes and/or section enrollment. In case of the undergraduate students the Drop Form must be signed by the respective academic counselor. The counselor determines whether the withdrawal is crucial for the advisee's academic performance and whether the course is not a pre-requisite for next semester courses for the advisee. Withdrawal from a course will not be allowed if it leads to a failure in meeting the minimum course load requirement for maintaining student's semester registration status, i.e. registration in a minimum of three courses in any semester. (Withdrawal from a repeating course, i.e. a course which the student is repeating for improving his previous grade earned in the same course in a previous semester, will not be allowed). The course (s) withdrawn within the allowed time as per academic calendar will be recorded on the transcript with a grade "W". After that withdrawal of a course will not be allowed.

Course Cancellation

SS-CASE-IT reserves the right to cancel a course for any reason (e.g. low enrollment, etc).

Cancellation of Admission

1. The Institute reserves the right to cancel admission of a student on grounds that include but are not limited to disciplinary reasons or false/fraudulent statements in application form, falsification of academic credentials etc. If, for any reason, Institute cancels the admission of a student after he has been selected, the reasons for the cancellation will be given to the student in writing.
2. Failure to register for any course for one academic year and not applying for semester leave will result in admission cancellation.
3. The institute may cancel the admission of a newly admitted student who fails to attend any class in the first four weeks of semester.
4. Student Admission Cancellation will be recommended by Department Academic Affairs Committee and approved by faculty Dean and notified by Institute Registrar.



FEE STRUCTURE SS-CASE-IT

Students are required to pay the fees at the time of admission and registration for the subsequent semesters. Following tables describe the fee structure for the current year. The fees may be revised any time depending on inflation and prevalent market trends.

B.Sc. (Electrical Engineering)	
One Time Charges (Payable at the Time of Admission)	
Admission Fee (Non Refundable)	Rs. 18,000
Securities (Refundable)	Rs.10,000
Per Semester Charges	
Semester Fee	Rs. 94,000
Total Payable at the Time of Admission	Rs. 122,000
Total Payable at the Start of Each Subsequent Semester	Rs. 94,000
BS Computer Science / BS Artificial Intelligence / BS Cyber Security	
One Time Charges (Payable at the Time of Admission)	
Admission Fee(Non Refundable)	Rs. 18,000
Securities (Refundable)	Rs.10,000
Per Semester Charges	
Semester Fee	Rs. 88,000
Total Payable at the Time of Admission	Rs. 116,000
Total Payable at the Start of Each Subsequent Semester	Rs. 88,000
BS (Software Engineering)	
One Time Charges (Payable at the Time of Admission)	
Admission Fee (Non Refundable)	Rs. 18,000
Securities (Refundable)	Rs.10,000
Per Semester Charges	
Semester Fee	Rs. 81,500
Total Payable at the Time of Admission	Rs. 109,500
Total Payable at the Start of Each Subsequent Semester	Rs. 81,500
Bachelor of Business Administration (BBA)	
One Time Charges (Payable at the Time of Admission)	
Admission Fee (Non Refundable)	Rs.10,000
Securities (Refundable)	Rs.10,000
Per Semester Charges	
Semester Fee	Rs. 65,000
Total Payable at the Time of Admission	Rs. 85,000
Total Payable at the Start of Each Subsequent Semester	Rs. 65,000

BS Accounting and Finance (BSAF)	
One Time Charges (Payable at the Time of Admission)	
Admission Fee (Non Refundable)	Rs.10,000
Securities (Refundable)	Rs.10,000
Per Semester Charges	
Semester Fee	Rs. 71,000
Total Payable at the Time of Admission	Rs. 91,000
Total Payable at the Start of Each Subsequent Semester	Rs. 71,000
Associate Degree in Commerce (B.COM 2-year)	
One Time Charges (Payable at the Time of Admission)	
Admission Fee(Non Refundable)	Rs.10,000
Securities (Refundable)	Rs.10,000
Per Semester Charges	
Semester Fee	Rs. 45,000
Total Payable at the Time of Admission	Rs. 65,000
Total Payable at the Start of Each Subsequent Semester	Rs.45,000
MS/PhD (For All Programs)	
One Time Charges (Payable at the Time of Admission)	
Admission Fee (Non Refundable)	Rs. 18,000
Securities (Refundable)	Rs.10,000
Per Semester Charges	
Per Course Charges (3.0 Credit Hours @ Rs.8,500/-per Credit Hour)	Rs. 25,500
Per Course Charges for MS Mathematics (3.0 Credit Hours @ Rs.5,800 per Credit Hour)	Rs. 17,400

- ▶ Per Credit Hr Fee for BSEE (Repeated Course) 5,500
- ▶ Per Credit Hr Fee for BSSE (Repeated Course) 4,900
- ▶ Per Credit Hr Fee for BSCS/BSAI/BSCYS (Repeated Course) 5,250
- ▶ Per Credit Hr Fee for BBA (Repeated Course) 3,800
- ▶ Per Credit Hr Fee for BSAF (Repeated Course) 4,150
- ▶ Per Credit Hr Fee for B.COM (Repeated Course) 2,900
- ▶ Registration Fee for Repeating Course 5,000

EXAMINATION RULES

Credit Hour Systems

1. The duration/frequency of classes for every course offered in Institute is referred to in terms of Credit Hours. The Credit Hours assigned to the theory courses or laboratory courses are determined by the class hours allocated to it per week throughout the semester. For a theory course, one credit hour is equivalent to one hour of classroom lecture per week; and for a laboratory or Studio courses, one credit hour is equal to three hours of practical work. No Credits Hours are assigned to the tutorial classes meant to help students understand the contents covered during the class.

Academic Standing

For Undergraduate Programs

1. The assignment of academic standing is based on both the student's most recent academic term and his cumulative grade-point average. At the end of each semester, students are awarded with different academic standings, based on their academic performance.
2. Following is the list of the standings/honors awarded to undergraduate students while enrolled.

Academic Standing	Criteria SGPA	Criteria CGPA	
Faculty Honors	3.90 to 4.00	3.50 or above	Normal course load and no disciplinary action
High Distinction	3.75 to < 3.90	3.50 or above	Normal course load and no disciplinary action
Distinction	3.50 to < 3.75	3.25 or above	Normal course load and no disciplinary action
Good	2.75 to < 3.50	2.50 or above	Not on academic warning or probation and no disciplinary action
Satisfactory	2.00 to < 2.75	2.00 or above	
Warning			The minimum semester GPA to remain in good academic standing is 2.00. Students are placed on academic warning for the next semester if their semester GPA falls below 2.00 at the end of a semester or his CGPA is less than 2.00.
Probation			Already on academic warning and earns a GPA less than 2.00 in the current semester is placed on probation for the next semester. Similarly a student whose CGPA is less than 2.00 and he obtains a GPA less than 2.00 in the current semester is also placed on probation for the next semester.
Dropped			If a student who is already on probation and obtains a GPA less than 2.00 and CGPA is still less than 2.00 in the current semester, or a student having a CGPA of less than 1.70 at the end of his first academic year may be expelled from the Institute

For MS and PhD Programs

3. The minimum satisfactory grade-point average (GPA) is 2.50 for MS and 3.00 for MS /doctoral students.
 - (a) A student who has a GPA or CGPA below the minimum satisfactory GPA requirement shall be placed on academic warning.
 - (b) A student on academic warning whose grade-point average for the academic term is above the minimum satisfactory scholarship requirement and cumulative grade-point average is below the minimum satisfactory scholarship requirement shall remain on academic warning.
 - (c) Admission of the student may be cancelled if he remains on Academic Warning for more than two semesters.

Student Evaluation System

1. The performance of every student shall be continuously monitored and accessed throughout the semester. During the semester a student's performance shall be evaluated by taking quizzes, assignments, mid-semester examination, laboratory reports and project presentation etc. A final examination shall also be taken at the end of the semester covering the entire syllabus. The course teacher shall be responsible for evaluation of work / performance of the students of his class and for the award of grades to them on the basis of such evaluation.
2. Grading Mechanism: Course grades shall be awarded to the students preferably based on their relative performance in the course.

3. There shall be 4-letter grades i.e. A,B,C& D for individual courses with 9 performance levels.

Letter Grades	Performance Levels
2 As	A and A-
3 Bs	B+, B and B-
3 Cs	C+, C and C-
2 D	D+ and D
F	Fail

4. There will be no C- and D grade in the postgraduate program

5. The grade points assigned to letter grades shall be indicated as under:

Letter Grades	Quality Points	Letter Grades	Quality Points
A	4.00	C	2.00
A-	3.67	C-	1.67
B+	3.33	D+	1.33
B	3.00	D	1.00
B-	2.67	F	0.00
C+	2.33		

6. The following grades are used under special conditions like grading research work and are not included in the calculation of grade-point average (GPA):

Letter Grades	Explanation
s	Satisfactory
u	Unsatisfactory
v	No credit earned. The "v" grade is used when a student audits a course

7. A student whose final grade is "F" or "U" has failed the course. The student must repeat and pass the course before credit will be allowed.

8. The following grades are used in the cases indicated and are not be included in the calculation of grade-point average (GPA):

Letter Grades	Explanation
I	Incomplete: Student must apply for I-grade within one week after the final exam of the respective course failing to which he will be awarded F-grade. His application for I-grade will be assessed by the Departmental Academic Affairs Committee. If the Committee approves I-grade, the student shall take the exam as per schedule given by the Controller of Examination.
W	Withdrawal without Penalty. Withdrawals from individual courses without penalty are not permitted after 60 percent of the academic term has passed, as specified by the official Academic Calendar, except in cases of hardship, as determined by the Department Academic Affairs Committee. Withdrawal from the Institute is not permitted after 60 percent of the academic term has passed, except in cases of hardship, by the Department Academic Affairs Committee.
NR	Not Reported. The "NR" grade is used when, by no fault of the student, the instructors' fails to submit grades before the deadline.
IJ	Incomplete Judicial. The "IJ" is used when disciplinary misconduct has been reported and the investigation is being conducted. It is a placeholder grade that is changed to a permanent grade as determined by the outcome of the investigation process. It remains in place until the charges are adjudicated and a proper final grade is determined and assigned.

9. **Calculation of Semester Grade Point Average (SGPA)** The semester grade point average (SGPA) shall be calculated by multiplying the grade points earned in a course with the number of credit hours of that course, taking the sum of such products for each course taken in that semester and finally dividing the result by the total number of credit hours attempted in that semester.

10. **Calculation of Cumulative Grade Point Average (CGPA)** The cumulative GPA (CGPA) shall be calculated similarly (as that for SGPA) for all the courses taken in all the semesters of the degree programs.
11. **Course Evaluation Components**
- (a) Different evaluation components of a course are generally as follows;
 - (i) Quizzes: There shall be an appropriate number of quizzes (announced/unannounced) per course.
 - (ii) Mid Semester Examinations: There shall be at least one mid semester examination in the middle of semester.
 - (iii) Home Assignments: There shall be an appropriate number of Home Assignments in the course in a semester. The course instructor may also assign a class project where appropriate.
 - (iv) **Presentations:** Instructor may require a class presentation where appropriate.
 - (v) **Laboratory Reports and Assessments:** The students shall submit laboratory reports on each laboratory practical held for the subject having practical part which the lab instructor will evaluate during the semester. Lab instructor will also take appropriate lab assessments to evaluate student performance during the semester.
 - (vi) **End Semester Final Examination:** There shall be separate Final Examination for theory and practical part of a subject at the end of semester. The duration of Theory paper will be from 2.00 to 3.00 hours covering the entire course at the end of each semester. Appearance in the final examination is mandatory.
 - (vii) **Any other Component:** A course instructor may add any other component as per the requirement of the course.

(b) **Weightage of Evaluation Components**

The final grades shall depend on the marks obtained in each of the evaluation components listed above. Suggested weight age given to each component is as follows. Any significant deviation from these weight ages must be brought in the notice of Department Academic Affair Committee for approval. The Controller of Examination will be informed about such cases in writing. Laboratory component if part of the course should have appropriate direct assessments for evaluation. Weight age of the laboratory component should correspond to the credit hour proportion of the lab to the total credit hours of the course.

Nature of Examination	Weightage (Min/Max)
Quizzes/Assignment/Presentation/Project	5-40%
Mid Semester Examinations	15 - 40%
Laboratory	As per credit hours proportion in the course
Final Examination	35 - 50%

- (c) **Absence from Examination** Absentees in any of the evaluation components shall be awarded zero marks whereas the absentee of end semester Final Examination shall be awarded an F grade irrespective of sessional marks provided his case for I grade is not approved.
- (d) **Showing of Answer Scripts**
- (e) The marked scripts of each examination component i.e quizzes, assignments, lab reports, mid and end semester examination shall be shown to the students by the concerned teacher within seven days of the activity performed. In case, a student is not satisfied with his awards and/ or clarification from the teacher concerned, he may make written complaint to the Chairman of the Department who will refer the case to the Department Academic Affair Committee and the decision of the Committee shall be final.
- (f) **Final Year Project** In the final year of the undergraduate programs, students shall be required to do a project which is assigned at least six credit hours. Each program must have a declared evaluation mechanism for award of grades in the final year project.

12. Repeating Courses / Improving Grades

- (a) Students are allowed to repeat a course in order to improve the CGPA. All course repetitions must be completed within the maximum allowable duration of the program. The latest grade earned by the student shall be considered for the computation of CGPA.
- (b) If a student drops a repeating course with a "W" grade, the previous earned grade of the student will be counted towards the CGPA.
- (c) Undergraduate students are allowed to repeat a course in which he has obtained grade below "C". An undergraduate student is allowed to repeat a maximum of 6 courses in an eight-semester degree program.
- (d) A post graduate student with a 'C' grade can repeat the course to improve the grade. A postgraduate student is allowed to repeat a maximum of 3 courses.
- (e) In case a student repeats a course, which has already been taken, and in case a student takes a new course in lieu of the elective course in which he failed, both the courses along with grades will be reflected on his final transcript.

13. Semester Leave

- (a) Students will be allowed to Semester Leave owing to some extreme and genuine reason to be approved by the Departmental Academic Affairs Committee.
- (b) A student must apply to the Chairman of the Department, in writing, for semester leave within fifteen days of commencement of the semester.
- (c) No semester leave will be granted in the first two semester of admission for undergraduate and first semester for postgraduate students or when the student has not earned any credit hours at the Institute.
- (d) The maximum duration of the degree programs shall remain the same which will be counted from the date of his admission including the semesters on leave.
- (e) Student status will be suspended for students who don't apply for semester leave and do not register in a semester.

14. Re-enrollment:

- (a) Students Whose admission is cancelled can apply for re-enrolment to the chairman of concerned department. The case will be forwarded to the Faculty Dean. If re-enrollment is allowed, the student will pay all the pending dues along with prescribed fee.
- (b) If program requirements have changed during the period of interruption of studies, the student will be required to modify his degree program to ensure conformity to the latest version of the curriculum.
- (c) Re-enrollment is not allowed to a student who don't complete his first semester after admission for graduate students and first two semesters for undergraduate student s. Such student can however seek fresh admission.
- (d) Students whose admission has been cancelled on disciplinary ground will not be re-enrolled in any program at the institute.

15. Internship

A student shall be required to complete any practical training programs if it is part of the degree completion requirement.

16. Academic Audit

On the completion of degree requirements, the Chairman of each department will sign the Academic Audit of each student showing the completion of the degree requirements or not. In case of any deficiency of degree completion, the reason will must be clearly mentioned. This Academic Audit will be forwarded to the Controller of Examinations.

17. Submission of Results

All results will be submitted by the instructor in the office of the Chairman of the Department. After discussion in the Board of Faculty, signed result by the Chairman will be submitted to the Controller of Examinations.

18. Notification of Results

As soon as possible after the completion of the examination and submission of awards by the Academic Department the Controller of Examinations shall notify the result after proper scrutiny.

19. Submission of Degree Petition Form

Submission of Degree Petition Form within 15 days after the announcement of provisional result is mandatory for each student who has completed minimum degree requirements. If he desires to improve his CGPA the Improvement of CGPA Form must be submitted within 15 days after the announcement of provisional result.

20. Rechecking of Examination Script

- a. The answer book of a student is normally shown to the student in an announced time slot by each instructor after the paper checking is complete. The student is expected to raise his concerns with the instructor at that time. In case of any grievance against the instructor, he can apply to the Department Chairman within one week who will forward the case to the Department Academic Affairs Committee for resolution.
- b. Once the course instructor submits the answer script to the examination department, the student has to formally apply for rechecking of his answer book. The student can apply for either remarking of the paper or clerical recheck on payment of prescribed fee within one week of the announcement of semester results.
- c. In the full re-mark of paper, the student answer book will be provided to the respective course instructor for going over his paper marking once again. The course instructor will show the paper to the student and answer his queries about marking. In case of any change in the result, necessary result change procedure will be completed by the instructor. In case of any grievance against the instructor, he can apply to the Department Chairman within one week who will forward the case to the Department Academic Affairs Committee for resolution within one week.
- d. In case of clerical re-check of the paper, the answer script shall not be re-assessed. The Controller of Examination will arrange for clerical re-checking of examination script by any faculty member from the relevant discipline on the complaint/request of students within two weeks. The Controller of Examination or any officer or re- checking committee appointed shall see that:
 - (i) There is no computational mistake in the grand total on the title page of the answer book.
 - (ii) The total of various parts of a question has been correctly made at the end of each question.
 - (iii) All totals have been correctly brought forward on the title page of the answer book.
 - (iv) No portion of any answer has been left un-marked.
 - (v) Total marks in the answer book tally with the marks sheet.
 - (vi) The hand-writing of the student tally in the questions/answer book.
 - (vii) The student or anybody on his behalf has no right to see or examine the answer books for any purpose.
 - (viii) The marks of a student could even decrease. In the event of reduction of marks the record shall be corrected accordingly and revised result will be updated.
 - (ix) In case the student result is revised in the process, the fee paid by the student will be refunded.

21. Academic Transcript

- (a) **Semester Grade Sheet:** The semester grade sheet will be provided at the end of each semester after the result notification. The semester grade sheet will indicate courses along with letter Grades, Grade Points, SGPA and CGPA.
- (b) **Official Transcript:** Official Transcript of Awards at any stage in the degree program shall be issued by Examination Department on payment of prescribed fee as per student request.
- (c) **Final Official Transcript:** Final Official Transcript will be issued to students who have been declared graduates by the examination department after completion of their degree programs. Final official transcript will be issued after payment of prescribed fee and submission of clearance certificate and other requirements.
- (d) If a student has not completed degree requirement or has not been notified as graduate by the examination department, the degree status of such students on the semester grade sheet/transcript will be shown as "Incomplete".

22. Credit Hours for the Award of Degree

- (a) The total number of credit hours required for the award of degree shall be as per the degree plan of each degree.
- (b) An undergraduate student is declared passed if he successfully completes all the requirements set for a degree from the Institute and attains a CGPA 2.0 or greater within the minimum and maximum duration for the particular degree program and there are no financial and other obligations outstanding against him.
- (c) A MS / M. Phil student is declared passed if he successfully completes all the requirements set for a degree from the Institute and attains a CGPA 2.5 or greater within the minimum and maximum duration for the particular degree program and there are no financial obligations outstanding against him.
- (d) A PhD student is declared passed if he/she successfully completes all the requirements set for a degree from the Institute and attains a CGPA 3.0 or greater within the minimum and maximum duration for the particular degree program and there are no financial obligations outstanding against him.

23. Institute Degree:

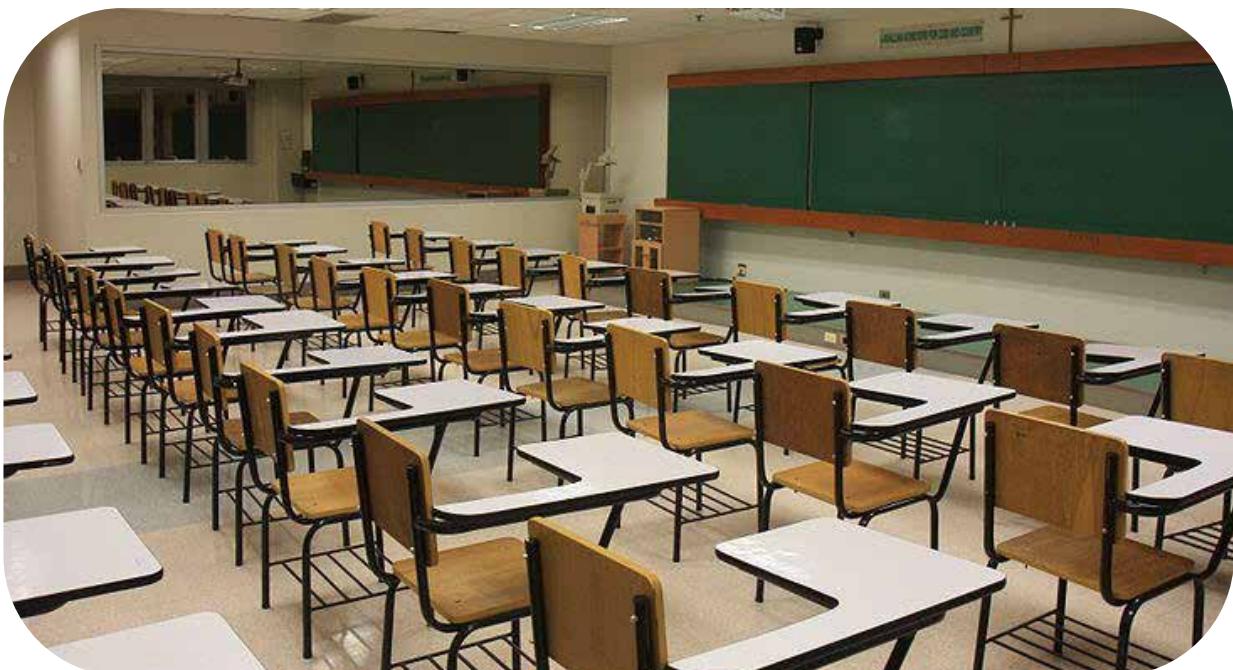
The degree shall normally be issued to the graduates at the time of Institute Convocation after submitting the duly completed official clearance form. However, a graduate after obtaining the Final official Transcript can apply for issuance of the degree before convocation on payment of the prescribed fee.

24. Cancellation of Degree:

Any plagiarism in research work or fake documents submitted by the student, even those submitted at the time of admission shall result in cancellation of degree if such a fact is discovered after the award of a degree. The cancellation process will be initiated by the Chairman of the respective department and forwarded to Academic Council for recommendation to competent authority of degree cancellation.

25. Conflict Resolution:

In case of any conflict or interpretation of the fore mentioned regulations on refund off and other charges, the matter will be referred to the Vice Chancellor through the Registrar whose decision will be considered final.



OFFICE FOR RESEARCH, INNOVATION AND COMMERCIALIZATION (ORIC)

ORIC have the essential role in assisting the Academia and Industry associations for research commercialization.



ORIC acts as a bridge and provides all the support for the activity. The model implemented is in direct conjunction with HEC. SS-CASE-IT provides students and faculty members with the environment that nurtures the process of creativity and problem solving. Active involvement of faculty members in industry provides students and researchers with the access to real-life engineering problems and how industry react to them.

Involvement of students into the industrial setup is the future of education. Research activities targeted towards economical industrial solution rather than myopic projects and wastage of time and resource. At SS-CASE-IT we have a focused mind-set, to provide students with the skillset to create and pave their own way in the world of Engineering, Computing & Business.

We have always set an ambitious target of achieving job placement of our graduating students with organizations of repute. These efforts have given fruit as many of our graduates are working in prestigious national and international Organizations across the globe.

CENTER FOR ADVANCED RESEARCH IN ENGINEERING

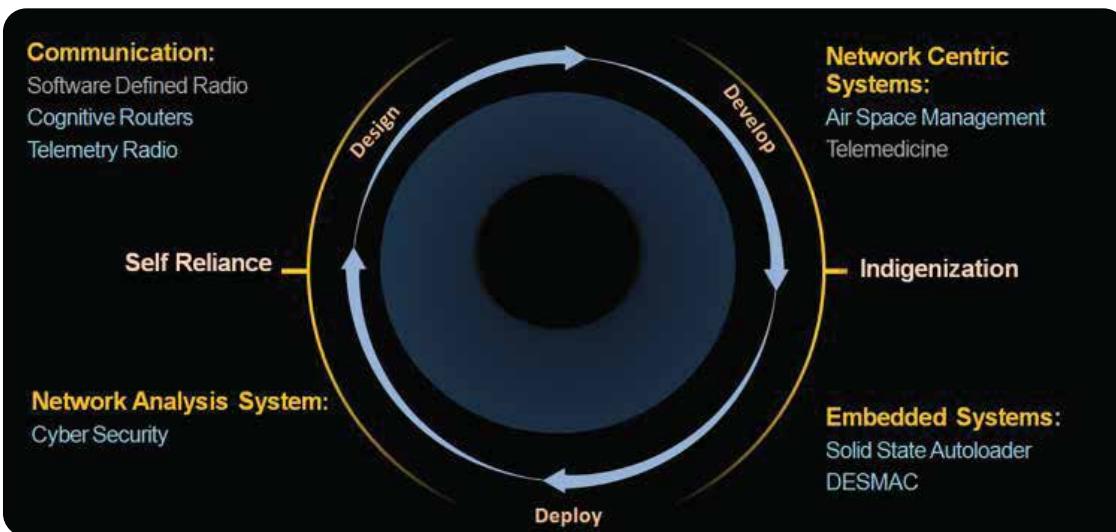


Center for Advanced Research in Engineering

Academic programs offered at SS-CASE-IT are with strong industrial orientation. Realizing the importance of a strong Academia-Industry relationship, Center for Advanced Research in Engineering (CARE) was established in January 2003 by the same team that established SS-CASE-IT displaying an ideal model of industry-academia partnership and collaboration.

Center for Advanced Research in Engineering (CARE); certified CMMI compliant organization is the most celebrated engineering organization in Pakistan. Our strong research and development focus has enabled us to position ourselves at the forefront of technology. Our success is based upon Clients' focal points. We work with our customers' needs, map their requirements to most suitable technologies and thus offer them the right solutions and products. CARE has outstanding products and system design portfolio and it thrives on its well-trained, diverse and experienced team. CARE has been catering for the dire technical needs of Pakistan by rendering services to different organizations.

CARE has expertise in the core areas of:



Software Defined Radio



Solid State Autoloader for Al-khalid Tank

CARE helps SS-CASE-IT students in undertaking cutting edge final year degree projects. CARE exposes SS-CASE-IT students to new technologies and industrial culture. This feature of an established engineering organization in an institution premises is very unique to SS-CASE-IT

Foreign Collaboration

Aggressively working with foreign companies in Turkey, China and Saudi Arabia on the design and implementation of information and communication technology products.

CASE ROBOTICS GROUP

CASE Robotics Group (CRG) was established in 2008 to encompass the significant and growing robotics community at SS-CASE-IT. It is an association of research lab, teaching faculty and undergraduate students in Electrical and Computer Engineering (ECE) department. Our mission is to imply world-class research and pedagogy to train future generations as critical thinkers and problem solvers. We achieve this objective by drawing from the breadth of our expertise which ranges from embedded system development to artificial intelligence, algorithms and social implication of robotics. We take pride in the way we challenge ourselves by deploying and running various complex robotics systems to achieve set goals. Our excellence is manifested in more than 50 national and international robotics titles and more than 10 international representations for Pakistan around the globe.

Considering the need for aligning our undergraduate ECE program with the demands of today's fast moving technological and multidisciplinary era, CRG offers students various projects of significant industrial and social impact. We at our robotics group strongly believe that engineering education without hands-on experience limits the capabilities of students. Do-It-Yourself (DIY) activities are the most engaging way of introducing core electrical and computer engineering principles. The process of building and programming robots in a team-based setting and against appropriate time constraints is indispensable. It is this experience at CRG which has helped our students and faculty members to deliver world-class products and startups, for example:

- Let's Innovate (www.letsinnovate.net) was founded in 2015 by a team dominated by CRG's graduated students and faculty members. Their leading product is HELLI, a smart helmet that is built from the ground up to tackle everyday commuter needs. HELLI safely connects riders while they are on-the-go along with enhancing their overall safety in the process.
- RoboMinors(www.robominors.com), Pakistan's leading robotics and STEM Education Company which provides educational services and products ranging from children as young as six years old to university students and working professionals.
- Portable & Robust Security Surveillance System installed at Institute of Optronics (IOP).
- Semi-autonomous Controller for X-Ray Machine for Shifa International Hospital, Islamabad.
- Programming and Training of 6-axis Robotic Arm for Welding Purpose at PAF Faisal Base, Karachi.
- Tank Tread System based mobile robot for bomb displacement system for defense applications.
- Automated satellite tracking system for NETSAT's DSNGs.

CRG has pioneered robotics research in Pakistan since its inception in early 2008 and has won more than 50 national and international titles. Few of the titles and participations include but not limited to:

ABU-ROBOCON 2019

Team from SS-CASE-IT after successfully qualifying national round went on to represent Pakistan as a National Robotics team for ABU-ROBOCON 2019. The event was held in Ulaanbaatar Mongolia. ROBOCON is the largest and most prestigious robotics event of the ASIA pacific region countries participate in the event comprising of some of the most technological advance counties like Japan, China, Korea, Russia, Singapore, Hong Kong and many others. Top universities from these counties participate in the educational event. SS-CASE-IT as always prepped final year students for the event. Team from SS-CASE-IT comprised of four students, i.e., Mr. Haider Ali, Mr. HamzahAyaz, Mr. Qamar Abbas and Abdullah Bukhari. Students were supervised by two faculty members, i.e., Dr. M Umer and Mr. Waqas Ur Rehman.

Our students Competed in the event with confidence, courage and scored a win against India in a main event Pool Match.



Singapore Autonomous Underwater Vehicle Challenge (SAUVC) 2017

Our team secured the first position in one of the world's largest underwater robotics challenges – SAUVC held in March 2017 in Singapore. SAUVC is famous for providing students with the opportunity to learn about the design of robots which can automatically navigate underwater and perform assigned tasks. The event is hosted by IEEE Singapore chapter at Singapore Polytechnic. This is the first time that any Pakistani team has participated in this prestigious event. Fourteen teams from eight countries including USA, China, India, Russia, Malaysia, Indonesia and Singapore participated in the event. Pakistani team, apart from sharing top position with Russia, also bagged Best Social Media Campaign award. Team from SS-CASE-IT comprised of four students, i.e. Mr. Haider Iftikhar, Mr. Usman Abid, Mr. Saad Malik and Ms. Mehrosh Fareed. Students were supervised by three faculty members, i.e. Dr. Mansoor Shaukat, Mr. Muhammad Adeel and Mr. Waqas Ur Rehman.



Pakistani team's group photo at SAUVC 2017 with their underwater robot

THE NATION

Pakistan wins top position in underwater robotics challenges SAUVC 2017

| March 27, 2017

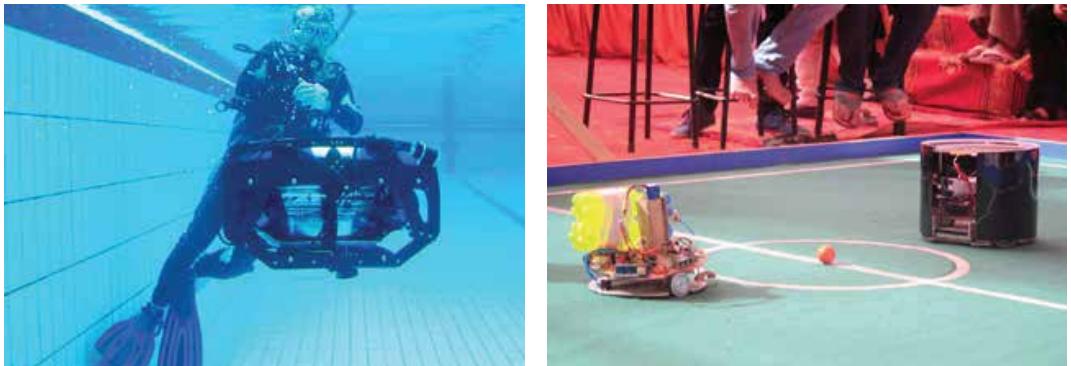
Press clipping from Daily The Nation covering SAUVC 2017

National Engineering Robotics Competition (NERC)

Various teams from CRG have the privilege and honor to win multiple titles at Pakistan's largest robotics competition, i.e., NERC. From 2009 to 2011, CRG has bagged a hat trick of winning the best team award along with numerous other positions and awards.

National Robosprint

Robosprint is a national robotics competition that SS-CASE-IT organizes in collaboration with other universities all around Pakistan. The competition is based on the concept of friendship and knowledge-sharing. A team of mentors at CRG tours every university of Pakistan from where a team has registered for the event and helps the team members with technical assistance. A team of students is also assigned as team assistants to all the teams and offer facilitation whenever required. These steps resonate into a culture of a national collaboration to realize the dream of a progressive and technologically aligned Pakistan.



ABU Robocon

Asia Pacific Broadcasting Union' (ABU) organizes Robocon, the largest Asian robotics event, in different countries. Only the best team from a country qualifies for the international finals. SS-CASE-IT is representing Pakistan since 2010 in different countries including Egypt, Thailand, Hong Kong, Vietnam and Indonesia. CRG, representing Pakistan, has also scored wins against teams like India and Russia in the international competitions.



Pakistan beating Russia 80-nil in Robocon 2011



ROBOCUP

RoboCup has the game of soccer at its heart with cooperative multi-robot and multi-agent systems playing in dynamic adversarial environments. In 2014, team from SS-CASE-IT represented Pakistan in this competition in Brazil. Another team from SS-CASE-IT has participated in RoboCup in Germany in 2016.



A shot from Robocup 2016 held in Germany.

COMPPEC

Students from CRG have won several final year project exhibitions all around the national canvas. One of the most prestigious final year project exhibition is COMPPEC, held in NUST each year, where our student projects have won best and runners-up awards multiple times since 2009.

SS-CASE-IT: A CONTRIBUTION IN KNOWLEDGE BASED ECONOMY

R&D Funding Ignite Technology Fund

SS-CASE-IT has been one of the largest recipient of research grants (Rs + 110 Millions) from Ignite National Technology Fund of Ministry of Information Technology in last 8 years and produced a number of cutting edge technologies for defense, telecomm and health care. We have developed a wide range of products like ECG Machine for Cardiac care, Software based diagnostic tools for wide range of eye diseases, Hospital Management & Information System, Net Centric Air defense System, various components for Al Khalid Tank etc.

No.	Title of Project	Client	Deployment	Funding Received
1	Massively Parallel Fingerprint Recognition System	Biometric Systems for Hospital Management, Islamabad	July-10	14.9 Millions
2	Arrhythmia and Sudden Death Syndrome Detection Hybrid Network Based Telemedicine System	Armed Forces Institute of Cardiology (AFIC), Rawalpindi	Feb-12	13.55 Millions
3	Intra-cardiac Signal Acquisition, Analysis, and Display (ISAAD) System for Electro-Physiology	Armed Forces Institute of Cardiology (AFIC), Rawalpindi	Apr-14	13.8 Millions
4	Development of a Net Enabled Retinal Image Analysis & Screening System for Grading & Diagnosis of Diabetic Retinopathy and its Integration in i-telemedicine System	Armed Forces Institute of Ophthalmology (AFIO), Rawalpindi	Apr-15	13.76 million
5	Development of the Aircraft In-Flight Loads Computer Software	Aviation Industries of Pakistan	Apr-15 (in progress)	13.76 million
6	OCT Image Analysis System for Grading and Diagnosis of Retinal Diseases and its integration in i-Hospital	Shifa International Hospital	June-19	12.4 Million
7	5G air interface test bed. Design of Waveform and IP development	Defense Organizations	June-19	29.8 Million
			Total	111.97 Million

Research Fundings from HEC & other Resources

SS CASE IT has made research an attractive proposition for faculty by facilitating them to develop research proposals for research grants from various funding agencies. SS CASE IT faculty members have been the major recipient of the research and development grants from National Center of Robotics & Automation, National Center for Cyber Security, Pakistan Science Foundation in last 5 years with a total funding received worth of Rs(+250) Million.

No.	Title of Project	Source	Principal Investigator	Funding Received
1	Deep Package Inspection Lab (2018)	National Center for Cyber Security, HEC	Dr. Najamus Siraj	78 Millions
2	Swarm Robotics Lab (2018)	National Center for Cyber Security, HEC	Dr. Mansour Shokat	76 Millions
3	MEMS Sensor Lab (2018)	National Center for Cyber Security, HEC	Dr. Shafaat Bazaz	74 Millions
4	Secure Communication for Classified (SCC) (2021)	National Center for Cyber Security, HEC	Dr. Qaiser Shafi	15 Millions
5	Indigenous Development of Automatic Syringe Pumps for Intravenous Infusion of COVID 19 Patients in ICU (2020)	Pakistan Science Foundation	Dr. Muhammad Umer and Dr. Shafaat Bazaz	3 Millions
6	Development of MEMS for Tactical applications (2021)	NESCOM	Dr. Shafaat Bazaz	4.1 Millions
7	Autonomous Underwater Mine Detection Vehicle Lab (2019)	NESCOM	Mr. Waqas Ur Rehman	2.3 Millions
			Total	252.4 Millions

Research Groups at SS-CASE-IT

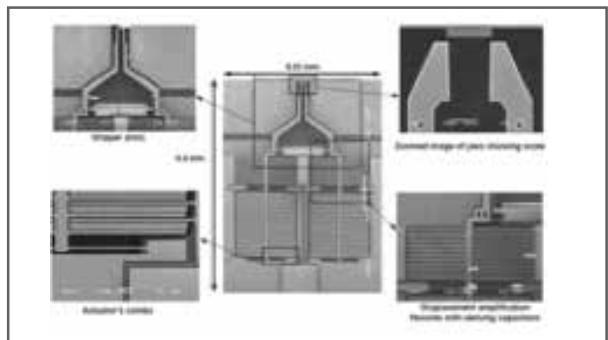
Networks and Cyber Security Groups (NCS)

Networks and Cyber Security (NCS) Group focuses on research and development in the area of computer networks and cyber security. This group collaborate with many R&D companies for different undergraduate and postgraduate level research projects leading to a commercial product. The main objective of this group is to perform research and develop prototype for testing the cutting edge technologies during the development of product.



MEMS and Chip Design (MCD) Group

Micro Electromechanical System and Chip Design (MCD) group focuses on the development of skilled manpower through scientific research to produce world class MEMS and chip design experts having expertise in design and testing to produce world class R&D in MEMS and initiate commercial activities in this area in Pakistan. Moreover, it will support the local needs of the academic institutions, strategic organizations. Lab also aims to develop artificial intelligence based MEMS Inertial Navigation Systems (gyroscope, accelerometers, magnetometer) for mobile robots and other applications.



Wireless Communications and Networks Group (WCNG)

Wireless Communications and Networks Group (WCNG) focuses on research, teaching and innovation in all aspects of wireless communication systems and networks. The research fields are application oriented that get the inspiration from the need and the technological evolution in the field of wireless communications. The research objective is to carry out comprehensive study and investigations for the development of novel methods and algorithms under a mathematical framework verified through simulations and experimental setup. WCNG has close collaboration with CARE, the commercial partner of CASE. In this regard, it has pursued multiple collaborative projects including some with funding by CARE. Moreover, CARE provides access to high-end communication equipment for testing of implemented algorithms including Rhode and Schwarz Vector Signal Generator (VSG), high sampling rate Spectrum Analyzer, etc.



Electric Power and Energy System Group

Power and Energy Systems research group is dedicated to conducting research to deliver technological and training solutions for the power industry. Their research activities are around renewable generation integration, condition assessment of critical power infrastructure and power electronics control and applications. This includes power system stability, state estimation, power quality, grid intelligence, electric transportation, control and operation of power systems and transformer condition monitoring with a specific focus on the needs of electricity supply industry.



QUALITY ENHANCEMENT CELL

Research & development, innovation, entrepreneurial spirit are important factors while developing a knowledge based economy. Realizing these challenges in the field of higher education, Sir Syed CASE Institute of Technology has established the Quality Enhancement Cell (QEC).

In incessant pursuance of quality assurance (QA) practices, the QEC has been structured in a way that it meets the standards set by the Higher Education Commission (HEC) as well as the Outcome Based Education (OBE) system introduced by Pakistan Engineering Council (PEC). SS-CASE-IT has been providing the best and most accurately aligned curriculum to serve the purpose. Recently, Electrical Engineering Program has been accredited by the Pakistan Engineering Council under Level – 2, OBE Accreditation.



QUALITY ASSURANCE MECHANISM

QEC regularly uses the Self-Assessment (SA) tools for achieving Quality Assurance. These practices help to assess the programs performance; whether the existing programs are able to meet the educational objectives and outcomes with the purpose and aims of improving the outcomes and outputs of the education system.



SELF-ASSESSMENT OF PROGRAMS

PROGRAM TEAM

Program team (PT) is responsible for preparing the self-assessment document and is nominated by the head of department. They also act as contact group for the period of assessment.

ASSESSMENT TEAM

Assessment team (AT) is responsible for the review of the self-assessment document and give its findings in the form of an AT report. Self-assessment of the following departments has been initiated.

- Department of Electrical Engineering
- Department of Computer Science
- Department of Management Science



LABORATORIES & RESEARCH ENVIRONMENT

LABORATORIES FOR UNDERGRADUATE PROGRAM

Computer Labs

There are four computer labs with state-of-the-art computers. These labs have total of 220 Computers (Core i-7 with 8GB RAM and 250 GB Hard-disk), are used to carry out labs associated with courses which require use of computer software applications and thus, are reserved during the class scheduled times. Each student is assigned a single computer during labs. However, computers are available during working hours for general use of students. Other than the scheduled class hours, all these labs are available for all students.

Systems Lab

This lab consists of 48 Core i5 & i7 PCs. This lab is used for computer science students for System Programming, Operating Systems, Artificial Intelligence and Web Engineering courses. This lab is also dedicated to Business Science students for their assignments, projects and research work.

Basic Electrical/Electronics Lab

This lab is used to carry out experiments in the core subjects of Electrical Engineering. The lab has 30 work stations; each equipped with oscilloscopes, a 5MHz signal generator, a regulated variable DC power-supply, multi-meter and a bread boarding station. The oscilloscopes are upgraded in a phased manner. Students work on these stations in groups of 2 and hence, this lab can handle a class of 60 students at a time.

Digital Design Lab

This lab is to carry out experiments in the core subjects related to digital systems, e.g. Digital Logic Design, Digital System Design, Microprocessor Based Embedded System Design, etc. The lab has 30 work stations consisting of custom made Digital Logic Design (FPGA) and Microcontroller trainers along with a PC loaded with requisite hardware-software. Students work on these stations in the groups of 2 and hence, this lab can handle a class of 60 students all at one time.

Electromechanical Systems Lab

Experiments related to the subjects of Electromechanical Systems, Control Systems and Power Electronics are performed in this Lab. The lab has a variety of equipment like cut-view and demonstration kits for transformers as well as AC/DC motors, Transformer Winding Machines, Permanent-Magnet and Wound Rotor DC Shunt Motor trainers, DC Series Motor trainers, DC generators and Induction Motor related experimental setups.

Communication Systems Lab

Experiments related to the subjects of Communication Systems, Digital Communications, Antenna Design & Microwave Engineering are performed in this lab. The lab has a number of trainers and work benches essential for the performance of these experiments. Plans are underway to upgrade the lab with state of the art SDR platforms to teach the students the latest in telecommunications. The lab share space with Electronics Lab and Electromechanical Lab.

Data Communication/DSP/Controls Lab

Experiments related to the subjects of Data Communication Networks and Network Programming, are conducted in this lab. The lab also contains numerous DSP training modules on which the students are trained to design and program various DSP architectures. The lab also hosts training of control systems setup for relevant experiments. The lab is equipped with 30 state-of the-art computers with necessary hardware and software needed to simulate the data communication networks, DSP, and control equipment. The lab has recently been upgraded with new PCs and is planned for future expansion with new control hardware.

Industrial Automation Lab

SS-CASE-IT is known for its work in robotics and automation. SS-CASE-IT along with its sponsor CARE has won numerous national and international awards in this field. In March 2017, SS-CASE-IT won the coveted first prize in international underwater robotic challenge SUAVC held in Singapore.

To help students obtain the knowledge and skills required for cutting edge technologies, an Industrial Automation Lab is available for students to learn the first principles of robotics and industrial automation. The lab consists of microcontrollers, PLCs, and numerous electronic and electrical components for the students to have a hands on experience in learning the subject.

Simulation labs

The simulation lab at SS-CASE-IT is well equipped with the computers with modern software tools such as MATLAB, Xilinx, MPLAB and Proteus to facilitate the experiments for various lab courses that require simulation modeling and analysis of complex systems and networks. The labs such as Digital Signal Processing, Data Communication Networks, Signals and Systems and Digital Communications are facilitated within this lab.

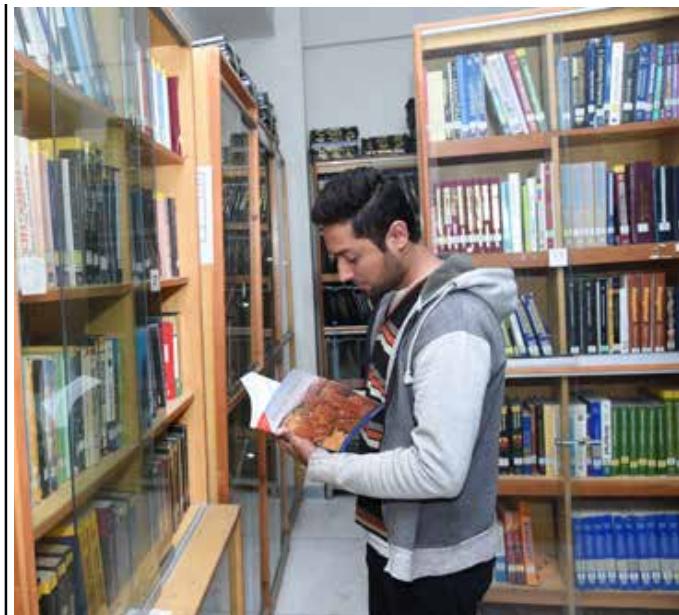


CAMPUS LIFE

SIR SYED CHISE INSTITUTE OF TECHNOLOGY



EXTRA CURRICULAR ACTIVITIES



Student Societies & Clubs

Multiple societies and clubs have been formulated for the students. They are supported with financial assistance to promote sports and social activities on campus.

These societies and clubs have helped students at SS-CASE-IT develop their physical health and mental skills through a number of events including...

In It to Win It, Educational Trip to Ghazi-Barotha Hydro-power project, Cricket tournament, Trip to Lahore, Workshop on Photoshop and Image editing, Seminar on cyber security, InfoTech, Parliamentary debate, Rang de Basanti, Workshop of Entrepreneurship and many more.



IEEE SS-CASE-IT Student Branch Islamabad:

IEEE SS-CASE-IT Student Branch Challenges your competencies and knowledge at technical and social level to enhance your skill sets. Institute of Electrical and Electronics Engineering (IEEE) main motive is "Advancing technology for humanity" and we are providing platform to the students to learn new technologies through workshops and seminars and to intensify the knowledge and communications skills of students. We arrange conferences to promote research culture among students. We also arrange industrial visits to fill up the gap between industry and academia. WIE (Women in Engineering) is an affinity group of IEEE SS-CASE-IT STUDENT BRANCH that aims to empower and promote participation of women in Engineering.



IN IT TO WIN IT MAY 2019

Seminar on Cyber Security February 2019



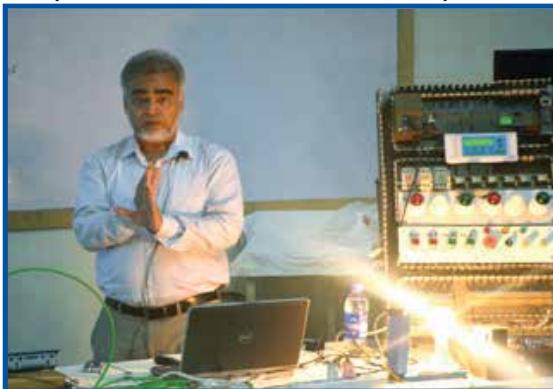
Industrial Visit Ghazi Brotha Dam December 2018



Industrial Visit Fatima Group Rawalpindi May 2018



Speaker of PLC and SCADA Seminar May 2018



Speaker of PLC and SCADA Seminar May 2018



"In it to Win it" IEEE SS-CASE-IT Student Branch WIE Affinity Group April 2018 Event Winners Team



Programming Competition In it to Win it April 2018



Arts Society

SS-CASE-IT Arts Society is a platform for students to enhance their leadership and management qualities. It also provides them the opportunity to identify and polish their inbuilt qualities. Goals include volunteering, serving and sponsoring various arts events in the Institute. Every year Arts Society conducts, promotes, assesses and continually improves several major events like Epic Arts, Scavenger Hunt and Talent Hunt etc.



Sports Society

Sports Society was formed with an aim to develop interaction, tolerance, sense of responsibility and sportsman spirit among the students of SS-CASE-IT. A student must not be competent in his own respective field but also should be able to participate in extracurricular activities. This society aims to provide a platform for students to show and improve their capabilities and skills and also to build character and leadership qualities.

Sports Society allows the students to express themselves using sports as a tool of communication by organizing many Intra/Inter-University/ies events defined in the domain. For some of the more gifted students, it provides excellent opportunities to unleash their natural talent and is also a relaxing exercise after the academia workload.

Entrepreneurship Society

The Entrepreneurship society is a dynamic student body which tends to deliver Entrepreneurial competitions under the umbrella of Sir Syed CASE Institution of Technology. It is a platform for the students to enhance their entrepreneurial, managerial and leading skills. The main motive of CES is to provide the resources and the opportunities to facilitate meaningful immersion in entrepreneurial ventures. We are not only focused on the entrepreneurial ventures but we do arrange some get together of whole Business department and the welcome party to our beloved juniors. The Society is open to all undergraduate and graduate students and welcomes all career interests.



Thinker's Forum

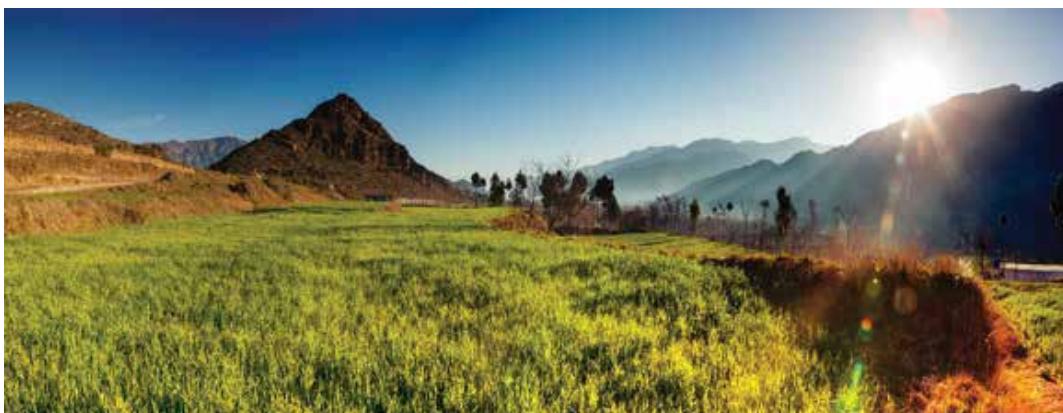
The forum aims to promote awareness in the student community about all topics of their concern. It aims help and encourage students to present their views and ideas in a professional way, shape their opinions with facts and knowledge, accept and honor the views of others and have sense to participate in healthy discussions. The forum arranges discussions and seminars on a variety of topics and invite scholars and thinkers of national repute to come and share their views with the SS-CASE-IT community.



Adventure Club

The idea of having this club is to provide students with an opportunity to escape from the daily routine of the busy campus life and be able to enjoy the wilderness and natural resources of Mother Nature.

Adventure club is not only about enjoying the life; it also directs the student to explore nature and visit different places. The main aim is to explore our Beautiful Pakistan and to promote tourism in different parts of country like Swat, Abbotabad, Gilgit, Skardu, Bahawalpur etc.



SS-CASE-IT C&T (CONSULTANCY AND TRAINING)

The society itself is vectored on the idea to synergize the efforts and innovative capabilities of Pakistani professionals so that they can have a unique platform to discuss, formulate and apply various concepts and industry driven solutions for the betterment of this country. It is a place where we put knowledge into action and thrive on the outcomes.

The society itself welcomes everybody from working professionals to young engineers to present their research, case studies or to use this as a platform to go into the industry and contribute.



TRANSPORT & HOSTEL FACILITIES



The Campus can be accessed from anywhere in Islamabad and Rawalpindi by public transport. To further facilitate students on other locations of Rawalpindi Islamabad, SS-CASE-IT provides transport facility with comparative rates. Generally the cost of transport varies between Rs.7,000/- to 9,000/- per month according to the route selected.

To download transport form visit www.case.edu.pk

NOTE: Transport service is provided for complete semester and cannot be discontinued with in semester.

Hostel Life

SS-CASE-IT has contracted with private hostel facility available in the vicinity of SS-CASE-IT campus to provide this facility for male and female students. With the aim to provide an environment where the students can fully focus on their studies, SS-CASE-IT administration ensures proper maintenance of the room, kitchen and other services to provide peaceful, disciplined and secure environment for students.

Hostel facilities includes:

Triple sharing room (Attached bathroom)

Monthly charges

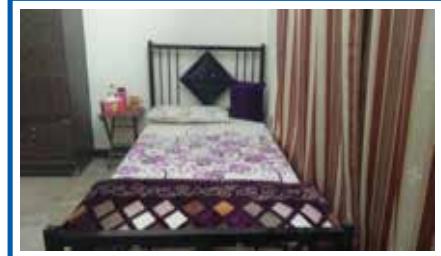
Rs. 12,000/-per person

Admission Fee (Non-refundable)

Rs. 2,000/-

Security (Refundable)

Rs. 5,000/-



It includes:

- i) High Speed Internet and Wifi
- ii) 2 times Meal(healthy and quality food)
- iii) 3 times Meal (only on weekend / Gazetted Holidays



Additional facilities includes:

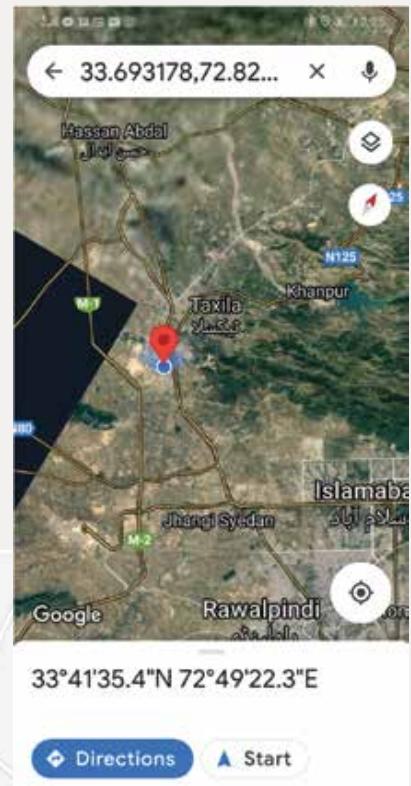
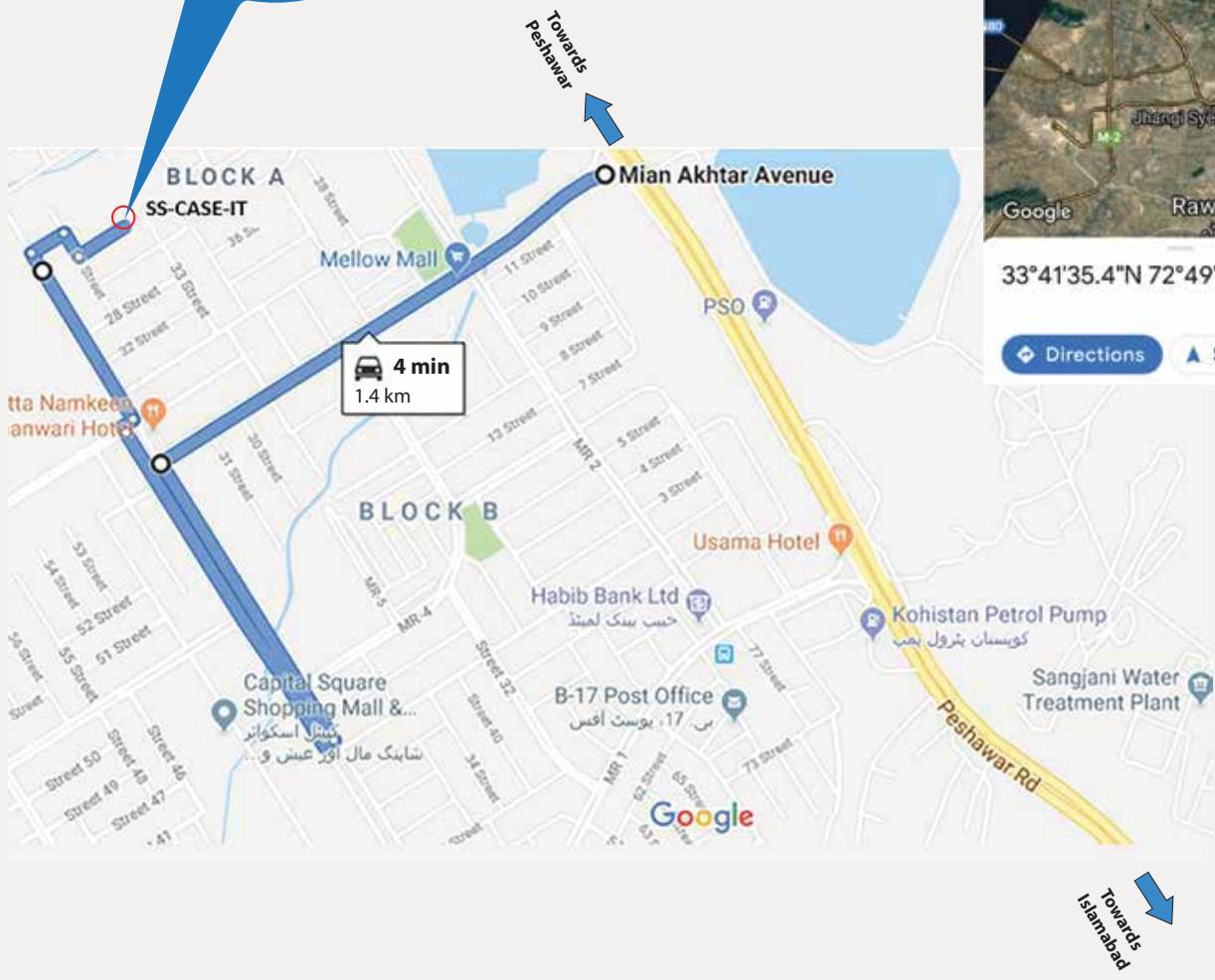
- iv) Laundry(as per actual) Extra Electrical Equipment Like TV, Fridge, AC, Room Cooler etc. could be provided & charged accordingly



NOTE: Hostel facility is provided for complete year and cannot be discontinued within the year.



LOCATION MAP



Sir Syed **CASE**
Institute of Technology

Street 33, Block A, Multi Garden, Sector B-17, Islamabad.



SIR SYED CASE INSTITUTE OF TECHNOLOGY

- 📍 Sir Syed CASE Campus, University Site, Street 33, Block A, Sector B-17, MPCHS, Islamabad.
- 📞 **Student Affairs Office:** +92-51-520 3471
- 🌐 www.case.edu.pk 📩 info@case.edu.pk 📱 fb.me/case.ete