HITEC UNIVERSITY
TAXILA

PROSPECTUS
2015-16
Title designed by Mr. Athar Iftikhar, student of HITEC University.
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Overview

Heavy Industries Taxila Education City (HITEC) is a comparatively new addition to the hallmarks of Taxila. Located at the foothills of Margalla, 30 km North West of Islamabad and Rawalpindi, it is an integrated and purpose specific complex, housing educational institutes, catering for pre-school to university level education.

In November, 2007, HITEC University, in affiliation with UET Taxila, commenced classes with an intake of 250 students. It was granted its own charter in November, 2009 by the Government of the Punjab. The University is sponsored by Heavy Industries Taxila Education Welfare Trust (HITEWT).

The University has a dynamic, industrious and highly committed full time faculty which keeps abreast with the latest development in teaching methodologies. In a short span of time HITEC University has emerged as a modern, well equipped and vibrant place of learning and can be rightly called a citadel of knowledge. It hosts state of the art facilities and takes pride in offering learning environment having unmatched safety and security of the premises.

The University has spacious, air-conditioned and very well equipped classrooms, laboratories, library, auditorium and excellent allied facilities. An on campus hostel facility for a limited number of students is also available on first come first serve basis. Work on construction of purpose built boys hostel is already in progress to accommodate more than 300 students. Plans are also in hand to construct a state of the art library and an auditorium with over 1500 seating capacity.

Students get ample opportunities for internships and employment due to close proximity of the University to Heavy Industries Taxila (HIT), Pakistan Ordinance Factories (POF), Heavy Mechanical Complex (HMC), Pakistan Aeronautical Complex (PAC) Kamra, Telephone Industries of Pakistan (TIP) and FECTO Cement etc.

The University, besides imparting quality education, assigns equal importance to character building, extra and co-curricular activities. We aim to make our students morally and physically sound individuals and responsible citizens of Pakistan with a strong urge of service to humanity, local and beyond.
Message from the Chairman Board of Governors

HITEC University Taxila is a young University which has earned recognition and respect among the contemporary Higher Education Institutions in a short span of eight years. The achievement of this distinction was made possible by the commitment and dedication of the faculty, staff and students.

HITEC University is participating effectively and efficiently in the national efforts to broaden the base of scientific and engineering education. It has Alhamdolillah graduated quality engineers, managers, scientists and Islamic scholars capable of meeting the modern day challenges. It has also produced its 1st PhD in Mathematics within 5 years after launching the Program.

You will be delighted to know that the University has already established foreign linkages with the leading Universities of UK and Turkey and recently it has signed the Letter of Cooperation for academic and research collaboration with the University Technology Malaysia (UTM). This arrangement will provide opportunity to our students to complete part of their education in world leading universities. I congratulate the first batch of its students who have already completed their studies for one year at Istanbul Technical University Turkey.

We at this University are committed to provide excellent environment for academic learning and moral grooming of the students. The University is also improving its infrastructure continuously and the commencement of the construction of the University hostel is another milestone in this direction.

May Allah Almighty grant success to the HITEC University in all its endeavors.

Lieutenant General
Syed Wajid Hussain, HI (M)
Board of Governors

1. Lieutenant General Syed Wajid Hussain, HI (M)  
   Chairman Heavy Industries Taxila Education Welfare Trust  
   Chairman

2. Major General Dr Muhammad Muazzam Ali Goraya  
   Director General, Military Vehicles Research and Development Establishment

3. Major General Akbar Saeed Awan (Retd)

4. Prof Dr Niaz Ahmad Akhtar  
   Vice Chancellor, University of Engineering & Technology Taxila

5. Raja Abdul Hanif  
   Member Provincial Assembly of the Punjab

6. Mr. Ijaz Khan  
   Member Provincial Assembly of the Punjab

7. Mrs. Sobia Anwar Satti  
   Member Provincial Assembly of the Punjab

8. Prof. Brigadier Dr. Muhammad Younus Javed  
   Dean Faculty of Engineering, EME College NUST, Rawalpindi

9. Brigadier Sajid Mahmood Khan  
   Director Technical, Heavy Industries Taxila

10. Brigadier Muhammad Sana Ullah Khan  
    Managing Director, HRF(T), Heavy Industries Taxila

11. Brigadier Ashraf Ullah Khan  
    Managing Director, HRF(M), Heavy Industries Taxila

    Director Administration, Heavy Industries Taxila

13. Secretary Higher Education Department, Punjab

14. Brigadier Qamar Zaman, SI(M) (Retd)  
    Vice Chancellor HITEC University Taxila  
    Secretary
Message from the Vice Chancellor

I appreciate your interest in HITEC University and extend a very warm welcome to aspiring students and their parents at the time of new admission. HITEC University, though relatively new, has remarkably progressed since its inception in 2007. The University, at the threshold of new academic year, offers an array of opportunities to the students in undergraduate and graduate programs in Electrical, Mechanical and Computer Engineering, Computer Sciences, Mathematics and Islamic Studies.

Ranked in category “W” by the Higher Education Commission of Pakistan, HITEC University is Pakistan’s premier academic and research institution, offering excellent environment conducive to learning and research. We induce and inculcate high moral values and sense of responsibility amongst our students. Conforming to the vision of the founders and by drawing our strength from our motto “In Truth I Triumph” we are determined to make this University a bastion of academic excellence. With us, your urge to know more will be transformed into a lifelong quest for seeking TRUTH.

It shouldn’t go unmentioned that the University has signed agreement with Strathclyde University UK. The students can now opt for Strathclyde University’s degree by spending two years in HITEC University and two years in Strathclyde University. A similar Memorandum of Understanding signed with Istanbul Technical University, Turkey will provide an opportunity to our students to study one year at ITU under the student exchange programme. Our University has also signed a Letter of Cooperation with Universiti Teknologi Malaysia that includes student exchange programme.

The University infrastructure is continuously being improved. A new hostel is under construction that will provide accommodation to more than three hundred students. The labs and library are being upgraded with latest equipment and state of the art facilities. Hemmed by Margalla hills in the east and walled in the west, HITEC University campus offers incomparable security of premises.

Looking forward to seeing you in HITEC University.

Brig (Retd)

Engr Qamar Zaman, SI (M)
Vision

HITEC University shall be a premier institution and bastion of academic excellence. It must become a citadel of our ideological moorings, national integration and socio-religious values. HITEC ought to trigger the human mind to think clearly perceiving the environment and issues confronting human beings, seeking intelligent, viable and practical solutions, leading to societal development and the overall betterment of human race. The campus shall provide our progeny the environment for intellectual flourishing, nurturing fertility of thought and creativity. HITEC University faculty will focus on preparing our youth to face the challenges of life with honor, confidence and fortitude through character building and grooming. In HITEC University merit, justice, honesty and adherence to moral and social values must prevail. The University shall provide a pedestal for fulfillment of our youth’s aspirations and hopes to live an honorable life as citizens of Pakistan.

Mission

HITEC University will be a center of excellence in teaching, learning and research. We instill and inspire intellectual curiosity, lifelong quest for knowledge and a keen urge for social and moral responsibility. The University will establish strong linkages with industry, ensuring innovative research leading to economic prosperity of Pakistan.
Emblem

HITEC University emblem symbolizes Pakistan’s national heritage, ideology, cultural values, and provides conviction and courage to its students. The University emblem is a roundel, in line with traditional Muslim shield. It has two rings; the outer ring contains the name of institution and its motto while the inner ring embodies a multi-layered insignia. On the top is the rising Sun signifying energy, hope and newness. At the bottom is a body of water which is source of all life. In the middle the white emerging lines stand for the earth which is the abode of all mankind. The blue lines show rivers on the Earth indicating that civilizations have grown on the bank of rivers. The pattern formed by white and blue lines alludes to an open book that represents all recorded human knowledge. The book is placed on the surface of the water, pointing to an eternal challenge we are confronted with. In the back drop of the book, emerges the golden Sun sending its rays across the universe. The rising Sun also represents the dawn of a new era where darkness is dispelled and brightness is ushered in.

Motto

The motto should guide the students in their future lives as a beacon of light and be a reflection of their character strength and grooming. ‘Truth’ is the key word in the selection of University’s motto, for indeed it has been the virtue of the prophets and the object of pursuit of all great men, scholars, researchers and scientists. Finding and upholding truth is the purpose and spirit of real education. The most befitting inspiration was found in a Quranic verse, “Wa Qaulu Qaulun Saddeeda”, (Ayat 70, Al-Ahzab) but to keep the sanctity of the divine words it has been replaced by a Hadith, carrying the same assertion “Assidqo Yunjee”, meaning “In truth lies success”. Its English equivalent “ In Truth I Triumph” is the translation of a Latin slogan “In Veritate Triumpho” ascribed to Myddelton of Gwanynog (1638 AD).
Taxila

Taxila is an ancient historical city, which is just 30 kms north of Islamabad, the capital of Pakistan. It is one of the most important archaeological sites in Pakistan and the world. It has numerous sites but of which, eighteen are on the UNESCO World Heritage List.

The city dates back to the ancient Gandhāran city of Takshashila (also Takkasila or Taxila) an important Vedic/Hindu and Buddhist center of learning from the 6th century BC to the 5th century CE. This is the region from where Buddhism travelled to the Far East. Persians, Greeks under Alexander the Great, Central Asians and Hindus invaded through the area and all subsequently left their mark.

Takshashila became a noted centre of learning at least several centuries BCE, and continued to attract students from around the old world until the destruction of the city in the 5th century. During its peak period of glory, Takshashila exerted “intellectual suzerainty” over other centres of learning in India, and its primary concern continued to be the higher education in various arts and crafts.

Takshashila is perhaps best known because of its association with Chanakya, also known as Kautilya, the strategist who guided Chandragupta Maurya and assisted in the founding of the Mauryan empire. The Arthashastra (Sanskrit for The knowledge of Economics) of Chanakya, is said to have been composed in Takshashila. The Ayurvedic healer Charaka also studied here. The ancient grammarian Panini, who codified the rules that would define classical Sanskrit, has also been part of the community at Takshashila.

The British archaeologist Sir John Marshall conducted excavations over a period of twenty years in Taxila. The ruins of Taxila contain buildings and Buddhist stupas located over a large area. The ruins of Taxila are divided into three major cities, each
Nicholson’s Obelisk, a monument of British colonial era situated at the Grand Trunk road welcomes the travelers coming from Rawalpindi/Islamabad to Taxila.

belonging to a distinct time period. In addition to the ruins of the city, a number of Buddhist monasteries and stupas also belong to the Taxila area. Some of the important ruins of this category include the ruins of the stupa at Dharmarajika, the monasteries at Jaulian and Mohra Muradu.

The monument was built by the British to pay tribute to Brigadier John Nicholson (1822–1857) an officer of the British Army who died in India during 1857.

In addition to the ruins of Gandhara civilization and ancient Buddhist/Hindu culture, relics of Mughal gardens and vestiges of historical Grand Trunk Road, which was built by Emperor Sher Shah Suri in 16th century, also exist in Taxila region.
How to Reach HITEC University

From Islamabad/Rawalpindi proceed on the GT road towards Peshawar. Only 10 km ahead of Sangjani Toll Plaza is the Taxila bypass. Those travelling on the motorway may use Tarnol or Bahter interchange to come on the GT road in order to reach the Taxila bypass. Turn towards the Taxila Museum, about 2 km on the Museum Road is HITEC University – a complex of huge buildings in red bricks and a prominent white mosque, all enclosed in black-stone boundary wall.
Faculty of Engineering and Technology
Faculty of Engineering and Technology

Dr. Ejaz Muhammad
Professor & Dean
PhD (Control System)
Cranfield University, UK

The Engineering Faculty consists of highly qualified and experienced academicians and researchers holding Ph.D and MS level qualifications from institutions of universal repute. Besides keeping abreast of the latest developments in the knowledge of their respective domains, the faculty members actively participate in the R&D activities. This stimulates new ideas and innovative thinking to guide our students in their research phase of studies. The minimum qualification for teaching undergraduate classes is an MS / M.Phil degree in the relevant field. Similarly, all Master level courses are taught by Ph.D qualified faculty only.

The class-room teaching, in HITEC University, is complemented with indepth hands-on experimentation in spacious, well furnished, and very well-equipped laboratories. In this context, we do claim a unique position amongst other competing institutions, as each of our EE and ME Departments hosts 12-dedicated laboratories. The laboratories of CS&E Departments are also equipped with state of the art machines and other allied facilities. We are now focusing on enhancing our research potential for postgraduate programs.

Extensive details about curricula, faculty, laboratories and research opportunities can be gleaned from the relevant description of the concerned Department in this prospectus.

A special point to note is that HITEC University is now transforming into an “OUTCOME BASED EDUCATION” center and aligning its academic programs with the requirement of “WASHINGTON ACCORD”. Consequently, our degrees would be reckoned as substantially equivalent to the degrees awarded in the U.S.A, Canada, Australia, Malaysia, South Korea, Singapore and Hong Kong.

So, if you aspire to be a proficient Electrical, Mechanical, Computer Engineer or an accomplished Computer Scientist, we are here to groom and equip you with requisite knowledge, skills and the attitude for your acceptance in the national and international job markets.
The Department of Electrical Engineering came into being with the inception of the HITEC University in 2007. We aim to impart quality education at undergraduate and postgraduate levels, thereby producing skillful engineers to cater for societal needs of the country and abroad.

Electrical Engineering, one of the oldest fields of engineering, deals with the study and application of electricity and electromagnetism. Initially this field comprised study of electricity and was largely considered to be a subfield of Physics. Nevertheless, it now covers a range of topics including Power Engineering, Control Systems, Signal Processing, Electronics and Telecommunications etc. Electrical Engineering is a diversified field that gave birth to many engineering disciplines over the decades; the most popular ones include Electronics, Telecommunications, Computer Systems and Industrial Electronics etc. The Department currently offers BS, MS and Ph.D. programs in the Electrical Engineering.

The objective of undergraduate program in Electrical Engineering is to equip the students with a concrete foundation in scientific and mathematical knowledge and in skills appropriate for practice in the field of Electrical Engineering. The postgraduate programs consist of advanced courses in Communication, Signal Processing and Control Systems etc and require the students to undertake research activities in these areas.

The field of Electrical Engineering is dynamic and covers the design, construction, testing, and operation of electrical components, circuits, and systems. The undergraduate Electrical Engineering program provides excellent platform for those who wish to embark on careers in the streams of Electronic, Communication and Power Engineering. The combination of high quality curriculum, highly qualified faculty, well-equipped laboratories and all available necessities at the Department give exposure to leading-edge technologies and open up new avenues for aspiring graduates to join the industries.

The curricula and syllabi of BS, MS and Ph.D. programs are well-planned and designed according to recommendations and guidelines of Higher Education Commission (HEC) and Pakistan Engineering Council (PEC). The BS Engineering program is duly accredited by the Pakistan Engineering Council and our graduates are readily accepted in the market.

The Department of Electrical Engineering holds highly qualified, motivated and professionally competent faculty who not only excel in their respective areas of specialization but also keep themselves abreast of recent developments.
Faculty

Dr. Jameel Ahmed
Designation: Professor & Chairman, HEC Approved PhD Supervisor
Qualification: Post Doc., NTU, Singapore, PhD (Telecom Engineering), HU Pak & NTU, Singapore
Areas of Interest: DSP, Secure Communication, Biomedical Signal Processing
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Dr. Ejaz Muhammad
Designation: Professor
Qualification: Ph.D. (System Identification), Cranfield University, UK
Areas of Interest: Stochastic Systems, Fuzzy Systems, Neuro Fuzzy Controls, Coding Theory
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Dr. Hafiz Ashiq Hussain
Designation: Associate Professor, HEC Approved PhD Supervisor
Areas of Interest: Optical Fiber Communication, Silicon Photonics
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Dr. Jahangir Kayani
Designation: Associate Professor (Honorary)
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Ghulam Shabbir
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Obaid Sabir
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Zaka ul Mustafa
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Designation: Lecturer
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Designation: Lecturer
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Areas of interest: Impact of Renewable Sources on Existing Power Systems
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Arshad Ali*
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Qualification: MS (Electrical and Electronic Engineering), University of Strathclyde, UK
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**Fizza Khalid**  
Designation: Lecturer  
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**Iftikhar Ahmed**  
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**Menna Nawaz**  
Designation: Lecturer  
Qualification: MS (Electrical Engineering), HITEC University, Taxila  
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**Amir Anees***
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- **Qualification:** MS (Electrical Engineering), NUST, Islamabad
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**Sana Khattak**
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- **Qualification:** M. Phil English Linguistics (in progress), NUML, Islamabad
- **Areas of interest:** Discourse Analysis, Visual Analysis, Semiotics, Semantics, ELT
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**M. Shahbaz Khan**
- **Designation:** Jr. Lecturer
- **Qualification:** MS Electrical Engineering (in progress), HITEC University, Taxila.
- **Fields of Interest:** DSP, VLSI, Embedded System
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**Shahryar Najam**
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- **Qualification:** MS Electrical Engineering (in progress), HITEC University, Taxila.
- **Fields of Interest:** DSP, VLSI, Embedded System
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**Syed Qasim Abbas**
- **Designation:** Lab. Engineer
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- **Fields of Interest:** Digital Systems, Automation and Robotics
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Mamoon Riaz
Designation: Lab. Engineer
Qualification: MS Electrical Engineering (in progress), HITEC University, Taxila
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Sobia Raja
Designation: Academic Coordinator
Qualification: MS (General Management), COMSATS, Wah Cantt.
Contact: coordinatoree@hitecuni.edu.pk

* On study leave
Faculty of Electrical Engineering
BS Electrical Engineering

BS Electrical Engineering is a broad-based bachelor degree program which includes study of subjects like Digital and Analog Electronics, Electromagnetic Field, Control Systems, Communication Systems, Power Engineering etc. The curriculum is in line with Pakistan Engineering Council (PEC) requirements and thus the program is duly accredited. Five batches have passed out to-date. As a consequence, the curriculum is comprehensive enough to meet all challenges and requirements of the field of Electrical Engineering at national and international levels. The program provides students with the skills required for a broad range of jobs in industry, government, academia, business and R&D organisations.

In an attempt to better serve our undergraduate students, and to shorten the time between their discovering a problem and getting advice on the solution, the Department has set up an “open advising” system. This counseling and support help students get through academic and administrative issues and establish a smooth working relation between students and Department at large. A faculty member is assigned the duty of a Class Advisor. The students are encouraged to interact with him/her as well as with entire faculty, so that, after the completion of BS Electrical Engineering program, they have better understanding and exposure of their field of choice.

The initial two years (four semesters) of the program are common for all students; however, from fifth semester and onward, elective courses are offered to make provision for the two major streams i.e. Electronic & Telecom Engineering and Power Engineering. To support these streams, state-of-the-art laboratories along with qualified staff are available in the Department.

The courses are so designed to establish strong academic foundation which ascertains candidates’ knowledge and skills for specialized and career-oriented opportunities. After completion of the program, BS Electrical Engineering degree is conferred upon the students. However, the transcript of individual student reflects the sequence of subjects as per adopted stream. The program spans over four years (eight semesters) and comprises 139 credit hours. The semester-wise breakup of curriculum is given as under:
## Curriculum

### Semester-1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>EE-101</td>
<td>Engineering Workshop</td>
<td>0+2</td>
</tr>
<tr>
<td>EE-102</td>
<td>Electric Circuits</td>
<td>3+1</td>
</tr>
<tr>
<td>MT-101</td>
<td>Calculus &amp; Analytical Geometry</td>
<td>3+0</td>
</tr>
<tr>
<td>CE-101</td>
<td>Computer Fundamentals</td>
<td>3+1</td>
</tr>
<tr>
<td>HS-101</td>
<td>English</td>
<td>3+0</td>
</tr>
<tr>
<td>HS-102</td>
<td>Pakistan Studies</td>
<td>2+0</td>
</tr>
<tr>
<td><strong>Total credits</strong></td>
<td></td>
<td><strong>18</strong></td>
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### Semester-2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
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<tr>
<td>EE-103</td>
<td>Network Analysis</td>
<td>3+1</td>
</tr>
<tr>
<td>MT-103</td>
<td>Differential Equations</td>
<td>3+0</td>
</tr>
<tr>
<td>BS-101</td>
<td>Engineering Physics</td>
<td>3+0</td>
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<tr>
<td>CE-102</td>
<td>Computer-Aided Engineering Drawing</td>
<td>0+2</td>
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<tr>
<td>CE-103</td>
<td>Object Oriented Programming</td>
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### Semester-3

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<thead>
<tr>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>EE-201</td>
<td>Basic Electronics</td>
<td>3+1</td>
</tr>
<tr>
<td>EE-203</td>
<td>Digital Logic Design</td>
<td>3+1</td>
</tr>
<tr>
<td>ME-201</td>
<td>Engineering Mechanics</td>
<td>3+0</td>
</tr>
<tr>
<td>MT-203</td>
<td>Linear Algebra</td>
<td>3+0</td>
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<tr>
<td>HS-103</td>
<td>Communication Skills</td>
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### Semester-4

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<tbody>
<tr>
<td>EE-204</td>
<td>Electrical Machines-I</td>
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<tr>
<td>EE-205</td>
<td>Electronic Devices and Circuits</td>
<td>3+1</td>
</tr>
<tr>
<td>HS-201</td>
<td>Technical Report Writing</td>
<td>2+0</td>
</tr>
<tr>
<td>MT-201</td>
<td>Complex Variables &amp; Transforms</td>
<td>3+0</td>
</tr>
<tr>
<td>IS-211</td>
<td>Islamic Studies</td>
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### Semester-5

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<tbody>
<tr>
<td>EE-302</td>
<td>Signals and Systems</td>
<td>3+0</td>
</tr>
<tr>
<td>EE-303</td>
<td>Microprocessor &amp; Interfacing Techniques</td>
<td>3+1</td>
</tr>
<tr>
<td>EE-307</td>
<td>Electronic Systems Design</td>
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<td>MT-302</td>
<td>Probability and Statistics</td>
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<td>EE-XXX</td>
<td>Elective-I</td>
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<tr>
<td>EE-305</td>
<td>Linear Control Systems</td>
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</tr>
<tr>
<td>EE-306</td>
<td>Digital Signal Processing</td>
<td>3+1</td>
</tr>
<tr>
<td>EE-308</td>
<td>Instrumentation &amp; Measurement</td>
<td>3+1</td>
</tr>
<tr>
<td>MT-202</td>
<td>Numerical Methods</td>
<td>3+0</td>
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<td>EE-XXX</td>
<td>Elective-II</td>
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<tr>
<td>EE-401</td>
<td>Project Part-I</td>
<td>0+3</td>
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<tr>
<td>EE-405</td>
<td>Power Electronics</td>
<td>3+1</td>
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<tr>
<td>MS-201</td>
<td>Engineering Economics</td>
<td>2+0</td>
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<td>EE-XXX</td>
<td>Elective-III</td>
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<td>Elective-IV</td>
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Total credits 17

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<td>EE-401</td>
<td>Project Part-II</td>
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<tr>
<td>EE-403</td>
<td>Computer Communication Networks</td>
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<td>MS-401</td>
<td>Engineering Management</td>
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<td>EE-XXX</td>
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Total credits 18

### List of Elective Courses

#### Elective-I
1. EE-301 Electromagnetic Theory
2. EE-309 Electrical Machines-II

#### Elective-II
1. EE-304 Communication Systems
2. EE-310 Power Generation

#### Elective-III
1. EE-402 Wave Propagation & Antennas
2. EE-404 Power Transmission & Distribution

#### Elective-IV
1. EE-411 Digital Communications
2. EE-431 Power System Protection

#### Elective-V
1. EE-427 Wireless Communications
2. EE-429 Power Systems Analysis

#### Elective-Vi
1. EE-417 Embedded Systems
2. EE-432 Power Systems (Operation & Control)
Course Contents

EE-101 Engineering Workshop
Electrical trauma and safety, wiring design, PCB design and fabrication, fabricating simple electronic circuits on breadboard, use of software tools for PCB design, assembling and soldering components on a PCB, soldering methods, etching, electronic house hold components repair/maintenance, use and understanding of data books, specification sheets, basic introduction, overview of MATLAB/Simulink product family and toolboxes.

EE-102 Electric Circuits
Two terminal circuits, resistor, capacitor and inductor, energy concepts, energy dissipated in a resistor, energy & energy transfer, electric current and potential difference concepts, power and energy, circuit theorems, periodic functions, magnetic effects of electric current, magnetic circuits with DC excitation, transformer, network responses, complex impedance and admittance functions, tuned circuits, quality factor.

CE-101 Computer Fundamentals
Introduction, language fundamentals, C-character set, constants, variables, data types-instructions, operators, control structures, if statement, multiple statements within if, nested if-else forms of if-else-if clause, case control structure, while, for and do-while loops, break and continue statements, functions, arrays, strings, structures.
EE-103 Network Analysis

Pre-Requisite: Electric Circuits
Inductors and capacitors as energy storage elements, natural response of first order circuits, transient and steady state response of a second order system. Introduction to Laplace and inverse Laplace transform, direct transformation of circuits from time domain to S-domain, AC steady state power, introduction to BODE plots.

BS-101 Engineering Physics
Crystal structure, packing fraction, X-ray diffraction and Bragg's law, categorization of solids, inter atomic forces, band theory of solids, semiconductor materials, PN-junction, electric field, Coulombs law & Gauss's Law with application, magnetic field and magnetic properties, BiotSavart’s law, Ampere’s circuital law with applications, induced EMF, Faraday’s law of electromagnetic induction, electromagnetic spectrum, electromagnetic waves, interference and diffraction.

CE-102 Computer Aided Engineering Drawing
Drawing basics, various views of a three dimensional object and their importance, AUTOCAD basics starting to draw, drawing in two dimensions and sketching, working with data, drawing in three dimensions, basics of 3D-drawing, drawing isometric view and section, plan and elevation views of various electrical and electronic devices in AUTOCAD, solid projection modeling, projects.

CE-103 Object Oriented programming
Pre-Requisite: Computer Fundamentals
Introduction to OOP, classes and objects, constant data members and static variables, arrays of objects, procedural versus object oriented programming languages, basic concepts and features of object oriented programming, constructors, destructors, new operator, getter and setter functions, access specifiers, operator overloading, inheritance, multiple inheritances, virtual functions, late binding, templates, object oriented design.

EE-201 Basic Electronics
Pre-Requisite: Engineering Physics
Introduction to semiconductor materials, energy levels in conductors, intrinsic and extrinsic semiconductor material, majority and minority carriers, theory of semiconductor diodes, forward and reverse biasing diode, Zener region of a semiconductor, diode specification sheets and testing methods, PN junctions, forward and reverse characteristics of a diode, ideal and practical diode concepts, series and
parallel configurations with DC inputs, current equation of a diode, diode as a switch, half wave rectification, full wave rectification, clippers, clampers, breakdown diodes, voltage regulators, voltage multipliers, junction transistors, bipolar junction transistors (BJTs), DC operating point, fixed biased circuits, emitter stabilized biased configuration, voltage divider biased configuration, voltage feedback biasing technique, introduction to JFET & MOSFET.

**EE-203 Digital Logic Design**

Review of number systems, theorems and postulates of Boolean algebra, simplification of switching function using graphical and tabular methods, combinational logic circuits, multiplexer, ROM, PAL, and PLA, sequential logic circuits, synchronous sequential machine, basic microprocessor designed conventions: register transfer, busing and sequencing of control.

**ME-201 Engineering Mechanics**

*Pre-Requisite: Engineering Physics*

Fundamental concepts and principles of mechanics, force factors, resultants, equilibrium of rigid body, kinetics and kinematics of particles, relative motion, curvilinear motion, basic thermodynamics laws and cycles, processes and PV-diagrams, heat transfer modes and heat transfer through walls and circular pipes.

**EE-204 Electrical Machines-I**

*Pre-Requisite: Circuit Analysis-II*

Ideal and practical single-phase transformer, 3-phase transformer connection, auto transformer and current & potential transformers, DC machines, motors &
EE-205 Electronic Devices & Circuits

Pre-Requisite: Basic Electronics
BJT AC models and small signal amplifiers, FET AC models and small signal amplifiers, multistage amplifiers, Darlington configuration, frequency response of single-stage and multi-stage amplifiers, class A, B, C and D power amplifiers, feedback amplifiers, oscillators.

generators, three phase motors, fractional horse-power motors and servo motors, synchronous generator and synchronous motor, vector diagram of alternator, regulation, stepper motor, single phase motor, induction motor, repulsion motor.

EE-302 Signals & Systems

Pre-Requisite: Complex Variables and Transforms, Circuit Analysis-II
Introduction to signals, classification of signals and systems, Laplace transform, properties of Laplace transform, inverse Laplace transforms, convolution, correlation functions, Fourier Series, frequency responses of system using Fourier transform, inverse Fourier transforms, Z-transform, inverse Z-transform, analog filter design, Butterworth, Chebecheve and Cauer filter design techniques, MATLAB simulation.

EE-303 Microprocessor and Interfacing Techniques

Pre-Requisite: Digital Logic Design
Architecture and programming technique, introduction to assembly language, 8086 pin-diagram and functions, interfacing ROM & RAM, peripheral programmable interface (PPI), interrupt priority controller, universal asynchronous and synchronous receiver transmitter (UART and USART) and its configuration, interfacing hex keypad, servo meters, robots, various LED and LCD displays etc.

EE-307 Electronic Systems Design

Pre-Requisite: Electronic Device and Circuits
Basic model of an operational amplifier, analysis of differential amplifier, Op-amp parameters, op-amp open-loop configuration, op-amp closed-loop configurations, active filters, integrators and differentiators, logarithmic and antilogarithmic amplifiers, Schmitt trigger, instrumentation amplifier, precision rectifiers, waveform generators and converters, timing circuits, sample and hold circuits, analog-to-digital and digital-to-analog converters, analog multiplexer and de-multiplexer, analysis and design of voltage regulators, three terminal voltage regulators, current limiting and boosting circuits, timers and phase locked loops, switched mode power supplies.
EE-305 Linear Control Systems

Concept of feedback in Control Systems, modeling of Electrical and Mechanical systems, transfer function of systems, stability, evaluation of output of a system for various inputs, Root Locus, PID Controller, Bode plots and introduction to state space concepts.

EE-306 Digital Signal Processing

Pre-Requisite: Signals and Systems

Introduction to digital signal processing, discrete signals and systems, time-domain analysis of discrete-time signals, frequency-domain analysis, Fourier series and Fourier transform, system response and frequency response, z-transform and its properties, digital filter design, finite impulse response (FIR) and infinite impulse response (IIR), filters and their applications in signal processing, real time digital signal processing.

EE-308 Instrumentation and Measurement

Pre-Requisite: Electronic Systems Design

Engineering units and standards, galvanometer, dc ammeters, dc voltmeters, ohmmeters, dc meter calibration, half-wave and full-wave ac voltmeters, energy measurement meters, transistor based electronic voltmeters, op-amp based electronic voltmeters, digital voltmeters and ammeters, frequency measurement, sensors and transducers, analog and digital interfacing of sensors and transducers, overview of measurement instruments.

EE-405 Power Electronics

Pre-Requisite: Basic Electronics

Principles of power electronics, power diode, power BJT, power MOSFET, IGBT and SCR, GTO and TRIAC and DIAC, half wave and full wave rectifiers with resistive and inductive loads, un-controlled, semi-controlled and fully controlled rectifiers, three-phase rectifiers: un-controlled, semi-controlled and full controlled, six-pulse, twelve-pulse and 24-pulse rectification, PWM converters, dc to ac converters, three-phase inverter, six-pulse, twelve-pulse inverters, PWM inverters, switching mode power supplies, DC to DC conversation, buck converter, boost converter and buck-boost converters, isolated converters, forward converters, fly back converters.
**MS-201 Engineering Economics**

Introduction to economics, simple and compound interest, annual, net present and net future worth’s, rate of returns, internal rate of return (IIR) and external rate of return (ERR), financial statements, interpretation of financial statements, fundamental economic concepts, supply and demands principle, market, types of market and forecasting, ratios, accounting, cost benefit ratios, equities, interest versus equities, recently discovered advantages of equity over interest and their implementation in corporate & banking sectors.

**EE-403 Computer Communication Networks**

*Pre-Requisite: Computer Fundamentals*

Computer communications concepts, layered network architectures and protocol reference models, systems and technologies for the physical layer, medium access control protocols, data link protocols, network layer functions and protocols, internetworking concepts, local area networks, wide area / public telecommunication networks, IP-based network and services, the TCP/IP suit of protocols.

**MS-401 Engineering Management**

Basics of management and its functions, evolution of management and development till today, role of managers and styles of management, leadership, organizational structure, motivation theories and process, decision making tools, productivity management in manufacturing and service concerns, product design development management, strategic management, project management and its processes, supply chains, risk management, operation management, quality management, six sigma and other quality standards.
Elective Courses

EE-301 Electromagnetic Theory

*Pre-Requisite:* Engineering Physics, Differential Equations

Vector analysis, coordinate systems, Coulomb’s law and Gauss’s law, electric field intensity and flux density, Greens theorems, energy and potential, conductors and dielectrics, boundary conditions, capacitance, Poisson’s and Laplace’s equations, steady-state magnetic field, magnetic forces, materials and inductance, time-varying fields and Maxwell’s equations, transmission lines, uniform plane waves. Electromagnetic radiation and antennas.

EE-304 Communication Systems

*Pre-Requisite:* Signals and Systems

Types of signals, types of modulation and demodulation, digital communication systems, digital modulation and de-modulation, signal spaces, receiver structures, transmission media, radio systems, satellite communication systems, optical communication systems, introduction to information theory.

EE-309 Electrical Machines-II

*Pre-Requisite:* Electrical Machines-I

Forces and torques in magnetic field systems, energy balance, multiple excited system, and dynamic equations, transformer fundamentals, importance of transformers, types and construction, ideal transformer, theory and operation of real single-phase transformers, phasor diagrams, leakage reactance, voltage regulation and efficiency, autotransformers, tapping, three phase transformation using two transformers, induction generator.

EE-310 Power Generation

*Pre-Requisite:* Electrical Machines-II

General parameters (loads and load curves), load factor, diversity factor, peak diversity factor, capital cost, operating cost, depreciation, spinning, cold, hot and firm reserves, hydroelectric power plants, types and classification of dams, advantages and disadvantages of hydro power plants, thermal power plants, steam plants, coal fired power plants, nuclear power plants, types of reactors, radiation damages, shielding, thermoelectric and MHD generators, renewable sources of energy, power factor.

EE-402 Wave Propagation & Antennas

*Pre-Requisite:* Electromagnetic Theory

Radiation mechanism, elementary doublet antenna, antenna gain, bandwidth, beam width, polarization, effects of ground on antennas, grounded and ungrounded antennas, directional high frequency antennas, dipole arrays and applications, microwave antennas, parabolic reflectors, horns and lens antennas, special purpose...
antennas, folded dipoles, helical, log periodic antennas, radio wave propagation, wave reflection, transmission of waves, transmission lines overview.

**EE-404 Power Transmission & Distribution**

*Pre-Requisite: Power Generation*
Transmission and distribution schemes, ac and dc transmission systems, electrical and mechanical design of overhead systems. EHV AC transmission system, corona effect, HV cables, grounding systems.

**EE-411 Digital Communications**

*Pre-Requisite: Communication Systems*
Pulse modulation, pulse amplitude modulation (PAM), time division multiplexing (TDM), pulse code coherent digital modulation schemes, coherent modulation schemes, non-coherent digital modulation schemes, performances & comparisons between the modulation techniques.

**EE-417 Embedded Systems**

*Pre-Requisite: Computer fundamentals, microprocessor and interfacing techniques*
Design of embedded digital systems, microcontrollers, embedded programs, real-time operating systems, design methodologies, hardware-software design, hardware modeling and computer-aided design, prototyping with FPGAs.

**EE-427 Wireless Communication**

*Pre-Requisite: Communication Systems*
Evolution of mobile communications, GSM, GPRS/EDGE, UMTS, WLAN/WPAN, WiMAX release 1&2, wireless propagation, physical layer transmission,
wireless transmission in AWGN, channel models, optimum receiver design.

EE-429 Power System Analysis

*Pre-Requisite:* Power Distribution & Transmission

Power in single phase A/C circuits, elements of power systems, Y-bus model and network calculation, KRON reduction, Z-bus model and network calculations, transients in RL and RLC circuits, symmetrical components, power system security, interconnected systems, power system operations and control, load frequency control, compensations in power system, load forecasting.

EE-431 Power System Protection

Protection systems, types of faults, fuse as protective device, types of fuses, characteristics of fuses, current transformer and its operation, relay construction, electromagnetic relays, thermal relays, introduction to microprocessor based protective relays, protection of transformers, generator protection, classification of circuit breakers, operational mechanism and rating of circuit breakers.

EE-432 Power System Operation & Control

*Pre-Requisite:* Power System Protection

Power System Control and its importance, modes of power system operation, power system stability, active and reactive power, SCADA system, control centers, controller tuning, communication sub system, data logging, economic dispatch, voltage, power and frequency control, load dispatch, unit commitment.
Laboratories

Students are provided the opportunity to augment their theoretical learning through practical work in the state-of-the-art laboratories. These labs are fully equipped to carry out practical work and undertake research in the field of electronics, telecommunication, signal processing, control systems and power engineering etc. Furthermore, these labs are adaptable, reconfigurable and modular, making them ideally suited for research in the wide range of fields to understand fundamental electrical engineering concepts. Lab experiments are designed in coherence with theory. The Department of Electrical Engineering has following twelve well maintained laboratories for the subject programs.

Electronics Lab: Electronics Lab is equipped with components such as diodes, transistors, operational amplifiers, oscilloscope, power supplies and function generators; required to practically implement the theoretical concepts of electronic systems.

Digital Systems Lab: Digital Systems Lab is designed for the understanding of digital logic concepts and consists of oscilloscopes, digital trainers, digital multimeters, function generators, 8086 microprocessor kits and supporting accessories. This lab is also used to provide practical implementation of microprocessor and interfacing techniques.

Communication Systems Lab: Communication systems lab helps the students to envision the theoretical communication concepts of both analog and digital communication systems. This lab consists of different analog and digital communication trainers.

DSP & VLSI Lab: Digital signal processing and very large scale integration lab utilizes advanced signal processing tools such as MATLAB, Xilinx and LABVIEW to visualize various signal processing techniques including convolution, DFT, FFT and digital filters designing techniques. DSP kits TMS 320C6713 DSK are also provided for advanced stage practical implementations.

Wave-Propagation & Antennas Lab: Wave-propagation and antennas lab comprises various types of trainers including wave-propagation, microwave-communication, antennas, satellite-communication and waveguide trainers. These trainers are suitable for the study of generation, propagation and reception of microwave signals.

Control Systems Lab: Control systems lab consists of multiple workstations, each equipped with an
oscilloscope, digital multi-meter, PID trainers, control system trainers, inverted-pendulum, ball and beam control, magnetic-levitation trainers. This lab also covers the industrial implementation of advanced control systems via different computer tools such as MATLAB and Simulink.

**Electrical Machines Lab:** Electrical machines lab provides the essential opportunity to the students to augment their concepts about the fundamentals of transformers and rotating machines. The lab is equipped with DC series/shunt motor, compound motor, universal motor, single-phase induction motor, single-phase transformer, three-phase induction motor, three-phase synchronous motor and three-phase transformer. The lab is equipped with various tests and monitoring equipment also.

**Computer Networks Lab:** This lab offers students the opportunity to perform practical experiments on data communication techniques and networking methodologies. The lab is well furnished with data communication LAN, WAN, and MAN trainers.

**Power Engineering Lab:** Power engineering lab provides an opportunity to improve practical skills of students in the field of electrical power systems. The students perform practical for different subjects such as high voltage engineering, electrical drives, power systems generation, transmission, distribution and protection.

**Electronic Workshop Lab:** Electronic workshop laboratory provides hands on experience to students about different electronic measuring equipments such as oscilloscope, Megger, analog/digital multi-meter, single/three-phase watt-meters. The lab is also utilized for a variety of engineering subjects including engineering workshop, electric circuits, network analysis, instrumentation and measurement.

**Computing Lab:** It is a dedicated lab for computer programming-oriented subjects like structured C, object oriented programming, java, computer-aided engineering drawing etc. high speed computers are installed to provide efficient computing facility for the respective courses.

**Information Technology Lab:** This lab provides the students the facilities of high speed internet access, browsing, surfing and to carry out their assignments etc.
MS Electrical Engineering

The Department of Electrical Engineering also offers Masters Program in Electrical Engineering. The studies involve advanced courses in Communication, Digital Signal Processing and Control Systems. Master’s degree is awarded after completion of 30 credit hours, 24 of which are coursework related and the remaining 6 credit hours are for a research thesis. In order to complete coursework, the student can take any course(s) from the list of offered subjects in respective semester.

List of Courses

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<tr>
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<td>EE-711</td>
<td>Advanced Digital Signal Processing</td>
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<td>EE-712</td>
<td>Digital Image Processing</td>
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<tr>
<td>EE-713</td>
<td>Real-Time DSP Design and Application</td>
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<td>EE-714</td>
<td>GIS and Remote Sensing</td>
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<tr>
<td>EE-715</td>
<td>Distributed Multimedia Systems</td>
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<td>EE-716</td>
<td>Computer and Machine Vision</td>
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<td>EE-718</td>
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<td>EE-719</td>
<td>Array Signal Processing</td>
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<td>EE-720</td>
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<td>EE-721</td>
<td>Stochastic Systems</td>
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<td>Information &amp; Coding Theory</td>
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<td>EE-725</td>
<td>Fuzzy Control Systems</td>
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<td>EE-726</td>
<td>Telecommunication &amp; Switching Principles</td>
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<td>EE-727</td>
<td>Optical Fiber Communication</td>
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<td>EE-728</td>
<td>Smart Antennas</td>
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<td>VLSI Designs</td>
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<tr>
<td>EE-732</td>
<td>Nonlinear Control Systems</td>
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<tr>
<td>EE-733</td>
<td>Robust Control Systems</td>
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<td>EE-734</td>
<td>Optimal Control Systems</td>
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<td>EE-736</td>
<td>Detection and Estimation Techniques</td>
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<td>EE-737</td>
<td>Advanced Computer Network</td>
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<tr>
<td>EE-738</td>
<td>Modern Electrical Drives</td>
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</tr>
<tr>
<td>EE-747</td>
<td>Special Topics in Image and Video Processing</td>
<td>3+0</td>
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</table>
Ph.D. Electrical Engineering

The Ph.D. Electrical Engineering program is offered as per guidelines of Higher Education Commission (HEC). The desirous candidates for Ph.D. program must possess 18 years MS degree with a minimum CPGA of 3.00 out of 4.00.

The program comprises 18 credit hours of coursework and 30 credit hours of research and doctorate dissertation. The courses can be selected in consultation with the Ph.D. supervisor from the list of graduate courses.

The completion of coursework is followed by a comprehensive examination for granting Ph.D. candidacy. The Ph.D. dissertation is evaluated by two experts of technologically advanced countries and one local expert. Subsequent to positive evaluation from these experts, the Ph.D. scholar is required to undertake an open defense to fulfill the degree requirements.

A minimum residency of two years at the university campus and publishing at least one research paper in an impact factor journal of good repute is also an essential requirement to earn a Ph.D. degree.
Research Groups

Following research groups are actively working in the Department in the respective research areas;

**Signal Processing & Communication Systems (SPCS) Research Group**

Signal processing and communication systems have given a new horizon to research at universities in Pakistan over the last decade. This stems from growing market interest and rapid developments in industry. The prime objective of this group is to formulate and implement innovative mathematical and statistical theories related to signal processing and communication systems, evaluate and analyze by estimation and detection of problems. The major areas of interest include signal processing, secure communication, RF and microwave circuits analysis, image processing and computer vision, wireless communication, tracking, and encryption techniques.

**Power & Control Systems (PCS) Research Group**

Multidisciplinary research in power and control systems establishes a constant attention on challenges being faced in this area at the national level. Core aim of the group is to conduct research in areas of power system and control theory, applications of control systems, analysis and design of future power generation and control system, power transmission and distribution, adaptive and robust control, renewable energy sources, optical networks capacity and control, optical routing and signal processing, industrial control and automation.

**Multicore Reconfigurable Processor Platform for Energy and Throughput Aware Applications**

Dr Jameel Ahmed as a Principal Investigator. The scope of the project includes the development of an FPGA based reconfigurable multicore architecture for runtime reconfiguration of cache size and associativity, number of cores and operating frequency. Using the performance counters, it will be able to have a feedback of energy consumption, application throughput and cache miss-rate. The project will also include the development of Fuzzy logic, Neural Nets, Game Programming or similar Artificial Intelligence based algorithm to strike a balance between throughput and energy consumption of work-load (applications). The details of the project team members are mentioned below:

- **Dr. Jameel Ahmed** (Principal Investigator)
- **Dr. Muhammad Yasir Qadri** (Co-Principal Investigator)

**Research Staff :**

- Fulltime project members : 6
- BS Students: 6
- MS Students: 4
- PhD Students: 2
- Post-Doc/Consultants: 2
Department of Mechanical Engineering

“Give me a place to stand and I would move the earth”

Archimedes
Department of Mechanical Engineering

Department of Mechanical Engineering has been one of the core departments since the inception of HITEC University in 2007. The Department imparts quality education through its highly motivated and qualified faculty graduated from leading national and international universities.

Mechanical engineering is one of the broadest and most sought after branch of engineering disciplines. It is the innovative application of science and technology to the design, production and operation of mechanical devices, machinery and systems. It mixes core traditional engineering principles with emerging technologies to create truly innovative solutions of design problems.

Mechanical engineers have tremendous flexibility, working in every type of industry; in jobs ranging from research and development to manufacturing and operations. They are involved with the design, analysis, testing, manufacturing, control, operation, and maintenance of mechanical systems. Our graduates enter a wide variety of industries including automobile, power sector, transportation, consumer products, sports goods, strategic organizations and food processing industries.

Mechanical Engineering graduates can also find careers in other professional areas like procurement, technical sales, consulting, technical management and even in financial institutes, by virtue of their broad-based education offered by the mechanical engineering curriculum. Mechanical engineering offers a wide array of jobs, therefore a degree in mechanical engineering enables a student to seek and secure job nearly anywhere in country or abroad.

Besides Bachelor’s, the Department also offers Master and Ph.D. degree programs for those interested in widening their intellectual horizon. These higher degrees prepare them for research and academic careers in R & D organizations or in universities. The curricula and syllabi of our BS, MS and P.h.D programs are well planned and designed according to the recommendations and guidelines of HEC and PEC. The BS Engineering Program is duly accredited by the PEC.

The Department of Mechanical Engineering comprises highly qualified, motivated faculty, who not only excel in their respective areas of specialization but also keep themselves abreast of the latest developments. Along with the quality teaching to stimulate intellectual curiosity, creativity and innovativeness in our engineers, the Department is actively involved in research in different fields, like thermo-fluids, structures and materials, production and manufacturing, and renewable energy recourses.
## Faculty

### Dr. S. Kamran Afaq

**Designation:** Professor and Chairman  
**Qualification:** Ph.D. University of Toulouse III, France  
**Areas of Interest:** Composite Material Structures (Design & Testing), Heat Transfer, Finite Element Analysis  
**Contact:** kamran.afaq@hitecuni.edu.pk

### Dr. Muhammad Ijaz

**Designation:** Associate Professor  
**Qualification:** Ph.D. University of Newcastle upon Tyne, UK  
**Areas of Interest:** Composite Materials (Manufacturing and Testing)  
**Contact:** muhammad.ijaz@hitecuni.edu.pk

### Dr. Mohammad Asim Farooqi

**Designation:** Associate Professor (Honorary)  
**Qualification:** Ph.D. Tokyo Institute of Technology, Japan  
**Areas of Interest:** Robotics  
**Contact:** asim.farooqi@hitecuni.edu.pk

### Dr. Fahad Sarfraz Butt

**Designation:** Assistant Professor  
**Qualification:** Ph.D. University of Manchester UK, MS Supaero, France  
**Areas of Interest:** Computational Fluid Dynamics, Experimental Bluff-Bodies Flows, Boundary Layers and Shock Wave Interaction, Supersonic Flows  
**Contact:** fahad.butt@hitecuni.edu.pk

### Dr. Muhammad Ehtisham Siddiqui

**Designation:** Assistant Professor  
**Qualification:** Ph.D. Ecole Centrale des Lyon, France  
**Areas of Interest:** Experimental Fluid Mechanics, Flow Instabilities Transition & Control, boundary layers  
**Contact:** muhammad.ehtisham@hitecuni.edu.pk

### Dr. Abdul Waheed Badar

**Designation:** Assistant Professor  
**Qualification:** Ph.D. Technical University of Berlin, Germany  
**Areas of Interest:** Solar Thermal Systems, Heat Transfer, Refrigeration Systems  
**Contact:** abdul.waheed@hitecuni.edu.pk
Mr. Amer Sattar
Designation: Assistant Professor
Qualification: MS Mechanical Engineering, UET Lahore
MS Mechanical Engineering, UET Peshawar
Areas of Interest: Stress Analysis, Thermodynamics, Mechanics of Materials
Contact: amer.sattar@hitecuni.edu.pk

Mr. Tanveer Ahmed
Designation: Assistant Professor
Qualification: MS Manufacturing Engineering, NUST
Areas of Interest: Manufacturing Management, Renewable Energy Systems
Contact: tanveer.ahmed@hitecuni.edu.pk

Mr. Naeem Jan Amin
Designation: Assistant Professor
Qualification: MSc Military Vehicle Technology, RMCS Shrivenham, Cranfield University UK
Areas of Interest: Internal Combustion Engines, Renewable Energy Resources
Contact: naeem.jan@hitecuni.edu.pk

Dr. Muhammad Farhan Ausaf
Designation: Assistant Professor
Qualification: Ph.D. Huazhong University of Science & Technology China.
Areas of Interest: Optimization, Process Planning & Scheduling and Advance Heuristic Algorithms
Contact: farhan.ausaf@hitecuni.edu.pk

Ms. Huma Fawad
Designation: Assistant Professor
Qualification: MBA, PIMSAT, BS Mechanical Engineering UET Lahore
Areas of Interest: Engineering Management, Engineering Entrepreneurship, Marketing, Sales, Production Engineering
Contact: huma.fawad@hitecuni.edu.pk
Syed Adeel Akhtar Shah
Designation: Assistant Professor
Qualification: MA. English (University Of Peshawar) MBA(Marketing) Preston University Islamabad. LLB University of Peshawar
Areas of Interest: Creative Writing, Report Writing, Communication Skills
Contact: adeel.shah@hitecuni.edu.pk

Mr. Athar Hameed
Designation: Lecturer
Qualification: MSc Mechanical Engineering. UET Taxila
Contact: athar.hameed@hitecuni.edu.pk

Mr. Luqman Ahmad Nizam
Designation: Lecturer
Qualification: MS Mechanical Engineering, UET Taxila
Areas of interest: Vibrations, Structural Design of Heat Exchanges, Renewable Energy
Contact: luqman.ahmad@hitecuni.edu.pk

Mr. Zaib Ali*
Designation: Lecturer
Qualification: MS Computational Mechanics, Swansea University, UK
Areas of interest: Computational Mechanics, CAD/CAM, FEA, FEM, Stress Analysis.
Contact: zaib.ali@hitecuni.edu.pk

Mr. Atta Ur Rehman Shah*
Designation: Lecturer
Qualification: MS Mechanical Engineering, GIKI
Areas of interest: Computational Mechanics, CAD/CAM, FEA, FEM, Stress Analysis.
Contact: atta.shah@hitecuni.edu.pk Ext. 325

Syed Maaz Hasan
Designation: Lecturer
Qualification: MS Mechanical Engineering, NUST
Areas of interest: Design, Modeling and Simulation, Manufacturing
Contact: syed.maaz@hitecuni.edu.pk
Mr. Saad Arif
Designation: Lecturer
Qualification: Ph.D. Robotics & Intelligent Machine Engineering, NUST (in Progress), MS Mechatronics Engineering, NUST
Areas of interest: Robotics, Embedded Control Systems, Intelligent Automotive Systems
Contact: saad.arif@hitecuni.edu.pk

Mr. Muhammad Talha Jamal Solaija
Designation: Junior Lecturer
Qualification: MS Mechatronics Engineering (In Progress) NUST
Areas of Interest: Instrumentation, Intelligent systems
Contact: talha.solaija@hitecuni.edu.pk

Mr. Muhammad Usman Manzoor
Designation: Junior Lecturer
Qualification: MS Mechanical Engineering (In Progress) HITEC University.
Area of Interest: Thermal Engineering
Contact: usman.manzoor@hitecuni.edu.pk

Mr. Anees Ur Rehman
Designation: Junior Lecturer
Qualification: MS Mechatronics Engineering (In Progress) NUST
Areas of Interest: Robotics, Motion Planning, Computer Vision, Programming.
Contact: anees.ur.rehman@hitecuni.edu.pk

Mr. Shahwar Yaseen
Designation: Junior Lecturer
Qualification: MS Robotics and Intelligent Machines Engineering (In Progress), NUST
Areas of Interest: Mobile Robots Path Planning
Contact: shahwar.yasin@hitecuni.edu.pk

Ms. Munaza Haq
Designation: Junior Lecturer
Qualification: MS Energy Engineering (In Progress), UET Taxila
Contact: munaza.haq@hitecuni.edu.pk
Mr. Moeen Mahboob
Designation: Junior Lecturer
Qualification: MS Mechatronics Engineering (In Progress), NUST
Areas of Interest: Robotics, Instrumentation & Computer Vision
Contact: moeen.mahboob@hitecuni.edu.pk

Mr. Imran Saijd Shahid
Designation: Junior Lecturer
Qualification: MS (In Progress), HITEC University
Areas of Interest: Composites Materials, Reverse Engineering & Aerospace Structures
Contact: imran.saijd@hitecuni.edu.pk

Mr. Zarak Khan
Designation: Junior Lecturer
Qualification: MS Design & Manufacturing Engineering, NUST
Areas of Interest: Additive Manufacturing, CAD/ CAM
Contact: zarak.khan@hitecuni.edu.pk

Miss Hadia Khan
Designation: Junior Lecturer
Qualification: Ph.D. (in Progress), NUML
Areas of Interest: English Language & Literature
Contact: hadia.khan@hitecuni.edu.pk

Mr. Yasir Hamid
Designation: Lab Engineer
Qualification: MS (In Progress), HITEC University
Areas of Interest: CFD, Finite Element Analysis, IC Engine, Non Newtonic Fluid Mechanics
Contact: yasir.hamid@hitecuni.edu.pk

Mr. Anique Mukhtar
Designation: Lab Engineer
Qualification: MS (In Progress), HITEC University
Areas of Interest: Heat Transfer, Fracture Mechanics
Contact: anique.mukhtar@hitecuni.edu.pk
Mr. Hafiz Abdullah Zafar
Designation: Lab Engineer
Qualification: MS (In Progress) HITEC University
Areas of interest: Computational Fluid Dynamics, Refrigeration & Air Conditioning, IC Engines
Contact: abdullah.zafar@hitecuni.edu.pk

Mr. Danish Ali Khan Tanoli
Designation: Academic Coordinator
Qualification: MBA (Banking and Finance), Institute of Business and Technology, Karachi
Contact: coordinatormed@hitecuni.edu.pk

* On study leave
Faculty of Mechanical Engineering
BS Mechanical Engineering

“Education is not the filling of a pail, but the lighting of a fire”

William Butler Yeats

BS Mechanical Engineering is an undergraduate academic degree conferred upon successful completion of four year program of studies at HITEC University. This program is approved by PEC; fully adhering to the guidelines and requirements set by PEC as well as HEC.

The four year program is split into eight semesters. It is a broad-based scheme and the curriculum, which culminates with a final year project, gives students a background that is essential to an engineering career. Mechanical engineering students take courses in Statics, Dynamics, Theory of machines, Vibrations, Mechanics of materials, Manufacturing processes, Control systems, Fluid mechanics, Thermodynamics, IC engines, Heat transfer and many more.

Students are taught the latest Mechanical Engineering curriculum that is well supported by six courses in Mathematics, two courses in Electrical and Electronics Engineering and one in Computer Engineering. All engineering subjects are fully complemented by requisite lab work to train the students on modern equipment and machinery. In Mechanical Engineering Department, the focus is on ‘learn by doing’. Our labs are at the core of this philosophy where students receive hands-on training in various fields along with application of software such as CAD/CAM/CAE/CNC ANSYS, MATLAB and Computational Fluid Dynamics.

In pursuance of its policy to keep the students abreast with the latest technological developments, the Department continuously upgrades its labs by adding new equipment and instruments. In many respects, we excel and stand higher than mechanical engineering departments of other engineering institutes in the country. The students are also encouraged to enhance their studies and enrich the overall learning experience by participating in science and technology fairs, technical exhibitions and design competitions. In addition, the Department provides opportunities to instill positive attitudes, values and ethics with special focus on personality development, communication and other soft skills to prepare students for existing competitive industrial environment and to make them responsible citizens.

Owing to growing demand, popularity and repute of our BS program, the Department has increased student intake from session 2013 and onwards. This reflects the confidence posed in us by the prospective students and their parents.
## Curriculum

### Semester-1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT 101</td>
<td>Calculus &amp; Analytical Geometry</td>
<td>3 + 0</td>
</tr>
<tr>
<td>BS 101</td>
<td>Engineering Physics</td>
<td>2 + 0</td>
</tr>
<tr>
<td>BS 102</td>
<td>Engineering Chemistry</td>
<td>2 + 0</td>
</tr>
<tr>
<td>HS 101</td>
<td>English</td>
<td>3 + 0</td>
</tr>
<tr>
<td>CE 101</td>
<td>Computer Fundamentals</td>
<td>2 + 1</td>
</tr>
<tr>
<td>ME 101</td>
<td>Workshop Technology</td>
<td>1 + 2</td>
</tr>
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</table>

**Total Credit** 16

### Semester-2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT 102</td>
<td>Linear Algebra and ODE</td>
<td>3 + 0</td>
</tr>
<tr>
<td>HS 102</td>
<td>Pakistan Studies</td>
<td>2 + 0</td>
</tr>
<tr>
<td>HS 201</td>
<td>Communication Skills</td>
<td>3 + 0</td>
</tr>
<tr>
<td>EE 220</td>
<td>Fundamental of Electrical Engineering</td>
<td>3 + 1</td>
</tr>
<tr>
<td>ME 104</td>
<td>Engineering Drawing &amp; Graphics</td>
<td>1 + 2</td>
</tr>
<tr>
<td>ME 105</td>
<td>Engineering Statics</td>
<td>3 + 0</td>
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**Total Credit** 18

### Semester-3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT 201</td>
<td>Complex Variables &amp; Transforms</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 102</td>
<td>Thermodynamics-I</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 103</td>
<td>Fluid Mechanics-I</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 201</td>
<td>Engineering Dynamics</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 202</td>
<td>Material Science &amp; Engineering</td>
<td>2 + 0</td>
</tr>
<tr>
<td>ME 205</td>
<td>Mechanics of Material-I</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 201L</td>
<td>Engineering Mechanics Lab</td>
<td>0 + 1</td>
</tr>
<tr>
<td>ME 205L</td>
<td>Mechanics of Material Lab</td>
<td>0 + 1</td>
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**Total Credit** 19

### Semester-4

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>MT 202</td>
<td>Numerical Methods</td>
<td>3 + 0</td>
</tr>
<tr>
<td>EE 320</td>
<td>Analog and Digital Systems</td>
<td>3 + 1</td>
</tr>
<tr>
<td>ME 203</td>
<td>Fluid Mechanics-II</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 204</td>
<td>Thermodynamics-II</td>
<td>2 + 0</td>
</tr>
<tr>
<td>ME 301</td>
<td>Mechanics of Material-II</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 303</td>
<td>Manufacturing Process</td>
<td>2 + 0</td>
</tr>
<tr>
<td>ME 203L</td>
<td>Fluid Mechanics Lab</td>
<td>0 + 1</td>
</tr>
<tr>
<td>ME 204L</td>
<td>Thermodynamics Lab</td>
<td>0 + 1</td>
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**Total Credit** 19

### Semester-5

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>MT 301</td>
<td>Partial Differential Equations</td>
<td>3 + 0</td>
</tr>
<tr>
<td>HS 202</td>
<td>Technical Report Writing</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 206</td>
<td>Heat and Mass Transfer</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 302</td>
<td>Theory of Machines</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 304</td>
<td>Design of Machine Elements-I</td>
<td>2 + 0</td>
</tr>
<tr>
<td>ME 306</td>
<td>I.C Engines</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 306L</td>
<td>I.C Engines Lab</td>
<td>0 + 1</td>
</tr>
<tr>
<td>ME 308L</td>
<td>Design of Machine Elements Lab</td>
<td>0 + 1</td>
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**Total Credit** 19

### Semester-6

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MT 302</td>
<td>Probability and Statistics</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 403</td>
<td>Control Systems</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 405</td>
<td>Instrumentation &amp; Measurement</td>
<td>2 + 0</td>
</tr>
<tr>
<td>ME 305</td>
<td>Refrigeration &amp; Air Conditioning</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 307</td>
<td>Mechanical Vibrations</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 308</td>
<td>Design of Machine Elements -II</td>
<td>2 + 0</td>
</tr>
<tr>
<td>ME 305L</td>
<td>Heat Transfer &amp; Refrigeration Lab</td>
<td>0 + 1</td>
</tr>
<tr>
<td>ME 307L</td>
<td>Machines/Vibrations Lab</td>
<td>0 + 1</td>
</tr>
<tr>
<td>ME 403L</td>
<td>Instrumentation &amp; Control Lab</td>
<td>0 + 1</td>
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**Total Credit** 19
### Semester-7

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MS 201</td>
<td>Engineering Economics</td>
<td>2 + 0</td>
</tr>
<tr>
<td>ME 401</td>
<td>Design Project-I</td>
<td>0 + 2</td>
</tr>
<tr>
<td>ME 402</td>
<td>Power Plant</td>
<td>2 + 0</td>
</tr>
<tr>
<td>HS 301</td>
<td>Islamic Studies</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 404</td>
<td>CAD/CAM</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 4XX</td>
<td>Elective-I</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 404L</td>
<td>CAD/CAM Lab</td>
<td>0 + 2</td>
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**Total Credit** 17

### List of Elective Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ME 410</td>
<td>Gas Dynamics</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 411</td>
<td>Computational Fluid Dynamics</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 412</td>
<td>Industrial Engineering</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 413</td>
<td>Finite Element Analysis</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 415</td>
<td>Optimization</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 416</td>
<td>Renewable Energy Resources</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 418</td>
<td>Tribology</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 421</td>
<td>Advanced Manufacturing Techniques</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 422</td>
<td>Advanced Stress Analysis</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 423</td>
<td>Experimental Stress Analysis</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 425</td>
<td>Engineering Entrepreneurship</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 426</td>
<td>Mathematical Modeling and Simulation</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 427</td>
<td>Robotics</td>
<td>3 + 0</td>
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### Semester-8

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>MS 401</td>
<td>Engineering Management</td>
<td>3 + 0</td>
</tr>
<tr>
<td>BS 302</td>
<td>Professional Values and Ethics</td>
<td>2 + 0</td>
</tr>
<tr>
<td>ME 401</td>
<td>Design Project-II</td>
<td>0 + 4</td>
</tr>
<tr>
<td>ME 4XX</td>
<td>Elective-II</td>
<td>3 + 0</td>
</tr>
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</table>

**Total Credit** 12
Course Contents

BS-101 Engineering Physics
Introduction to units and their inter-conversion, dimensionless quantities, vectors, centroids/areas/volumes, moments of inertia, simple harmonic motion, waves and oscillations, electricity and magnetism, waves and acoustics, introduction to industrial electronics, use of polarized light in instruments, magnetism and electromagnetism, nuclear fission, solid state physics, crystals and non-crystals.

BS-102 Engineering Chemistry
Thermochemistry, Electrochemistry, Laws of electrolysis, Organic chemistry, Production and uses of hydrocarbons, Production and uses of minerals, Extraction of metals and their properties, Cement industry, Production of cement and its testing, Production and uses of rubber, Paint industry, Fertilizer industry, Water filtration techniques, Coolants and their uses, Properties and type of explosives, Production of rocket fuel/propellant and types of propellants, Type of alloys and their uses.

BS-302 Professional Values and Ethics
Ethical and moral issues for engineers, health, safety and welfare of people, major theories of moral development, code of ethics prescribed by professional bodies, fundamental human rights and its legal provision in an organization, principles of justice, contract laws, arbitration, partnership, evidence laws, labor laws, drafting and legal documents used in contractual transactions.

ME-101 Workshop Technology
Soldering, brazing and welding, introduction to machine tools, basic lathe operations, basic processes in metal shop, forging and foundry shop, tools and accessories, furnaces, electric shop, types and uses of cables, electrical accessories for house wiring and testing
methods.

**ME-102 Thermodynamics-I**
Introductory concepts and definitions, energy and the first law of thermodynamics, evaluating properties, control volume analysis, the second law of thermodynamics, entropy.

**ME-103 Fluid Mechanics-I**
Introduction, fluid statics, elementary fluid dynamics, the Bernoulli equation, fluid kinematics, differential analysis of fluid flow, similitude, dimensional analysis and modeling, viscous flow in pipes.

**ME-104 Engineering Drawing and Graphics**
Introduction, dimensioning, sheet planning, use of drawing instruments, orthographic projection, engineering geometry, fits and tolerances, geometrical dimensioning and tolerances, practice of using different drawing tools e.g. pencil, scriber, t-square etc, attachment of drawing sheet on board and division of sheet. drawing of a cycloid, epicycloids, hypocycloid and involutes to a given circle, drawing the views of 3-D models using the concepts of 1st and 3rd angle projections, introduction to auto-CAD, basic commands and functions, drawing view in 1st and 3rd angle projections, introduction to 3-D modeling.

**ME-105 Engineering Statics**
Introduction to statics, force systems, equilibrium, structures, distributed forces, friction.

**ME-201 Engineering Dynamics**
Introduction to dynamics, kinematics of particles, kinetics of particles, kinetics of system of particles, plane kinematics of rigid bodies. Newton’s Laws, gravitation, rectilinear motion, plane curvilinear motion, rectangular coordinates, normal and tangential coordinates,
polar coordinates, space curvilinear motion, relative motion, kinematics of system of particles, Impulse and momentum, conversation of energy and momentum, plane kinematics of rigid bodies, Introduction to impulse and momentum. Impacts.

**MS-201 Engineering Economics**

Introduction to economics, simple and compound interest, annual, net present and net future worth's, rate of returns, internal rate of return (IIR) and external rate of return (ERR), financial statements, interpretation of financial statements, fundamental economic concepts, supply and demands principle, market, types of market and forecasting, ratios, accounting, cost benefit ratios, equities, interest versus equities, recently discovered advantages of equity over interest and their implementation in corporate & banking sectors.

**ME-202 Material Science and Engineering**

Introduction, the structure of crystalline solids, imperfections in solids, diffusion, mechanical properties of metals, dislocations mechanisms, failure, phase diagrams: development of microstructure and alteration of mechanical properties, applications and processing of metal alloys, ceramics, polymer structures, composites, corrosion and degradation of materials, electrical properties, thermal properties, magnetic properties, optical properties, materials selection and design considerations.

**ME-203 Fluid Mechanics-II**

Boundary layer flow, boundary layer equation, separation and wake, lift and drag of immersed bodies, airfoil theory, numerical analysis, flow through open channels, uniform flow, specific energy, hydraulic jump, compressible flow, adiabatic isentropic steady flow, converging and diverging flow, hydraulics.

**ME-204 Thermodynamics-II**

Nozzle shape, critical pressure ratio, convergent-divergent nozzle, steam turbine, impulse and reaction, pressure and velocity compounding, velocity diagram, conditions for maximum efficiency, reciprocating compressors, single stage and multistage, condition for minimum work, isothermal and volumetric efficiency, rotary compressors, radial and axial flow, blade velocity diagram, degree of reaction.

**ME-205 Mechanics of Materials-I**

Concept of stresses, axial loading, normal stresses, shearing stress, stress and strain-axial loading, stress strain diagram, Poisson's ratio, thermal stresses, elasto-plastic behavior, torsion and bending moments, stresses in torsion and bending, angle of twist in the elastic range, pure bending, residual stresses, analysis and design of beams for bending, shear force and bending moment diagrams, transformations of stresses and strains, Mohr's circle for two-dimensional loading, deflection of beams, columns.

**ME-206 Heat and Mass Transfer**

Concept of heat flow, conduction, convection and radiation heat transfer, free and forced convection, heat transfer from extended surfaces, mass transfer, Fick's law, analogy between heat and mass transfer, the overall heat transfer co-efficient, log mean temperature difference, heat exchanger types, the effective NTU relations.

**ME-301 Mechanics of Materials-II**

Transformations of stresses and strains, Mohr's circle for 3-dimensional stresses, general state of stress, theories of failure, stresses in thin-walled pressure vessels, fatigue failures, measurements of strain, strain rosette, equation of elastic curve,
statically indeterminate beams, singularity function to determine the slope and deflection of beam, method of superposition, moment-area theorems, impact loading, compatibility equations.

ME-302 Theory of Machines
Friction between un-lubricated surfaces, screw threads and efficiency, friction of pivot, collar and conical bearing, cone, plate and centrifugal clutch, belts and rope drives, chains and sprockets, brakes, governors, effort and power, sensitivity, gyroscope, geometry of gears, linkages synthesis and analysis, position, velocity and acceleration analysis, turning moment diagram, flywheels, valve diagrams and valve gears, steering gears, static and dynamic balancing, worm and worm gear analysis, cam designing.

ME-303 Manufacturing Processes
Introduction to manufacturing technology, plastic deformation, metal forming processes: forging, rolling, extrusion, drawing, sheet metal forming; complex manufacturing processes and core technologies, laser manufacturing, advanced manufacturing process design, quality management system, raw materials and energy requirements of manufacturing process, manufacturing process simulation software.

ME-304 Design of Machine Elements-I
Basic criteria of the performance and design of machine parts, determination of permissible and actual stresses, design of simple element, design of keys, cotters and couplings, design of welded, riveted, and bolted joints, design of helical springs and leaf springs, design of shafts, design standard (ISO, ASME, ANSI, ASTM etc), metal fit and tolerances

ME-305 Refrigeration and Air-Conditioning
Introduction, vapor compression cycle, multi-pressure systems, air cycle refrigeration systems, absorption refrigeration cycle, refrigerants, psychometry, air
conditioning systems, heating and cooling load calculations, transmission and distribution of air.

**ME-306 Internal Combustion Engines**
Engine types and their operations, engine design and operating parameters, thermo-chemistry of fuel and air mixture, ideal models for engines cycles, gas exchange processes, engine friction and lubrication, engine heat transfer, modeling real engine flow and combustion process.

**ME-307 Mechanical Vibrations**
Oscillatory motion, equation of motion, viscously damped free vibration, logarithmic decrement, forced harmonic vibration, two degree of freedom system, normal modes of vibration, vibration absorber, vibration damper, vibration of elastic bodies, free and forced vibration of a uniform bar, critical speed of rotating shafts with single rotor and two rotors.

**ME-308 Design of Machine Elements-II**
Design of spur, helical, bevel and worm gears, design of fly wheel, design of brake/clutches, design of power screws/translation screws, design of belt and chain drive, selection of bearings.

**ME-402 Power Plants**
Steam power plants, steam generators, engines and auxiliary components, losses in pipes, turbine, pump and condenser, gas turbine power plant, the practical gas turbine cycle, jet propulsion plant, aircraft jet engine, subsonic and supersonic propulsion, propellants and combustion, thrust chamber, nuclear power plant, nuclear reactions as energy sources, moderators and reflectors, nuclear hazards and safety practice.

**ME-403 Control Systems**
Feedback concepts and its terminology, modeling of systems having transatory movements, modeling of rotary systems, modeling of thermal systems, review of
laplace transformation, derivation of transfer function, computing the output of a system for a given input, stability and its types, response of the first order systems, response of the second order systems, type of the second order systems, performance specifications of a typical second order systems, root locus techniques.

**ME-404 CAD/CAM**

Computer in industrial manufacturing, geometric modeling system, interactive computer graphics, rapid prototyping, automation, computer aided quality control, CNC machines. Computer integrated manufacturing, flexible manufacturing system, cellular manufacturing system, implementation of a CAD/CAM system, group technology and CAPP.

**ME-405 Instrumentation and Measurements**

Introduction, sensor/transducer technologies and characteristics, temperature measurement system, flow and level measurement systems, displacement, velocity, and acceleration measurement both linear and rotational, optical encoders and optical tachometer, signal conditioning and data acquisition.

**MS-401 Engineering Management**

Basics of management and its functions, evolution of management and development till today, role of managers and styles of management, leadership, organizational structure, motivation theories and process, decision making tools, productivity management in manufacturing and service concerns, product design development management, strategic management, project management and its processes, supply chains, risk management, operation management, quality management, six sigma and other quality standards.

**Elective Courses**

**ME-410 Gas Dynamics**

Introduction, basic governing laws of conservation of mass, momentum and energy, sub-sonic and supersonic gas flow, isentropic flow, normal and oblique shocks, Rayleigh flow and Fanno flow, Prandtl-Meyer compression and expansion.

**ME-411 Computational Fluid Dynamics**

Introduction, partial differential equation, basics of finite difference methods, concepts of error, consistency and stability, momentum and energy equations, diffusion equations, turbulence modeling, boundary layer computational methods, hyperbolic equations, grid systems.

**ME-412 Industrial Engineering**

Production management and decision making, analytical and quantitative methods of management, planning organization and control of production systems, plant layout, work and method study.

**ME-413 Finite Element Analysis**

The stiffness method and the plane truss, integral formulations and variational methods, weak boundary value problem, Rayleigh–Ritz method, error analysis, Eigen value problem, two and three dimensional problems, plane elasticity, bending of plates, beams, use of commercial FEA codes, applications of FEA in the relevant fields of study.

**ME-415 Optimization**

Introduction to optimization with reference to engineering design, operation research and management problems, Kuh-Tucker conditions, linear programming applications for design, sensitivity analysis with application to engineering design, nonlinear design
optimum problems and their solutions with numerical techniques, case studies with application of optimum techniques to machine components.

**ME-416 Renewable Energy Resources**

Introduction to types of renewable energy, solar energy, wind energy, geothermal energy, ocean thermal energy, tidal wave energy, biomass energy, fuel cell and heat pump systems, wind turbine design specifications, compatible electric generators and major operational issues of the wind mill for electric power generation, wind mills design usage for pumping water.

**ME-418 Tribology**

Tribology history and applications, theory of friction, contact mechanism, the study of surfaces, roughness measurements, mechanism of wear and types of wear, the lubricants and its properties. The study of seals, its design and wear phenomenon, temperature distribution study on contacting surfaces. The study of bearing and its types, tribology study in polymers and composites.

**ME-421 Advanced Manufacturing Techniques**

Principles of manufacturing, resources planning, operations management, forecasting techniques, production planning and scheduling procedures, analysis of manufacturing resources. Material inventory activities, facilities and physical plant layout, production process and equipment, manufacturing automation, productivity, quality, team projects using computer modeling software.
ME-422 Advanced Stress Analysis
Elasticity field equations, methods of solution, 2D problems, plane stress and plane strain, axi-symmetric problems, thick-walled cylinders, rotating, discs, stress concentration around circular inclusions, 2D problems in rectangular coordinates, corrective solutions, end effect, self-similar problems, singularities, elastic indentation, introduction to plasticity: stress-strain, idealization, yield function, hardening rules, total and incremental models, residual stresses, Bauschinger effect, Autofrettage cyclic plasticity, normality rule, back, stress, movement of yield surface, numerical implementation of cyclic, plasticity

ME-423 Experimental Stress Analysis
Stress optical law-polarized light, effect of stressed model in a plane polariscope, effect of stressed model in circular polariscope, isochromatic fringe patterns, isoclinic fringe patterns, materials for three-dimensional photo elasticity, resistance strain gauges, parameters influencing behavior of strain gauge, introduction to polariscope and basic experiments on polariscope.

ME-425 Engineering Entrepreneurship
Entrepreneurship, innovation and engineering, a sociologist, economist, psychologist perspective, entrepreneurial process, generating a business idea, financial analysis, competitor analysis, target market analysis, business plan, business model, types of industries, types of business entities, culture and legal formalities, marketing mix, SME, Japanese management style, risks and benefits of being an entrepreneur, case studies.

ME-426 Mathematical Modeling and Simulation
Modeling multi-domain engineering systems for design and control system implementation. network representation, state-space models, multiport energy storage and dissipation, Legendre transforms, non-linear mechanics, transformation theory, Lagrangian and Hamiltonian forms, control-relevant properties. application examples like electro-mechanical transducers, mechanisms, electronics, fluid and thermal systems, compressible flow, chemical processes, diffusion, and wave transmission.

ME-427 Robotics
Coordinate frames, homogeneous transformations, introduction to forward kinematics, inverse kinematics, dynamics, velocities, static forces, and Jacobians, trajectory planning, mechanical design of robots.
### Laboratory Courses

#### Undergraduate Laboratories

Mechanical Engineering program at HITEC is very well supported by laboratory work. Experimental work related to different subjects is carried out in our following teaching labs.

**ME 101L Workshop Technology**

Introduction to measuring tools like vernier caliper, micrometer screw gauge etc, machining of cylindrical job as per given drawing contains facing, turning, center drilling, taper turning, grooving, chamfering, outer and inner threading, boring, shaping of jobs as per given drawings which include, square, rectangular, hexagonal, key way shapes, introduction to electric arc welding, gas welding and gas cutting process, different types of flame.

**ME-201L Engineering Mechanics**

Vectors and equilibrium of forces, spring compression apparatus, spring extension, moments, reactions of beams, frame structure, center of gravity, statics and dynamics coefficient of friction, measurement of centrifugal force, governor.

**ME-205L Mechanics of Materials**

Hardness measurement, determination of fatigue life and endurance limit, modulus of rigidity and maximum shear strength, load of spring under certain deformation, modulus of elasticity, elastic limit, yield point, tensile strength of different materials, flexural strength, buckling; strain measurement under tensile, torsion and bending load.

**ME-203L Fluid Mechanics**

Viscosity of liquids, gauge calibration, hydrostatic pressure, metacentric height, Bernoulli’s theorem, impact of jet, flow through orifice, free and forced vortex, flow visualization, Osborne Reynolds’s number, flow over Weirs/Laminar flow analysis, pipe friction apparatus/head loss in fluid friction, pelton turbine, pump performance/map of a pump, characteristics of pump in series and parallel configuration, losses in bends.

**ME-204L Thermodynamics**

Change in boiling point of a fluid at different pressures, study of boiling by increasing the flow rate of heated water, study of Diesel and Otto cycle during the two and four strokes, study of all components of turbo jet engine, study of Wankel engine, study the working and thermodynamics of steam engine and the thermodynamics of Rankine cycle and derivation of its efficiency as applicable to steam power plant.
ME-305L Heat Transfer and Refrigeration

Thermal conductivity of different materials, linear and radial, interface temperature and thermal resistance concept, coefficient of heat transfer and efficiency in free and forced convection for flat plate, fins and pipe bundle, NUSSELT number, Reynolds number, log mean temperature difference (LMTD), study and the flow rate effects on heat transfer for shell and tube, spiral, concentric and plate heat exchanger, Stefan Boltzmann law of thermal radiation for black, grey and polished surfaces, demonstrate the working of refrigeration and air-conditioning unit.

ME-306L I.C Engine

Measurement of torque and speed using graphical method, calculation of brake mean effective pressure, measurement of air and fuel consumption, drawing engine performance curves, calculation of volumetric and thermal efficiencies, plotting of PV diagram, calculation of indicated mean effective pressure and indicated power, cut away model of four-stroke diesel and two-stroke petrol engine, cut-away models of fuel injection pump gear box and air/fuel filter.

ME-307L Theories of Machines and Vibrations

Application of Grashof condition on a slider-crank mechanism and study the variation in velocity and acceleration, slotted link slider-crank mechanism, static and dynamic balancing, gyroscopic effect at first, second and third moments, working of gears, belt assembly, car differential and fly wheel. natural frequency of the system (with and without damper), torsional stiffness and the natural frequency of the given bar. compare theoretical natural frequency with values obtained by measurement. forced oscillations and the phenomena of resonance.

ME-308L Design of Machine Elements

Basics of programming in MATLAB, programming flow control in MATLAB, graphics in MATLAB, machine design examples in MATLAB. Introduction to ANSYS, basics of finite elements analysis, two dimensional trusses, plane stress brackets, solid modeling, effect of self weight, cantilever beam with concentrated and distributed load, buckling, thermal analysis in ANSYS with different boundary conditions, design optimization using ANSYS.

ME 403L Instrumentation and Control

Introduction to sensors and transducers, study of sensor behavior, properties and characteristics of strain gauges, linear and rotary potentiometers, LVDT, a variable-area capacitor, optical encoders, opto-reflector, tachogenerators, reed switch, variable reluctance probe, thermocouples, RTDS and thermistors, pressure control sensors and transducers. characterization of P, I, D and PID controllers in, flow, level, pressure and temperature control processes.

ME-404L CAD/CAM

Introduction to Pro E, extrusion, hole, round and chamfer fillet, shell, revolve, ribs, pattern, sweep, blend and engineering design, swept and blended features, helical sweep features, drawing layout, advanced mechanism, detailing, final assembly. introduction to machining and CNC technology, coordinate systems and basic programming codes used in CNC milling/lathe machines, introduction to rapid traverse, linear and circular interpolation, introduction to work coordinate offset, tool length and cutter radius compensation, write and execute the programming on CNC milling machine of given figures.
Lab Upgrades

The Labs of Mechanical Engineering Department are undergoing continuous upgradation. Some of the prominent equipments, machines and instruments that have recently been introduced into the existing labs are listed in the following;

The VB-5340 FIAT DOHC cut section with EFI system (IC Engine Lab)
- 4 stroke petrol engine 4-cylinders
- Displacement: 2000 cc
- Gearbox: 5 forward speed + reverse
- Differential with hypoid crown wheel and pinion
- Twin overhead camshaft driven by a toothed belt
- Electronic Ignition
- Dual braking circuit
- McPherson Front Suspension
- Front disk brakes and rear drum brakes

Polariscope (Mechanics of Materials Lab)
- Experimental stress analysis for teaching and research purposes

Toggle Joint Apparatus (Theory of Machines Lab)
- To study the Toggle joint, its working and mechanism

Rotational Moment of Inertia (Theory of Machines Lab)
- For studying Rotational Moment of Inertia of different objects

Wind Tunnel (Fluid Mechanics Lab)
- Apparatus for experimenting air flow for subsonic flows for research purposes

Fluid Friction Apparatus (Fluid Mechanics Lab)
- For studying friction of fluid using different piping configurations, valves and other fluid resistances.
Student Chapters

ASME Student Chapter
American Society of Mechanical Engineers
American Society of Mechanical Engineers is a professional association that, in its own words, “promotes the art, science, and practice of multidisciplinary engineering and allied sciences around the globe” via “continuing education, training and professional development, codes and standards, research, conferences and publications, government relations, and other forms of outreach.” ASME Student Chapter was inaugurated in HITEC University in Sep. 2011, it is regularly conducting various events among the students such as tutorials and seminars, industrial tours, competitions and conferences etc. It is currently managing 120 members and has its own webpage: asmehitec.webs.com. Dr. S. Kamran Afaq is its advisor. Recently ASME Student chapter has arranged a series of lectures to help the students excel in their skill in CAD Software. It also arranged an Idea week. The event comprised different sub events like Auto Mania (Junior), Auto Mania (Senior), Technical Quiz and Adobe Photoshop Workshop etc.

SMEP Student Chapter
Society of Mechanical Engineers of Pakistan
The Society of Mechanical Engineers of Pakistan aims at providing a platform to the Mechanical Engineers to enhance their professional expertise, introduce standardization, improve quality of education, provide with growth opportunities etc. Student chapter of SMEP was inaugurated on 6th March 2013 with the intention to be one of the most active student societies.

ASHRAE Student Chapter
American Society of Heating Refrigeration Air conditioning
ASHRAE (Formerly the American Society of Heating, Refrigerating and Air Conditioning Engineers), founded in 1894, is a building technology society with more than 54,000 members worldwide. The Society and its members focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability within the industry. ASHRAE HITEC University Student Chapter was inaugurated on March, 6th 2014 under the advisory of Dr. Muhammad Ehtisham Siddiqui.
Research Groups

Research in different areas leading to MS and Ph.D. degrees and that pertaining to industrial projects is carried out under the following research groups in the Department;

Thermo Fluids Research Group (TRG), headed by Dr. Fahad Sarfraz Butt

This research group combines the research potentials of the two of the most evergreen fields of science and engineering: fluid mechanics and thermodynamics.

Here we are interested in experimental and numerical thermo fluids research. The ongoing research is in the domains of boundary layer flows, internal and external transition flows, wind energy and aero-thermodynamics.

We possess strong experimental and computational facilities on campus. A research grade subsonic wind tunnel and a rotating disc apparatus coupled with flow measurement devices especially hot wire anemometer are available. We possess powerful workstations for CFD simulations which will run majority of computational experiments.

MS projects completed/in progress are listed in the following;

• Evaluation and Validation of Pressure Loss Coefficient in T Junction by CFD Simulation (completed)
• Design and Development of MIQA Micro Plying Vehicle (completed)
• Aero Elastic Analysis of Joined Wing (in progress)

Structures and Materials Research Group (SMRG), headed by Dr. S. Kamran

This group is mainly involved in research in the area of composite materials due to their wide spread usage in numerous applications. Some of the completed and in progress MS and Ph.D. projects under this group are;

• Numerical Simulation of Composite Armor Box For Main Battle Tanks (completed)
• Analytical and Numerical Modeling of Steel and Composite Leaf Springs (completed)
• Design, Optimization and Analysis of a Composite
MS Mechanical Engineering

"Education is not preparation for life; education is life itself"

John Dewey

Today, more than ever before, the knowledge and skills of talented persons with advanced degrees in Mechanical Engineering are vitally needed to face technical challenges of 21st century. To achieve this goal, the Department offers MS in Mechanical Engineering.

The MS degree is awarded for the completion of a program of advanced study, comprising of 30 credits of graduate courses and a research thesis which is considered to be the centerpiece of a student's graduate experience.

Typically, the MS students take courses of their choice from the list of courses offered in any semester. Although research project is assigned to a student on successful completion of course work, yet the students are encouraged to take courses in the fields which they anticipate or are interested in for their MS research project.


Students with BS degrees in Mechanical Engineering, Mechatronics Engineering or Aerospace Engineering can be admitted into the MS program.
Ph.D. Mechanical Engineering

“Develop a passion for learning. If you do, you will never cease to grow”

Anthony J. D’Angelo

The Doctor of Philosophy (Ph.D.) in Mechanical Engineering is the highest degree awarded by the Mechanical Engineering Department and is recommended for students who are interested in leadership careers in academia or research and development pursuits in public or private sector organizations.

The doctoral candidate is expected to attain a level of mastery in some area of Mechanical Engineering, and must therefore choose a field and study the most advanced courses offered in that field.

Ph.D. program is designed to give students the depth in mathematics and engineering sciences, developing analytical skills, together with intensive study and research experience in a specialized area of Mechanical Engineering.

The degree is awarded in recognition of high level of scholarship, the ability to carry out independent research, and the publication of such research in national and international journals of repute. The program comprises minimum 18 credit hours of graduate level course work and 30 credit hours of research thesis.

The program necessitates two years of residency in HITEC University. The students eligible for admittance in Ph.D. program should possess an MS/M. Phil. Degree with a minimum CGPA 3 out of 4 and should have passed GAT subject examination as per requirement of HEC, in vogue.

The specific course requirements for a doctoral student are set in consultation with his/her research adviser to support the student’s area of research. The completion of coursework is followed by a comprehensive examination for granting candidacy as a Ph.D. researcher. A positive evaluation of the research by one local and two foreign experts, as per requirements of the HEC, leads to an open defense of the thesis. Publication of at least one research paper in an impact-factor carrying journal of repute is also an essential requirement for the award of the Ph.D.
## MS/Ph.D. Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ME-711</td>
<td>Finite Element Analysis</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME-712</td>
<td>Advanced Material Science and Engineering</td>
<td>3 + 0</td>
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<tr>
<td>ME-713</td>
<td>Advanced Solid Mechanics</td>
<td>3 + 0</td>
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<tr>
<td>ME 715</td>
<td>Advanced Theory of Elasticity</td>
<td>3 + 0</td>
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<tr>
<td>ME-716</td>
<td>Advanced Thermodynamics</td>
<td>3 + 0</td>
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<tr>
<td>ME-718</td>
<td>Advanced Fluid Mechanics</td>
<td>3 + 0</td>
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<tr>
<td>ME 719</td>
<td>Computational Fluid Dynamics</td>
<td>3 + 0</td>
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<tr>
<td>ME 720</td>
<td>Experimental Stress Analysis</td>
<td>3 + 0</td>
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<tr>
<td>ME-723</td>
<td>Manufacturing System</td>
<td>3 + 0</td>
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<tr>
<td>ME 724</td>
<td>Advanced Robotics</td>
<td>3 + 0</td>
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<tr>
<td>ME-729</td>
<td>Engineering Design and Optimization</td>
<td>3 + 0</td>
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<tr>
<td>ME-730</td>
<td>Mechanics of Composite Materials</td>
<td>3 + 0</td>
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<tr>
<td>ME-731</td>
<td>Fracture Mechanics</td>
<td>3 + 0</td>
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<td>ME 732</td>
<td>Advanced Dynamics</td>
<td>3 + 0</td>
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<tr>
<td>ME-735</td>
<td>Theory of Plates and Shell</td>
<td>3 + 0</td>
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<tr>
<td>ME-737</td>
<td>Radiation Heat Transfer</td>
<td>3 + 0</td>
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<tr>
<td>ME-738</td>
<td>Advanced Heat Transfer</td>
<td>3 + 0</td>
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<tr>
<td>ME-739</td>
<td>Theory of Turbo Machinery</td>
<td>3 + 0</td>
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<td>ME-740</td>
<td>Gas Dynamics</td>
<td>3 + 0</td>
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<td>ME 760</td>
<td>Solar Thermal Systems</td>
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<td>ME 761</td>
<td>Boundary layer Flows</td>
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<tr>
<td>ME 762</td>
<td>Introduction to Turbulent Flows</td>
<td>3 + 0</td>
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<tr>
<td>ME 763</td>
<td>Mechanics of Manufacturing Processes</td>
<td>3 + 0</td>
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<tr>
<td>ME 765</td>
<td>Advanced Control Systems</td>
<td>3 + 0</td>
</tr>
<tr>
<td>ME 800</td>
<td>Special Topics</td>
<td>3 + 0</td>
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</tbody>
</table>
Course Contents

ME-711 Finite Element Analysis
Introduction to FEA, Fundamental Concept (Strong, Weak Forms, Matrix Forms), Stiffness Matrix: Linear Spring System with examples in structural, fluid and thermal systems. 1D linear and Quadratic Shape functions, Bar Element: Trusses. Beam Element: Beams and Frames with different type of loading and constraints. 2D Element: Linear Triangular Element with application on plates.

ME-712 Advanced Materials Sciences and Engineering
Elasticity, nonlinearity in crystalline materials, pseudo-elasticity, rubber elasticity, visco-elasticity: elasticity and fluidity, plasticity, limit of elastic response, mechanism in crystalline materials and non-crystalline materials, creep, deformation mechanism maps for elesto-plasticity, fracture due to fatigue.

ME-713 Advanced Solid Mechanics
Fundamental concept of structural mechanics with application to mechanical engineering, residual stresses, thermal effects, analysis of beams and columns, tensioned beams, trusses, frames, cables and shafts of general material and shape, elastic buckling of columns, energy methods, principle of virtual work, introduction to computational structural mechanics.

ME-715 Advanced Theory of Elasticity
Analysis of stress and strain in two- and three-dimensions, Equilibrium and compatibility equations, Plane stress and plane strain analysis and applications, Stress strain and strain displacement relations in 3D, Two-dimensional problems in polar coordinates, General equations in polar coordinates, Strain- displacement relations, compatibility equation, and stress- strain relations, Axisymmetric problems, thick-walled cylinders, rotating disks of uniform thickness, Governing equations for symmetric bending of circular plates, Thermal stresses in cylinders and disks.

ME 716 Advanced Thermodynamics
This course provides a more advanced study of engineering thermodynamics. Includes an examination of the fundamental concepts of classical, macroscopic thermodynamics at a level beyond what is covered in a first course. Coverage includes additional advanced topics such as availability (exergy), equations of state, property relationships, and mixture properties. An introduction to the microscopic aspects of thermodynamics will provide a foundation for understanding the principles of statistical thermodynamics.

ME 718 Advanced Fluid Mechanics
Introduction, kinematics, Rayleigh problems, boundary layer separation and drag, one dimensional
compressible flow, steady supersonic two dimensional flow, linearized flow, viscous flow, introduction to turbulence, turbulence modeling.

**ME 719 Computational Fluid Dynamics**

Introduction, partial differential equations, basics of finite difference methods, concept of error, consistency and stability, momentum and energy equations, diffusion equations, turbulence modeling, boundary layer computational methods, hyperbolic equations, grid systems.

**ME 720 Experimental Stress Analysis**

Review of elementary elasticity, that includes laws of stress transformation, principal stresses and principal strains, equations of equilibrium, Mohr’s stress circle, construction of Mohr Circle for two and three dimensional stress-strain systems, stress concentration points, Strain-measurement method and related instrumentation using electrical resistance strain gauges, Optical methods of stress analysis, using photo elasticity, Laboratory sessions on electrical resistance strain gages and polariscope.

**ME 723 Manufacturing Systems**

This course focuses on important issues in the design and operation of manufacturing systems and gives some intuition about behavior of these systems. Topics include material handling, material transport system, storage systems, components and classification of manufacturing systems, group technology, cellular manufacturing, flexible manufacturing systems, assembly lines and manufacturing support systems.

**ME 724 Advanced Robotics**

Robot programming languages, Introduction to mobile robots, Motion planning, Grasp kinematics, Manipulation and grasp planning, Robot intelligence, Special robot mechanisms.

**ME 729 Engineering Design & Optimization**

This course focuses on the application of optimization techniques for engineering design. Topics include design problem formulation, graphical optimization, optimum design concepts, unconstrained optimization, constrained optimization using KKT conditions, linear programming using SIMPLEX method, numerical methods for optimization and nontraditional/modern optimization algorithms like Genetic Algorithms and Particle Swarm Optimization etc. and introduction to multivariable optimization along with use of MATLAB for optimization.
ME-730 Mechanics of Composite Materials

ME-731 Fracture Mechanics
Theory of elasticity, introduction to fracture mechanics, linear elastic fracture mechanics, elastic field equations, crack tip plasticity, the energy principle, plastic fracture mechanics, mixed-mode fracture mechanics, fatigue crack growth, fracture toughness correlations.

ME 732 Advanced Dynamics

ME-735 Theory of Plates and Shells
Vector, Tensor and Equation of Elasticity, Energy Principles and Variational Methods, Classical Theory
of Plates, Circular plates, Buckling of Plates, Theory and Analysis of Shells.

**ME-737 Radiation Heat Transfer**

**ME-738 Advanced Heat Transfer**
Introduction, general heat transfer equation in rectangular, cylindrical and spherical coordinate system, steady (2-D) and transient (1-D) analysis, analytical, numerical and graphical methods to solve heat transfer equation. Convection equation (mass, momentum and energy), laminar and turbulent heat transfer, free and forced convection (internal and external flows).

**ME 739 Theory of Turbomachinery**
The course aims at giving an overview of different types of turbo-machinery used for energy transformation, such as pumps, fans, compressors, as well as hydraulic, steam and gas turbines. Working principles of turbo-machines and apply it to various types of machines, velocity triangles in turbo-machinery stages operating at design and off-design conditions, Perform the preliminary design of turbo-machines (pumps, compressors, turbines) on a 1-D basis, characterization turbo-machinery stages, off-design behaviour of turbines and compressors and relate it to changes in the velocity triangles.
ME 740 Gas Dynamics
Fluid flow and thermodynamics of gases, Control volumes, vector calculus, equations of motion, Gas dynamics of nozzles, Steady and unsteady waves, oblique shocks, Prandtl-Meyer expansion, Linearized potential flow, thin airfoil theory.

ME 760 Solar Thermal Systems

ME 761 Boundary Layer Flows

ME 762 Introduction to Turbulent Flows
Introduction, Experimental techniques for turbulent flows, Equations governing turbulent flows, Benchmark data and features of basic turbulent flows, Turbulence modeling, Numerical scheme for prediction of thin shear flows, Numerical scheme for prediction of separated flows, Introduction to Large Eddy Simulation (LES), Elements of Direct Numerical Simulation (DNS).

ME 763 Mechanics of Manufacturing Processes
Basics of Materials Behaviour, Orthogonal cutting model in Machining, Cutting Conditions in Operations, Forces in Metal Cutting & Surface Finish, Grinding Analysis, Cutting Tools and Technology, Non-Conventional Machining Processes, Analysis of Plastics Extrusion, Bulk deformation and Analysis of Open Die Forging, Flat Rolling & Metallic Extrusion, Drawing Analysis, Engineering Analysis of Sheet Metal, Engineering Analysis of Pouring, collector

**ME 765 Advanced Control Systems**
Frequency response analysis, Design with PID controller, Pole-assignment controller design, State-space modeling, Controllability, Observability, Linearization of nonlinear systems, Introduction to Robustness, Lyapunov stability concepts, Linear Quadratic Regulator (LQR), Overview of Kalman filter theory.

**ME 800 Special Topics**
Due to breadth of Mechanical Engineering curriculum, there are many other topics which fall under its purview. Keeping this in view, a maximum of three courses other than those mentioned above, can be offered at MS level as Special Topics.
Department of
Computer Science and Engineering
Department of Computer Science and Engineering

Dr. Fawad Ahmed
Chairman
Department of Computer Science & Engineering

The Department of Computer Science and Engineering was established in Spring 2014 with the aim to impart quality education to our students by teaching them theory backed by hands on practical training. The Department not only emphasizes on technical skills of students, but also endeavors to enhance their sense of responsibility towards humanity. We host full time, dedicated and professional faculty, equally well adept in teaching, learning and research. The Department has dedicated, spacious and well-equipped laboratories providing software and hardware resources. The curricula of all our programs have been designed according to the guidelines of the Higher Education Commission of Pakistan (HEC), the National Computing Education Accreditation Council (NCEAC) and the Pakistan Engineering Council (PEC).

The BS Computer Science program at HITEC University was initially started in Fall 2012, within the Department of Electrical Engineering with the aim to prepare students for a productive career in software industry, academia and for higher studies in computer science. The field of Computer Science encompasses many sub-disciplines, for example, software development, image processing, computer networks, mobile computing, soft computing, etc. The exponential growth in all these areas, mainly due to compact and computationally powerful hardware has opened emerging job markets, both locally and internationally. Once the world fully adapts to the new Internet Protocol Version 6, the number of IP-based devices in domestic and commercial applications would increase dramatically. It is expected that this sudden surge in technology will require a lot of human resource in software development.

The successful launch of BS Computer Science program has been instrumental in commencing BS Computer Engineering program in Fall 2014. The BS Computer Engineering program is designed to prepare students in a number of fields related to analog electronics, digital system design, computer architecture, signal processing and software. Our faculty works with students with a vision to empower them with the skills and tools necessary to meet the requirements of the industry.

In Fall 2014, the Department also started MS Computer Science with the aim to bridge the gap between graduate level knowledge and the cutting edge research and its implementation. The MS program is designed to enable students to learn advanced technologies in the domain of computer science by taking specialized courses and further enhance their practical and research skills by completing thesis. From Spring 2016, the Department is planning to start Ph.D. in Computer Science also.

Besides academics, we also focus on personality and character building of our students by facilitating them to get involved in extra curricular activities within and outside the University. There are a number of student societies which play a very vital role towards enhancing our students’ potential in various sports and also cultivate their interest in science, technology, literature, culture and arts. We envision our students becoming innovators and leaders who would be able to contribute to the aspirations of the society. I look forward to see you in our Department where you can start working to build an exciting career in one of the most promising technologies of this era.
Faculty

Dr. Muhammad Younus Javed
Designation: Professor
Qualification: Ph.D. University of Dundee, Scotland, UK
Areas of Interest: Distributed and Parallel Systems, Digital Image Processing, Algorithmics and Computer Networks
Contact: myjaved@hitecuni.edu.pk

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Areas of Interest: Image Processing, Multimedia Security, Cryptography
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Dr. Khalid Hussain
Designation: Associate Professor (Honorary)
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Dr. Faraz Ahsan
Designation: Assistant Professor
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Dr. Jawad Hussain
Designation: Assistant Professor
Qualification: Ph.D. Massey University, New Zealand
Areas of Interest: Multimedia Communication, Machine learning
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Muhammad Zubair
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Areas of Interest: Biomedical Image Processing, Pattern Recognition, CAD System Development
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Anam Raffique
Designation: Lecturer
Qualification: MS (Computer Engineering), UET Taxila, Pakistan
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Area of Interest: Networks Protocols
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Sadia Azam
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Areas of Interest: Digital Design, Image Processing
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Hira Shahzad
Designation: Jr. Lecturer
Qualification: M.Phil. English Literature (In progress), NUML, Islamabad
Areas of Interest: Technical Report and Creative Writing
Contact: hira.shahzad@hitecuni.edu.pk

Hina Abrar
Designation: Jr. Lecturer
Qualification: MS Software Engineering (in progress) UET Taxila, Pakistan
Areas of Interest: Cloud Computing, Data Security
Contact: hina.ibrar@hitecuni.edu.pk

Iram Abdullah
Designation: Jr. Lecturer
Qualification: MS Software Engineering (in progress), UET Taxila, Pakistan
Areas of Interest: Computer vision, Web development
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Muhammad Riaz
Designation: Lab Officer
Qualification: BS (Computer Science), CIIT, Pakistan
Areas of Interest: Programming & Database
Contact: muhammad.riaz@hitecuni.edu.pk
Faculty of Computer Science & Engineering
BS Computer Science

The BS Computer Science program at HITEC University endeavors to produce computer scientists and highly skilled programmers who can play a productive role in software industry, research and the academia. The program comprises of eight semesters (four years) and covers essential courses in Computing and Computer Science. Additional elective courses are offered to develop in-depth advanced knowledge. In the last two semesters, every student is required to take a six credit hour final year project with the aim to solve a real life problem by utilizing the previously acquired knowledge and skills. The outline provided by the Higher Education Commission of Pakistan has been followed while making the curriculum.

Besides the essential courses, advanced courses in the area of Distributed Computing, Machine Learning, Artificial Intelligence, Mobile Application Development, Software Engineering, Digital Image Processing, etc., are also offered to provide depth in specialized tracks of computer science. In addition, a number of courses are also offered from other disciplines. Five courses are offered from the Mathematics Department. These courses provide an insight into the mathematical theory and concepts which drive classical as well as the latest innovation in Computer Science. A number of university electives are offered to groom the overall personality of our students.

Most of our courses are accompanied by lab work. These labs are supervised by the concerned faculty member and lab staff. The lab sessions are conducted in our newly established state-of-the-art labs. These labs are powered by both license and open source software. Besides these standard labs, a specialized lab related to distributed computing is also being developed. There is a plan to establish a lab related to computer vision and machine learning in the next few months. This will enable our students to develop skills which will help them secure jobs both nationally and internationally. The semester-wise breakdown of BS Computer Science curriculum is appended below.
## Curriculum

### Semester-1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-101</td>
<td>Introduction to Information and Communication Technologies</td>
<td>2+1</td>
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<tr>
<td>CS-102</td>
<td>Programming Fundamentals</td>
<td>3+1</td>
</tr>
<tr>
<td>MT-101</td>
<td>Calculus &amp; Analytical Geometry</td>
<td>3+0</td>
</tr>
<tr>
<td>HS-101</td>
<td>English</td>
<td>3+0</td>
</tr>
<tr>
<td>CS-103</td>
<td>Discrete Structures</td>
<td>3+0</td>
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### Semester-2

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<tbody>
<tr>
<td>CS-104</td>
<td>Object Oriented Programming</td>
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<td>EE-201</td>
<td>Basic Electronics</td>
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<tr>
<td>HS-102</td>
<td>Pakistan Studies</td>
<td>2+0</td>
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<tr>
<td>HS-103</td>
<td>Communication Skills</td>
<td>3+0</td>
</tr>
<tr>
<td>MT-108</td>
<td>Multivariate Calculus</td>
<td>3+0</td>
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### Semester-3

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<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CS-201</td>
<td>Data Structures &amp; Algorithms</td>
<td>3+1</td>
</tr>
<tr>
<td>EE-203</td>
<td>Digital Logic Design</td>
<td>3+1</td>
</tr>
<tr>
<td>MT-203</td>
<td>Linear Algebra</td>
<td>3+0</td>
</tr>
<tr>
<td>IS-211</td>
<td>Islamic Studies</td>
<td>3+0</td>
</tr>
<tr>
<td>HS-201</td>
<td>Technical Report Writing</td>
<td>3+0</td>
</tr>
<tr>
<td>MS-201</td>
<td>Engineering Economics</td>
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### Semester-4

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<tbody>
<tr>
<td>CS-202</td>
<td>Database Systems</td>
<td>3+1</td>
</tr>
<tr>
<td>CS-203</td>
<td>Operating Systems</td>
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</tr>
<tr>
<td>CS-204</td>
<td>Software Engineering</td>
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</tr>
<tr>
<td>CS-205</td>
<td>Computer Architecture &amp; Organization</td>
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</tr>
<tr>
<td>MT-103</td>
<td>Differential Equations</td>
<td>3+0</td>
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<tbody>
<tr>
<td>CS-301</td>
<td>Theory of Automata &amp; Formal Languages</td>
<td>3+0</td>
</tr>
<tr>
<td>CS-302</td>
<td>Numerical Computing</td>
<td>2+1</td>
</tr>
<tr>
<td>CS-31x</td>
<td>CS Elective-I</td>
<td>3+1</td>
</tr>
<tr>
<td>CS-303</td>
<td>Microprocessor &amp; Assembly Language</td>
<td>3+1</td>
</tr>
<tr>
<td>MT-302</td>
<td>Probability and Statistics</td>
<td>3+0</td>
</tr>
<tr>
<td>MS-310</td>
<td>International Relations</td>
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### Semester-6

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<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CS-304</td>
<td>Computer Networks</td>
<td>2+1</td>
</tr>
<tr>
<td>CS-305</td>
<td>Human Computer Interaction</td>
<td>2+1</td>
</tr>
<tr>
<td>CS-306</td>
<td>Design &amp; Analysis of Algorithms</td>
<td>3+0</td>
</tr>
<tr>
<td>CS-307</td>
<td>Compiler Construction</td>
<td>3+1</td>
</tr>
<tr>
<td>CS-32x</td>
<td>CS Elective-II</td>
<td>3+0</td>
</tr>
<tr>
<td>MS-311</td>
<td>Psychology</td>
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### Semester-7

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<tr>
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<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CS-401</td>
<td>Final Year Project-I</td>
<td>0+3</td>
</tr>
<tr>
<td>CS-402</td>
<td>Information Security</td>
<td>3+0</td>
</tr>
<tr>
<td>CS-41x</td>
<td>CS Elective-III</td>
<td>2+1</td>
</tr>
<tr>
<td>CS-42x</td>
<td>CS Elective-IV</td>
<td>3+0</td>
</tr>
<tr>
<td>MS-401</td>
<td>Engineering Management</td>
<td>3+0</td>
</tr>
<tr>
<td>IS-411</td>
<td>Professional Ethics</td>
<td>2+0</td>
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<tr>
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<td><strong>Total credits</strong></td>
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### Semester-8

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CS-401</td>
<td>Final Year Project-II</td>
<td>0+3</td>
</tr>
<tr>
<td>CS-406</td>
<td>Artificial Intelligence</td>
<td>2+1</td>
</tr>
<tr>
<td>CS-43x</td>
<td>CS Elective-V</td>
<td>3+0</td>
</tr>
<tr>
<td>CS-44x</td>
<td>CS Elective-VI</td>
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</tr>
<tr>
<td>MS-410</td>
<td>Technology Entrepreneurship</td>
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### Elective Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-310</td>
<td>System Programming</td>
<td>3+1</td>
</tr>
<tr>
<td>CS-311</td>
<td>Digital Image Processing</td>
<td>3+1</td>
</tr>
<tr>
<td>CS-312</td>
<td>Computer Graphics</td>
<td>3+1</td>
</tr>
<tr>
<td>CS-320</td>
<td>Software Quality Assurance</td>
<td>3+0</td>
</tr>
<tr>
<td>CS-321</td>
<td>Software Project Management</td>
<td>3+0</td>
</tr>
<tr>
<td>CS-322</td>
<td>Software Engineering &amp; Formal Specifications</td>
<td>3+0</td>
</tr>
<tr>
<td>CS-410</td>
<td>Distributed Computing</td>
<td>2+1</td>
</tr>
<tr>
<td>CS-411</td>
<td>Web Engineering</td>
<td>2+1</td>
</tr>
<tr>
<td>CS-412</td>
<td>Web Services</td>
<td>2+1</td>
</tr>
<tr>
<td>CS-420</td>
<td>Wireless Networks</td>
<td>3+0</td>
</tr>
<tr>
<td>CS-421</td>
<td>Social Computing</td>
<td>3+0</td>
</tr>
<tr>
<td>CS-422</td>
<td>Multimedia Communications</td>
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</tr>
<tr>
<td>CS-430</td>
<td>Artificial Neural Networks</td>
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</tr>
<tr>
<td>CS-431</td>
<td>Fuzzy Logic</td>
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</tr>
<tr>
<td>CS-432</td>
<td>Fundamentals of Data Mining</td>
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</tr>
<tr>
<td>CS-440</td>
<td>Cloud computing</td>
<td>3+1</td>
</tr>
<tr>
<td>CS-441</td>
<td>Mobile Application Development</td>
<td>3+1</td>
</tr>
<tr>
<td>CS-442</td>
<td>Game Development</td>
<td>3+1</td>
</tr>
</tbody>
</table>
BS Computer Engineering

Computer Engineering discipline integrates Electrical Engineering and Computer Science for building hardware, software and networks. Computing devices are now playing a significant role in shaping our way of living and culture. The BS Computer Engineering program at HITEC University is designed to meet the challenges of computer engineering job market, both locally and globally. The course outline is as per the guidelines of the Higher Education Commission of Pakistan and the Pakistan Engineering Council. The program is designed to make students gain expertise in the field of Computer Engineering with emphasis in Digital Systems, Signal Processing and Software Development.

The duration of the program is 4 years (8 semesters) and consists of courses from a wide range of topics that are covered by offering foundation, breadth, depth and a few non-engineering courses. The foundation courses provide students with the fundamental concepts and tools to pursue their studies at a higher level. The breadth courses give exposure to a number of important areas closely related to the field of computer engineering. The depth courses offer advanced topics and contains a substantial design component. In the last two semesters, every student is required to take a six credit hour final year design project that involves design, testing, analysis and implementation of a prototype system which covers both hardware and software.

A hallmark of our Computer Engineering program is that classroom teaching/learning is complemented with ample hands-on experimentation. Most of the core courses require accomplishing a design project to demonstrate the knowledge and practical skills imparted during the semester. To thoroughly understand technology and to further keep pace with the rapid development in the field of engineering, we strongly believe that mathematics play a very instrumental role. It is an extremely useful tool to find rational and relevant solutions for various engineering problems and helps to solve complex systems. In this context, our program consists of six mathematics courses that make a solid foundation for designing and testing computer engineering related solutions and further provides a smooth transition for higher studies.

Besides engineering courses, there are a number of courses related to Economics, Management, Communication and Technical Report Writing, Religion, Ethics and Entrepreneurship. These courses not only enable our students to be current with the dynamics of the market, but also help them to become a responsible citizen, playing a positive role towards the improvement of our society. The semester-wise breakdown of BS Computer Engineering curriculum is appended below.
## Curriculum

### Semester-1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE-101</td>
<td>Computing Fundamentals</td>
<td>2 + 1</td>
</tr>
<tr>
<td>EE-102</td>
<td>Electric Circuits</td>
<td>3 + 1</td>
</tr>
<tr>
<td>MT-101</td>
<td>Calculus and Analytical Geometry</td>
<td>3 + 0</td>
</tr>
<tr>
<td>IS-211</td>
<td>Islamic Studies</td>
<td>3 + 0</td>
</tr>
<tr>
<td>HS-101</td>
<td>English</td>
<td>3 + 0</td>
</tr>
<tr>
<td>BS-101</td>
<td>Engineering Physics</td>
<td>3 + 0</td>
</tr>
<tr>
<td><strong>Total credits</strong></td>
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### Semester-2

<table>
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<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CE-106</td>
<td>Computer Application in Engineering</td>
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<tr>
<td>CE-107</td>
<td>Computer-Aided Engineering Drawing</td>
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</tr>
<tr>
<td>CE-108</td>
<td>Programming Fundamentals</td>
<td>3 + 1</td>
</tr>
<tr>
<td>EE-201</td>
<td>Basic Electronics</td>
<td>3 + 1</td>
</tr>
<tr>
<td>HS-103</td>
<td>Communication Skills</td>
<td>3 + 0</td>
</tr>
<tr>
<td>MT-103</td>
<td>Differential Equations</td>
<td>3 + 0</td>
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<tr>
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<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CE-201</td>
<td>Data Structures and Algorithms</td>
<td>3 + 1</td>
</tr>
<tr>
<td>CE-202</td>
<td>Digital Logic Design</td>
<td>3 + 1</td>
</tr>
<tr>
<td>CE-203</td>
<td>Discrete Structures</td>
<td>3 + 0</td>
</tr>
<tr>
<td>EE-103</td>
<td>Network Analysis</td>
<td>3 + 1</td>
</tr>
<tr>
<td>MT-201</td>
<td>Complex Variables &amp; Transforms</td>
<td>3 + 0</td>
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<tr>
<td>CE-206</td>
<td>Computer Organization and Assembly Language</td>
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<tr>
<td>CE-207</td>
<td>Object Oriented Programming</td>
<td>3 + 1</td>
</tr>
<tr>
<td>CE-208</td>
<td>Database Systems</td>
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<tr>
<td>MT-203</td>
<td>Linear Algebra</td>
<td>3 + 0</td>
</tr>
<tr>
<td>HS-201</td>
<td>Technical Report Writing</td>
<td>3 + 0</td>
</tr>
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### Semester-5

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE-301</td>
<td>Microprocessor &amp; Interfacing Techniques</td>
<td>3 + 1</td>
</tr>
<tr>
<td>CE-302</td>
<td>Signals and Systems</td>
<td>3 + 1</td>
</tr>
<tr>
<td>CE-3xx</td>
<td>CE-Elective I</td>
<td>3 + 1</td>
</tr>
<tr>
<td>CS-311</td>
<td>Digital Image Processing</td>
<td>3 + 1</td>
</tr>
<tr>
<td>MT-202</td>
<td>Numerical Methods</td>
<td>3 + 0</td>
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<tr>
<td><strong>Total credits</strong></td>
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### Semester-6

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<th>Course Code</th>
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<tbody>
<tr>
<td>CE-306</td>
<td>Operating Systems</td>
<td>3 + 0</td>
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<tr>
<td>CE-307</td>
<td>Computer Communication Networks</td>
<td>3 + 1</td>
</tr>
<tr>
<td>CE-3xx</td>
<td>CE-Elective II</td>
<td>3 + 1</td>
</tr>
<tr>
<td>CE-3xx</td>
<td>CE-Elective III</td>
<td>3 + 0</td>
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<tr>
<td>MT-302</td>
<td>Probability and Statistics</td>
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</tr>
<tr>
<td>HS-102</td>
<td>Pakistan Studies</td>
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### Semester-7

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<tbody>
<tr>
<td>CE-401</td>
<td>Final Year Project –I</td>
<td>0+3</td>
</tr>
<tr>
<td>CE-402</td>
<td>Digital System Design</td>
<td>3+1</td>
</tr>
<tr>
<td>CE-4xx</td>
<td>CE-Elective IV</td>
<td>3+0</td>
</tr>
<tr>
<td>MS-201</td>
<td>Engineering Economics</td>
<td>2+0</td>
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<tr>
<td>MS-401</td>
<td>Engineering Management</td>
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### Semester-8

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<thead>
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<tbody>
<tr>
<td>CE-401</td>
<td>Final Year Project –II</td>
<td>0+3</td>
</tr>
<tr>
<td>CS-406</td>
<td>Artificial Intelligence</td>
<td>2+1</td>
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<tr>
<td>CE-4xx</td>
<td>CE Elective-V</td>
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<tr>
<td>IS-411</td>
<td>Professional Ethics</td>
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<tr>
<td>MS-410</td>
<td>Technology Entrepreneurship</td>
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### Elective Courses

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CE-310</td>
<td>Embedded Systems</td>
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</tr>
<tr>
<td>CE-312</td>
<td>Digital Signal Processing</td>
<td>3+1</td>
</tr>
<tr>
<td>CE-314</td>
<td>Computer Architecture</td>
<td>3+0</td>
</tr>
<tr>
<td>CE-316</td>
<td>Embedded Software Development</td>
<td>3+1</td>
</tr>
<tr>
<td>CE-318</td>
<td>Embedded Operating Systems</td>
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</tr>
<tr>
<td>CE-320</td>
<td>Telecommunication Systems</td>
<td>3+0</td>
</tr>
<tr>
<td>CE-322</td>
<td>Software Engineering</td>
<td>3+0</td>
</tr>
<tr>
<td>CE-410</td>
<td>Wireless and Mobile Networks</td>
<td>3+0</td>
</tr>
<tr>
<td>CE-412</td>
<td>Data and Network Security</td>
<td>3+0</td>
</tr>
<tr>
<td>CE-414</td>
<td>Parallel &amp; Distributed Computing</td>
<td>3+1</td>
</tr>
<tr>
<td>CE-416</td>
<td>Neural Networks and Fuzzy Logic</td>
<td>3+0</td>
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<tr>
<td>CE-418</td>
<td>Mobile Application Development</td>
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<td>CE-420</td>
<td>Computer Graphics</td>
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<tr>
<td>CE-422</td>
<td>System Programming</td>
<td>3+1</td>
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Course Contents

CS-101 Introduction to Information and Communication Technologies
Basic definitions and concepts, hardware: computer systems and components. Storage devices, number systems, software: operating systems, programming and application software, introduction to programming, databases and information systems, networks, data communication, the Internet, browsers and search engines, the Internet: email, collaborative computing and social networking, the Internet: e-commerce, IT security and other issues.

CS-102/CE-108 Programming Fundamentals
Principles of structured and modular programming, overview of structured programming languages, algorithms and problem solving, program development; analyzing problem, designing algorithm/solution, testing designed solution, translating algorithms into programs, fundamental programming constructs, data types; basics of input and output, selection and decision (if, if-else, nested if-else, switch statement and condition operator), repetition (while and for loop, do-while loops), break statement, continue statement, control structures, functions, arrays, pointers, records, files (input-output), testing & debugging.

CS-103/CE-203 Discrete Structures
Mathematical reasoning: introduction to logic, propositional and predicate calculus; negation disjunction and conjunction; implication and equivalence; truth tables; predicates; quantifiers; natural deduction; rules of Inference; methods of proofs; use in program proving; resolution principle; Set theory: paradoxes in set theory; inductive definition of sets and proof by induction; relations, representation of relations by graphs; properties of relations, equivalence relations and partitions; Partial orderings; Linear and well-ordered sets; functions: mappings, injection and surjection, composition of functions; inverse functions; special functions; Peano postulates; Recursive function theory; Elementary combinatorics; counting techniques; recurrence relation; generating functions; Graph Theory; its elements, Planar Graphs, graph coloring, Euler graph, Hamiltonian path, trees and their applications.

CS-104/CE-207 Object Oriented Programming
Evolution of Object Oriented Programming (OOP), Object Oriented concepts and principles, problem solving in Object Oriented paradigm, OOP design process, classes, functions/methods, objects and encapsulation; constructors and destructors, operator and function/method overloading, association, aggregation, composition, generalization, inheritance and its types, derived classes, function/method overriding, abstract and concrete classes, virtual functions, polymorphism, exception handling.
**EE-201 Basic Electronics**
Fundamentals of semiconductor physics: band theory, semiconductors (intrinsic and extrinsic), PN junction, PN junctions as a rectifier, clipper and clamper circuits, Zener diode and voltage regulator, LED and LCD etc., Transistors: Bipolar Junction Transistors, BJT biasing circuits, Q-point, BJT as a switch, BJT amplifiers, classes of amplifiers, power amplifiers, Metal Oxide Transistors, nMOS, pMOS and CMOS inverters circuits. Introduction to A/D and D/A conversion circuits.

**CS-201/CE-201 Data Structures and Algorithms**
Introduction to data structures and algorithms; complexity analysis; arrays; sorting algorithms: insertion sort, selection sort, bubble sort, shell sort, heap sort, quick sort, merge sort, radix sort, bucket sort; linked lists: singly linked lists, doubly linked lists, circular list; stacks, queues, and priority queue; Recursion: Function call and recursion implementation, tail recursion, non-tail recursion, indirect recursion, nested recursion, backtracking. Trees: binary trees, binary heap, binary search, tree traversal, insertion, deletion, and balancing a tree; heap; B-Tree; Spanning Tree, Splay Trees; graphs: representation, traversal, shortest path, and cycle detection; isomorphic graphs; graph traversal algorithms; hashing; memory management and garbage collection.

**EE-203/CE-202 Digital Logic Design**
Number systems, logic gates, Boolean algebra, combination logic circuits and designs, simplification methods K-Maps, Quinne, Mc-Cluskey; Flip Flops and latches, asynchronous and synchronous circuits, counters, shift registers, shift registers counters, triggered devices & its types. Binary arithmetic and
arithmetic circuits, memory elements, state machines. Introduction Programmable Logic Devices (CPLD, FPGA); lab assignments using tools such as Verilog HDL/VHDL, MultiSim, etc.

**MS-201 Engineering Economics**
Introduction to economics, simple and compound interest, annual, net present and net future worth’s, rate of returns, internal rate of return (IIR) and external rate of return (ERR), financial statements, interpretation of financial statements, fundamental economic concepts, supply and demands principle, market, types of market and forecasting, ratios, accounting, cost benefit ratios, equities, interest versus equities, recently discovered advantages of equity over interest and their implementation in corporate & banking sectors.

**CS-202/CE-208 Database Systems**
Basic database concepts, database architecture, DB design life cycle, schema architecture, conceptual, logical and physical database modeling and design, Entity Relationship Diagram (ERD), Enhanced ERD, relational data model, mapping ERD to relational model, functional dependencies and normalization, relational algebra, Structured Query Language (SQL), transaction processing, concurrency control and recovery techniques, query optimization concepts.

**CS-203/CE-306 Operating Systems**
History and goals, evolution of multi-user systems. Introduction to the techniques used to implement operating systems and related kinds of systems software; Process Management (creation, synchronization, and communication); Multi-Threading, processor scheduling; deadlock prevention, avoidance, and recovery; main-memory management; virtual memory management (swapping, paging, segmentation and page-replacement algorithms); control of disks and other input/output devices; file-system structure and implementation; and protection and security.

**CS-204/CE-322 Software Engineering**
Overview of SE, generic process models, business information systems, requirements engineering, difference between structured analysis and object oriented analysis, difference between FDD diagrams & UML diagrams; data & process modeling, logical versus physical models, software design process, software quality assurance, project management, risk management, maintenance and reengineering.

**CS-205 Computer Architecture and Organization**
The design of computer systems and components. processor design, instruction set design, and addressing; control structures and microprogramming; memory management, caches, and memory hierarchies; and
interrupts and I/O structures. Pipelining of processor issues and hurdles, exception handling, parallelism, multiprocessor systems.

**CS-301 Theory of Automata and Formal Languages**
Finite state models: language definitions preliminaries, regular expressions/regular languages, Finite Automata (FAs), Transition Graphs (TGs), NFAs, Kleene’s Theorem, Transducers (automata with output), pumping lemma and non-regular language grammars and PDA: context free grammars, derivations, derivation trees and ambiguity, simplifying CFLs, normal form grammars and parsing, decidability, context sensitive languages, grammars and Linear Bounded Automata (LBA), Chomsky’s hierarchy of grammars, Turing Machines, Post Machine, variations on TM, TM encoding, universal Turing Machine, defining computers by TMs.

**CS-302 Numerical Computing**
The concepts of efficiency, reliability and accuracy of a method; minimizing computational errors; theory of differences, difference operators, difference tables, forward differences, backward differences and central differences. Mathematical preliminaries, solution of equations in one variable, interpolation and polynomial approximation, numerical differentiation and numerical integration, initial value problems for ordinary differential equations, direct methods for solving linear systems, iterative techniques in matrix algebra, solution of non-linear equations.

**CS-303 Microprocessor and Assembly Language**
Microprocessor bus structure: addressing, data and control, introduction to registers and flags, addressing
modes, instruction sets including data movement, arithmetic and logic, program control, stack and its operation, peripheral control interrupts, introduction to assembler and debugger, manipulation and translation of machine and assembly code, describing actions inside the processing chip.

**MS-310 International Relations**

International Relations and its practical significance; Mainstream theories and their explanations, interpretations and applications in practical terms; Realism, Liberalism and Marxism; International Relations and global politics; globalization; humanitarian intervention, security dilemma, terrorism, development and environmental issues etc.

**CS-304 Computer Networks**

Data communication concepts, analogue and digital transmission, noise, media, encoding, asynchronous and synchronous transmission. Network system architectures (OSI, TCP/IP), error control, flow control, data link protocols, bridging. Local area networks and MAC layer protocols, multiplexing, switched and IP Networks, Inter-networking, Routing. Transport layer protocols TCP, UDP and SCTP, application layer protocols, wireless LANs.

**CS-305 Human Computer Interaction**

Usability paradigm and principles, introduction to design basics, HCI in software process, design rules, prototyping, evaluation techniques, task analysis, universal design and user support and computer supported cooperative work, introduction to specialized topics such as groupware, pervasive and ubiquitous applications.

**CS-306 Design and Analysis of Algorithms**

Introduction; asymptotic notations; recursion and recurrence relations; divide-and-conquer approach; sorting; search trees; heaps; hashing; greedy approach; dynamic programming; graph algorithms; shortest paths; network flow; disjoint sets; polynomial and matrix calculations; string matching; NP complete problems; approximation algorithms.

**CS-307 Compiler Construction**

Introduction to interpreter and compiler. Compiler techniques and methodology; organization of compilers; lexical and syntax analysis; parsing techniques. Types of parsers, top-down parsing, bottom-up parsing, type checking, semantic analyzer, object code generation and optimization, detection and recovery from errors.

**MS-311 Psychology**

Individual behavior in organizations, including personality, decision-making, personal networks, and ethics, interpersonal behavior, teamwork, conflict, negotiations, leadership, and power and influence, organizational factors affecting behavior, including reward systems, culture, and organizational design.

**CS-402 Information Security**

Basic notions of confidentiality, integrity, availability; authentication models; protection models; security kernels; encryption, hashing and digital signatures; audit; intrusion detection and response; database security, host-based and network-based security issues operational security issues; physical security issues; personnel security; policy formation and enforcement; access controls; information flow; legal and social issues; identification and authentication in local and
distributed systems; classification and trust modeling; risk assessment

**MS-401 Engineering Management**
Basics of management and its functions, evolution of management and development till today, role of managers and styles of management, leadership, organizational structure, motivation theories and process, decision making tools, productivity management in manufacturing and service concerns, product design development management, strategic management, project management and its processes, supply chains, risk management, operation management, quality management, six sigma and other quality standards.

**CS-406 Artificial Intelligence**
Introduction, intelligent agents, solving problems by searching, informed search and exploration, constraint satisfaction problems, adversarial search, logical agents, first-order logic, inference in first-order logic, knowledge representation, planning and acting in the real world, uncertainty, probabilistic reasoning, probabilistic learning methods, reinforcement learning, probabilistic language processing, perception and robotics, introduction to LISP/PROLOG and expert systems (ES) and applications.

**MS-410 Technology Entrepreneurship**
The aim of the course is to provide hands-on introduction to the many dimensions of starting and growing a technology company. Students will develop a clear understanding on how to evaluate market opportunities, design profitable business models, raise capital, develop a product that customers need and build a winning team. Students will gain the skills and tools to turn technical ideas into profitable sustainable businesses. The course provides the student the opportunity to develop his/her own business plan based on the material provided in the course. In addition, a number of entrepreneurs and venture capitalists will be invited to give their first hand experiences. The course is particularly suited for students wanting to become entrepreneurs as well as anyone who expects to manage people in their business careers.

**CE-101 Computing Fundamentals**
Number systems, binary numbers, Boolean logic, history of computer systems, basic machine organization, Von Neumann Architecture, algorithm definition, programming paradigms and languages, high level and low level programming languages, compiler interpreter
and assembler, graphical programming. Overview of software engineering and information technology, operating system, computer networks and the Internet, computer graphics.

**CE-106 Computer Application in Engineering**

Introduction to computer-aided design tools including AutoCAD, OrCAD, MATLAB, LabVIEW, Rational Rose and Vision, etc. Computer-aided drafting principles and practices, engineering drawing fundamentals using AutoCAD. Drawing of electrical circuits and layouts of electronic assemblies. Study of theoretical concepts of electronic components and circuits using simulation software: PSPICE, MATLAB, and LabVIEW.

**BS-101 Engineering Physics**

Crystal structure, packing fraction, X-ray diffraction and Bragg’s law, categorization of solids, inter atomic forces, band theory of solids, semiconductor materials, PN-junction, electric field, Coulombs law & Gauss’s Law with application, magnetic field and magnetic properties, BiotSavart’s law, Ampere’s circuital law with applications, induced EMF, Faraday’s law of electromagnetic induction, electromagnetic spectrum, electromagnetic waves, interference and diffraction.

**CE-107 Computer-Aided Engineering Drawing**

Drawing basics, various views of a three dimensional object and their importance, AUTOCAD basics, drawing in two and three dimensions and sketching, drawing isometric view and section, plan and elevation views of various electrical and electronic devices in AUTOCAD, solid projection modeling, projects.

**CE-301 Microprocessor and Interfacing Techniques**

Architecture and programming technique, introduction to assembly language, 8086 pin-diagram and functions, interfacing ROM & RAM, peripheral programmable interface (PPI), interrupt priority controller, universal asynchronous and synchronous receiver transmitter (UART and USART) and its configuration, interfacing hex keypad, servo meters, robots, various LED and LCD displays etc.

**CE-302 Signals & Systems**

Introduction to signals, classification of signals and systems, Laplace transform, properties of Laplace transform, inverse Laplace transforms, convolution, correlation functions, Fourier Series, frequency responses of system using Fourier transform, inverse Fourier transforms, Z-transform, inverse Z-transform, analog filter design, Butterworth, Chebecheve and Cauer filter design techniques, MATLAB simulation.

**CE-307 Computer Communication Networks**

Computer communications concepts, layered network architectures and protocol reference models, systems and technologies for the physical layer, medium access control protocols, data link protocols, network layer functions and protocols, internetworking concepts, local area networks, wide area / public telecommunication networks, IP-based network and services, the TCP/IP suite of protocols.

**CE-402 Digital System Design**

Introduction to Hardware Descriptive Language (HDL), VHDL, Register Transfer Level (RTL): structural, data flow and behavioral modeling, digital system design modeling and designing using HDL, finite state machine, digital logic testing and simulation, design and implementation using FPGA, introduction to Application Specific Integrated Circuits (ASIC).
**Elective Courses**

**CS-310/CE-422 System Programming**
Introduction to system programming, the Unix and Linux operating systems, multi-threaded programming, Unix system threads, replacing threads with dispatch queues, functions, control structures, bit manipulation, arrays and pointers, strings and text files, deriving types.

**CS-311 Digital Image Processing**
Introduction, elements of digital image processing, image model, sampling and quantization, relationships between pixels, image enhancement: enhancement by point processing, spatial filtering, enhancement in the frequency domain, discrete Fourier transform, color image processing, image segmentation, morphological image processing.

**CS-312/CE-420 Computer Graphics**
Graphics hardware, fundamental algorithms, applications of graphics. Interactive graphics programming — graph plotting, windows and clipping, and segmentation. Programming raster display systems, differential line algorithm, panning and zooming. Raster algorithms and software — scan-converting lines, characters and circles. Scaling, rotation, translation, region filling and clipping. Two and three dimensional imaging geometry (perspective projection and orthogonal projection) and transformations. Curve and surface design, rendering, shading, color and animation.

**CS-320 Software Quality Assurance**
Introduction to software quality, software defects, reasons of poor quality, quality laggards, project management approaches, cost and economics of SQA, quality measurements, software requirements and SQA, requirements defects, writing quality requirements, quality attributes of requirements document, software design model and software design defects, quality design concepts, programming and SQA, SQA reviews, software inspections, software
testing - WBT techniques, BBT techniques, testing strategies, debugging, test planning, automated software testing, test cases, responsibilities of testers; SQA and SCM, SCM plan and SQA plan, process assurance, process management and improvement, introduction to quality metrics, a process model of software quality assurance.

**CS-321 Software Project Management**

Introduction to PM and SPM, software models and process improvement, project planning, scheduling, estimation, personnel and project organization, change management, monitoring and control, protocols and standards, software QA and risk management, explore software project management activities from product concept through development based upon best practices.

**CS-322 Software Engineering and Formal Specifications**

Introduction, limitations of testing and need for formal verification, overview of logic and propositional calculus, calculational logic, logical connectives, Boolean equality, continued equivalence, disjunction, conjunction, implication, introduction to Hoare’s logic, weakest pre-condition, the assignment axiom, calculating assignments, sequential composition, conditional statements, reasoning about conditional statements, constructing conditional statements, inductive proofs and constructions, patterns and invariant, from verification to construction, Design by Contract (DBC), the six principles of design by contract, UML and formal methods, the Object Constraint Language (OCL), algebraic specifications, specifications of abstract data types, completeness, axioms and term rewriting, modularity and re-usability,
model-based specifications, the Z (Zed) specification language, Z schemas and schema calculus, promotions, data and functional refinements, petri nets, limitations and acceptance of formal methods, seven myths of formal methods.

CS-410 Distributed Computing

Introduction to parallel and distributed systems, software architectures: threads and shared memory, processes and message passing, Distributed Shared Memory (DSM), Distributed Shared Data (DSD). System models, networking and internetworking, communication models and abstractions (message passing, stream-oriented communications, remote procedure calls, remote method invocation), naming in distributed systems, concurrency and synchronization, process synchronization, distributed transaction and concurrency control, distributed data replication, security and access control, overview of web services, cloud computing.

CS-411 Web Engineering

XML, XSL, XLink, DOM, SMIL, RDF, RDF-SCHEMA, Web 3.0 and the semantic web, Web Searching, web services.

CS-412 Web Services

Significant in distributed application development, the architecture of a web service, web service standards and specifications. Technologies of web services such as Simple Object Access Protocol (SOAP), Web Service Description Language (WSDL), Universal Description, Discovery and Integration (UDDI), Extensible Markup Language (XML) and XML schema, and newer, emerging technologies; ASP.NET, Web Forms, and C#, develop and implement dynamic, client-side web-based applications, employing web services, including ADO.NET's database functionality.

CS-420 Wireless Networks

Fundamental techniques in design and operation of first, second, and a brief overview of third generation wireless networks: cellular systems, medium access techniques, radio propagation models, error control techniques, handoff, power control, common air protocols (AMPS, IS-95, IS-136, GSM, GPRS, EDGE, WCDMA, CDMA2000, etc), radio resource and network management.

CS-421 Social Computing

Latest research and development activities in social networking e.g., Service architectures for social networks; common APIs for popular architectures (Facebook, Open Social, etc.); Open ID and Shibboleth; linked data for social networks (FOAF, SKOS, etc); social network properties and analysis methodologies; social network interoperability; social network topologies and ecosystems. Social networks in e-learning, enterprise and media; identity, privacy and ownership in social networks; aspects of recommendation engines and information retrieval in social networks; sentiment classification, opinion extraction, social knowledge acquisition, social group identification and clustering, outlier detection.

CS-422 Multimedia Communications

Technologies for multimedia processing, coding, and communications; state-of-the-art compression technologies will be presented. Emphasis will be given to state-of-the-art multimedia coding standards, including JPEG/JPEG-2000, H.26x, MPEG, and scalable video coding (SVC); Video codec system, multimedia networking, special considerations for sending multimedia over the Internet and wireless
networks, such as video adaptation, error resilience, error concealment, and quality of service.

**CS-430 Artificial Neural Networks (ANN)**


**CS-431 Fuzzy Logic System**

Mathematical introduction of fuzzy sets and fuzzy logic, a study of the fundamentals of fuzzy sets, operations on these sets, and their geometrical interpretations. Methodologies to design fuzzy models and feedback controllers for dynamical systems, fundamental concepts of dynamical systems, multi-input multi-output dynamical systems, stability, feedback control design, and MATLAB control system toolbox. Fuzzy systems and properties of fuzzifier and defuzzifier design, design of fuzzy systems, fuzzy controllers, hardware and software based design of fuzzy logic control system.

**CS-432 Fundamentals of Data Mining**

Concepts of data mining, data pre-processing and pre-mining, (noisy and missing data, data normalization and discretization), outlier detection, Data mining learning methods, data mining classes (association rule mining, clustering, classification), fundamental of other algorithms related to data mining (fuzzy logic, genetic algorithm and neural network), decision trees, rules, patterns and trends.

**CS-440 Cloud Computing**

Introduction to .NET framework architecture, windows forms, working with controls, building customized controls, classic ASP, inputs/outputs, rich server controls, data list, repeater, data grid, migration and interoperability, managing state, caching, configuring, deploying, securing, using web forms applications, asynchronous programming, XML programming, web services, need for XML web services architecture and underlying technologies, designing, publishing, deploying, securing and enhancing the usability of applications.

**CS-441/CE-418 Mobile Application and Development**

Introduction to mobile computing, development environment, factors in developing mobile applications, HTML5 for mobiles, frameworks, user-interface, text-to-speech techniques, intents and services, storing and retrieving data, communications via network and the web, telephony, notifications and alarms, graphics, multimedia, location, hardware sensors, developers and App store license agreements, security and hacking, platforms issues.

**CS-442 Game Development**

History of computer and video games, game design principles, python programming, pygame,
storytelling, sprites and animation, game development methodologies, physics, loose ends, audio, sound, and music (PDF), 2D game group project check-in, game testing, ethics, MMORPGs, and securing online games, game engines, iOS development, cocos2D, games in 2012 and beyond.

**CE-310 Embedded Systems**
Introduction to embedded systems; components, tools and platforms; The C2M embedded design process; sensors and actuators; embedded system software, mixing C and assembly, HW/SW co-design; fundamentals of real-time operating systems, concurrent software and multi-tasking, scheduling, inter-task communication & synchronization, case studies using examples of embedded systems.

**CE-312 Digital Signal Processing**
Introduction to digital signal processing, discrete signals and systems, time-domain analysis of discrete-time signals, frequency-domain analysis, Fourier series and Fourier transform, system response and frequency response, z-transform and its properties, digital filter design, finite impulse response (FIR) and infinite impulse response (IIR), filters and their applications in signal processing, real time digital signal processing.

**CE-314 Computer Architecture**
Introduction to the computer architecture and organization, history of computers, instruction set, architecture, design and implementation of data-path/control, program counter, representing numbers, register banks, performance analysis, enhancing the architecture, pipelining, pipelining hazards (structural, control and data hazards) memory organization.

**CE-316 Embedded Software Development**
Introduction to embedded software development and programming, software design and management, optimization, multi-threading, scheduling and
prioritization, case studies.

**CE-318 Embedded Operating Systems**
Overview of embedded operating systems, single-core scheduling, multi-core scheduling, resource/data sharing, isolation through virtualization, case studies of open source and commercial RTOS, recent advancement.

**CE-320 Telecommunication Systems**
Introduction to media, bandwidth and noise, Twisted pair (UTP, STP), coaxial cables (types and specifications), optical fibres (types and losses), Introduction to optical sources and detectors. Microwave links, satellite communication and infrared links, Frequency Division Multiplexing (FDM), TDM, FDMA, TDMA and CDMA. Switching: circuit and packet switching. Introduction to mobile and cellular communications and current technologies.

**CE-410 Wireless and Mobile Networks**
Introduction to wireless communication, wired vs. wireless communication, electromagnetic spectrum, design challenges, wireless transmission, evolution of wireless networks, QoS, security, multimedia services and applications, tariff management, WLANS, WiMAX, Wireless PAN, fundamentals of cellular concepts, analog mobile phone system, GSM specifications, identifiers in GSM networks, 4G overview, issues, mobility management, handoff types, QoS considerations.

**CE-412 Data and Network Security**
Cryptology and simple cryptosystems, conventional encryption techniques, stream and block ciphers, the Advanced Encryption Standard. confidentiality & message authentication, hash functions, number theory and algorithm complexity, public key encryption, RSA and discrete logarithms and elliptic curve cryptography. Digital signatures, key management schemes, identification schemes, dial-up security, e-mail security, PGP, S-MIME, Kerberos and directory authentication. Emerging Internet security standards, SET, SSL and IPsec, VPNs, firewalls and viruses.

**CE-414 Parallel and Distributed Computing**
Shared-memory multiprocessor architecture, multi-computer clusters, grid computing infrastructure and technologies, parallel programming models and software tools, latency tolerance and multiprocessing techniques cluster and grid computing techniques and applications: grid and P2P services, wireless grids, network security, selfish grids, and trusted computing.

**CE-416 Neural Networks and Fuzzy Logic**
Biological neurons, signal propagation in biological neurons, model of a single artificial neuron, activation functions, feedforward and feedback neural networks, re-enforcement learning, self-organizing map, learning vector quantization, Boolean vs. fuzzy logic, fuzzy sets, fuzzy relations, fuzzification, de-fuzzification, inference engine, case studies.
MS Computer Science Program

The MS Computer Science program started in Fall 2014 to support quality research in the domain of computer science at the post graduate level. The vision of this program is to bridge the gap between graduate level knowledge and the cutting edge research and its implementation.

To fulfill the MS degree requirements, a student needs to complete 30 credit hours by taking 8 courses of 24 credit hours and 6 credit hours of thesis. Out of 8 courses, 4 courses are core and the remaining 4 courses can be taken from the specialization electives offered by the department.

The objective of thesis is to enable our students to select a problem, identify research questions, develop a hypothesis, conduct experiments and furnish their findings in the form of a thesis.

List of Courses

Core Courses

Course Code | Course Title | Credit Hours
--- | --- | ---
CS-711 | Theory of Computation and Information Systems | 3(3-0)
CS-712 | Advanced Operating Systems | 3(3-0)
CS-713 | Advanced Analysis of Algorithms | 3(3-0)
CS-714 | Advanced Computer Networks | 3(3-0)
CS-719 | MS Thesis | 6(0-18)

Software Engineering Electives

Course Code | Course Title | Credit Hours
--- | --- | ---
CS-721 | Advanced Software Engineering | 3(3-0)
CS-722 | Object Oriented Modeling | 3(3-0)
CS-723 | Software Requirements Engineering | 3(3-0)
CS-724 | Software Architecture | 3(3-0)

Networks and Communication Electives

Course Code | Course Title | Credit Hours
--- | --- | ---
CS-741 | Special Topics in Computer Networking | 3(3-0)
CS-742 | Multimedia Communication | 3(3-0)
CS-743 | Network Security | 3(3-0)
CS-744 | Network Performance Evaluation | 3(3-0)
CS-745 | Network Programming | 3(3-0)
CS-746 | Network Modeling and Simulation | 3(3-0)
CS-747 | Next Generation Networks | 3(3-0)
Course Contents

CS-711 Theory of Computation and Information Systems
Automata theory, formal languages, Turing Machines, computability theory and reducibility, computational complexity, determinism, non-determinism, time hierarchy, space hierarchy, NP completeness, selected advanced topics.

CS-712 Advanced Operating Systems
Modern operating system issues: microkernels and IPC, user level OS servers, microkernel-bases systems, distributed computing, security issues, remote procedure call, concurrency, transactions, parallel computing, shared memory and message passing.

CS-713 Advanced Analysis of Algorithms
Introduction of formal techniques and the underlying mathematical theory, NP-completeness, search techniques, randomized algorithms, heuristic and approximation algorithms, asymptotic analysis of upper and average complexity bounds, fundamental algorithmic strategies (brute-force, greedy, divide-and-conquer, backtracking, branch-and-bound, pattern matching, and numerical approximations), standard graph and tree algorithms, standard complexity classes, time and space tradeoffs in algorithms, using recurrence relations to analyze recursive algorithms, non-computable functions, the halting problem, and the implications of non-computability.

CS-714 Advanced Computer Networks
Review of basic concepts: the OSI model, packet and circuit switching, network topologies, the TCP/IP protocol stack: IP, ARP, TCP and UDP, DNS, ICMP, Internet addressing, routing, IP multicast, RSVP, next generation IP, satellite systems, WAP, congestion control, congestion in the Internet, mobile IP, Voice over IP (VoIP), VPNs, network security, Quality of Service (QoS), network vs. distributed systems management protocols, web-based management.

CS-721 Advanced Software Engineering
Theory and practice of process life cycle, project planning, requirements capture, software design, team programming, unit and integration testing, system delivery and maintenance, process and product evaluation and improvement. Component-based software engineering models such as CORBA, COM+, EJB, .NET, Web Services. Centers on an intense semester-long multi-iteration team project that requires pair programming and other agile programming practices.

CS-722 Object Oriented Modeling
Object-oriented design concepts, features and problems of complex systems, evolution the object-oriented model, foundations and elements of the object-oriented model, classes and objects, relationships among classes, relationships among objects, interplay of classes and objects, approaches to identifying classes
and objects, object-oriented design methodologies, methodology notation (elements of UML or any other selected notation, class and object diagrams, interaction diagrams, state transition diagrams, process and module diagrams, etc.), applications and case studies.

**CS-723 Software Requirement Engineering**

Introduction to process models for requirements engineering, requirements engineering, system requirements, functional and non-functional requirements, how software requirements may be organized in a requirements document, why process improvement is important and to suggest a process improvement model for requirements engineering.

**CS-724 Software Architecture**

Software architecture styles, architecture description languages, architecture-implementation mapping, and product line architectures. REST architecture style and web services.

**CS-741 Special Topics in Computer Networking**

CS-742 Multimedia Communication

CS-743 Network Security
Cryptology and simple cryptosystems, Conventional encryption techniques, stream and block ciphers; DES, The Advanced Encryption Standard, confidentiality and message authentication, hash functions, number theory and algorithm complexity, public key encryption, RSA and Discrete Logarithms, elliptic curves, digital signatures, key management schemes, identification schemes, dial-up security, e-mail security, PGP, S-MIME; Kerberos and directory authentication. Emerging Internet security standards: SET; SSL and IPsec; VPNs, Firewalls, viruses.

CS-744 Network Performance and Evaluation
Analytical, simulation and experimental methods to evaluate and design networks and protocols, network management tools, performance metrics and workload of a system, statistical techniques, queuing models to analyze system performance.

CS-745 Network Programming

CS-746 Network Modeling and Simulation
Exposure to theoretical techniques and simulation using various tools such as OPNETs, OMNET ++, simulating and analyzing models of complex systems.

CS-747 Next Generation Networks
VLANs, trunking, configuration of HSRP, VRRP, and GLBP, OSPF and IS-IS, and describe MPLS LDP, link state routing protocols, operation and configuration of single area OSPF (including load balancing and authentication), IS-IS, common issues with IS-IS, configuration of basic BGP to enable inter-domain routing in a service provider network, ACL and IP address translation, fundamentals of Cisco IOS XR, and IOS XE software technology.
Ph.D. Computer Science

The Ph.D. program in Computer Science is planned to commence from Spring 2016 and would follow the guidelines of the Higher Education Commission (HEC). Desirous candidates for Ph.D. program must possess an MS degree in Computer Science or Electrical Engineering with a minimum CPGA of 3.00 out of 4.00 and must clear GAT subject examination.

The program would comprise of 18 credit hours of coursework and 30 credit hours of research and doctorate dissertation. The courses can be selected in consultation with the respective Ph.D. supervisor from the list of graduate courses. The completion of coursework is followed by a comprehensive examination for granting Ph.D. candidacy. The Ph.D. dissertation would be evaluated by two experts from technologically advanced countries and one local expert. Subsequent to positive evaluation of the thesis, the Ph.D. scholar is required to undertake an open defense to fulfill the degree requirements.

A minimum residency of two years at the university campus and publishing at least one research paper in an impact factor journal of good repute is also an essential requirement to earn a Ph.D. degree.
Computer Science and Engineering Laboratories

HITEC Computational Cluster Lab (HCCL)

A computing cluster is a set of PCs connected together to provide the feeling of a single computer capable of achieving heavy processing. Currently more than 60% of the world’s fastest supercomputers are cluster based. The major applications are distributed computing, parallel programming, etc. HCCL is designed to provide small set of clusters which can be joined to form a large cluster or establish a grid via connecting those smaller chunks.

IT Lab

The general purpose IT laboratory provides open access support for Computer Science, and Computer Engineering students. Each machine provides general software profile. The latest, state-of-the-art PC workstations are set up with wired and wireless Internet access to facilitate students in completing their assignments, lab reports, etc.

Embedded Systems and Hardware Lab

This lab provides embedded and other hardware resources that are required to design, analyze and implement embedded systems. In addition, the lab also has a number of analog and digital equipment required for experimentation and project building at both junior and senior level of undergraduate studies.

Data Communication Lab

This laboratory is utilized to facilitate hands-on experiments for communication courses in the fields of wired and wireless communications. It would help in grasping theoretical concepts and visualization of how data in terms of bits and bytes gets transmitted. Peer-to-Peer and Client-Server models along with various network topologies are covered. Different simulation tools are installed in the lab to get an in-depth understanding and practical expose to network communication technologies.

Network Security Lab

The network security lab shall provide exposure to a number of security tools and technologies. Linux-based workstations and servers are installed to help students in gaining practical skills in domains like system programming and network administration. This would help students to become capable to design, develop and implement algorithms on a commercial scale.
Faculty of Sciences
Faculty of Sciences comprises Departments of Mathematics and Islamic Studies. Both the Departments offer post graduate programs only. The faculty of these Departments is recognized for its excellence in research. Over the years, the Faculty of Sciences has been very innovative in its approach to curriculum and course offerings. In designing the MS and Ph.D. courses, the faculty has endeavored to make them up-to-date. Similarly the courses offered at Bachelor level, are also designed to bridge the gap between theory and application. We are passionate about delivering inspirational, innovative and cutting edge teaching; this is our ethos and these goals are embedded in our strategy.

Our staff is as dedicated to teaching as they are to their research, bringing their knowledge into the learning environment and encouraging our students to develop and flourish in an academic community. Through research led-teaching, we pride ourselves on giving students the skills, knowledge, and the ability to discover and understand for themselves. Through this work, we ensure that they not only become capable and professional social science graduates, but also well informed and accomplished individuals.

Inquiry-based learning (IBL) is an important element of the ‘research-led’ learning experience. ‘IBL’ describes a cluster of strongly student-centered approaches to learning and teaching that are driven by inquiry or research. Students conduct small or large-scale inquiries that enable them to engage actively with the concepts and questions of their discipline(s), often in collaboration with each other. Learning takes place through an emergent process of exploration and discovery. Guided by subject specialists and those with specialist roles in learning support, students use the scholarly and research practices of their disciplines to move towards autonomy in creating and sharing knowledge.

Apart from classroom teaching, the faculty remains involved in the supervision of the students while guiding them in various extra and co-curricular activities, literary pursuits and competitions within and outside University. The conducive environment provided by the Faculty of Sciences helps to attain its objectives.

The faculty is led by Dr. Syed Tauseef Mohyudin, who has unique distinction of being first to supervise Ph.D. theses of Mathematics. He has published his research work extensively in journals of international repute. His expertise in the realm of research has won him several awards of excellence namely; Best Research Paper Award 2010, President’s Pride of Performance Award on 23rd March, 2012 and the Research Productivity Awards (in category A) 2011 and 2012.
The universe cannot be read until we have learned the language and become familiar with the characters in which it is written. It is written in mathematical language, and the letters are triangles, circles and other geometrical figures, without which it is humanly impossible to comprehend a single word. Without these, one is wandering about in a dark labyrinth'.

Galileo Galilei (1564 - 1642)
Department of Mathematics

Dr. Muhammad Tahir
Professor & Chairman
Department of Mathematics

The Department of Mathematics aims at providing a comprehensive knowledge of Mathematics at undergraduate as well as MS and Ph.D. levels.

At undergraduate level the students of Electrical Engineering, Mechanical Engineering, Computer Engineering, and Computer Science are provided with high quality knowledge of Applied Mathematics. Furthermore, at MS (Mathematics) and Ph.D. (Mathematics) levels the students are imparted state of the art education.

These programmes have earned a great repute over the years and students all over the country show great enthusiasm for admission in this University.

Apart from going through the course work, the students are encouraged to carry out quality research work, leading to publications in renowned international journals.

The syllabi have been designed to enrich the students’ understanding towards the subject of Mathematics with a view to helping them encounter practical problems successfully in their careers. Utmost emphasis is laid on conceptual learning and application of Mathematics to the real world problems with the aid of good examples and exercises. In this regard a balance is maintained between applications and the basic principles behind them.

The curriculum of Mathematics focuses primarily on the development of fundamental tools and strives to provide a strong foundation, which allows the students to cope up with the basic mathematical and physical concepts of science and engineering. At the same time the curriculum for MS and Ph.D. programmes has been synthesized with the objective to produce high quality mathematicians of international standard.

Being mindful of the importance of the subject of Mathematics, the University has inducted highly qualified permanent faculty members, mostly Ph.D., to meet all the challenges at undergraduate as well as MS and Ph.D. levels.

Apart from directing the students in the discipline of Mathematics, plentiful emphasis is laid on their character building. This aspect is taken care of consciously so that after graduating from this institution they should not only portray themselves as good Mathematicians but also as good citizens and good Muslims.
Faculty

Dr. Muhammad Tahir
Designation: Professor and Chairman
Qualification: Ph.D. (Mathematics), University of Wales, United Kingdom
Areas of Interest: Numerical Solution of Partial Differential Equations
Contact: mtahir@hitecuni.edu.pk

Dr. Syed Tauseef Mohyud Din
Designation: Professor
Qualification: Ph.D. (Mathematics), COMSATS Institute of Information Technology, Islamabad
Areas of Interest: Analytical and Numerical Techniques for Differential Equations
Contact: syedtauseef@hitecuni.edu.pk

Dr. Muhammad Rafique
Designation: Professor
Qualification: Ph.D. (Mathematics), Quaid-i-Azam University, Islamabad
Areas of Interest: Astrophysics & Differential Equations
Contact: mrdhillon@hitecuni.edu.pk

Dr. Zahid Iqbal
Designation: Assistant Professor
Qualification: Ph.D. (Mathematics), Quaid-i-Azam University, Islamabad
Areas of Interest: Fluid Mechanics, Series and Numerical Solutions
Contact: zahid.iqbal@hitecuni.edu.pk

Dr. Muhammad Shakeel
Designation: Assistant Professor
Qualification: Ph.D. (Mathematics), HITEC University, Taxila
Area of Interest: Soliton Theory
Contact: muhammad.shakeel@hitecuni.edu.pk

Sarah Amjad
Designation: Assistant Professor
Qualification: MPhil (Mathematics), Quaid-i-Azam University, Islamabad
Areas of Interest: Differential Equations & General Relativity
Contact: sarah.amjad@hitecuni.edu.pk


Rafay Mustafa
Designation: Lecturer
Qualification: MPhil (Mathematics), NUST, Islamabad
Area of interest: Computational Mathematics
Contact: rafay.mustafa@hitecuni.edu.pk

Farman Ullah Khan
Designation: Lecturer
Qualification: MS (Mathematics), COMSATS Institute of Information Technology, Islamabad
Ph.D. (in progress)
Area of interest: Computational Fluid Dynamics
Contact: farman.ullah@hitecuni.edu.pk

Rashid Mehmood
Designation: Lecturer
Qualification: MPhil (Mathematics), Quaid-i-Azam University, Islamabad
Ph.D. (in progress)
Area of interest: Fluid Mechanics
Contact: rashid.mehmood@hitecuni.edu.pk

Tahir Abbas
Designation: Coordinator (Dean Sciences)
Qualification: MSc (Statistics), University of Wah, Wah Cantt
Contact: tahir.abbas@hitecuni.edu.pk

Babar Shahzad
Designation: Academic Coordinator
Qualification: MS (Management Sciences), COMSATS Institute of Information Technology, Islamabad
Contact: babar.shehzad@hitecuni.edu.pk
**MS Mathematics**

This program requires a course work of 24 credit hours. Also, 6 additional credit hours are required to be completed either through research and submission of a thesis and its successful defense or by taking two additional courses in lieu of the thesis. This program imparts specialized knowledge in various areas of mathematics and exposes the students to latest development in them.

Special efforts are made to nurture and enhance the research capabilities of the students through seminars, workshops and the ensuring critique sessions.

Typical research topics for MS students are Numerical Analysis, Analytical and Numerical techniques for ordinary and partial differential equations and Finite Element Analysis. Research opportunities are also available in Numerical Linear algebra, Mechanics of Fluids (Newtonian and Non-Newtonian), Computational Fluid Dynamics and Computational Rheology.

**List of Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTH-701</td>
<td>Perturbation Methods-I</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-705</td>
<td>Mathematical Modeling</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-706</td>
<td>Mathematical Essentials for Cryptography</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-707</td>
<td>Relativistic Astrophysics</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-708</td>
<td>Advanced Ordinary Differential Equations with Applications</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-709</td>
<td>Advanced Numerical Analysis</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-710</td>
<td>Numerical Linear Algebra</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-712</td>
<td>Computational Fluid Dynamics</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-715</td>
<td>Boundary Value Problems-I</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-717</td>
<td>Integral Equations &amp; Applications</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-718</td>
<td>Advanced Partial Differential Equations and Applications</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-720</td>
<td>Variational Inequalities and Applications</td>
<td>3+0</td>
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTH-721</td>
<td>Numerical Solution of Partial Differential Equations</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-723</td>
<td>Finite Element Analysis-I</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-724</td>
<td>Advanced Numerical Linear Algebra</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-726</td>
<td>Advanced Mathematical Physics</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-728</td>
<td>Advanced Cryptography</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-729</td>
<td>Fractional Calculus &amp; Applications</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-731</td>
<td>Numerical Solution of Boundary Value Problems for ODEs</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-732</td>
<td>Advanced Fluid Mechanics</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-733</td>
<td>Non-Newtonian Fluid Mechanics</td>
<td>3+0</td>
</tr>
<tr>
<td>MTH-769</td>
<td>Thesis (MS level)</td>
<td>6+0</td>
</tr>
<tr>
<td>MTH-786</td>
<td>Ph.D. Thesis</td>
<td>30+0</td>
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</tbody>
</table>
Ph.D. Mathematics

The Doctor of Philosophy (Ph.D.) in Mathematics is the highest degree awarded by the Department. The program comprises 18 credit hours of course work and 30 credit hours of research thesis. The courses are selected in consultation with the thesis supervisor. The progress of student is continuously monitored through the Guidance and Evaluation Committee (GEC).

The students eligible for admittance in Ph.D. program should possess an MS/M. Phil. Degree with a minimum CGPA 3 out of 4 and should have passed GAT subject examination as per requirement of HEC, in vogue.

The completion of course work is followed by comprehensive examination for granting candidacy as a Ph.D. Scholar. The program necessitates two years of residency in HITEC University.

The Ph.D. thesis is evaluated by one local and two foreign experts from technologically more advanced countries, as per requirement of the HEC. After positive evaluation from these experts, the Ph.D. Scholar is required to undertake an open defense to fulfill the degree requirements.

The degree is awarded in recognition of high level of scholarship, the ability to carry out independent research, and the publication of such research in national and international journals of repute.

The Department sponsors research activities involving analytic and numerical solutions of Ordinary and Partial Differential Equations, Finite Element Analysis, Numerical Linear Algebra, Newtonian and Non-Newtonian Fluid Mechanics and Computational Fluid Dynamics etc.

Our Ph.D. program is the most vibrant and extensive vis a vis other universities of Pakistan.
Courses Contents

**MTH-701: Perturbation Methods-I**
Introduction, order symbols and Gauga functions, asymptotic series and expansions, asymptotic expansion of integrals, integration by parts, Laplace's method and Watson's Lemma, method of stationary phase and method of steepest descent, straight forward expansions and sources of non-uniformity, the Doffing equation, Small Reynolds number flow past a sphere, small parameter multiplying the highest derivative, the method of strained coordinates, Lindstedt Poincare method, renormalization method, variation of parameters and method of averaging, method of multiple scale with examples.

**MTH-705: Mathematical Modeling**
Classification of mathematical models, deductive, inductive, floating models. Modeling methodology, Modeling skills, Use of difference equations for mathematical modeling, matrix models, Consistency of models, Discrete models, population growth model; linear models; logistic models. Continuous models: One variable models; equilibrium and stability; multivariable models. Mathematical modelling using random numbers: Stochastic models: Discrete probabilistic models and continuous probabilistic models.

**MTH-706: Mathematical Essentials for Cryptography**

**MTH-707: Relativistic Astrophysics**

**MTH-708: Advanced Ordinary Differential Equations with Applications**
Applications of first and second order ODEs; Systems of first order ODEs, Eigenvalue method for first order systems, variation of parameters for first order systems, Nonlinear ODEs, Lotka-Voltera predator-prey model; Series Solution of ODEs, Legendre's differential equation, Bessel's differential equation, Hypergeometric differential equation, Chebyhev differential equation, Laguerre Differential Equation, Hermite's Differential Equation.

**MTH-709: Advanced Numerical Analysis**
MTH-710: Numerical Linear Algebra


MTH-712: Computational Fluid Dynamics


MTH-715: Boundary Value Problems-I

Introduction to boundary value problems, linear and nonlinear models, Adomian’s decomposition method, modification in decomposition methods, applications
of ADM and MADMs for IV and BVPs, variational iteration method, Adomian’s polynomials and Padé approximation, comparison of VIM, ADM and other techniques, Homotopy Perturbation Method (HPM), Modifications in HPM, Applications in HPM and its modified versions, Modification of variation of parameters method (VPM), Differential Transform method and its applications, Introduction of Homotopy Analysis method.

MTH-717: Integral Equations and Applications


MTH-718: Advanced Partial Differential Equations and Applications

Introduction, linear and nonlinear PDEs, homogeneous and inhomogeneous PDEs, solutions of PDEs, boundary and initial conditions, well-posed PDEs, method of characteristics, method of separation of variables, Laplace’s equations, D’Alembert’s solution, solution of physical models, solitons and compactons, solitary Wave theory, Types of travelling wave equations, Pade approximation, various techniques to find travelling wave solutions.

MTH-720: Variational Inequalities and Applications

Principle Technique, Convergence Analysis, Variational Inclusions, Resolvent Equations.

**MTH-721: Numerical Solution of Partial Differential Equations**


**MTH-723: Finite Element Analysis-I**

Calculus of Variations, Hamilton’s Principle. One Dimensional Shape Functions, Integral Formulations and Variational Methods: Integral Formulations, Weighted-Integral and Weak Formulations, Linear and Bilinear Forms and Quadratic Functionals, Variational Methods, the Ritz Method, Approximation Functions, Method of Weighted Residuals. Galerkin and Weighted Residual Methods, Finite Elements in One Dimension, Weak Form with Linear Trial Functions, Second Order Equations, Linear Elements of Second Order Equation, Local and Global Matrices, Quadratic Element of Second Order Linear Problems, Mixing Two Different Elements.

**MTH-724: Advanced Numerical Linear Algebra**

Iterative Matrices and Preconditioning, Chebyshev Acceleration and Symmetric SOR (SSOR), Projection Methods, Krylov Subspace Methods, Arnoldi’s Iteration, Incomplete Orthogonalization Method (IOM), Generalized Minimal Residual (GMRES) Method, The Lanczos Iteration, Incomplete LU (ILU) Factorization Preconditioners, Conjugate Gradient (CG) Method, Incomplete Modified Gram-Schmidt, Multigrid Methods, Weighted Jacobi Iteration, Gauss-Seidel Iteration, Nested Iteration, Algebraic Multigrid (AMG), Smoothness in AMG, Interpolation in AMG.

**MTH-726: Advanced Mathematical Physics**


**MTH-728: Advanced Cryptography**

Introduction and Classical cipher systems, Block Ciphers, DES, AES Cipher, Correlations and Walsh Transforms, Cryptographic Criteria, Generalization to S-Boxes, Pseudo-Random-Sequence Generators and Stream Ciphers, Linear Feedback Shift Registers, Public key Cryptography, Elliptic curve cryptography, Digital Signature and Authentications Threats, Challenge-response algorithms, zero knowledge protocols and oblivious transfer, Lattice based Cryptography.
MTH-729: Fractional Calculus and Applications
Special functions of the fractional calculus, gamma function, Mittag-Leffler function, Wright function, functional derivatives and integrals, Grundwald Letnikov fractional derivatives and applications, Reimann Liouville fractional derivatives, properties of fractional derivatives, Caputo’s fractional derivatives, Laplace and Fourier transforms of fractional derivatives, existence and uniqueness theorems, Leibniz rule, techniques in fractional calculus, fractional Green’s function, one-term, two-term, three-term, four-term and n-term equations, Numerical evaluation of fractional derivatives, approximation of fractional derivatives, finite part integrals and fractional derivatives, Abel’s integral Equations, Solution of Bessel’s equation, Applications to Diffusion problems.

MTH-732: Advanced Fluid Mechanics

MTH-733: Non-Newtonian Fluid Mechanics
Classification of non Newtonian fluids, Rheological formulae (Time independent fluids, Thixotropic fluids and viscoelastic fluids), Variable viscosity fluids, The deformation rate, Viscoelastic equation, Materials with short memories, The Rivlin-Ericksen fluid, Basic equations of motion in rheological models. The linear viscoelastic liquid, Axial oscillatory tube flow, Angular oscillatory motion, Periodic transients, Basic equations in boundary layer theory, Truncated solutions for viscoelastic flow, Similarity solutions.
Courses offered to other Departments

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT-101</td>
<td>Calculus and Analytical Geometry</td>
<td>3+0</td>
</tr>
<tr>
<td>MT-102</td>
<td>Linear Algebra and Ordinary Differential Equations and</td>
<td>3+0</td>
</tr>
<tr>
<td>MT-103</td>
<td>Differential Equations</td>
<td>3+0</td>
</tr>
<tr>
<td>MT-108</td>
<td>Multivariate Calculus</td>
<td>3+0</td>
</tr>
<tr>
<td>MT-201</td>
<td>Complex Variables and Transforms</td>
<td>3+0</td>
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<tr>
<td>MT-202</td>
<td>Numerical Methods</td>
<td>3+0</td>
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<tr>
<td>MT-203</td>
<td>Applied Linear Algebra</td>
<td>3+0</td>
</tr>
<tr>
<td>MT-301</td>
<td>Partial Differential Equations</td>
<td>3+0</td>
</tr>
<tr>
<td>MT-302</td>
<td>Probability and Statistics</td>
<td>3+0</td>
</tr>
</tbody>
</table>

**MT-101: Calculus and Analytical Geometry**

Functions and graphs, limits & continuity, differentiation and applications, extreme values of a function, differentials and approximation, indeterminate forms, Leibnitz theorem, integration, rules of integration, applications of definite integrals, length of a plane curve, volumes of solids of revolution, conic sections, infinite sequences and series, vectors in 3-dimensional space, vector valued functions and motion in space, analytical geometry in 3-dimensional space, functions of several variables, partial derivatives, tangent planes and normal lines, extrema of functions of two variables.

**MT-102: Linear Algebra and Ordinary Differential Equations**

Introduction to differential equations, first-order differential equations, applications of first-order differential equations, higher-order differential equations, techniques to solve higher order ODEs, variation of parameters method and applications, method of undetermined coefficients and applications, series solutions of ODEs, Cauchy Euler equation, introduction to linear algebra, system of linear equations, applications of linear equations in real life problems.

**MT-103: Differential Equations**

Introduction to differential equations, exact and non-exact differential equations: Initial value problem, separable equations, homogeneous equations, exact equations, integrating factors, orthogonal trajectories. applications of first-order differential equations: nonlinear equations, Bernoulli’s equation, Riccati equation, Clairaut equation, linear differential equation of higher order: Cauchy-Euler’s equation, reduction of order, Wronskian. applications of 2nd order differential equations. partial differential equations: one dimensional heat flow, higher dimensional heat flow, one dimensional wave equation, higher dimensional wave equation, Laplace’s equation.

**MT-108: Multivariate Calculus**

Functions of several variables, partial derivatives of first and higher order, tangent planes and differentials, extreme values and saddle points. Multiple integrals: 3 dimensions, vector functions: arc length and unit tangent vector, curvature and unit normal vector N, torsion and unit binormal vector B. vector calculus: line integrals, vector fields, work, circulation and flux, conservative fields. Green’s theorem, curl and divergence, parametric surfaces and their areas, surface integrals, the divergence theorem of Gauss, Stokes theorem.

**MT-201 Complex Variables and Transforms**

Complex Analysis, Polar form of complex numbers, complex functions, their derivatives, analytic functions, Cauchy-Riemann equations, Laplace equation, Line
integral in the complex plane, Cauchy’s integral theorem, Functions given by power series, Taylor and Maclaurin series. Vector Calculus, Vectors in 2-space and 3-space, vector product (cross product), arc length, gradient of a scalar field, directional derivative, divergence of a vector field, curl of a vector field, Line integrals, Green’s theorem in the plane, Divergence theorem of Gauss, Stokes theorem. Fourier Series, periodic functions, even and odd functions, half-range expansions, Fourier transforms, solution of differential equations.

**MT-202 Numerical Methods**

Solving nonlinear equations (bisection method, Newton-Raphson method, Horner’s method, method of false positions, secant method), Solving non-linear system of equations, Interpolation with equal interval of arguments (Newton formulas), Unequal interval of arguments (Divided difference interpolation formula) Lagrange Interpolation, Numerical Differentiation, Numerical Integration (Newton-Cotes), Solving first order ODEs (Euler and Heun’s methods, predictor-corrector methods, Runge-Kutta methods) Solving system of first order ODE’s, Solution of second order ODEs.

**MT-203 Applied Linear Algebra:**

Basic matrix operations, linear system of equations, Gauss elimination, linear models in science and engineering, linear dependence and independence of vectors, rank of a matrix, homogeneous and non homogeneous systems, determinants and their properties, Cramer’s Rule, inverse of a matrix, Gauss-Jordan elimination method, Decomposition of matrices (LU, Doolittle, Crout), vector spaces, inner product spaces, linear transformations, Eigen values and Eigen vectors, orthogonal matrices, orthogonal transformations, diagonalization of matrices, quadratic forms.

**MT-301 Partial Differential Equations**

Linear and nonlinear PDEs, homogeneous and inhomogeneous PDEs, formulation of PDE, classifications of a second order PDE, superposition principle, method of characteristics, one dimensional, two dimensional, three dimensional and higher dimensional heat flow, method of separation of variables, Dirichlet Neumann and Robin conditions, Fourier series and transform, one dimensional and higher dimensional wave equation, method of separation of variables, wave equation in an infinite domain: D’Alembert solution, Laplace equation in two and three dimensions, Laplace equation in polar coordinates.

**MT-302 Probability and Statistics**

Descriptive statistics, measures of central tendency, probability, conditional probability, multiplicative rules, random variables, discrete random variables and probability distributions, continuous probability distributions, joint probability distributions, mathematical expectation, mean, variance and covariance of random variables, Chebyshev’s theorem, discrete uniform distributions, binomial distribution, Poisson distribution, normal distribution, estimation (point estimates and confidence intervals), test of hypothesis (what is hypothesis testing, errors in hypothesis testing, one-tailed and two-tailed tests of significance, sample tests of hypothesis about population mean, two-sample tests of hypothesis), regression and correlation.
Department of Islamic Studies

“The word of wisdom is the lost asset of the believer, so wherever he finds it, he has a better right to it”

(Al-Tirmadhi)
Department of Islamic Studies

The Department of Islamic Studies in HITEC University was established in 2008 as emerging seat of higher learning and research. The Department has envisioned evolving into a center of excellence for producing religious scholars to revitalize the spirit of Islamic thought and scientific query. Students are welcome to pursue Master and Ph.D. programs. The Department offers diversity of courses to produce the research dealing with the current problems and futuristic issues in the light of Islamic scholarship.

In addition, to provide thorough understanding of fundamental classical sources of Islam, the curricula and syllabi of Islamic studies is designed to revive the Islamic system of objective based diligence in order to enable the students to deal with present challenges.

The Department dedicates to enable the students to work for cause of Islam in different cultures and civilizations. Our mission is to provide quality education in Islamic thoughts and culture to open the opportunity of launching Dawah, teaching and training programs at International level.

The Department helps the students to acquaint themselves with the concept of convergence of Islam and science. Modern time has opened vast chapter of compatibility of modern science with Quran. Therefore, a number of courses are introduced to achieve these objectives.

“The word of wisdom is the lost asset of the believer, so wherever he finds it, he has a better right to it”

(Al-Tirmadhi)
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Faculty of Islamic Studies
MS Islamic Studies

The Department offers MS (Islamic Studies) program. It is a broad based scheme, focusing on contemporary socio-political and economic issues, Ijtihad, objectives of Islamic Shariah, Islamic philosophy, International relations, Islamic world view and contemporary study of major world religions.

Researchers are encouraged to work on practical issues to fulfil the needs of our society in particular and humanity in large.

The MS degree is awarded after completion of 30 credit hours, 24 of which are course work. The remaining 6 credit hours can be completed either by writing a research thesis or by taking 2 additional courses from the list of offered subjects in respective semester.

Ph.D. Islamic Studies

The Doctor of Philosophy (Ph.D.) in Islamic Studies is the highest degree awarded by the Department. The program comprises 18 credit hours of course work and 30 credit hours of research thesis. The courses are selected in consultation with the thesis supervisor. The progress of student is continuously monitored through the Guidance and Evaluation Committee (GEC).

The students eligible for admittance in Ph.D. program should possess an MS/M. Phil. Degree with a minimum CGPA 3 out of 4 and should have passed GAT subject examination as per requirement of HEC, in vogue.

The completion of course work is followed by comprehensive examination for granting candidacy as a Ph.D. Scholar. The program necessitates two years of residency in HITEC University.

The Ph.D. thesis is evaluated by one local and two foreign experts from technologically more advanced countries, as per requirement of the HEC. After positive evaluation from these experts, the Ph.D. Scholar is required to undertake an open defense to fulfill the degree requirements.

The degree is awarded in recognition of high level of scholarship, the ability to carry out independent research, and the publication of such research in national and international journals of repute.

The Department encourages the researchers to work on current problems and futuristic issues related to the renaissance of Islamic thought, philosophy and scientific knowledge, leading to the ultimate truth.
## MS/Ph.D. Islamic Studies Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>IS-701</td>
<td>Development of Quranic Commentary Literature &amp; its Trends</td>
<td>3+0</td>
</tr>
<tr>
<td>IS-702</td>
<td>Diligence in Islam (Ijtihad)</td>
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<tr>
<td>IS-703</td>
<td>Objectives of Islamic Shariah (Maqasid al-Shariah)</td>
<td>3+0</td>
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<tr>
<td>IS-704</td>
<td>Islamic Thoughts and Sciences: Source Literature</td>
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<tr>
<td>IS-705</td>
<td>Islamic Philosophy</td>
<td>3+0</td>
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<tr>
<td>IS-706</td>
<td>Contemporary Issues: Islamic View Point</td>
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<tr>
<td>IS-707</td>
<td>Hadith Studies</td>
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<tr>
<td>IS-708</td>
<td>Principles of Tafsir</td>
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<td>IS-710</td>
<td>Comparative Study of Tafsir Literature</td>
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<td>IS-711</td>
<td>Principles of Fiqh</td>
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<td>IS-712</td>
<td>Comparative Study of Different Juristic Schools of Thought</td>
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<td>IS-713</td>
<td>Islamic Banking and Finance</td>
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<td>Management &amp; Administration in Islam</td>
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<td>IS-715</td>
<td>Islamic World View</td>
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<td>IS-716</td>
<td>International Relations and Islam</td>
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<td>IS-718</td>
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<td>IS-720</td>
<td>Analytic Study of Seerah</td>
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<td>IS-721</td>
<td>Ethics of Disagreement in Islam (Adab al-Ikhtalaf)</td>
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<td>IS-722</td>
<td>Dawah Principles &amp; Techniques</td>
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<td>IS-723</td>
<td>Islamic Economics</td>
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<td>IS-724</td>
<td>Islamic Political System</td>
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<td>Research Methodology</td>
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<td>MS Thesis/Two Courses</td>
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### MS/Ph.D. Islamic Studies Courses continued:

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<td>Islamic Political System</td>
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<td>Research Methodology</td>
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<td>IS-720</td>
<td>Analytic Study of Seerah</td>
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<td>IS-721</td>
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<tr>
<td>IS-786</td>
<td>MS Thesis/Two Courses</td>
<td>0+6</td>
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### Notes:

- Courses marked with an asterisk (*) indicate elective courses.
- All courses are offered at the University of [Institution Name].
Course Contents

IS-701 Development of Quranic Commentary Literature and its Trends
Early development of Quranic commentary literature, difference between Tafsir and Ta’wil, prerequisite qualification for writing Quranic commentary, basic sources of understanding Quran, different trends in Quranic commentaries and introduction to their representative literature, transmitted commentary, opinion based commentary, commentary based on: scholastic theology, grammar and literary rhetoric, spiritual approach, earlier Divine scriptures, sectarianism, manners of recitation, scientific approach, comprehensive approach.

IS-702 Diligence in Islam (Ijtihad)
Ijtihad: definition, need and importance, Ijtihad in the time of Holy Prophet (PBUH) and his companions, principles of Ijtihad: objectives and cause based, development of the principles of Ijtihad: principles of Imam Abu Hanifah, Imam Malik, Imam Ja’far al-Sadique, Imam al-Shaf’i, Imam Ahmad bin Hanbal and Al-Zahiriyah, qualification of a Mujtahid, classes of Mujtahidin, scope of Ijtihad in present time, change of Ijtihad with the change of time and space, need for a global fiqh based on international infrastructure of Ijtihad, taqlid and fatwa and their impact on society, importance of taqlid in the process of Ijtihad, practical training of Ijtihad in contemporary issues.

IS-703 Objectives of Islamic Shariah (Maqasid al-Shariah)
Introduction: Islam revolves around objectives, determination of objectives from Quranic injunctions and Prophetic traditions, kinds of objectives: general and specific, types of objectives: indispensable, required and refining objectives, five traditional objectives of Islamic law, new objectives mentioned by contemporary scholars, order of priority among the objectives, implementation of objectives in various aspects of life, scope of Ijtihad on the basis of objectives of Islamic shariah.

IS-704 Islamic Thoughts and Sciences
Source Literature: Introduction to source books and fundamental literature about Quranic sciences, Tafsir, Hadith sciences and its literature, Islamic law and jurisprudence, history, biographies, geographical histories, chronological histories, historical geography, literature on Islamic thoughts, political system, economics, and social studies, scholastic theology and encyclopaedic works of Islam, famous libraries of the world having rich collection of Islamic literature.

IS-705 Islamic Philosophy
Human nature and its demands, basic questions and their answers by the secular philosophies and the religions, God (Allah), His being, Oneness and attributes, creation of universe, human beings and their destination, human spirit: difference between life and spirit, freewill and predestination, good and evil, sources of human knowledge: nature, five senses, intelligence, revelation (possibility and its modes), prophet hood and its proof, cause and effect, miracles and causes, effects of faith and deeds on human personality, life after death: possibility, reward and punishment, intercession, personification of faith and deeds into heaven and hell.

IS-706 Contemporary Issues
Islamic View Point: Political issues, democracy in the light of Islam, international relations in contemporary world in the light of juristic concept of Dar al-Islam
and Dar al-harb, concept of Ummah and nationality, preaching of an un-Islamic religion in Islamic world and vice versa, medical issues: transplantation, cloning, test tube baby, family planning, alcoholic medicines, abortion, economic issues: indexation on deferred payment, premium on rental contracts, sale of rights, murabahah, paper currency, electronic currency, money changing, insurance, stock exchange: sale and purchase of shares, mudharabah and financing, social issues: interfaith marriages, divorce and its ways of application, Islamic concept of hijab, filtration of polluted water, moon sighting and difference of dawn.

**IS-707 Hadith Studies**

Introduction to Hadith, need and importance, Hadith/ Sunnah as a source of Islamic shariah, ways of judgment of authenticity of Hadith, different kinds of Hadith, compilation of Hadith literature, famous books of Ahadith, Hadith sciences in sub-continent.

**IS-708 Principles of Tafsir**

Definition, Quran and its revelation, Makki and Madani verses, arrangement of Quranic text, causes of revelation, gradual revelation, compilation, dialects of Quranic recitation, abrogation of Quranic injunction, miraculous nature of the Quran, interpretation (Tafṣīr and Ta‘wil), Al-muhkam wal mutashaabih, introduction to verse, chapter, part and manzil, cause of repetition in the Quran, literary form of Quran, interlink among verses and chapters, basic qualification of a Mufassir, Uloom-e-Khamisa.

**IS-709 Principles of Hadith**


**IS-710 Comparative Study of Tafsir Literature**


**IS-711 Principles of Fiqh**

Introduction, history, sources of Islamic Jurisprudence: basic and secondary, Iṣṭiḥsans (Juristic Preference): definition, kinds and authenticity, Iṣṭiḥsān (presumption of Continuity): definition and authenticity, maslahah mursalah (extended analogy): definition, requirements, sadd-ul-dharay (blocking the lawful means to an
unlawful end), qawl-al-sahabi (opinion of a companion), Shar-o-man Qablana (earlier scriptures), Urf (custom): definition, types and legal status, Maqasad shariah (juristic ideologies), Ijtihad and taqlid.

**IS-712 Comparative study of Islamic schools of thought**

Introduction, background and formation, compilation of fiqh, scholars of Islamic schools, great Imams, minor scholars, rules and principles of each Imam and school of thought, contradictory and alternative differences, main reasons for conflicting rulings, stagnations and decline, emergence of taqleed, proximity amongst schools of law, modern institutions of collective opinions.

**IS-713 Islamic Banking and Finance**

Islamic finance: introduction, foundation, characteristics, principles, status of present economic systems in Islamic shariah, the concept of usury, financial tricks, gambling and other prohibited activities, banking: introduction, types, characteristics, functions, Islamic banking: introduction, history, background, global scenario, different modes of financing, shariah standards, shariah audit and compliance, Islamic insurance (Takaful), current issues, critical study of modern Islamic banking.

**IS-714 Management and Administration in Islam**

Islamic management and administration: background, fundamental theories: freedom, justice, equality, consultation and dignity of mankind, Islamic view of human nature: introduction, types of people, the functions of man, the responsibilities, accountabilities, social behaviour, evolutionary development of administration and management, sources of Islamic administration and management: the time of Holy Prophet (PBUH)
and the Pious Caliphs (R.A), institutions: the diwan (secretariat), hisbah, a comparison of Islamic and other models, emphasis on Islamic values and ethical standards, non-usurious financial institutions, punishment on administrative corruption, balance between material and spiritual wellbeing, Divine origin, prevention of injustice, concept of shura (consultation), emphasis on cooperation, concept of leadership, qualities of leadership, expectation of the group, concept of administrative law.

**IS-715 Islamic World View**

Unity of God, unity of human race, dignity of mankind, equality, freedom of faith, thought, expression, occupation, earning of livelihood, movement, choice and action, legal and social justice, security of life, faith, honour, property and family, right of privacy, education and healthcare, ethical values: truth, honesty, commitments, peace and tolerance, patience and gratitude, use of natural capital, environmentalism, responsibility, accountability, no punishment without trial, international obligations, judgment of good and evil, respect for the chastity of woman, status of Dawah and Jihad.

**IS-716 International Relations and Islam**

Islam as an international religion, a complete code of life, characteristics of Islamic state and its relation with other states and communities, studies of principles of international relations mentioned by famous scholars of early Islamic period, emergence and trajectory of Islam as a force in international relations since the late 19th century, revival of Islam in world politics, concept of Jihad and Dawah, relationship with non-Muslims, global issues: population, reasons for becoming human rights an international interest and concern, various international concerns/issues of environment: global warming, ozone depletion, acid rain, desertification & deforestation, efforts towards the protection of environment, proliferation of weapons, obstacles to arms control, major steps/efforts towards arms control, role of international Islamic organizations in world politics, major issues of Muslim world, Muslim minorities.

**IS-717 Comparative study of Major World Religions**

Religion: definition, need, two categories of religion – Divine and worldly, Divine religion: Judaism, Christianity and Islam, common teachings and differences, worldly religions: Hinduism, Buddhism, Confucius, Zoroastrianism, points of convergence and divergence, comparative study of: creation of universe, the creator, the message, salvation and life hereafter, dignity of mankind and racism, human rights, status of women, social customs, divine status of kingdom, status of religious leaders, political and socio-economic laws, movements of renaissance in these religions, religion in the twenty first century, world religion and peace, Islam: last the universal religion, characteristics.

**IS-718 Islam and Science**

Scientific method: introduction, study of scientific method in the light of Holy Quran, a brief history of conflict between science and religion, study of important aspects of creation in the light of Islam and science: heavens and the earth, basic process of the formation of the universe and resulting composition of the worlds, modern scientific data concerning the formation of the universe, testing the data in the Quran concerning the creation, astronomy in the Quran: general reflections concerning the sky, nature of heavenly bodies, celestial organization, the conquest of space, the earth in
the Quran: water cycle and the sea, the earth’s relief (creation of mountains), the earth’s atmosphere, the origin of life, the vegetable kingdom, the animal kingdom, human reproduction, sex education, preservation of data: Quranic concept of preservation of doing, saying and thinking of human beings, scientific research about recording and preservation of human activities by waves and human thoughts in subconscious, brief history of Muslim contribution to science: medicine, mathematics, astronomy, physics, chemistry, geography, future of sciences in the Muslim world.

**IS-719 Research Methodology**

Identification of research problem, formulation of hypothesis and problem statement, review of relevant concepts, principles of Islamic research: transmitted narration, cognizance, their application in Tafsir, Hadith, Islamic law, Islamic jurisprudence, history and other branches of Islamic sciences, techniques of research: library research, surveys, lab research, preparation of synopsis, data collection techniques, data testing, academic writing, analyzing and presentation of results, discussion and conclusion of research, recommendations and suggestions, defence of thesis, Case study: sample research article, stepwise training from observation, problem, hypothesis, literature review, data collection, analysis, results, discussion, recommendations, indexation, bibliography.

**IS.720 Analytic Study of Seerah**

An overview of socio-political and religion-ethical background of the world in general and Arabic peninsula
in particular at the eve of emergence of Islam, study of Makkan period: formation period of establishment of faith and belief, spirituality, training of the followers, firm standing and patience, utilization of each opportunity to achieve the sacred goal, sacrifices, formation of a new community and search for peaceful environment, study of Madni period: foundation of society and state, brotherhood, peace treaties with surrounding tribes, security and administration, spread of knowledge and education, enforcement of law of war and peace, law making and judiciary, rights of citizens and state, rights of non-Muslims, status of women, political and economic system of prophetic state, social institutions, dissemination of Islam and international relations.

IS.721. Ethics of Disagreement in Islam (Adab al-Ikhtalaf)

Difference between divergence and variation, kinds of differences: (a) political: causes of differences during the early period of Islam, political differences amongst the companions of the Holy Prophet (PBUH) and their respect to each other, difference between the concept of Khilafah and Imamah, brief history of this difference and coexistence of Sunni and Shia’ people down the history. (b) scholastic: emergence of Mutazalities, Ashariah, Maturadiah, Murjiah, Khawarij and Shia’ as scholastic Islamic groups and their thoughts, effects of these groups on the society and their inter-group relations, differences of today and ways to establish the harmony and tolerance among the difference schools of thought, (c) judicial: origin of the variation in the Holy Quran and Sunnah, history of differences of scholars in academic affairs with respect to each other during the early period of Islam. Causes of difference of opinion among the scholars of juristic schools of thought, difference of opinion as a source of legislation,
way-out in necessity and scope to change of law with the change of time and space, Study of Al-sha’arani’s ideology of Al-Mizan and its application in our society, provision of Talfiqe (applying the opinions of different schools of thought to solve the problem) and the status of Taqlid (to follow the opinion of single jurist in every issue of life).

**IS-722 Dawah Principles & Techniques**

Finality of prophethood, need and importance of Dawah, two kinds of Dawah: (a) call for Islam, (b) enjoining good and forbidding evil, the caller: prerequisite qualification: credibility, truthfulness, honesty, patience, tolerance, organization and accommodation, knowledge of fundamentals of Islam, Islamic concept of Dawah, subjects of Islamic Dawah, awareness about the faith, customs and culture of the called, ability to use the different branches of knowledge for Dawah purpose, role of Islamic schools of thought to make the Dawah more acceptable, methodology of Dawah: emotional, intellectual and experimental, wisdom based, positive dialogue, argumentation, dialogue: basic principles, Quranic base for interfaith dialogue and its application on different religions and various issues.

**IS-723 Islamic Economics**

Analytic study of capitalism, socialism and Islamic economic system, principles of Islamic economics: Divine guidance, concept of real ownership and trust, demarcation of Halal and Haram in earning and spending, circulation of money and distribution of wealth, balance in personal and social motives, Usury: Islamic viewpoint regarding interest on savings, investments, personal and commercial loans, present banking system, interest free banking and alternatives through Mudharabah and Musharakah, a critical study of current Islamic banking system, indexation (another alternative): effects of devaluation and its adjustment through indexation in the light of Islam, how to implement the Islamic economic system.

**IS-724 Islamic Political System**

Principles of Islamic political system: unity and sovereignty of Allah, dignity of mankind, equality of human being, basic sources of Islamic law: the Book and the Sunnah, human beings as representative of Allah, legislative system: election / selection of ruler, basic qualification of ruler, consultative council (Shura), qualification of members and their prerogative, judicial system: importance of justice, independence of judiciary, justice for all, social justice, administrative justice, rights and obligations of state and citizens. Status of women, rights of non-Muslims and just foreign policy.
Courses Offered to Other Departments

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<td>IS-411</td>
<td>Professional Ethics</td>
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<td>HS-102</td>
<td>Pakistan Studies</td>
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**ISL-202 Islamic Studies (Arabic)**

Basic teaching of the Holy Quran: Basic principle of the Arabic language (fundamentals of Arabic grammar, definite & indefinite articles, parts of speech, haroof e jara, subject & object pronouns, demonstrative pronouns, namaz (full text & translation) prayers, imperative sentences, singular, dual & plural, masculine & feminine, tajweed o qirat, surah al Hujrat (verdict & explanation) surah al Furqan (last chapter, traits of a momin) (verdict & explanation); the importance of Hadith in Islam; Jawahir ul Hadith (20 selected Ahadith); philosophy of Islamic beliefs (Tawheed, angels, holy scripture, prophets, day of judgment, predestination and decree, philosophy of Islamic prayers (shahadah, salat, zakat, saum & haj); duties in Islam (Jihad, Dawah, amr bil maroof wa nahi anil munkir); life of Muhammad (PBUH) as trader, teacher, preacher, army commander, guardian, husband & loving father; makki & madni life; sources of Islamic law and jurisprudence (Quran, Hadith, Ijma and Qayas); Islamic culture & civilization; death, shrouding and burial.

**ISL-406 Professional Ethics**

Important ethical teachings, purification of inner self from arrogance, jealousy and selfishness, change of undesirable habit and elimination of social evil, sincerity, hard work, concept of Halal and Haram regarding professions and professional activities, vast concept of trust and its application in the professions, honesty and truth, piracy, hacking, cybercrime, consumer crime and concealment of knowledge, fulfilment of commitments, respect of human beings in general and clients in particular, ethical obligation of a worker and an organization, advertising ethics, current ethical issues in Pakistan, role of prayer (Dua), self control and struggle to face the challenges (Sabr) and gratitude or use the opportunities (Shukr) to make the life a success, learn time management and practice punctuality.

**HS-102 Pakistan Studies**

Ideology of Pakistan, two-nation theory, historical perspective of ideology of Pakistan, Religious & reformatory movements, Muslims political struggle legislative council, 1861, indian council act, 1892, partition of Bengal, Simla deputation, formation of all India Muslim league Muslims political struggle, problems of Indian independence and the Muslims, 14 points of Quaid-e-Azam, Allama Iqbal’s presidential address, 1930, lahore resolution, the lands of Pakistan, demand for Pakistan initial problems of Pakistan, constitutional development, political parties and political regime, political regimes, economic development in Pakistan, foreign policy of Pakistan, Pakistan in 21st century, Current achievements and problems, Economic and political achievements, energy crises, sectarianism, and terrorism
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Male</td>
</tr>
<tr>
<td>CNIC No.</td>
<td>05-09-1996</td>
</tr>
<tr>
<td>Date of Birth</td>
<td>Islam</td>
</tr>
<tr>
<td>Religion</td>
<td>AB+</td>
</tr>
<tr>
<td>Blood Group</td>
<td>Punjab</td>
</tr>
<tr>
<td>Province</td>
<td>Chakwal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contact Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present Address</td>
</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>Permanent Address</td>
</tr>
<tr>
<td>Email</td>
</tr>
<tr>
<td>Phone Number</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Father/Guardian Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father Name:</td>
</tr>
<tr>
<td>Father CNIC Number:</td>
</tr>
<tr>
<td>Guardian Name:</td>
</tr>
<tr>
<td>Guardian Phone No.:</td>
</tr>
<tr>
<td>Father Profession:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academcis Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree Obtained Mark</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>936</td>
</tr>
</tbody>
</table>
Admissions

The admissions are strictly based on merit. The University is open to all persons without prejudice to gender, religion, race, creed, color or domicile.

Admission will be granted on the basis of eligibility criteria. Applicants, who have appeared in a prerequisite examination prescribed for admission in a program and are awaiting results, will be provisionally admitted against an undertaking that they will pass their examination as per admission criteria.

Students awaiting results are required to submit attested copies of their certificates/degrees within two weeks after the declaration of results, failing which the University will cancel their admissions. Only those students will be registered who would complete all admission formalities including deposit of their fees and other dues on prescribed date.

Every undergraduate student shall be expected to take the full load of the courses prescribed for the semester. A master level student, however, will have the option to enroll for fewer courses. Admission Test is applicable to candidates of undergraduate programs only.

Students applying for graduate programs are required to be qualified as per criteria laid down by HEC.

The Office of the Registrar is the nucleus of the University and coordinates all the activities within and outside of the University. It is the custodian of the common seal and academic records of the University. It provides secretariat support to the Board of Governors and the Vice Chancellor. It maintains the register of students and its graduates. This office is also responsible for the admissions, registration, semester enrolments of the students and preparation of degrees for the graduating students. It is responsible for the record keeping concerning students, faculty and staff of the University.
Eligibility Criteria

BS (Electrical/Mechanical Engineering)
- F Sc/A Level or equivalent with Physics, Chemistry and Mathematics or
- Diploma of Associate Engineers in Electrical or Mechanical Engineering
- Minimum 60 % marks

BS (Computer Engineering)
- F Sc/A Level or equivalent with Physics, Chemistry/Computer Science and Mathematics
- Minimum 60 % marks

BS (Computer Sciences)
- Intermediate/equivalent with Mathematics, Chemistry/Computer Sciences and Physics
- Minimum 50 % marks

MS Engineering (Electrical/ Mechanical)
- BE/B.Sc Engineering in relevant discipline
- Minimum CGPA 2.00/4.00 or 50% marks
- GAT General conducted by NTS with minimum 50% cumulative score

MS (Computer Science)
- BS (Computer Science/Software Engg), MCS / MSc Comp Sc
- Minimum CGPA 2.00/4.00 or 50% marks
- GAT General conducted by NTS with minimum 50% cumulative score

MS (Mathematics)
- BS/M.Sc Mathematics
- Minimum CGPA 2.00/4.00 or 50% marks
- GAT General conducted by NTS with minimum 50% cumulative score

MS (Islamic Studies)
- MA/BS (Islamic Studies/Shariah/Arabic)
- Dars-e-Nizami from HEC recognized institution with 50% marks
- Minimum CGPA 2.00/4.00 or 50% marks
- GAT General conducted by NTS with minimum 50% cumulative score

Ph.D.
- MS / M Phil or equivalent (in relevant discipline) with minimum CGPA 3.00/4.00 from an HEC recognized institution
- GAT Subject test conducted by NTS with minimum 60% cumulative score or GRE Subject test with minimum 60% percentile score

Admission Test
A written Admission Test is compulsory for all admissions in undergraduate programs as advertised in the national press.

Subjects to be tested
Admission Test comprising of the subjects indicated against each discipline will be held at the prescribed date:
- Engineering: Mathematics, Physics, Chemistry/Computer Science and English
- Computer Science: Mathematics, Physics, Computer Science and English
Entrance Test Subjects Weightage

The subjects and their weightage in admission test papers will be as under:-

Engineering
- Mathematics 40%
- Physics 30%
- Chemistry/Computer Science (For Computer Engineering) 10%
- English 20%

Computer Science
- Mathematics 40%
- Physics 30%
- Computer Science 10%
- English 20%

Determination of Merit

The final merit will be determined based on:-
- University Admission Test 50%
- HSSC Part 1/HSSC or equivalent 40%
- SSC /O-level 10%

Merit list of candidates who have appeared in A level (Final Exams) will be prepared by assigning 50% weightage to O-Level marks and 50% weightage to the admission test. Final selection will be based on securing minimum 60% marks in A Level as per equivalence provided by Inter Board Committee of Chairmen.

Late Admissions

As a matter of policy, late admissions are not entertained and no deviation is made from the announced schedule. The University reserves the right to reject the application of a student for admission without assigning any reason.

Registration and Enrollment

- On completion of admission formalities including deposit of dues, the applicants will be registered as bonafide students of the University
- Applicants are required to provide original academic certificates and documents to the Registrar Office at the time of registration
- After registration, Registrar Office will issue University Registration Card / Identity Card to all students
- Students are allowed to enroll for the courses offered by their department after getting their Registration Number
- If a student fails to get himself enrolled for the courses, his/her name will be struck off the strength and vacant position will be offered to the next candidate on the waiting list
- Students must enroll for the courses in each semester within first two weeks of the start of the semester
- All admissions will be provisional until provision of original documents

Transfer within HITEC University

We do not encourage shifting students from one discipline to the other. However in extreme circumstances, students can be transferred from one discipline to the other within the same merit or to the discipline with lower merit on their request.
## Dates to Remember

<table>
<thead>
<tr>
<th>Events</th>
<th>Date</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of Prospectus</td>
<td>June 08, 2015</td>
<td>Monday</td>
</tr>
<tr>
<td>Last Date of Submission of Admission Form</td>
<td>August 03, 2015</td>
<td>Monday</td>
</tr>
<tr>
<td>Admission Test</td>
<td>August 09, 2015</td>
<td>Sunday</td>
</tr>
<tr>
<td>Admission Test Result/1st Merit List</td>
<td>August 15, 2015</td>
<td>Saturday</td>
</tr>
<tr>
<td>Deposit of Dues / Registration of Students</td>
<td>August 17-21, 2015</td>
<td>Monday - Friday</td>
</tr>
<tr>
<td>Second Merit List (if required)</td>
<td>August 22, 2015</td>
<td>Saturday</td>
</tr>
<tr>
<td>Deposit of Dues / Registration of Students</td>
<td>August 24-28, 2015</td>
<td>Monday – Friday</td>
</tr>
<tr>
<td>Third Merit List (if required)</td>
<td>August 29, 2015</td>
<td>Saturday</td>
</tr>
<tr>
<td>Commencement of Fall Semester 2015</td>
<td>September 14, 2015</td>
<td>Monday</td>
</tr>
<tr>
<td>Orientation</td>
<td>September 14, 2015</td>
<td>Monday</td>
</tr>
</tbody>
</table>

## Contacts

**Muhammad Hafeez**  
Registrar  
Office: 051-4908143  
Fax: 051-4908145  
Email: registrar@hitecuni.edu.pk

**Farrukh Shahzad**  
Deputy Registrar  
Office: 051-4908146-49 Ext. 364  
Cell: 0333-5444556  
Email: deputy.registrar@hitecuni.edu.pk

**Muhammad Nazim Siddiqui**  
Assistant Registrar (A & R)  
Office: 051-4908144  
Cell: 0320-5060001  
Email: assistant.registrar@hitecuni.edu.pk
Financial Matters

Mrs. Nabila Shuja  
MSc, M.B.A, DIABP, MCP, MCSE+I, MCDBA, CCNA.  
Treasurer

Treasurer is the Chief Financial Officer of the University. Treasurer Office maintains accounts of the University in accordance with laid out audit procedures. It also manages assets, liabilities and expenses etc. as per International Accounting Standards (IAS). It prepares the Annual Budget and ensures expenses according to the budgetary allocations.

Fee Structure

The fee structure for the student registered in the academic year 2015-16 in different disciplines of undergraduate & postgraduate is as under

<table>
<thead>
<tr>
<th>Programs</th>
<th>Admission/Registration/Development Fee (One Time)</th>
<th>Security Deposit (One Time)</th>
<th>Semester Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS Engineering</td>
<td>Rs. 30,000/-</td>
<td>Rs. 20,000/-</td>
<td>Rs. 90,000/-</td>
</tr>
<tr>
<td>BS Computer Science</td>
<td>Rs. 30,000/-</td>
<td>Rs. 20,000/-</td>
<td>Rs. 60,000/-</td>
</tr>
<tr>
<td>MS Engineering</td>
<td>Rs. 10,000/-</td>
<td>Rs. 10,000/-</td>
<td>Rs. 5,000/-per cr hr</td>
</tr>
<tr>
<td>MS Mathematics</td>
<td>Rs. 10,000/-</td>
<td>Rs. 10,000/-</td>
<td>Rs. 5,000/-per cr hr</td>
</tr>
<tr>
<td>MS Islamic Studies</td>
<td>Rs. 9,000/-</td>
<td>Rs. 3,000/-</td>
<td>Rs. 2,500/-per cr hr</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Rs. 10,000/-</td>
<td>Rs. 10,000/-</td>
<td>As per respective MS cr hr Fee</td>
</tr>
</tbody>
</table>

- Semester fee includes tuition fee, examination fee, lab charges, sports subscription etc.
- All the registered students will pay their fee as per the fee slips issued by the Accounts Office.
- Challan forms will be available from the Accounts Office at the time of admission. Fee is payable at any branch of Bank Alfalah Limited or through bank draft in favor of HITEC University.
- Subsequently, fee challans will be issued before the commencement of each semester.
- Please note that all fees are subject to revision.
## Refund Policy

<table>
<thead>
<tr>
<th>Timeline</th>
<th>% age of Tuition Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Undergraduate Program</strong></td>
<td></td>
</tr>
<tr>
<td>Up to 7th day after commencement of Classes</td>
<td>Full Fee (100%) Refund</td>
</tr>
<tr>
<td>8th-15th day after commencement of Classes</td>
<td>Half Fee (50%) Refund</td>
</tr>
<tr>
<td>From 16th day after commencement of Classes</td>
<td>No Fee Refund</td>
</tr>
<tr>
<td><strong>Postgraduate Program</strong></td>
<td></td>
</tr>
<tr>
<td>Up to 14th day after commencement of Classes</td>
<td>Full Fee (100%) Refund</td>
</tr>
<tr>
<td>After 14th Day of commencement of Classes</td>
<td>No Fee Refund</td>
</tr>
</tbody>
</table>

## Fine for Late Payment of Fee

The following fine will be levied for payment of fee after due date:

- For the first ten days after due date, 5% of the payable amount.
- After ten days up to twenty days, 10% of the payable amount.
- After twenty days Rs. 10,000/- will be charged.
- Two months after due date, Registration shall be suspended.
- For re-activation of registration, the student will be required to pay the admission charges again, with all outstanding charges and fine.

## Financial Assistance/Scholarship

HITEC University allocates substantial amount every year for scholarships and financial assistance to deserving students as described below:-

- **China North Industries Corporation (NORINCO) Scholarship** - Awarded to position holders of all undergraduate disciplines on semester basis (semester GPA should not be less than 3.50)

- **Full tuition fee waiver** - For the top 50 merit list position holders of engineering discipline for 1st semester only.
• **Financial Assistance on need-cum Merit Basis** - given to needy students, subjects to minimum 2.5 semester GPA.

• **Muhammad Nusrat Scholarship** - supports the deserving students subject to minimum GPA of 2.50.

• **Begum Razia Sultana Scholarship** - awarded to bright female students enrolled in regular program of HITEC University.

• **NTS Scholarship** - given to needy students

**Hostel Accommodation (for boys)**

Only limited on-campus accommodation is available on “first come first served basis”.

<table>
<thead>
<tr>
<th>Hostel Security (Refundable)</th>
<th>Rs. 10,000/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Semester Charges</td>
<td>Rs. 30,000/-</td>
</tr>
</tbody>
</table>

**Transport**

Transport facility is available for Islamabad & Rawalpindi areas only.

| Per Semester Charges | Rs. 20,000/- |

**Miscellaneous Charges**

<table>
<thead>
<tr>
<th>Course Repeat Fee</th>
<th>Rs. 4,000/- per cr hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester Freeze Fee</td>
<td>25% of the each semester Fee</td>
</tr>
<tr>
<td>Migration Fee</td>
<td>Rs. 25,000/- each semester exempted</td>
</tr>
<tr>
<td>Transcript Fee/ Semester</td>
<td>Rs. 300/ Rs. 600 Normal/Urgent</td>
</tr>
<tr>
<td>Degree Fee</td>
<td>Rs. 3000/Rs. 5000/- Normal/Urgent</td>
</tr>
<tr>
<td>Additional Grade Report including Attestation</td>
<td>Rs. 300/- per semester</td>
</tr>
<tr>
<td>Recalculation Fee</td>
<td>Rs. 1,000/- per subject</td>
</tr>
<tr>
<td>Attestation</td>
<td>Rs. 100 per document</td>
</tr>
<tr>
<td>Duplicate Admit Card</td>
<td>Rs. 200/-</td>
</tr>
<tr>
<td>Convocation Charges</td>
<td>Rs. 8,000/-</td>
</tr>
</tbody>
</table>

**Contacts**

**Mrs. Nabila Shuja**
Treasurer HITEC University
Tel: 051-4908146-49 Ext. 305
Cell: 03235577705
Email: treasurer@hitecuni.edu.pk

**Mr. Bilal Awan**
Assistant Treasurer
Tel: 051-4908146-49 Ext. 310
Email: bilal@hitecuni.edu.pk
Academic Regulations
The HITEC University follows semester system, quite akin to that in vogue in American universities. Singular features of this system are highly focused and well delivered classroom lectures, extensive experimentation and continuous assessment of students’ performance. It aims to infuse habits of regularity and competitiveness amongst the students.

The following few pages give definitions of various terms applicable to our system. They also contain a summary of rules and regulations. Please do take a few minutes to peruse through them.

**Academic Calendar**

It consists of two regular and a Summer Semester. Duration of regular semesters is nineteen weeks each which includes sixteen weeks of teaching and three weeks of examinations. The Summer Semester (conducted for undergraduate programs only) is condensed to eight weeks duration, but the credit hours taught for a course are equal to a regular semester. The schedule of semesters for the year 2015-2016 is:-

<table>
<thead>
<tr>
<th>Semester</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester 2015</td>
<td>14 Sep 2015 - 22 Jan 2016</td>
</tr>
<tr>
<td>Spring Semester 2016</td>
<td>08 Feb 2016 - 17 Jun 2016</td>
</tr>
<tr>
<td>Summer Semester 2016</td>
<td>27 Jun 2016 - 02 Sep 2016</td>
</tr>
</tbody>
</table>

**Contact Hour**

Means one hour including ten minutes break spent on academic and research related activities including instructional work/tutorials, laboratory work (practical), research work, projects, seminars, workshops, internships, etc during the course of studies at the University.

**Credit Course**

A course of which enrolment and successful completion is a
mandatory requirement for the award of degree.

Credit Hour (Cr Hr)
A lecture of one hour duration (including ten minutes break) delivered per week per semester for a course countable towards a student’s Cumulative Grade Point Average. However, in case of seminars, tutorials and laboratory work (practical), one credit hour may require two or three contact hours depending upon the nature of the subject.

Semester Credit Load
In every semester, undergraduate students must enroll in all the courses prescribed for that semester (as specified in the road map of that program). The academic load in each semester ranges from fifteen to nineteen credit hours for undergraduate and three to twelve credit hours (i.e. one to four courses) for graduate students. In Summer Semester, an undergraduate student can enroll in the number of courses not exceeding nine Cr Hrs.

Academic Performance Evaluation
The students are evaluated as per following criteria:-
- Quizzes
- Home assignments
- Case Studies/Seminars/Workshops
- Practical/Laboratory Tests
- Project
- Internship
- Viva Voce
- Sessional Examinations
- End Semester Examination

Grading System
The performance of each student in a course of study is based on relative grading system except otherwise mentioned. The grades and grade points in case of relative grading are as follows:-

<table>
<thead>
<tr>
<th>GRADE</th>
<th>GRADE POINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.00</td>
</tr>
<tr>
<td>A-</td>
<td>3.67</td>
</tr>
<tr>
<td>B+</td>
<td>3.33</td>
</tr>
<tr>
<td>B</td>
<td>3.00</td>
</tr>
<tr>
<td>B-</td>
<td>2.67</td>
</tr>
<tr>
<td>C+</td>
<td>2.33</td>
</tr>
<tr>
<td>C</td>
<td>2.00*</td>
</tr>
<tr>
<td>C-</td>
<td>1.67</td>
</tr>
<tr>
<td>D</td>
<td>1.00</td>
</tr>
<tr>
<td>F</td>
<td>0.00</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete</td>
</tr>
</tbody>
</table>

(* Lowest grade in case of post graduate courses)

Note: In all cases of project, thesis, dissertation evaluation and where the class strength is 10 or less students, the performance will be based on the marks obtained by a student and the grades and grade points will be as follows:-

<table>
<thead>
<tr>
<th>MARKS</th>
<th>GRADE</th>
<th>GRADE POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100</td>
<td>A</td>
<td>4.00</td>
</tr>
<tr>
<td>85-89</td>
<td>A-</td>
<td>3.67</td>
</tr>
<tr>
<td>80-84</td>
<td>B+</td>
<td>3.33</td>
</tr>
<tr>
<td>75-79</td>
<td>B</td>
<td>3.00</td>
</tr>
<tr>
<td>70-74</td>
<td>B-</td>
<td>2.67</td>
</tr>
<tr>
<td>65-69</td>
<td>C+</td>
<td>2.33</td>
</tr>
<tr>
<td>60-64</td>
<td>C*</td>
<td>2.00*</td>
</tr>
<tr>
<td>55-59</td>
<td>C-</td>
<td>1.67</td>
</tr>
<tr>
<td>50-54</td>
<td>D</td>
<td>1.00</td>
</tr>
<tr>
<td>less than 50</td>
<td>F</td>
<td>0.00</td>
</tr>
<tr>
<td>-</td>
<td>I</td>
<td>Incomplete</td>
</tr>
</tbody>
</table>

(*Lowest grade in case of post graduate courses)
Award of Grade ‘F’

In addition to ‘F’ grade awarded on the basis of academic failure, a student shall not be allowed to appear in end semester examination of a subject in which his/her attendance is less than 75%, and he/she shall be awarded ‘F’ grade in that subject. The ‘F’ grade so obtained shall only be cleared by repeating the same course whenever offered.

Award of Grade ‘I’

A student, who, because of illness or other acceptable reasons approved by the Departmental Board of Studies/Board of Faculty, fails to appear in end semester examination, provided his overall attendance is not less than 75%, is given ‘I’ as a grade. The student receiving such a grade makes up the unfinished portion of his course and is given a grade at the discretion of the faculty without prejudice to the previous grade ‘I’. In case the student fails to make up the course work, he receives a grade ‘F’ unless further extension is given by the Board of Faculty. He shall pay the prescribed fee for re-appearing in the end semester paper. Following procedure should be adopted to remove “I” grade:-

- **Sessional Examinations.** Whenever a student misses sessional examination, makeup test shall be arranged within the period to be decided by the Departmental Board of Studies but not later than four weeks from original date of missed sessional examination. Makeup test for Mid-term examination of two hours duration (only for lab courses) will also be governed accordingly.

- **End Semester Examination.** Whenever a student misses end semester examination, make up examination shall be arranged within first six weeks after the beginning of the subsequent semester.

**Attendance Rule**

A student shall not be allowed to appear in end semester examination of a subject in which his/her attendance is less than 75%, and he/she shall be awarded ‘F’ grade.

**Cumulative Grade Point Average (CGPA)**

Means the summation of grade points of all credit courses divided by the total number of credit hour taken by a student, i.e.

\[
CGPA = \frac{\text{Sum of (P x N)}}{\text{Sum of N}}
\]

Where ‘P’ represents grade point assigned to a letter grade scored by the student in a course and N represents the number of credit hours associated with the course. In short it is the ratio of total grade points earned in all the courses to the total number of credit hours of those courses.
**Semester Grade Point Average (GPA)**

Means the summation of grade points of the particular semester credit courses divided by the total number of credit hour taken by a student in that semester, i.e.

\[
\text{GPA} = \frac{\text{Sum of (PxN) of a semester}}{\text{Sum of ‘N’ of that semester}}
\]

Where ‘P’ represents grade point assigned to a letter grade scored by the student in a course and N represents the number of credit hours associated with that course. Here numerator is the summation of grade points earned in a semester and denominator is the summation of credit hours attended in that semester.

**Repetition of Course(s)**

A student can repeat a course to obtain minimum CGPA laid down for the prescribed program or to improve the CGPA. It is the responsibility of the student to clear the failed course(s) or improve CGPA by applying (subject to course offering) to the respective chairperson and get the approval to repeat the course. While repeating a course, a student will undergo all the formalities applicable to regular semester i.e. pay the fee, attend the classes and appear in the quizzes, assignments, projects, practical examination, sessional examinations and end semester examination as planned for the course. During Summer Semester a maximum of ‘B’ grade shall be awarded.

Opting to repeat a course(s) a student shall not be eligible for top honors/awards even if he/she improves and obtains equal or better CGPA. The student transcript shall show both old and new earned grades, but the CGPA shall be based on better earned grade. Apart from clearance of ‘F’ grade an undergraduate student can repeat a maximum of six courses and graduate student can repeat a maximum of two courses.

**Semester Freeze**

Based on the positive recommendation of the Chairperson of the Department/College/Institution, Semester Freeze up to one year from course work is allowed to students facing acute domestic problems or any other valid reason(s). During semester freeze period the student shall be required to pay 25% of the tuition fee (Rs. 6000/- for Ph.D. student) for each semester to continue his/her registration with the University. Prior to resumption of studies after the semester freeze, it shall be mandatory to clear all the previous outstanding dues, if any. Freezing of a Semester in first semester is not allowed.

**Final Grade**

The grade earned by a student in home assignments, quizzes, case studies, viva voce, practical/laboratory work, sessional examinations, end semester examination and projects etc, are formalized into
final result by the concerned faculty member. All the examination answer books/sheets including end semester examination are marked and shown to the students. The marks obtained by the student in each examination are also displayed on notice boards at least one week prior to commencement of end semester examinations. The faculty members prepare the final results of the students on the standard grade sheet in duplicate and submit it to the Departmental Board of Studies. The grade sheets of each course duly approved by the Departmental Board of Studies are then sent to the Office of the Controller of Examinations.

Recalculation/Change of Grade
There shall be no re-evaluation of answer scripts of the end semester examination. However, a candidate shall be allowed to have his answer scripts rechecked by the Controller of Examinations on payment of prescribed fee within 30 days of the declaration of the result. The Dean of the Faculty concerned, on the recommendation of the concerned Chairperson, may condone the delay up to a maximum period of 15 days on payment of double fee. The Controller of Examinations and a faculty member of the concerned department shall check the answer scripts of the end semester examination of the applicant and satisfy themselves regarding following aspects and certify that:

- The script belongs to the applicant and that it has not been changed.
- No portion of the script has been left unmarked.
- The marks awarded in the script have been correctly brought out/ reproduced on its cover.
- The grand total on the cover of the script is correct.
- The grand total on the cover of the script is correctly transferred to the award list.
- The result has been correctly posted and notified.

Change in Pre-end Semester Examination Result(s)
After notification/declaration of final results by the Controller of Examinations, pre-end semester examination results will not be changed e.g. quizzes, assignments, sessional examinations or any other activity which was assigned marks. Only the application(s) raising query in final paper will be accepted. Student(s) seeking change/rectification of pre-end semester examination results due to erroneous entry of marks by the concerned faculty member will be admitted and processed through Chairperson of concerned Departments/Institutes/Colleges.

Medium of Instruction
The medium of instruction will be English except where permitted by the competent authority.

Semester Enrolment
Enrolment in each regular and Summer Semester is mandatory for every student. List of enrolled students will be notified by the Registrar Office within first two weeks of commencement of each semester and Controller of Examinations shall publish results on the basis of that list. Enrolment forms are available with each Department and if a student fails to enroll for the semester, his/her name will be struck off the university rolls and will be included in the list of suspended students. The registration will be restored after paying the laid down fee and the fine imposed as per rules.

Course Add/Drop
Undergraduate Programs. A student, if allowed to enroll in additional course(s) in a regular semester or during Summer Semester, can add or drop a course(s) on the basis of conflict in weekly program or on personal grounds within first two weeks of commencement
of semester. In this case fee will not be charged, nor will the result be announced. In all other situations a student is liable to pay the fee and his result will also be announced.

Graduate Programs. A student can apply and get approval by the respective Chairperson of department/school/institution, to add or drop a course(s) due to conflict in weekly program or on personal grounds within first two weeks of commencement of regular semester. In this case fee will not be charged, nor will the result be announced. In case a student applies for dropping a course(s) within two weeks after first sessional examination, fee will be charged, but the result will not be announced. In all other situations a student is liable to pay the fee and his/her result will also be announced.

Award of Bachelor/Master/Ph.D. Degree and Academic Deficiencies

Award of Degree

HITEC University, awards undergraduate/graduate degree to the students who satisfy the following conditions:-

- Have completed the minimum credit hours as per approval of PEC/HEC for each program.
- Have achieved a minimum CGPA of 2.00, 2.50 and 3.00 for Bachelors’, Masters’ and Ph.D. programs respectively.
- Have no unclear ‘F’ grade.
- Have cleared all dues.

Conditions for Academic Deficiencies

A student who obtains one or more of the following grades in a regular semester final result is considered academically deficient, namely:-

- ‘F’ grade in any subject.
- Semester GPA less than 2.00, 2.50 and 3.00 for Bachelors’, Masters’ and Ph.D. programs respectively, in first semester only.
- CGPA is less than 2.00, 2.50 and 3.00 for Bachelors’, Masters’ and Ph.D. programs respectively.
- ‘I’ (Incomplete) grade in any course.

Academic Deficiencies

- Probation. Probation means that a student is deficient in academic standards and is either likely to be relegated or withdrawn from the program.
- Relegation. Relegation means that the student is asked to join the next junior class when recommended by the Board of Faculty. It can be on academic, medical or disciplinary grounds.
- Withdrawal. Withdrawal means that a student is considered unsuitable for further studies and shall be deregistered from University rolls.

Disposal of Academically Deficient Bachelor Students

Probation

A student is placed on academic probation under any of the following conditions, if:-

- First semester GPA is equal to or more than 0.75 but below 2.00.
- CGPA at the end of second semester is equal to or more than 1.50 but below 2.00.
- CGPA in third or subsequent semesters is below 2.00 but does not qualify for relegation.
- Fails in a subject(s).
Relegation
A student is relegated under any of the following conditions, if:-

- The second semester CGPA is equal to or more than 1.25 but below 1.50.
- From third and in subsequent semesters, obtains CGPA less than 2.00 in two consecutive regular semesters.
- On medical or disciplinary grounds.
- Recommended on medical grounds will not be counted towards withdrawal.

Withdrawal
A student is withdrawn from the University subject to any of the conditions listed below:-

- At the end of the first semester, obtains GPA below 0.75.
- At the end of first two semesters secures CGPA below 1.25.
- Earns relegation after being placed on relegation twice except as provided in the rules.
- On disciplinary ground or using unfair means in the examination.

Graduate Academic Regulations
Masters’ and Ph.D. candidates may visit the University website to acquaint themselves with the academic regulations pertaining to graduate and Ph.D. programs.
• Student Affairs
• Quality Assurance & Collaboration
• IT Services
• Library
• Alumni
Student Affairs

Huma Fawad  
Director Student Affairs  
MBA, PIMSAT, BS Mechanical Engineering  
dsa@hitecuni.edu.pk

Student Affairs Office provides a variety of services to the students. It is responsible for all extra and co-curricular activities within and outside the university campus. It provides students with opportunities to enhance their potential in various sports and also cultivates interest in literature, culture and arts.

It looks after the discipline and welfare of students. The office allots hostel accommodation and ensures that students abide by the university rules. Distribution of financial assistance to deserving students on need cum merit basis is another important responsibility being performed by this office.

We also carry out liaison for the internship of students in various industries and organizations. It is also responsible for arranging Inter University Events, Open House, Job Fairs, Educational and Excursion Trips.

Hostel

Hostel facility is available for a limited number of students. Fully furnished, well ventilated and airy rooms with allied facilities are provided to them at very reasonable rates. However, this facility is available to newly admitted students for the first year only. This facility is being extended for all the students as the University is constructing a purpose built hostel complex. Separate hostel facility is available for girl students.

Transport

University owns a fleet of transport, consisting of buses and vans, for transporting students at nominal charges. The transport operates on two different routes. Route-1 covers Islamabad whereas, Route-2 facilitates students coming from Rawalpindi. Local transport is also available for students living in close proximity of the University.

Swimming Pool

The all-weather indoor swimming pool provides good leisure time activity to the students all year round. The water of the swimming pool is changed regularly and great attention is paid to maintain excellent hygienic conditions. Students can avail this facility at nominal charges.

Stadium

University stadium, which is presently under construction, is surrounded in East and South by the lush green hills of Margalla mountain ranges and give very pleasant and picturesque look. It is the venue for all outdoor sports and is also the popular site for the annual funfair festival.

Gymnasium

“Healthy body keeps a healthy mind”. A state of art gym has been established in HITEC sports complex. Students are encouraged to keep themselves fit and use the gym facilities
during their spare time. Separate timings have been laid down for the male and female students to avail this facility. An additional facility of Aerobic Centre is also available for the students who are interested to learn the art of aerobics.

**Auditorium**

“Nusrat Auditorium” having a seating capacity of 300 persons, is a spacious, well furnished and centrally air conditioned premises. It is equipped with the latest multimedia/public address system and is available for organising different kind of activities. Student’s societies arrange their functions and activities like debates, declamation contests, dramas, skits, ramp walk, musical, technical & scientific shows and exhibitions.

**Cafeterias**

Two cafeterias have been established in the University campus where fresh, hygienic and healthy food is available on payment. Both the cafes are well furnished, airy and provide clean atmosphere and serve traditional and fast foods at reasonable prices.

**Societies**

Seven different clubs/societies have been formed to look after various interests of students. They are managed by elected Student Office Bearers (President/Secretary). Guidance is provided by the Student Affairs Office and Faculty in-charge of the respective society.

**Literary Society**

This society provides a learning atmosphere and encourages students to undertake literary activities. It holds Inter Department and Inter University debates/declamation contests and forms part of the Editorial Board of the University Magazine. This Society is also responsible for publishing the University News letter, etc.

**Creative Art Society**

The society makes efforts in promoting Pakistani culture. It holds art competitions, variety shows and other cultural events. It also arranges art and craft exhibitions, funfairs and musical programs.

**Adventure & Social Welfare Society**

This society helps University Administration in creating a conducive, clean and caring environment. Society also endeavors to create awareness of environmental issues among the students. It organizes different types of social events to inculcate the spirit of social services, volunteerism and patriotism, among students.

**Sports Society**

This society promotes sports activities amongst
students, holds Inter Departmental sports competitions and encourages students to participate in all Inter University competitions. Basketball, Football, Cricket, Hockey, Volleyball, Badminton and Table Tennis matches are held quite frequently.

**Science Society**
This society provides a forum to enhance the scientific knowledge of the students. It organizes Inter University project competitions/exhibitions and arranges Quiz Shows, Conferences and Seminars, etc.

**Character Building Society**
The society has been entrusted with the responsibility to create awareness about importance of character and good working atmosphere through lectures, discussions and essay writing, etc. It inculcates moral and ethical values among students.

**Girls Society**
Girls Society in HITEC University aims to develop leadership skills in girl students and provide them equal opportunities to compete with each other in various Extra & Co-Curricular Activities without any inhibition.

**Financial Assistance**
In each semester, University allocates and distributes a large amount of financial assistance to help needy students. During Fall Semester 2014 & Spring Semester 2015 an amount of Rs. 5.6 M was distributed amongst deserving students on need cum merit basis. In addition to that, all Huffaz students are entitled to receive stipend of Rs. 1000/- per month.

**Student’s Counselling**
Student Affairs Office holds the responsibility to promptly resolve any personal or collective problem faced by the students.

**Alumni**
Up-to-date record of all graduates of HITEC University is being maintained by Student Affairs Office. University achievements, news and career opportunities are regularly communicated to the Alumni on a dedicated University Alumni Website. DSA Office also holds online alumni elections every two years.

**Open House (Job Fair)**
To help students and alumni explore and make successful career choices, this Office assists the employers and the employees in meeting each other in the “Open House” every year, which is attended by a large number of Executives of Industries and Organizations. It also ensures personal and professional development of the students.
Dress Code – Students

Boy Students:

- Formal trousers (Jeans not allowed)
- Dress shirts only (T-Shirt, Sports Shirt, etc not allowed)
- Shalwar qameez (on Fridays only)
- Blazers jersey, coat, jackets (for winters)
- Closed shoes (slippers, sandals not allowed)
- Display of University Student ID Card during University working hours is mandatory.

Girl Students:

- Any decent shalwar qameez, trousers with dupata / scarf.
- Blazer, jersey, coat, jackets, shawls (for winters)
- Jeans, tights, sleeveless, short qameez not allowed. (length of qameez be at knee level)
- Closed shoes (sandals, slippers, pencil heels not allowed)
- Wearing of heavy / expensive jewellery and heavy makeup is not allowed.
- Display of University Student ID Card during University working hours is mandatory.
Students Achievements in Inter – University Competitions

Students of HITEC University are very keen to participate in various inter university events/competitions. However due to various reasons the students are allowed to participate in regional universities only. Some of these competitions in which our students won 1st/2nd positions are given below.

IEEE Week 2014

IEEE Week 2014 was organized by FAST National University, Islamabad on 18 Dec 2014. 11 teams from different universities participated. Our two members team, comprising of Muhammad Ammad and Taimoor Arif participated in the event “Dream to 3D” and won 1st position.

DBFC at GIKI

10th Aircraft Design, Build & Fly Competition was jointly organized by HEC, PEC and PAF at GIKI in April 2015. Twenty two universities from all over Pakistan participated in the competition. “HITEC Falcon”, comprising Ch. Abdullah, Husnain-ul-Abideen, Hafiz Usman Iqbal, Bilal Ibrahim and Moeed-ud-Din secured “1st Position”.

IMEC’15 at GIKI

ASME GIKI Chapter organized International Mechanical Engineering Convention 2015 (IMEC ’15) and Student Professional Development Conference (SPDC’15) from 17th to 19th April 2015, in which HITEC University won the winner and runner-up prizes for Human Powered Vehicle Competition (HPVC), 1st prize for Mind Crunch and 2nd position for Best Research Paper modules of IMEC’15.

TECTIQS’14

TECTIQS’14 at Iqra University, Islamabad was held in November 2014. Wajiuddin Qazi stood 1st in Scenario Writing Competition while Shehryar Iftikhar was declared winner in the Photography event.

Student Technical Development Conference’ 2014 at UET Lahore, KSK Campus

Muhammad Owais Siddiqui student of HITEC University participated in ASME “Old Guard Oral Presentation Competition” organized by University of Engineering & Technology, Lahore (KSK Campus) in May 2014. He secured 2nd position out of 27 participants from all over Asia.

MCS Myriad’15

MCS Myriad’15 competition was held in Military College of Signals, Rawalpindi from March 5-8, 2015. Singles competition was won by Shah Jamal Laghari of CS Department while Malik Affan paired with Shah Jamal Laghari emerged as winners for the Doubles event.
IJSEC’15 at MAJU
In an Inter University competition, IJSEC’15 held at Muhammad Ali Jinnah University, Islamabad in April 2015, HITEC university student Wajiuddin Qazi stood 1st in Technoselfie Competition while the 2nd place was again won Shehryar Iftikhar. Our team comprising of Zulqarnain Naveed Bahadur and Wajiuddin also won 1st prize in Poster Competition.

LUMS Sports Fest (LSF’15)
HITEC University Cricket team comprising Nauman Awais Abbasi, M. Asad, Jahangeer Khan, Zeeshan Haider, Usama Khan, Luqman Ghani, Wasif Sattar and Aakif Mehmood participated in LUMS Sports Fest 2015 and secured 2nd position amongst 12 teams.

Express Education & Career Expo
HITEC University participated in University competition organized by Express Media Group in Pak China Friendship Centre in Islamabad held in May 2015. In Team Module, team of Sheheryar Iftikhar and Aftab Ahmad won 2nd Position, while in Selfie Competition team of Zulqarnain Naveed Bahadur & Sheikh Ehsan also won 2nd Position.

IST Youth Carnival’15
HITEC University won the Champions trophy as well as prize money for being the best University amongst 50 participating Universities of the country, in IST Youth Carnival held in May 2015. Overall 21 positions were claimed by HITEC University.

Global Undergraduate Exchange Program (UGRAD):
HITEC University is proud that its 5th semester student, Mr. Owais Siddique was selected in a nationwide competition to study for one semester in USA under The Global Undergraduate Exchange Program (Global UGRAD). The Global Undergraduate Exchange Program awards one-semester scholarship to outstanding undergraduate students for non-degree, full-time study combined with community service, internships and cultural enrichment.
Olympiad’ 15.

“HITEC Olympiad 15”, an interuniversity competition organized for the first time in the University from April 21-24, 2015. More than 24 universities and colleges participated in 22 different events from Sports like Cricket, Futsal, Badminton, Table Tennis, Chess to Qiraat Naat, Declamations, Drama, Singing, Video graphy, Sketching, Photography, Speed Wiring, Speed Programming and E-gamming, etc.

The Olympiad was inaugurated by Mrs. Shaheen Khan, Advisor Learning Innovation and Sports Division of Higher Education Commission. Sports activities were held in the lush green lawns of HITEC with scenic Margalla Hills in the background while all indoor competitions were organized in comfortable halls and auditorium of the University.

Events were judged by prominent personalities to ensure non partiality. Experts like Dr. Qari Taj Afsar, Mr. Muddasar Abbas, Mr. Tabish Iqbal, Mr. Zarar Haider Babri, Mr. Muhammad Younas Rumi, Mr. Azhar Hafeez, Mr. Zulqarnain Haider, Mr. Batin Farooqi and Mr. Shahzad Ali judged the events in their respective categories.

Funfair was also arranged parallel to the events to give a festive feel to the Olympiad participants. A drama was also organized by the team of renowned artist Mr. Masood Khawaja and the audience enjoyed it thoroughly.

Lt. Gen. Syed Wajid Hussain HI(M), Chairman Board of Governors of HITEC University and Chairman HIT was the honorable chief guest of closing ceremony. He expressed his appreciation of the event and congratulated all winners on their achievements.
The Directorate of Quality Assurance and Collaborations was established in 2012. The Directorate has a quality enhancement cell with the primary role of assuring quality under the guidance of Higher Education Commission. This office is responsible for assuring compliance with the concept and practices that are frequently being developed and adopted in several education systems across the World. It is also responsible for assuring academic standards specified by Pakistan Engineering Council and Higher Education Commission that are implemented in order to deliver quality education to students.

A number of feedback mechanisms are in place for evaluating the continuous improvement efforts by faculty and staff of the University. This includes student feedback about teaching quality in classroom by respective faculty members, program and course outcomes, feedback by faculty members regarding the subjects they have taught in a semester and faculty satisfaction over research teaching and learning environment being provided to them, graduating students’ feedback, alumni satisfaction survey, and employer surveys for the performance of HITEC Alumni after graduation and having sought jobs in industry or academia.

This feedback data is analyzed statistically and its outcomes are discussed at various levels of management. As a result strategies are evolved for improving study environment of students, classroom teaching, and learning as well as research. These are discussed and implemented as standard operating procedures in all teaching and service departments. Most recently, various evaluation forms have moved from paper based to online evaluation. The Directorate is in process to formalize and publish policies governing the mandatory use of online evaluation surveys of students and faculty members.
The Directorate has signed MOUs with University of Strathclyde, Glasgow, UK and Istanbul Technical University, Turkey for collaboration in terms of student exchange program and research activities. This collaboration is highly beneficial to students in terms of gaining exposure, increasing their research abilities, and overall a very good learning experience. Students applying for admissions at HITEC University can have an option to study for 2+2 year undergraduate degree programs in Electrical or Mechanical Engineering according to which they will spend the first two years at HITEC University and next 2 years at Strathclyde University, Glasgow, UK in respective departments. They will be awarded the degree of Bachelors of Science in Engineering by Strathclyde University.

In Istanbul Technical University, which is ABET accredited, Engineering students of sixth semester have an opportunity for one year exchange study program. They will be awarded with HITEC University degree.

HITEC University has recently signed Letter of Cooperation (LOC) with University Technology Malaysia (UTM) which is one of the oldest public engineering and technology university in Malaysia. LOC includes students exchange program also.

The Directorate takes pride in ensuring that HITEC University not only meets the stringent requirements of Pakistani educational accreditation bodies and industry, but provide opportunities of studying abroad in top international universities. Our ultimate aim is that HITEC University alumni should be readily accepted for industrial jobs based on their professional excellence and academia for higher studies based on their quest for knowledge.
Information Technology Services

Information Technology (IT) is transforming the process of teaching and learning in educational environment and helps reducing barriers to education. IT staff provides core IT infrastructure and application services across the University. It collectively delivers and supports a wide range of applications and services used by students, researchers, faculty and administrative staff.

The Department also manages projects to deliver new applications and services on network and software, or enhancements to existing capabilities. Computer facilities within the University includes six computer labs and one state of art project lab on open source virtual environment, equipped with 550 high specification desktop computers. All computers are centrally connected on domain based network. The facilities of Internet and Intranet, individuals email addresses and separated storage areas are also provided in these labs.

Information Technology Services include:

**Application Services**
Comprises e-learning, web design, digital library system, admission system and online attendance system.

**Infrastructure Services**
Includes customer IT support, facilities management including file servers and domain controller, networks and Wi-Fi quality and administration.
Architecture, Security and Innovation

Ensuring clarity and consistency of overall IT architecture, IT security management, leading on IT service innovation with highly sensitive adaptive security appliances.

File Server and Moodle

The University file server through which students and faculty exchange their assignment and also download necessary software and data.

Intrusion Detection and Penetration Testing

The network team of IT Department provides services on open source IDS to secure HITEC University core network from internal and external attacks.

Internet

A high speed Internet connection of 24 MB bandwidth is available for students and faculty 24 x 7. The bandwidth quota of 750 KB is allotted to each student for downloading software from Internet.

PERN

The Pakistan Education and Research Network (PERN) from HEC connect HITEC University with other research institutes through high-speed internet bandwidth. The main purpose of this network is to facilitate researchers/students in sharing data and to coordinate with each other through video conferencing.

Data Center

A state of art Data Center provides private cloud services to facilitate deployment of applications without the cost and complexity of buying and managing the under lying hardware and software layers.

Library Automation

A Gigabyte optical fiber backbone is provided from the data center to the library providing fully automated with EM System and library management system that provides user facilities to log in and check out for borrowing and returning library material.

HEC Digital Library

A pool of public IP is connected at HEC end from HITEC University directly managed by our network team.
HITEC University Library

HITEC University Library forms an essential complement of academic pursuits of our students. The aim of the Library is to provide access to materials and information resources which will help you in your studies and learning. All new students are offered an orientation tour of the Library.

Expert and helpful staffs are on hand to help you in finding information or resource you may be looking for.

The Library is located in the University Secretariat Block, within easy walking distance from departments and students accommodation. It is open till late night from Monday to Friday and also functions, occasionally, on weekends. Library is fully automated with electromagnetic security system and a Library management system (LibMax). It provides Online Public Access Catalogue (OPAC), full contents of HITEC University and HEC digital libraries, as well as scanning and photocopying facilities to students and researchers. The Library holds over 18100 volumes, a growing e-book collection, newspapers, periodicals, print and electronic journals, academic databases and an extensive collection of CDs.

A large number of work stations in the Library premises give you access to our online catalogue. We also subscribe for online databases like IEEE and ASME. Their contents as well as those of other libraries can be viewed on a dedicated and large cluster of networked computers. All these resources can also be accessed through any computer connected to HITEC University’s network. (http://www.digitallibrary.edu.pk/hitec_uni_taxila.html).
Alumni

Muhammad Rizwan Siddiqui
Graduate Research Assistant
GIKI

My four years stay at HITEC University groomed my personality and imparted clear concepts of knowledge concerning my area of studies. Whenever I had to compete with the students of other universities, I found that I had the confidence to outperform them. Despite being a new university, HITEC has a special niche amongst its contemporaries. A degree from HITEC is an assurance of a bright future.

Nisar Ahmed Rana
Satellite Engineer
SUPARCO

I am a Satellite Engineer in the National Space Agency of Pakistan and my assignment is to manage the payload subsystem of Pakistan’s first communication satellite. I do feel that the degree from the HITEC University has prepared me very well to shoulder my professional responsibilities with all the confidence and inner strength. Besides this, I have been inspired to face the challenges of life with comfort and ease.

Umair Naeem Malik
Manager
Nayatel Pvt Ltd

HITEC University not only comprises comfortable class rooms and well-equipped spacious Laboratories, its faculty and teaching / learning processes are excellent too. My stay at HITEC has been the most exquisite experience of my life. Thank you HITEC for bestowing me with the knowledge, confidence and a spirit to achieve even high goals.

Ahmed Nadeem
Lead Project Development Engineer
FABCON Group of Companies

With all the hindsight, I am immensely satisfied that I decided to choose HITEC University for my engineering education. Today, I find myself imbued with knowledge, skills and the confidence to discharge my professional duties and meet my societal obligations for creating prosperity in my country.
Noman Ali Khan

I consider HITEC University to be a symbol of excellence. I am lucky to have received my Mechanical Engineering degree from here. The Department of Mechanical Engineering, like other Departments, hosts 12- very well equipped Laboratories and students are exposed to excellent learning environments. It is for this reason that now I am an MS student in this very University. I pray that this University keep growing towards even higher levels of excellence.

Muhammad Tayyab Khalil
Site Engineer, FWO

The education I received from HITEC University has been a unique blessing for me. I will remain ever grateful to the excellent faculty I was privileged to learn from. The overall atmosphere of the campus is very uplifting and intellectually stimulating. I say with pride that I not only earned my Bachelor’s Degree in Mechanical Engineering but also learnt to exhibit compassion, tolerance and respect towards others.

Moosa Khattak
Assistant QA/QC Engineer, SENDAN International Co. Ltd, Jubail, KSA

HITEC University has infused in me the confidence and courage to carve a prosperous future in life. I learnt to face the challenges with fortitude and have the knowledge to evolve solutions to the practical problems in my professional life. I am gainfully employed in Saudi Arabia. Thank you HITEC University for enabling me to be what I am today.
HOW TO APPLY ONLINE

- Access the admission link: admissions.hitecuni.edu.pk
- Register using your email address
- A Password will be sent at your email address
- Login at the given link to fill Online Application Form
- Upload candidate photograph with blue background (300 kb or less in size)
- Application confirmation will be sent at the given email address within 24 hours of submission
- Print Application Form along with challan slip
- Pay the cost of Prospectus @ Rs.2000/- (Rupees two thousand only) in any online branch of Bank Alfalah Ltd.
- Candidates can also send Bank Draft for Rs.2000/- in favour of HITEC University Taxila, instead of Bank Challan. By clearly writing the name of candidate, CNIC Number and Challan Number (mentioned on the challan slip) at back of Bank Draft
- Send the printed Application Form along with paid challan slip (HITEC University Copy) or Bank Draft and attested copies of required academic documents through courier or registered mail to: The Registrar, HITEC University Taxila, Museum Road Taxila Cantt.
- Facility to fill Application Form online is also available in the University.

Contact
Ph: 051-4908146-49 (Ext-309), 051-4908144
Email: assistant.registrar@hitecuni.edu.pk
iram.abdullah@hitecuni.edu.pk
Disclaimer
The information in this prospectus is correct at the time of printing. It provides general guidance to the students and does not form part of any contract. The university would endeavor to provide the courses and facilities described herein, but reserves the right to make alterations in its programs, policies and fees tariff at any time, if necessary.