Balochistan University of Engineering & Technology
Khuzdar

Postgraduate Prospectus 2015-16
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Our Vision

Academic excellence in Technical education
Quality and innovative education

MISSION STATEMENT

BUET, Khuzdar is the only Engineering University of the province, providing a technical base and research platform to youngsters and contributing its due share in socio-economic uplift of Pakistan in general, and Balochistan in particular. At BUET, we are committed to impart quality education by promoting a healthy research culture and to equip the students with practical knowledge and innovative ideas.

Our Goals

- Provide an attractive campus environment and the resources to promote learning throughout the University
- Create supportive environments and innovative opportunities for student learning.
- Provide high quality, accessible education that prepares learners for productive and creative lives
- To provide a technical base for Development of country
- To Contribute the due share in development of country by producing technically sound and motivated Engineers
- To provide a best platform for research and promote modern education
- To give the University an International recognition.
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Preface

Balochistan University of Engineering and Technology Khuzdar is a well-known public sector university providing a technical base for development of country by producing technically sound and motivated Engineers. The graduate Engineers passed out from this institution are contributing their due share in development of country by serving in different public and private organizations.

The establishment of Balochistan Engineering College Khuzdar was announced in 1973 and its administrative approval by ECNEC was granted in 1977. After passing through different phases of construction, the college was in a position to start its first year engineering classes in 1988. After the successful performance of just seven years, the Institution was raised to the level of university in 1994.

Under the leadership of Engr. Brig (Retd.) Muhammad Amin SI (M) as Vice Chancellor, Balochistan University of Engineering and Technology Khuzdar is achieving important milestones and has gained immense significance as an institution of higher education in Pakistan. The University produces professionals and researchers of very high calibre, capable of developing indigenous technologies to meet the growing demands of the 21st century. Balochistan UET Khuzdar has a team of devoted and foreign qualified faculty, state of art laboratories, well-furnished central and departmental Libraries, students’ hostel and other basic facilities of life.

Coming to Balochistan UET Khuzdar could be one of the most rewarding experiences of any student’s life after getting admission on the basis purely of merit in the discipline for which he or she applies. Intellectual challenges to extend knowledge and skills of each student have to be faced; however at BUET campus there would also be chances to develop new acquaintances and possible friendships.

BUET is offering Master’s degree programs in the following fields.

1. Civil Engineering
2. Electrical Engineering (Telecommunication and Electrical Power)
3. Mechanical Engineering
4. Computer Engineering and Computer Science
It is indeed an honour for me to lead one of the prestigious engineering universities of the country and the oldest engineering University of Balochistan. Achieving excellence through learning is mandatory on every Muslim as per legacy of our great religion Islam as Allah Tabarak wa Talla says in the Holy Quran.

“... And We sent down iron, wherein is great military might and benefits for the people, and so that Allah may make evident those who support Him and His messengers unseen. Indeed, Allah is Powerful and Exalted in Might.” (Surah Al-hadid)

Above quoted verse is one of the many verses in Quran highlighting importance of Engineering education and learning. People of Balochistan are one of the most blessed on earth by all means; we own the longest coast in Asia 1700 km on the opening of strait of Hurmag (Hurmuz) till Karachi, Mehrgarh is the jewel of nine thousand years old Shaal-Naal civilization where the very basic tools of human civilization like wheel were invented. Wheel is taken as the foundation of Engineering civilization, as its invention made transportation / traveling easy and speedy, its use in pulley and other basic instruments made engineering & economic development faster. From Mehrgarh we made impact on the neighboring civilizations of Central Asia, Iran, Afghanistan, India and Babylon as its grandchildren. On spiritual front Khuzdarians & Baloch people have the unique honour to be the FIRST ONES in sub-continent to embrace Islam in the era of Caliph Hazrat Omer Razi’Allah Anho and this area used to be part of Caliphate for centuries with a Governor appointed by the Caliph of Muslims.

Balochistan University of Engineering & Technology Khuzdar which took birth as an engineering college established back in 1987, has transformed into a renowned university serving as center of excellence in engineering education. The graduates of this University are serving the humanity both nationally and internationally. After establishing its credentials at undergraduate level, it’s a moment of great pleasure and pride for me to announce the start of the postgraduate programs in all four departments Civil, Electrical, Mechanical and Computer Systems Engineering and Sciences of BUETK. We have the vision that in future universities will not only be assessed by the quality of the graduates who have walked through their portals but also by the quality of the research work carried out by them in addition to the industrial linkages. The postgraduate program at BUETK will provide a platform to the engineering and science graduates of Balochistan to transfer their inherited immense talent of research into practical achievements beneficial to the people of Balochistan in particular and for Pakistan in general. I welcome all the postgraduate students at the prestigious BUETK and assure you that we have a team of highly qualified professional faculty members who are competent, efficient, caring and are well capable of pursuing scholastic and research activities. I am certain that with the support of His Excellency Prime Minister Nawaz Sharif having special affection for Balochistan, our Honourable Chancellor, Govt of Balochistan, and prayers of our well-wishers, BUETK will soon become paragon of excellence and the top model university in Pakistan imparting quality education and conducting high quality research Insha’Allah.
Pro-Vice Chancellor’s Message

It is indeed a matter of great honour for me to be the Pro Vice Chancellor of this prestigious Institution — my own alma mater.

Balochistan University of Engineering and Technology Khuzdar is the second oldest and the only Engineering University of the province providing quality education to youngster of the nation.

Balochistan UET Khuzdar started functioning in 1988 as Engineering College and then was upgraded to the level of University in 1994. Universities are the only path to lead the nation toward civilization, prosperity and stability. Universities are also considered as the sole plate form of research, innovation and creativity. The establishment of research environment in a university is not possible in absence of postgraduate programmes. It is news of great pleasure to announce that we are going to start postgraduate courses in all discipline of engineering, i.e. Civil, Electrical, Mechanical and Computer System Engineering Departments. In the presence of high caliber foreign qualified and dedicated faculty I am sure that like graduate classes we shall succeed in imparting quality education at postgraduate level as well.

I offer my heartily felicitation to Director Postgraduate studies Dr. Shabbar Naqvi and his team for working day and night and giving the university its real status by starting postgraduate programs.

It is my desire to see BUET a fast growing and leading Institute of research, innovation and learning of Pakistan

Professor Dr. Zahoor Ahmed Baloch
Pro-Vice Chancellor
**Director Postgraduate’s Message**

It gives me immense pleasure and honour to introduce the Postgraduate programs in the prestigious Balochistan University of Engineering and Technology Khuzdar. This University is the leading University in the province Balochistan in the field of Engineering and Technology since long and has been providing quality Engineers and Scientists not only in Pakistan but abroad as well. After demonstrating excellent work in imparting undergraduate quality education, we are starting postgraduate programs leading to the degree of M.E/MS in Civil, Electrical, Mechanical, and Computer Engineering & Science. The aim of the postgraduate program is to provide top quality engineers and scientists who can serve the nation both at national and international level. This program will also help in developing research culture in University ultimately benefiting the local community and beyond.

I welcome all the postgraduate students at Balochistan University of Engineering & Technology Khuzdar and assure them that under the leadership of the Worthy Vice Chancellor Engr. Brig. (Retd.) Muhammad Amin SI (M), the highly qualified, dedicated and devoted faculty will try their level best to provide best possible facilities to the students for their timely completion of studies.

I envisage that all the students will have a knowledgeable journey during their postgraduate life in BUET Khuzdar.

Dr. Shabbar Naqvi  
Director Postgraduate Studies
Dean Faculty of Engineering’s Message

I welcome all the postgraduate students to Balochistan University of Engineering and Technology Khuzdar. This premier Engineering University has been imparting quality education in the fields of Electrical, Civil, Mechanical and Computer Systems Engineering and Sciences since its time of establishment in 1987. The University’s engineering faculty consists of highly qualified and experienced academicians and researchers, holding Doctoral and Master level qualifications from institutions of universal repute. Besides keeping abreast of the ongoing developments in the knowledge of their respective domains, the faculty members actively participate in Research and Development activities. Thus, opening new avenues of innovative thinking to help our students in the research phase of their degrees.

The postgraduate programs at BUETK will open new horizons for the Engineers of Balochistan to get acquainted with the latest trends developing in the world in the fields of Engineering and Technology. The research part of the postgraduate program will fulfil the quest of generating new ideas, leading to finding practical solutions of the engineering problems especially faced by people of Balochistan in particular and in Pakistan in general. The program will also help in becoming BUETK the top ranked University not only in Pakistan but globally as well.

I congratulate the faculty and administration of university especially Directorate of Postgraduate Studies for their untiring efforts to make it possible to start this prestigious program at BUETK.

Prof. Dr. Syed Mushtaq Ahmed Shah
Dean Faculty of Engineering
Director Quality Enhancement Cell’s Message

Balochistan University of Engineering & Technology is established environmentally advantageous for continues improvements in its effort for providing the highest level of quality education. The university is making its all-out efforts to boost its standards through teaching excellence and quality research in a highly challenging environment besides being located at a hard and remote area.

QEC is carrying out its utmost efforts with the involvement of entire workforce to obtain highest possible contentment of students. Our endeavors are to make our students useful to society in particular and to people in general. The aim of the QEC is to ensure that international standards of teaching and evaluation are maintained in the University.

It makes us feel so proud to have the Postgraduate programs of M.E/MS in the University. QEC of BUETK will make every possible effort to make sure that teaching and research standards are maintained in the University for the postgraduate programs. QEC will also provide guidance to students for their research activities under HEC guidelines.

The team of QEC welcome all postgraduate students at BUETK with an aim of providing quality environment for teaching and research.

Engr. Ali Raza Shah
Director QEC
Administration Profile

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Department of Civil Engineering

Introduction

The Department of Civil Engineering at the Balochistan University of Engineering & Technology, Khuzdar is the oldest and the largest in Balochistan. The department has produced graduate engineers who have made significant contributions in the planning and execution of Civil Engineering projects in at national as well as international level.

The Department offers a two-year course leading to the Master Degree ME in Civil Engineering. The faculty of the department continues to strive loftier by exploring new frontiers of knowledge, imparting the latest technical knowledge to the students and conducting high quality of research. The students are required to take three core courses and five elective courses followed by six months of research work in order to complete the degree.

Message of the Chairman

On behalf of our faculty and staff, I welcome you to the post graduate program of department of Civil Engineering. We are constantly striving to improve our educational and research programs. Our curriculum focuses on analysis and creative thinking and our educational programs are aligned with the needs of the industry in the 21st century.

In spite of limit resources, the department of Civil Engineering has promoted quality education with determination and strength. By the grace of Almighty, we have succeeded in building traditions of discipline, hard work and determination on quality and excellence. Our students have been upholding the norms of meaningful acquisition of knowledge and unprejudiced endeavor to excel.
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Education Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dr. Salah Uddin</strong></td>
<td>Chairman/Associate Professor</td>
<td>Ph.D (GeoTech) University of Nottingham UK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M.E (Structure) NED UET, Karachi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B.E (Civil) Balochstan UET, Khudzdar</td>
</tr>
<tr>
<td><strong>Engr. Sharfuddin Memon</strong></td>
<td>Assistant Professor</td>
<td>M.E MUET, Jamshoro</td>
</tr>
<tr>
<td></td>
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<td>B.E (Civil) MUET, Jamshoro</td>
</tr>
<tr>
<td><strong>Engr. Zulfiqar Jattak</strong></td>
<td>Assistant Professor</td>
<td>ME (Civil) UTM Malaysia</td>
</tr>
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<td>B.E (Civil) Balochstan UET, Khudzdar</td>
</tr>
<tr>
<td><strong>Engr. Abdul Majeed</strong></td>
<td>Assistant Professor</td>
<td>ME (Civil) NED UET, Karachi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B.E (Civil) Balochstan UET, Khudzdar</td>
</tr>
<tr>
<td><strong>Engr. Fozia Baloch</strong></td>
<td>Assistant Professor</td>
<td>ME (Civil) MUET, Jamshoro</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B.E (Civil) Balochstan UET, Khudzdar</td>
</tr>
<tr>
<td><strong>Engr. Noor Ahmed</strong></td>
<td>Lecturer</td>
<td>On Study Leave for PhD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M.E (Transportation) Germany.</td>
</tr>
<tr>
<td></td>
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<td>B.E (Civil) Balochstan UET, Khudzdar</td>
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## Scheme of Studies of M.E (Civil Engineering)

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<tr>
<th>Core Courses</th>
<th>Credit Hours</th>
<th>Total Credit Hours</th>
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<tr>
<td>S No</td>
<td>Code</td>
<td>Subjects</td>
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<tr>
<td>1.</td>
<td>CE-501</td>
<td>Structural Dynamics</td>
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<tr>
<td>2.</td>
<td>CE-502</td>
<td>Foundation Engineering</td>
</tr>
<tr>
<td>3.</td>
<td>CE-503</td>
<td>Pavement Analysis &amp; Design</td>
</tr>
<tr>
<td>4.</td>
<td>CE-504</td>
<td>Open Channel Flow</td>
</tr>
<tr>
<td>5.</td>
<td>CE-505</td>
<td>Design of Hydraulic Structures</td>
</tr>
<tr>
<td>6.</td>
<td>CE-601</td>
<td>Dissertation</td>
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<tr>
<th>Elective Courses</th>
<th>Credit Hours</th>
<th>Total Credit Hours</th>
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<tbody>
<tr>
<td>S No</td>
<td>Code</td>
<td>Subjects</td>
</tr>
<tr>
<td>1</td>
<td>CE-511</td>
<td>Advanced Soil Mechanics</td>
</tr>
<tr>
<td>2</td>
<td>CE-512</td>
<td>Geometric Design of Highways</td>
</tr>
<tr>
<td>3</td>
<td>CE-513</td>
<td>Rock Mechanics</td>
</tr>
<tr>
<td>4</td>
<td>CE-514</td>
<td>Advanced Engineering Materials</td>
</tr>
<tr>
<td>5</td>
<td>CE-515</td>
<td>Advanced Irrigation Engineering</td>
</tr>
<tr>
<td>6</td>
<td>CE-516</td>
<td>Operational Research</td>
</tr>
<tr>
<td>7</td>
<td>CE-517</td>
<td>Research Methodology</td>
</tr>
<tr>
<td>8</td>
<td>CE-518</td>
<td>Soil Foundation Dynamics</td>
</tr>
</tbody>
</table>

### CONTENTS OF COURSES

#### CE-501 Structural Dynamics
**Course Outline**

#### CE-502 Foundation Engineering
**Course Outline**
Selection criteria of foundation resting on various types of soils. Foundation of non-uniform soils and rocks. Case studies of actual foundation problems. Development of theoretical bearing capacity equations for shallow and deep foundation under drained and undrained conditions
Design procedures and behaviour of different types of foundations. Introduction to seismic
behaviour of subsoil and building foundations. Foundation problem solution by Finite Difference Method. Reinforced earth Beam on elastic foundation Lateral thrust due to compaction of soil by rollers

**CE-503 Pavement Design and Analysis**

*Course Outline*


**CE-504 Open Channel Flow**

*Course Outline*


**CE-505 Design of Hydraulic Structures**

*Course Outline*


**CE-601 Dissertation**

Students are required to register for a six credit hours research work. The topics of research will be relevant to the field of Civil Engineering decided and reviewed by the Supervisors and approved by Directorate of Postgraduate Studies

**Elective Courses**

**CE-511 Advanced Soil Mechanics**


**CE-512 Geometric Design of Highways**
Course Outline

Introduction: Classification of rural highways and urban roads. Objectives and requirements of highway geometric design. Design Control and Criteria

Design Elements: Sight distances - types, analysis, factors affecting, measurements, Horizontal alignment - design considerations, stability at curves, superelevation, widening, transition curves; curvature at intersections, vertical alignment - grades, ramps, design of summit and valley curves, combination of vertical and horizontal alignment including design of hair pin bends, design of expressways, IRC standards and guidelines for design. problems.

Cross Section Elements: Right of way and width considerations, roadway, shoulders, kerbs traffic barriers, medians, frontage roads; Facilities for pedestrians, bicycles, buses and trucks, Pavement surface characteristics - types, cross slope, skid resistance, unevenness.

Design Considerations: Design considerations for rural and urban arterials, freeways, and other rural and urban roads - design speeds, volumes, levels of service and other design considerations.

Design Of Intersections: Characteristics and design considerations of at-grade intersections; Different types of islands, channelization; median openings; Rotary intersections; Grade separations and interchanges - types, warrants, adaptability and design details; Interchanges - different types, ramps. Computer applications for intersection and interchange design.

CE-513 Rock Mechanics
Course Outline
Rock as material, Rock formation and structure, Folding, faulting and joints, Stress-strain analysis of rock, Friction, Linear elasticity, Strength and deformation characteristics of rock, Strength of cemented granular materials, Crack phenomena and the mechanism of fracture, Fluid pressure and flow in rocks, Brittle and creep behavior, Static and dynamic rock properties, Mining and other civil engineering applications

CE-514 Advanced Engineering Materials
Course Outline

Introduction: Introduction to concrete applications. Types of waste materials and industrial by-product. Application in concrete construction


CE-515 Advanced Irrigation Engineering
Course Outline

CE-516 Operational Research

Course Outline
Transportation: Solution Method
Network Models: Minimal Spanning Trees Algorithm, Shortest-Route problems
Coordinating and Sequencing: Critical Path analysis, Float times, Project Evaluation and Review Technique (PERT). Crashing, Gantt Charts
Forecasting: Time Series Decomposition. Moving Average Technique, Smoothing, Correlation and Regression

CE-517 Research Methodology

Course Outline
This course covers the basic introduction to modern approaches to science and particularly engineering. The student will get an insight into the history and philosophy of science and into how scientific methods are applied in the science of engineering. The goal is to enable the students to read contemporary scientific literature in the chosen field of specialization and distil the main ideas of a paper and to write these down in his/her own words. At the end of this course the student will have acquired knowledge of how to conduct a research project and of how to write scientific texts.

CE-518 Soil Foundation Dynamics

Course Outline
Vibration of elementary systems, foundation vibratory theory, foundaion design for vibratry loads, foundation isolation, wave propagation theory, response of soils to dynamic load, dynamic soil properties, field and laboratory methods for evaluation of dynamic properties, liquefaction of sands, vibratory compaction of granular materials.
Department of Electrical Engineering

Introduction

The Electrical Engineering Department at Balochistan University of Engineering and Technology came into existing along with the establishment of the “Balochistan Engineering College” in 1987. The Electrical Engineering Department is one of the largest departments in the University. Around the world, throughout every country, electricity is the most widespread and desirable form of energy. Its many advantages include flexibility, ease of control and distribution, high efficiency, and cleanliness availability all the times, no need to store it likes Coal etc. As population grows and economic growth continues, electric energy is in short supply. Pakistan being the developing country is beset with this problem. Our industry is faced challenges arising out of the rapid growth of the population and short supply of the energy. In order to meet these challenges effectively and successfully highly skilled trained engineers are needed to develop and implement the advances in Science and technology to solve the problems and ensure a very high degree of system reliability along with the utmost regard for the protection of our ecology. The Department of Electrical Engineering through the Directorate of Postgraduate Studies has developed a Program of postgraduate studies and research leading to Master of Engineering. The courses have been designed to solve every day problems and every effort is being made to arrive at the solutions of these problems through the teaching and research.

The department is offering two years course leading to the degree of M.E (Electrical) with specialization in Telecommunication Engineering. It is a program option for students seeking careers in telecommunication. The plan of study offers advanced-level courses in the theory, analysis, and design, modelling and manufacturing of telecommunications systems. Areas covered include digital Communications Systems, Data Network Protocols, Broadband Networks, Semiconductor Manufacturing, Wireless and satellite Communications, communication Security and Digital Signal Processing.

The department is also offering two year course leading to the degree of M.E (Electrical) with specialization in Electrical Power Engineering. The course covers power system analysis, electrical machines, power electronics, computational methods, simulation, and optimization of the power system transmission and distribution of electric power, power protection and high voltage engineering.

For both programs, the students are required to complete three core courses and five elective courses followed by six months of research work in order to complete the degree.

Message of the Chairman

Engr. Usman Baloch

The Electrical Engineering Department at the Balochistian University of Engineering and Technology Khuzdar was established in the year 1987. Since then this department has witnessed an impressive growth in all aspects. The graduates from this department are serving both at national and international level which itself is an indication of the quality education imparted in this department. Electrical engineering is a discipline which has a vast range from electrical power engineering to telecommunication engineering. As demand for Electrical engineers in the energy sector is on the rise, it is very essential to move towards good quality postgraduate education and research activities. The Electrical Engineering department is starting postgraduate program in Electrical Power Engineering and Telecommunication energy in line with the demand of highly skilled engineers in Balochistan and outside. The department has high quality faculty in these areas to cope with the latest trends in Electrical Power and Telecommunication Engineering.

I welcome all the postgraduate students from the core of my heart to the Electrical Engineering department in particular and BUETK in general.
Faculty

**Engr. Muhammad Usman Baloch**  
Chairman/ Associate Professor  
MS (Microwave Engineering) NUST, Rawalpindi  
B.E (Electrical) MUET, Jamshoro

**Prof. Dr. Zahoor Ahmed**  
Pro Vice Chancellor/Professor  
PhD (STC) ENSIL, France  
Master-II Research (ISIC), Limoges France  
M.E (C.I.S.E) UET, NWFP  
B.E (Electrical) Balochistan UET, Khuzdar

**Dr. Faizullah Mahar**  
Associate Professor  
PhD. Iqra University, Karachi.  
MSc (CS) NED UET, Karachi.  
B.E (Electrical) Mehran UET, Jamshoro.

**Engr. Muhammad Abid Mengal**  
Assistant Professor  
M.E (Electronics) BUITEMS, Quetta.  
B.E (Electrical) Balochistan UET, Khuzdar.

**Engr. Ayaaz Hussain**  
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B.E (Electrical) Mehran UET, Jamshoro.  
On Study Leave for PhD

**Engr. Attaullah Khidrani**  
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B.E (Electrical) Balochistan UET, Khuzdar.

Engr. Noor Hussain
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B.E (Electrical) Balochistan UET, Khuzdar.
Course Contents

Core Courses

TC-501 Probability and Random Process
Course Outline

TC-502 Information Theory
Course Outline
Information measures, Coding Theorem, Data Compression, Entropy source entropy and Noiseless coding Theorem. Sources coding Huffman coding. Hamming Distance and code special codes for noise channels.

TC-503 Digital Communication Theory
Course Outline

Elective Courses

Scheme of Studies of M.E (Electrical) with specialization in Telecommunication Engineering

Core Courses

<table>
<thead>
<tr>
<th>S No</th>
<th>Code</th>
<th>Subjects</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>1</td>
<td>TC-501</td>
<td>Probability and Random Processes</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>TC-502</td>
<td>Information Theory</td>
<td>3</td>
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<td>3</td>
<td>TC-503</td>
<td>Digital Communication Theory</td>
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<td>4</td>
<td>TC-504</td>
<td>Advanced Communication Systems</td>
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<tr>
<td>5</td>
<td>TC-601</td>
<td>Dissertation</td>
<td>-</td>
<td>6</td>
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</tbody>
</table>

Elective Courses

<table>
<thead>
<tr>
<th>S No</th>
<th>Code</th>
<th>Subjects</th>
<th>Credit Hours</th>
<th>Total Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TC-511</td>
<td>Communication Security</td>
<td>3</td>
<td>3</td>
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<tr>
<td>2</td>
<td>TC-512</td>
<td>Satellite Communication</td>
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<tr>
<td>3</td>
<td>TC-513</td>
<td>Advanced Digital Signal Processing</td>
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<tr>
<td>4</td>
<td>TC-514</td>
<td>Microwave Systems</td>
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<tr>
<td>5</td>
<td>TC-515</td>
<td>Mobile Telephone System</td>
<td>3</td>
<td>3</td>
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<tr>
<td>6</td>
<td>TC-516</td>
<td>Communication Networks</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>TC-517</td>
<td>Principles of Radar</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
TC-504 Advanced Communication Systems

Course Outline
Review of Fourier transforms theory, RF sub-system design, RF channel characteristics, Modulation and demodulation, multiplexing, carrier and sub-carrier signal processing, analog and digital system design, Satellite related RF issues.

TC-601 Dissertation
Course Outline
Students have to select a 6-credit Dissertation/ project to meet the degree requirement. Topics will touch on one or more of the following areas: Communications, Navigational Systems; Computers, Digital Systems; Microelectronics; Microwaves and Antennas; Power, Control Systems; Software Engineering or any other related area approved by Project Advisor and BOASRATD

Elective Courses

TC-511 Communication Security
Course Outline

TC-512 Satellite Communications
Course Outline

TC-513 Advanced Digital Signal Processing
Course Outline
Review of discrete signals and systems in temporal and spectral domains, data acquisition, discrete transforms (DFT, DCT and z-transforms), digital filters-IIR and FIR, spectral estimation, adaptive filters, multi-rate signal processing, Wavelets and joint time-frequency analysis, and real-time signal processing.

TC-514 Microwave Systems
Course Outline
Wave guides and transmission lines, General Microwave circuit theorem. Resonant Cavities, Microwave Junction and scattering matrices, Non-reciprocal devices. Fundamentals of Microwave Filter design.

TC-515 Mobile Telephone Systems
Course Outline
Need for mobile system, Basic cellular system, Performance criteria, Operation of cellular system, Analog and Digital cellular systems, Elements of cellular system design, Specifications of analog systems, Cell coverage for signal and traffic, Cell site and mobile antennas, co-channel interference reduction.
TC-516 Communication Networks
Course Outline
Review of Markov chain, Queuing theory, open and closed network of queues, priority queuing. Application of stochastic modeling. Optimization techniques to Communication Network design and Analysis. Data Link Control, Performance models of multi-access channels, Routing and flow control.

TC-517 Principles of Radar
Course Outline

<table>
<thead>
<tr>
<th>Scheme of Studies of M.E (Electrical) with specialization in Electrical Power Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Courses</strong></td>
</tr>
<tr>
<td><strong>S No</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
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<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

| **Elective Courses**                           |
| **S No** | **Code** | **Subjects**                           | **Credit Hours** | **Total Credit Hours** |
|         |         |                                     | **Theory** | **Lab** |                  |
| 1       | EE-511  | Operation and Control of Electric Power Systems | 3          | 0       | 3                 |
| 2       | EE-512  | Power System Planning                | 3          | 0       | 3                 |
| 3       | EE-513  | Power System Reliability             | 3          | 0       | 3                 |
| 4       | EE-514  | High Voltage Engineering              | 3          | 0       | 3                 |
| 5       | EE-515  | Energy Management                     | 3          | 0       | 3                 |
| 6       | EE-516  | Distributed Generation                | 3          | 0       | 3                 |
| 7       | EE-517  | Advanced Control Systems              | 3          | 0       | 3                 |

**Course Contents**

**Core Courses**

EE-501 Power System Analysis and Design
Course Outline
Power system planning, studies, and design; time-domain modeling and analysis of power-system networks; power flow, stability, fault, and economic dispatch analysis; symmetrical components
EE-502 Transients in Power Systems
Course Outline
Over voltages during faults, voltage recovery, arcing faults, restrikes, theory of switching surges. Systems grounding, traveling waves, lightning and surge protection, insulation coordination.

EE-503 Power System Protection
Course Outline
Theory of system and equipment protection, characteristics of relays, relay coordination, and system considerations. Power system fault performance, protective system goals, fault sensing and protection algorithms. Applications to generator, transformer, bus transmission line, and distribution line protection. Distributed generation and the connection to the grid

EE-504 Renewable Energy in Power Systems
Course Outline
Renewable energy sources and their integration in electrical networks. Power-flow control from highly variable resources. Cost analysis and planning Overview of Electric Power Systems, PV - Solar resource, PV - PV Cell physics, PV systems, Wind Power Systems, Distribution Generators, Economics of Dist Resources. Perform basic assessment and design of a renewable electrical energy system for a given application

EE-601 Dissertation
Course Outline
Students have to select a 6-credit Dissertation/ project to meet the degree requirement. Topics will touch on one or more of the following areas: Power systems, Control Systems; Embedded generation; and Power system reliability, power system operations and power system analysis or any other related area approved by Project Advisor and BOASRATD

Elective Courses
EE-511 Operation and Control of Electric Power Systems
Course Outline
Course topics include: modeling of generators and transmission networks; security-constrained economic dispatch and security-constrained unit commitment formulations (linear programming and mixed-integer programming) and methodologies (dynamic programming, Lagrangian relaxation, and Benders decomposition); market clearing under different time scales; locational marginal price

EE-512 Power System Planning
Course Outline
Long-term planning will identify a financially viable and physically feasible mix of resources, including traditional generation and transmission sources as well as advanced techniques such as renewable generation, demand response, and the micro grid, to enhance the overall reliability of power systems. This course will introduce the students generation and transmission expansion planning of a vertically integrated utility and in a competitive market.

EE-513 Power System Reliability
Course Outline
Power System Reliability will take a close look at modern electric power systems from the generation/transmission/distribution capacity planning point of view. The main topics will include the application of probability theory to power systems including generating capacity, loss of load expectation, expected energy not supplied, interruption frequency indices, interruption duration indices, and service availability indices. Course will cover the computational techniques for above probabilistic metrics of power system reliability. Commercial reliability software will be introduced into the class to help students get hands on experiences on industry power system reliability study.
EE-514 High Voltage Engineering
Course Outline
High voltage engineering basic concepts; theoretical, design, and practical aspects of over voltages, travelling-waves, insulation, and aging; breakdown mechanisms; insulation coordination. AC/DC conversion processes, converter technologies, and design; harmonics, controls, and protection; AC/DC interactions and system performance; modeling, application, and installation; current-source versus voltage-source converters

EE-515 Energy Management
Course Outline

EE-516 Distributed Generation
Course Outline
Integration in power systems Distributed generation advantages and needs Power System Operation: Electric grid introduction Supply guarantee and power quality. Stability Effects of renewable energy into the grid Boundaries of the actual grid configuration Consumption models and patterns. Demand Side Management

EE-517 Advanced Control Systems
Course Outline
Department of Mechanical Engineering

Introduction

Mechanical engineering spans the broadest spectrum of engineering activities — from concept and design, through manufacturing and maintenance of all kinds of products and systems. It includes the areas such as energy, fluid mechanics, dynamics, combustion, vibration, design, manufacturing processes, systems modeling and simulation, mechatronics, robotics, mechanics of material, and engineering materials. By combining a comprehensive education in the engineering sciences with a solid foundation in practical, problem-solving know-how, BUETK’s Mechanical Engineering postgraduate program prepares students to take on challenges that may carry technological and societal consequences.

The department is offering two years program leading to the degree of M.E (Mechanical Engineering). The students are required to complete three core courses and five elective courses followed by six months of research work in order to complete the degree.

Message of the Chairman

It's my great honor to welcome you to the Mechanical Engineering Department and our great community of researchers.

In this department, we have high expectations. We expect our students to perform at high academic level, and for our graduates to go well beyond being significant contributors in the field of Mechanical Engineering.

Our dedicated faculty graduated from world renowned universities grows our leading-edge research programs in different fields of Mechanical Engineering such as Energy systems, Thermo-fluids, Industrial & Manufacturing, Design, Material science etc. We strive to ensure that all our young students have a strong education with leadership, management and teaming skills, internship experience, and involvement in student activities. We entrust that emphasizing these areas will make our young students well-qualified to take leadership roles in the future.

The innovative curriculum, well equipped laboratories and competitive research enable the department to provide high-quality training to prospect professional engineers and future leaders for industry, academia, government, and society.

For me as a Chairman Mechanical Engineering Department, it is a matter of pride to see the BUETK striving for competence and excellence within its limited resources and being situated in a remote and hard area of Balochistan. The BUETK faculty and staff deserve appreciation for their laudable contributions.
Faculty

**Engr. Liaquat Ali Lehri**  
Chairman /Assistant Professor  
M.E (IME) AIT, Thailand.  
B.E (Mechanical) Balochistan UET, Khuzdar

**Prof. Dr. Syed Mushtaq Ahmed Shah**  
Dean Faculty of Engineering/Professor  
PhD INSA-LYON, France.  
M.S INPG, France.  
M.S NUST, Rawalpindi.  
B.E (Mechanical) Balochistan UET, Khuzdar

**Engr. Bashir Ahmed Laghari**  
Assistant Professor  
M.E (Energy System) NED UET, Karachi.  

**Engr. Mushtaq Rajput**  
Assistant Professor  
M.E (Manufacturing) NED UET, Karachi.  

**Engr. Javaid Iqbal**  
Assistant Professor  
M.E (ThermoFluid) Leicester U.K  
M.E (Energy System) NED, Karachi.  
B.E (Mechanical) Balochistan UET, Khuzdar.
<table>
<thead>
<tr>
<th>Name</th>
<th>Qualifications</th>
<th>Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Professor</td>
<td>B.E (Electrical) Balochistan UET, Khuzdar</td>
<td>(On study leave for PhD)</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>B.E (Mechanical) Balochistan UET, Khuzdar</td>
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</tr>
<tr>
<td>Engr. Muhammad Naeem</td>
<td>M.E (Material) EMU, North Cyprus.</td>
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<tr>
<td>Assistant Professor</td>
<td>B.E (Mech) Balochistan UET, Khuzdar.</td>
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<tr>
<td>Engr. Muhammad Ishaq</td>
<td>M.E (IME) A.I.T, Thailand</td>
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<tr>
<td>Assistant Professor</td>
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<tr>
<td>Lecturer</td>
<td>B.E (Mechanical) Balochistan UET, Khuzdar</td>
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</tr>
<tr>
<td>Engr. Abdul Hameed Baloch</td>
<td>MS (Mechanical), Malaysia</td>
<td></td>
</tr>
<tr>
<td>Lecturer</td>
<td>B.E (Mechanical) Balochistan UET, Khuzdar</td>
<td></td>
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</tbody>
</table>
### Scheme of Studies of M.E (Mechanical)

#### Core Courses

<table>
<thead>
<tr>
<th>S No</th>
<th>Code</th>
<th>Subjects</th>
<th>Credit Hours</th>
<th>Total Credit Hours</th>
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</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td>Theory</td>
<td>Lab</td>
</tr>
<tr>
<td>1.</td>
<td>ME-501</td>
<td>Advanced Engineering Materials</td>
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<tr>
<td>2.</td>
<td>ME-502</td>
<td>Advanced CAD/CAM</td>
<td>3</td>
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<tr>
<td>3.</td>
<td>ME-503</td>
<td>Advanced heat Transfer</td>
<td>3</td>
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<tr>
<td>4.</td>
<td>ME-504</td>
<td>Advanced Fluid Mechanics</td>
<td>3</td>
<td>0</td>
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<tr>
<td>5.</td>
<td>ME-505</td>
<td>Advanced Metal Forming</td>
<td>3</td>
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<tr>
<td>6.</td>
<td>ME-506</td>
<td>Experimental Stress analysis</td>
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<td>7.</td>
<td>ME-601</td>
<td>Dissertation</td>
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#### Elective Courses

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<tr>
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<td>ME-512</td>
<td>Safety health and environment</td>
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<tr>
<td>3.</td>
<td>ME-513</td>
<td>Industrial management</td>
<td>3</td>
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<tr>
<td>4.</td>
<td>ME-514</td>
<td>Computer Integrated Manufacturing</td>
<td>3</td>
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<tr>
<td>5.</td>
<td>ME-515</td>
<td>Computational Fluid dynamics</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

### Course Contents

#### Core Courses

**ME-501 Advanced Engineering Materials**

**Course Outline**

**ME-502 Advanced CAD/CAM**

**Course Outline**

**ME-503 Advanced heat Transfer**

**Course Outline**
CONDUCTIN: Review of analytical methods in heat conduction, melting and freezing, sources and sinks, composites media, numerical methods for steady and unsteady state problems. Numerical methods for solution of steady and unsteady conduction problems

CONVECTION Analysis of isothermal and non-isothermal boundary layers. Exact and approximate solution of laminar and turbulent flow, variable property and high speed effect, the dimensional analysis. Navier stokes equations numerical solutions by velocity and temperature fields in boundary layers of simple and complex shapes

RADIATION properties; Black body radiation, Shape factor, network analogy, and solar radiation

ME-504 Advanced Fluid Mechanics
Course Outline
Fluid Dynamics; laminar and turbulent boundary layer flow with and without heat transfer, boundary layer separation, stability transition and control. Kinematics and dynamics of flow of continuous media. Navier stokes equation, simplification exact and approximate solution. Irrational of hydrodynamics stability, turbulence, free shear flows, chemical reactions, and shock expansions. Rotating Fluid Machinery; Aerodynamics of compressor and turbines, subsonic, transonic and supersonic flow characteristics, secondary flow and stall stability, components matching of total non-dimensional representation of performance

ME-505 Advanced Metal Forming
Course Outline
Microscopic Plasticity and yield criteria; Plastic work, Effective stress; Effective strain; Flow rules for plastic stress–strain relations principle of normality. Work hardening and Plastic instability; Super Plasticity; Combined stress and strain rate effects; Strain rate dependence; temperature dependence of flow stress; Hot working ;temperature rise during deformation. Ideal work; Ideal work or uniform energy; Extrusion and rod drawing; Friction; Redundant work, and mechanical efficiency: maximum Drawing reduction. Slab analysis; Sheet drawing; comparison of slab method and ideal work method; wire drawing; Direct compression in plane plain strain; Average pressure during plane strain compression; Sticking friction; Axisymmetric compression; flat rolling

ME-506 Experimental Stress analysis
Course Outline

Elective Courses

ME-511 Project Management
Course Outline
Fundamental principles, project proposals and feasibilities, project life cycle; project organization and human resource management; PM planning; Work breakdown structure; estimating time and cost; Precedence relationships: Project scheduling and control techniques; Computerized project management; special software packages

ME-512 Safety health and environment
Course Outline

Principles of accidents prevention, hazard analysis. Legal, humanitarian and economic reason for action.

Safety inspection, procedures, safety Training First aid and emergency procedures

Introduction importance of clean environment, Scale of environment pollution. Environmental ACT. Health and Safety Act


ISO Standards for Safety and health and environment

**ME-513 Industrial management**

**Course Outline**

Plant Management, Management Systems role and functions of management. Productivity, basic concepts, classification, management and improvement. Role of work study, work measurement and work sampling. Facilities Planning and design, Plant location, material handling, systems, types of production, MRP-II, group technology, make or buy decisions, demand forecasting, material requirement planning, inventory, models and just in time (JIT) techniques. Production planning scheduling problems and models. Project management. Techniques for PERT & CPM. Network scheduling, activity crashing and resource leveling.

Human resource management

Recruitments process, job evaluation, performance appraisal, on financial and financial incentives training. Labour relations, management theories.

**ME-514 Computer Integrated Manufacturing**

**Course Outline**


**ME-515 Computational Fluid dynamics**

**Course Outline**

Introduction to computational fluid dynamics, problem solving strategy using CFD, Governing Equations of Fluid Flow, Discretization of Governing equations, finite difference method. Introduction to the finite volume method, numerical solution of governing equations, Solution analysis and accuracy, introduction to advanced topics
Department of Computer Systems Engineering and Sciences

Introduction

The Department of CSE&S established in the year 2000, is an important addition in public sector University operating at Khuzdar. The Department aims at providing quality education in the field of Computer science and Information Technology to the people of Balochistan in particular and the other provinces in general, through target oriented teaching, problem oriented research and good services.

The Department has a beautiful building, good strength of qualified faculty, departmental library and well equipped laboratories meeting modern requirements in the field of Computer systems. The Department has the credit of structuring the layout of the overall Computer network of the university and also managing the Datacenter and Video conferencing room.

The Department is offering two years M.E program in Computer Engineering. The graduates of this program will have knowledge about the latest trends in the field of Computer Engineering. The students are required to complete three core courses and five elective courses followed by six months of research in order to complete the degree.

The department is also offering two year MS program in Computer Science in order to meet the demands of the Software industry of Pakistan, and also becoming the first institute in the region providing an opportunity to the local graduates to enhance their education and perform quality research under supervision of highly qualified faculty of the department. The students are required to complete two core courses and six elective courses followed by six months of research in order to complete the degree. It is worth mentioning that this department is already offering the degrees of BS (Computer Science) and MCS in the evening program.

Message of the Chairman

Engr. Sohrab Khan Bizanjo

The CSE&S department was established in 2002 and is the youngest of all the engineering departments of BUETK. The field of Computer Science and Engineering provides excellent professional prospects and challenging career opportunities. The Department of Computer Systems Engineering & sciences is a vibrant and a rapidly growing department with innovative education to be in the forefront of Information Technology field. The department is committed to provide top-notch education which prepares students to successfully enter in the job market. The department of CSE&S is on the move! We have a vision to be the best department at BUET Khuzdar. Being the best means striving to be better today than yesterday, setting higher standards and working with full devotion to meet those standards. After setting the benchmarks at undergraduate level ranging from B.E(Computer Engineering) to BS(Computer Science) and MCS, we are taking our mission to start the M.E(Computer Engineering) and MS (Computer Science) programs once again leading from the front in this area. We have the top quality faculty and research environment that will help postgraduate students in becoming shining stars in the field of Computer Engineering and Sciences.

I welcome all postgraduate students in this department to explore a wide range of educational and research opportunities at the Department of Computer Systems Engineering & Sciences.
## Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Qualifications</th>
<th>Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chairman/ Assistant Professor</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Dr. Shabbar Naqvi</strong></td>
<td>PhD (Advanced Fuzzy Logic) University of Nottingham UK.</td>
<td>M.E (CS) NED UET, Karachi.</td>
</tr>
<tr>
<td><strong>Director Postgraduate Studies/ Associate Professor</strong></td>
<td></td>
<td>B.E (CS) NED UET, Karachi.</td>
</tr>
<tr>
<td><strong>Engr. Mohammad Dawood</strong></td>
<td>MS (Information Security) Malaysia</td>
<td>B.E (CS) Balochistan UET, Khuzdar</td>
</tr>
<tr>
<td><strong>Chairman Basic Sciences/ Assistant Professor</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Engr. Jalal Shah</strong></td>
<td>MS (Software Engineering) UTM Malaysia</td>
<td>B.E (CS) Balochistan UET, Khuzdar</td>
</tr>
<tr>
<td><strong>Assistant Professor</strong></td>
<td></td>
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<tr>
<td><strong>Assistant Professor (On study leave)</strong></td>
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</tbody>
</table>
## Scheme of Studies of M.E (Computer Engineering)

### Core Courses

<table>
<thead>
<tr>
<th>S No</th>
<th>Code</th>
<th>Subjects</th>
<th>Credit Hours</th>
<th>Total Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Theory</td>
<td>Lab</td>
</tr>
<tr>
<td>1.</td>
<td>CS-501</td>
<td>Advanced Computer Architecture</td>
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<tr>
<td>2.</td>
<td>CS-502</td>
<td>Advanced Operating Systems</td>
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<tr>
<td>3.</td>
<td>CS-503</td>
<td>Advanced Computer Networks</td>
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<tr>
<td>4.</td>
<td>CS-504</td>
<td>Advanced Digital Image Processing</td>
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<tr>
<td>5.</td>
<td>CS-505*</td>
<td>Advanced Digital Signal Processing</td>
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<tr>
<td>6.</td>
<td>CS-601</td>
<td>Dissertation</td>
<td>-</td>
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</tr>
</tbody>
</table>

* indicates courses in collaboration with Electrical Engineering Department of BUETK

### Elective Courses

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<tr>
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<td></td>
<td></td>
<td>Theory</td>
<td>Lab</td>
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<tr>
<td>1.</td>
<td>CS-511</td>
<td>Fuzzy Informatics and Intelligent Systems</td>
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<td>2.</td>
<td>CS-512</td>
<td>Big Data Analytics</td>
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<td>CS-513</td>
<td>Information System Security Management</td>
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<td>4.</td>
<td>CS-514</td>
<td>Advanced Software Engineering</td>
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<td>5.</td>
<td>CS-515</td>
<td>Advanced Data Structures</td>
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<td>CS-516</td>
<td>Object Oriented Software Design</td>
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<td>CS-517</td>
<td>Secure Software Development</td>
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<tr>
<td>8.</td>
<td>CS-518</td>
<td>Cloud Computing</td>
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<td>9.</td>
<td>CS-519</td>
<td>Advanced Software Quality Assurance</td>
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<tr>
<td>10.</td>
<td>CS-520</td>
<td>Requirement Engineering</td>
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<tr>
<td>11.</td>
<td>CS-521</td>
<td>Information Theory &amp; Coding</td>
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<td>Current Topics in Computer Engineering</td>
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<td>CS-524</td>
<td>Technical Report Writing and Research Methodology</td>
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</table>
CS-501 Advanced Computer Architecture
Objectives: To understand the detailed architecture of the modern processors including techniques of parallelism, advanced concepts of pipelining etc
Course Outline:

CS-502 Advanced Operating System
Objectives: To study the advanced operating system topics and be exposed to recent developments in operating systems research.
Course Outline
Distributed operating system, parallel operating, system, overview of the operating systems: UNIX, DOS, VMS, Windows NT, Novell Netware 4.xx, Linux, memory management, multiprogramming, virtual paging, segmentation, principle of DOP, advanced features of DOP and parallel operating systems, and parallel operating systems.

CS-503 Advanced Computer Networks
Objectives: The goals of the course are to develop a strong understanding of network from the physical to application layer. The focus is on principles, architectures, and protocols used in modern networked systems, wireless and mobile networks.
Course Outline
This course covers a set of advanced topics in computer networks including Protocol layering, Internet protocol, Transmission Control Protocol, routing algorithms and application specific protocols. It also examines the fundamentals of mobile network architecture, mobility issues in networking, routing schemes for mobile and nomadic hosts, including Mobile IP, Mobile Ad Hoc Network (MANET) protocols, DHCP and IPv6. Unix Programming Environment for Socket Programming including UDP, TCP, Routing and Raw Sockets is also discussed in detail.

CS-504 Advanced Digital Image Processing
Objectives
- To investigate advanced algorithms and techniques for a variety of real world imaging applications
Course Outline
This course contains the advanced topics in digital image compression. The different topics covered in this course includes, Image Enhancement in Spatial Domain, Image Enhancement in Frequency Domain, Image Restoration, Color Image Processing, Morphological Image Processing, Image Segmentation, Object Recognition, Wavelet and Multi-resolution Processing, Feature Detection & Classification. The group projects enable the students to work on substantial designs that require the understanding of the task
domain, exploration of solution methods, and implementation of a selected approach. Each team presents a preliminary plan, an approach with feasibility analysis, and a final demonstration.

**CS-505 Advanced Digital Signal Processing**

**Objectives**: To provide an in depth knowledge of theory and applications of DSP.

**Course Outline**


**CS-601: Dissertation**

Each student will be required to undertake a research project under a supervisor assigned to him/her according to postgraduate rules.

**Elective Courses**

**CS-511 Fuzzy Informatics & Intelligent Systems**

**Course Objectives**

- To understand basic knowledge of fuzzy sets and fuzzy logic
- To apply basic knowledge of fuzzy information representation and processing
- To apply basic fuzzy inference and approximate reasoning
- To understand the basic notion of fuzzy rule base
- To apply basic fuzzy system modelling methods

**Course Outline**

The uncertain and inexact nature of the real world, ideas and examples, fuzzy membership functions; fuzzy numbers and fuzzy arithmetic, Basic concept and properties of fuzzy logic versus classical two-valued logic, Fuzzy inference principles; fuzzy decision making; approximate reasoning, If-Then rules; general format of fuzzy rule base; establishment of fuzzy rule base, Multi-objective optimization, performance evaluation, decision-making

**CS-512 Big Data Analytics**

**Course Objectives**

- To explore the fundamental concepts of big data analytics
- To learn to analyze the big data using intelligent techniques.
- To understand the various search methods and visualization techniques.
- To learn to use various techniques for mining data stream
Course Outline


CS-513 Information System Security Management
Course Objectives

- To learn about the security issues related to an enterprise
- To understand the responsibilities of the administration and security team of an organisation
- To understand the standards of the security and rules governing it

Course Outline

The subject is aimed at imparting knowledge and skill sets required to assume the overall responsibilities of administration and management of security of an enterprise information system. This subject covers issues related to administration and management of security of enterprise information systems. Topics include auditing and data management, risk management, contingency planning and incident handling and responses. The subject will study in detail principles and tools related to these topics. The subject will also cover security standards, evaluation and certification process; security planning, ethical and legal issues in information and privacy.

CS-514: Advanced Software Engineering
Course Objectives

- To have a clear understanding of Software Engineering concepts.
- To gain knowledge of the Analysis and System Design concepts.
- To learn how to manage change during development

Course Outline

Ideas and techniques for designing, developing and modifying large software systems, specification and documentation. Functions oriented and object oriented modular approach designing for reuse and maintainability, specification and documentation. Cost and quality metrics and estimation. Project team organization and management

CS-515: Advanced Data Structures
Course Objectives

- To understand the principles of iterative and recursive algorithms.
- To learn the graph search algorithms.
- To study network flow and linear programming problems.
- To learn the hill climbing and dynamic programming design techniques.
• To develop recursive backtracking algorithms.
• To learn the principles of shared and concurrent objects.
• To learn concurrent data structures

Course Contents


CS-516: Object Oriented Software Design

Course Objectives

• To investigate principles of object-oriented software engineering, from analysis through testing
• To learn techniques at each stage of development, including use cases, UML, etc
• To practice these principles and techniques by developing a “real world” software system prototype
• To study and experiment with alternative models of the software development process from the classical waterfall model to Extreme programming

Course Outline

Object-oriented design concepts, Introducing OO concepts through typical OO programming languages. 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, CASE tools.

CS-517: Secure Software Development

Course Objectives

• To understand the basic principles of secure software development
• To get in-depth knowledge about the role of technical project leaders in the development of safe and secure software

Course Outline

Software is ubiquitous and is riddled with security flaws. We may or may not know how to write software in a way that provides a moderately high level of security and robustness. But the question remains, “Why don’t software developers practice these techniques?” The course details with two of the myriad answers to this question. The first is the meaning of secure software, and discusses requirements derivation and analysis, and describes their validation. The second answer lies in the roles of executives, managers and technical leaders of projects in secure software development. The course discusses several ways to develop software in such a way that security considerations play a key role in its development.

CS-518: Cloud Computing

Course Objectives

• To introduce the broad perceptive of cloud architecture and model
• To understand the concept of Virtualization
• To be familiar with the lead players in cloud.
• To apply different cloud programming model as per need.
• To be able to set up a private cloud.
• To understand the design of cloud Services.
• To learn to design the trusted cloud Computing system

Course Outline

Cloud computing fundamentals, the role of networks in Cloud computing, Essential characteristics of Cloud computing, Cloud deployment model, Cloud service models, Multitenancy, Cloud cube model, Cloud economics and benefits, Cloud types and service scalability over the cloud, Virtualization concepts, types, Server virtualization, Storage virtualization, Storage system architecture, Big data, Virtualized Data Centre (VDC) architecture, VDC environments, concepts, planning and design, Managing VDC and cloud infrastructures, hybrid storage networking technologies, Cloud Security risks, Security, Privacy, Trust, Operating system security, Security of virtualization, Taxonomy and survey of QoS management and service, Selection methodologies for cloud computing, Auto scaling, Load balancing and monitoring in open source cloud, Resource scheduling for Cloud.

CS-519: Advanced Software Quality Assurance

Course Objectives

• To understand quality management processes
• To distinguish between the various activities of quality assurance, quality planning and quality control
• To understand the importance of standards in the quality management process and their impact on the final product

Course Outline

Introduction to software quality, challenges, objectives, quality factors, components of SQA, contract review, development and quality plans, SQA components in project life cycle, SQA defect removal policies, Basics of software testing, test generation from requirements, finite state models, combinatorial designs, test selection, minimization and prioritization for regression testing, test adequacy, assessment and enhancement, testing strategies, white box and black box approach, integration testing, system and acceptance testing, performance testing, regression testing, internationalization testing, ad-hoc testing, website testing, usability testing, accessibility testing, test plan, management, execution and reporting, software test automation, automated testing tools, Hierarchical models of software quality, software quality metrics, function points, software product quality, software maintenance quality, effect of case tools, software quality infrastructure, Project progress control, costs, quality management standards, project process standards, management and its role in SQA, SQA unit

CS-520: Requirement Engineering

Course Objectives

• To understand the requirements for establishing large, complex software systems
• To understand both formal and informal approaches of software requirements
• To get in-depth knowledge of different models required in the decision making of process of a software selection

Course Outline

In this course, concepts for systematically establishing, managing the requirements for a large, complex, changing and software-intensive systems, from technical, organizational and management perspectives will be discussed in detail. The course will cover both formal and informal approaches, while keeping a balance. The course will involve building models of both requirements engineering process and requirements engineering product, concerning both functional and non-functional goals/requirements/specifications, using a systematic decision-making process.

CS-521: Information Theory & Coding

Course Objectives

• To quantify the notion of information in a mathematically and intuitively sound way
• To explain how this quantitative measure of information may be used in order to build efficient solutions to multitudinous engineering problems
• To show information theory’s reaching interest in other fields (economics, biology, statistics, computer science, artificial intelligence

Course Outline

The concepts of source and channel. Measure if information, entropy, and mutual information. The noiseless coding theorem. The noisy coding theorem. Channel capacity: symmetric and non-symmetric channels. Rate-distortion theory. Basics of multiple user information theory. Linear codes: parity and generator matrices, syndrome error correction and detection capability, minimum distance. Performance bounds of linear codes, hamming and Golay codes, Galois fields, shift register implementation, cyclic codes. BCH decoding algorithm, burst correction codes.

CS-522: Mobile Communication Systems

Course Objectives

• To prepare students for engineering work in the industry and for the advanced graduate work in the area of mobile communication
• To provide concepts and useful tools for design and performance analysis of wireless communication systems

Course Outline

Introduction to wireless communication systems and networks, Cellular Wireless Networks and System Principles, Antennas and radio Propagation, Signal Encoding and Modulation techniques, 1G, 2G and 3G wireless systems (AMPS, GSM, GPRS, EDGE, etc), the UMTS network and radio access technology Wireless LANs, IEEE802.1x.

CS-523: Current Topics in Computer Engineering

Course Outline
This course will be used for teaching a wide variety of subjects. The topics to be taught will be selected to reflect developments and the latest trends of interest in the field of Computer Engineering.

**CS-524 Technical Report Writing & Research Methodology**

**Course Objectives**

- To understand the modern approaches of technical report writing
- To understand the scientific methodology of doing research based work
- To get an insight on writing research proposals, reports, dissertations

**Course Outline**

This course covers the basic introduction to modern approaches to science and particularly engineering. The student will get an insight into the history and philosophy of science and into how scientific methods are applied in the science of engineering. The goal is to enable the students to read contemporary scientific literature in the chosen field of specialization and distil the main ideas of a paper and to write these down in his/her own words. At the end of this course the student will have acquired knowledge of how to conduct a research project and of how to write scientific texts. Content covered includes,

- The principles of theory of science.
- Different research areas and their application areas in engineering science
- Methods for information seeking.
- Reviewing/ assessing of scientific publications
- To work in a group and group organizational control tools
- Scientific writing
- How to write and organize a scientific publication.
- Research ethics/morals.
- Presentation of/ acting as opponent of research results
### Scheme of Studies of MS (Computer Science)

#### Core Courses

<table>
<thead>
<tr>
<th>S No</th>
<th>Code</th>
<th>Subjects</th>
<th>Credit Hours</th>
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<td>Theory</td>
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<tr>
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<td>CS-551</td>
<td>Advanced Theory of Computation</td>
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#### Elective Courses

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<td>Advanced Compiler Design-II</td>
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<td>Fuzzy Systems</td>
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<td>Decision Theory</td>
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<td>CS-516</td>
<td>Object Oriented Software Design</td>
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</table>

### Course Contents

#### Core Courses

**CS-551 Advanced Theory of Computation**

Course Outline

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-552 Advanced Algorithm Analysis**

Course Outline

Advanced algorithm analysis including the introduction of formal techniques and the underlying mathematical theory. NP-completeness; Search Techniques; Randomized Algorithms. Heuristic and Approximation Algorithms; Topics include asymptotic analysis of upper and average complexity bounds using big-O, little-o, and theta notation. Fundamental algorithmic strategies (brute-force, greedy, divide-and-conquer, backtracking, branch-and-bound, pattern matching, and numerical approximations) are covered. Also included are standard graph and tree algorithms. Additional topics include standard complexity classes, time and space tradeoffs in algorithms, using recurrence relations to analyze recursive algorithms, noncomputable functions, the halting problem, and the implications of noncomputability. Algorithmic animation is used to reinforce theoretical results. Upon completion of the
course, students should be able to explain the mathematical concepts used in describing the complexity of an algorithm, and select and apply algorithms appropriate to a particular situation.

Elective Courses
CS-561 Parallel and Distributed Computing
Course Outline

CS-562 Network Security
Course Outline
Introduction; Cryptology and simple cryptosystems; Conventional encryption techniques; Stream and block ciphers; DES; More on Block Ciphers; The Advanced Encryption Standard. Confidentiality & 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; Miscellaneous topics.

CS-563 Network Administration
Course Outline
Through completion of this course, students will be able to plan, install, and configure a Web Server, manage, monitor, and optimize a Web Server, and design and implement a Web Site on the Web Server created.

CS-564 Advanced Compiler Design-I
An in-depth study of compiler backend design for high-performance architectures. Topics include control-flow and data-flow analysis, classical optimization, instruction scheduling, and register allocation. Advanced topics include memory hierarchy management, optimization for instruction-level parallelism, modulo scheduling, predicated and speculative execution. The class focus is processor-specific compilation techniques, thus familiarity with both computer architecture and compilers is recommended.

CS-565 Advanced Compiler Design-II
The course should consist of one or two major projects. Theoretical study should depend on the level of the first course Design I and the student needs.

CS-566 Machine Learning
Course Outline
Basic concepts of Machine Learning; Supervised learning; Supervised learning setup. Logistic regression; Perceptron; Generative learning algorithms; Gaussian discriminant analysis; Support vector machines; Model selection and feature selection; Evaluating and debugging learning algorithms; Learning theory; Bias/variance tradeoff; Union and Chernoff/Hoeffding bounds; Unsupervised learning; K-means Clustering; EM algorithm. Factor analysis; PCA (Principal components analysis); ICA (Independent components analysis); Reinforcement learning and control; Bellman equations; Value iteration and policy iteration; Linear quadratic regulation; Q-learning; Value function approximation.

CS-567 Evolutionary Computing/Algorithms
Course Outline

CS-568 Fuzzy Systems
Course Outline
The Mathematics of Fuzzy Systems and Control; Fuzzy Sets and Operations on Fuzzy Sets; Fuzzy Relations and the Extension Principle; Fuzzy Logic and Approximate Reasoning; Fuzzy Systems and Their Properties; Fuzzy Rule Base and Fuzzy Inference Engine; Fuzzifiers and Defuzzifiers; Fuzzy Systems as Nonlinear Mappings; Approximation Accuracy of the Fuzzy System; Fuzzy Systems with Second-Order Approximation Accuracy; Approximation; Accuracy of Fuzzy Systems with Maximum; Design of Fuzzy Systems from Input-Output Data; A Table Look-Up Scheme; Gradient Descent Training; Recursive Least Squares; Design of Fuzzy; Systems Using Clustering; Non-adaptive Fuzzy Control; Adaptive Fuzzy Control; Fuzzy Linear Programming

CS-569 Decision Theory
Course Outline
Introduces the basic problems and techniques of decision making may be covered in two basic parts: 1. principles and approaches in decision making, 2. explores the methods and applications of information that are used in making an optimal decision. Differences between the classical frequencies approach and Bayesian approach in making decision, identify prior distributions and likelihood functions, and combine these two entities to obtain posterior distributions, which will then be combined with loss function to obtain Bayesian estimators. Concepts of conjugate distributions on prior and posterior distributions, important definitions in decision theory, proving admissibility and inadmissibility of a decision, process of making an optimal decision, utility and reward, and sensitivity analysis related to an optimal decision. Analysis of subjective probabilities

CS-570 Advanced Database Systems
Course Outline
Advance Normal Forms such as Multivalued Dependency, 4th and 5th normal forms, Domain Key normal form, Hierarchical structure of DBMS, Storage and File Organization, Storage Indexing and Hashing, Relational Calculus, Query Processing Transaction processing, ACID properties, Serializability, Recoverability, Concurrency control and Recovery, Protocols (Lock-based, Graph-based, Timestamp-based, Validation-based), Deadlock Handling techniques and prevention, Log-based Recovery, Failure with loss of Nonvolatile storage.

Notes:
- Courses can be added/deleted in the list of core and elective courses for all programs as per HEC guidelines and with approval of the competent authority
- Courses in each semester for all programs will be offered depending upon the availability of the faculty

Admission

1. Authority of Admission
   i. The admission to any postgraduate degree programs shall be made by the Board of Advanced Studies Research and Technological Development (BOASRATD) of BUETK on the basis of merit list prepared and checked by the Directorate of Postgraduate Studies, (DPS).
ii. Lists of selected candidates shall be displayed by the DPS and if needed subsequent lists would be displayed till the last seat is filled up. (Explanation: The last list shall be displayed keeping in view that 75% attendance in lectures shall not suffer).

iii. The BOASRATD may refuse admission to a candidate without assigning any reason.

2. Time for Admission

Candidates may be admitted at the beginning of each spring or fall semester. If a candidate fails to complete enrollment, his/her admission shall stand cancelled. However, nominees of HEC, foreign countries and other Government organizations, may be admitted before the mid-term examination.

2.1 Criteria and Procedure for admission

i. 16 years of education or 4 years (minimum 130 credit hours) education after F.Sc / A levels.

ii. International students must get their testimonial attested from foreign office of their respective country and get their testimonial translated in English (if they are not in English).

iii. For admission, in engineering disciplines the candidate must possess Bachelors of Engineering degree or equivalent in the relevant fields.

iv. The terminal degree must be recognized by PEC/HEC (as applicable), with a minimum CGPA of 2.0 out of 4.00 (3.0 out of 5.0), B grade or 55% marks. Percentage will only be valid if CGPA is not mentioned on the transcript.

v. Application for admission shall be made on the prescribed form, and sent to the director postgraduate studies, either by hand or by registered post. Any application received after the closing date shall not be considered. Any applicant (other than Faculty of BUET and overseas students) who fails to appear in the Admission Test shall stand disqualified for admission.

vi. Admission shall be granted on the basis of merit. Merit list of successful candidates will be prepared in accordance with criteria as under:

   a. Last Examination Result.
   b. Admission test conducted by University or GRE score.
   c. Interview of candidate
   d. The faculty member of the university, affiliated colleges and foreign students are exempted from admission test.

vii. Names of all selected candidates shall be displayed on the university notice boards and university website.

viii. Selected candidates shall be required to report to the office of director postgraduate studies for verification of their documents, payment of prescribed fees and complete the registration / enrolment documents within the prescribed date as notified.

ix. The Vice-Chancellor may cancel admission of any candidate without any reason.
x. The Government employees seeking admission at BUET Khuzdar must produce No Objection Certificate from their respective departments. The candidates belonging to other provinces must produce migration certificate.

xi. The candidate must produce, at the time of the first enrollment, a certificate from the University Resident Medical Officer to the effect that he/she is free from any communicable (contagious) disease or mental or physical disability which is likely to stand in the way of his/her pursuing the chosen field of study.

xii. A candidate for admission has no age limit as long as there is no physical or mental handicap.

3. Routing of Academic Matters

All the academic matters shall be routed through proper channel i.e. through the Chairman of the Department or member of BOASRATD, DPS, to the Vice Chancellor.

4. Enrollment

i. An application for enrollment on the prescribed Course Registration Form accompanied by proof of fee payment (bank receipt) shall be presented to the office of the Director Postgraduate Studies on or before the day(s) notified for enrollment.

ii. The Director Postgraduate Studies under special circumstances and on payment of prescribed late fee may permit a student to enroll within ten days after the commencement of the classes.

iii. The Vice Chancellor may allow a student to enroll till the last day of the 4th week after the commencement of classes, with double late fee.

iv. Enrollment in absentia is not allowed. Student is required to be present in person with a proof of identification (CNIC) for enrollment.

v. Enrollment shall only be considered complete when Course Registration Form is submitted to the office of the Director Postgraduate Studies. Depositing of fee only will not serve the purpose.

vi. A candidate admitted to a postgraduate degree programme shall, so long as he/she has not submitted thesis, has to enroll for each semester.

5. Medium of Instruction

Instructions in all classes and laboratories and all examinations written or oral shall be carried out in the English language. The international students have to produce the proof of fluency in English.

6. Scheme of Studies

6.1 General

i. The subjects of study for the postgraduate degree programmes may be amended from time to time. A student shall present an acceptable research project thesis in addition to completing his/her approved course work in order to qualify for the award of the degree.
Each Program shall be of thirty (24) credit hours (excluding 06 credits for Master Research Thesis).

There shall be two semesters in one calendar year, namely; Spring Semester and Fall Semester.

Wherever applicable and in order of merit of selection, each candidate shall have the option to enroll either in the part-time or full-time program.

Any student enrolled in the full-time program must complete all requirements in four semesters (3 semesters for course work and 1 semester for dissertation), whereas in part-time program a student must complete all requirements in six semesters, including withdrawal; if any.

Students may, however, also be allowed by the director postgraduate studies to register for dissertation which shall be based on an analytical and/or experimental work. The dissertation shall be administered as follows:

a. The dissertation shall be equivalent to six credit hours and shall be required to be completed within duration of 1-2 semesters.

b. The requisite work for dissertation has to be carried out under the supervision of an approved supervisor.

c. Details regarding Research Work for Dissertation are as described in section 19.

6.2 Duration of Course

i. The duration for the M.E. degree shall not be less than four and more than six semesters in full-time program and not less than six and more than eight semesters for the students admitted in part-time program.

ii. The employees of the government/other agencies nominated for M.E. degree at this University shall have to take study leave to pursue studies as a regular student, failing which he/she will not be admitted.

6.3 Duration of Semester

i. There shall be 2 semesters (Fall and spring) of 18 weeks each. The commencement of semesters shall be regulated by the Director Postgraduate Studies.

(Explanation: out of 18 weeks, 16 weeks shall be actual teaching time. The rest may be utilized for enrollment, conduct of examinations and declaration of results, etc.)

6.4 Registration in Semester / Courses of Study

i. The students are required to register themselves in at least one course offered as such for the Semester by concerned Department(s) and/or registration for Dissertation.

ii. Registration in course(s) shall be open to the student who:

a. has been offered admission.
b. has achieved at least 2.0 CGPA.

iii. A student whose CGPA is less than 2.0, if desires, shall be allowed to register in new course(s) for earning credit.

iv. Such student shall be on probation and must achieve at least 2.5 CGPA on completion of the semester.

v. Failing to achieve at least 2.0 CGPA, she/he shall be allowed to register in course(s) only for the improvement of CGPA.

vi. Any student may be allowed to take one course of three credit hours offered under any other area of specialization in the same Department or in any other Department of the University with the recommendation of member of BOASRATD or concerned Chairman and with approval of director postgraduate studies.

vii. Registration of students in any course may be subjected to the maximum number of students in the class.

viii. An offered course shall be withdrawn if less than 4 four students have been registered in that specific course.

ix. Any student may be allowed to change a course within two weeks after the date of the commencement of the classes by the permission of member of BOASAT/chairman concerned department and with prior of director postgraduate studies.

6.5 Transfer of Credits / Exemption

Transfer of credit/ exemption of courses(s) may be granted by the concerned Chairman against courses(s) which the student has passed earlier provided that:

i. Application must be submitted before the completion of first semester of studies.

ii. Discontinuation of his/her studies has not exceeded two calendar years.

iii. Such course(s) was (were) not counted towards any other degree.

6.6 Transfer of Credits

The BOASRATD may consider credits earned by a student at another HEC recognized institution, subject to a maximum of 50 per cent of the minimum credit requirements for the degree, on the recommendations of Equivalence Committee, constituted by VC provided that:

i. The contents of the course(s) for which credit is claimed, are identical or similar to the course included in his/her planned course work.

ii. The course for which credit is claimed should not have been used for any other degree.

iii. Courses with less than B grade shall not be considered for transfer of credit hours.
iv. Any credit course(s) completed during preceding four semesters from this University with at least .B. grade may be credited with transfer of grade(s) as follows;

v. Course(s) listed under the current scheme of specialization

vi. One course from any other specialization in line with clause 12.6(vi), if applicable.

vii. Students shall submit their course work during first semester and Synopsis should be approved by the end of 3rd semester of their programme of study

viii. A course studied to qualify a degree shall not be taken / considered for any other higher degree programme.

ix. Credit earned for a course shall lapse on the expiry of five years for regular student and seven years for part time student from the end of the semester in which the course was qualified. The BOASRATD may revalidate the lapsed courses for special reasons to be recorded.

x. No course shall carry more than 4 credit hours.

6.7 Exemption of Courses
Subject to equivalence, exemption may be granted:

i. To a maximum of six credit hours equivalent courses passed in at least .B. grade from any other institution.

ii. Any number of non-credit courses from any other institution. Grades of exempted course(s) shall not be counted towards CGPA and the thirty credit hours requirement for the degree shall be reduced accordingly.

Note: Necessary notification towards grant of transfer of credits /exemption shall be issued in each case.

6.8 Cancellation of Admission
The admission of a student enrolled in any Program shall be cancelled under the following circumstances:

i. If the student is involved in any breach of discipline as prescribed in Regulations.

ii. If a student fails to register in any semester without being officially allowed withdrawal either from the Semester or from the Program.

6.9 Withdrawal from Semester

i. A student may discontinue an enrolled semester before appearing in the final examination with the permission of the Vice Chancellor, obtained through the DPS on the recommendations of the Chairman/member BOASRATD on account of sickness duly certified by the University Medical Officer or due to circumstances beyond his/her control, subject to fulfillment of condition that the student has passed the final examination of previous semester with minimum prescribed GPA/CGPA required for the said degree programme.

ii. The facility of discontinuation can be availed only once during the whole degree programme and that too for one semester only.
iii. A candidate shall not ordinarily be allowed to discontinue studies during the first semester.

iv. A student permitted to discontinue is required to resume his/her studies from the next semester on the recommendation of Chairman or member BOASRATD notified by the Director Postgraduate Studies.

v. During the semester freeze, bonafide status of the student shall remain suspended. He/she will not be entitled to avail any privilege as that of a regular student.

vi. The fees paid shall not be refunded. In any case withdrawal shall only be allowed after successful completion of first semester.

6.10 Withdrawal from Program

A student, who is unable to continue his/her studies because of unavoidable circumstances on his/her part and desires withdrawal from the Program, should apply to the director postgraduate studies. If allowed, necessary notification shall be issued. In any case withdrawal shall only be allowed after successful completion of first semester.

6.11 Re-Admission in the Program

i. A student who has officially withdrawn from the Program may be readmitted in the program provided that the period of absence together with period of study shall not exceed maximum permissible period as given in rules

ii. If a student fails to enroll in any semester(s) without permission of the competent authority, he/she shall cease to be on the rolls of the university and in case he/she desires re-admission, he/she shall have to apply for the same.

iii. The BOASRATD may re-admit such a candidate subject to the payment of Rs. 5000/- in additional of semester admission fee as per semester gap fee.

iii. The BOASRATD may refuse the re-admission if the reasons presented are not convincing.

7. Grades:

Grades given to a student in each course shall be of two types:

(i) Numerical Grades:

Assessment of performance on the basis of marks (out of 100) fixed for a course of any credit Hours Unit, shall be termed Numerical grade (NG).

(ii) Alphabetical Grades

Equivalent of numerical grade in terms of alphabets shall be termed as Alphabetical Grade (AG). Each letter carries a value in terms of numerical points of Grade point (GP).

7.1 Grading System:

a) Grade points should be as follows:

A for 4, B+ for 3.5, B for 3, C+ for 2.5, C for 2, D for 1 and F for 0 or fail and I for incomplete.

Maximum Grade Point Average = 4.00

Please Note: Each course Title consists of theory and Practical, as given in the Courses of studies

b) Equivalence between letter grading and numerical grading shall be as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Marks (%)</th>
<th>GP</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100</td>
<td>4.0</td>
<td>Excellent</td>
<td></td>
</tr>
<tr>
<td>B+</td>
<td>80-89</td>
<td>3.5</td>
<td>Very Good</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>75-79</td>
<td>3.0</td>
<td>Good</td>
<td></td>
</tr>
</tbody>
</table>

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i. If a student fails to obtain CGPA of 2.0 at the end of each academic year (fall, spring and following summer) his/her admission shall stand cancelled. However he/she may seek fresh admission.

Note: The student who avails only one regular semester (fall/spring) must obtain GPA of 2.5 at the end of summer session of the same academic year to remain on roll.

ii. A student, who obtains CGPA of 2.5 or more but less than 3.00 upon the completion of entire approved course work, may be allowed to repeat once the courses of the previous semesters in which he/she had obtained the lowest grades in order to improve the CGPA so as to obtain the minimum of 3.00 failing which he/she shall cease to be on the rolls.

iii. CGPA of 3.00 out of 4.00 is required to qualify for the award of degree.

7.2 Grade Point Average

The academic rating of a student shall be calculated on the basis of the Grade Point Average. The Grade Points obtained by a student in each course shall be multiplied by the number of credit hours specified for that course and then the Grade Point Average (GPA) shall be calculated.

7.3 Cumulative Grade Point Average

a) The Cumulative Grade Point Average (CGPA) shall be calculated at the end of the second semester and each of the subsequent semesters.

b) If a student fails to secure a minimum CGPA of 2.00 at the end of the 8th semester he/she will be given one additional chance to pass a course in which he/she has obtained the lowest grade, when it is offered for the examination.

c) If a student is unable to pass a course or courses in the additional chance given, he/she will stand automatically removed from the rolls of the university.

d) A student will be given one additional chance to improve his/her CGPA by repeating a course or reappearing in the examination of a course he/she has obtained Grade C or lower, when the course is offered for examination.

e) If a student fails to make up the deficiency in his/her Cumulative Grade Point Average in the number of chances permitted, he/she will cease to be on the rolls of the university.

8. Examination

i. There shall be two examinations mid and final in each semester. In addition to these examinations, the teacher shall give home assignments and quizzes etc. to the students. The nature of these examinations will be left to the teacher who will be solely responsible for the conduct of examination as well as evaluation in his/her course. The grade given in the course by the teacher shall be final but.

ii. Only those students, who have at least 75% attendance in theory and practical separately in each course, shall be eligible to appear in the final examination.

iii. A teacher shall report to the DPS the names of students who are absent from the lectures/practical continuously for seven days to enable DPS to struck off the names of such students. The struck off students may be readmitted under the university rules or refused admission if the reasons given for readmission are not convincing enough.

iv. The final examination for a semester shall be held on a date, time and place to be notified by controller of examinations.

iv. The scripts of each examination shall be discussed with the students.
v. The mid-semester examination shall be held during 9th week of the semester which shall carry 30 per cent of the total allocated marks for the course. This examination shall be held by the teacher concerned who shall determine the form of the examination.

vi. For the purpose of evaluation, one credit will carry 20 marks e.g. a four credit course will carry 80 marks. These marks will be divided in accordance with the credits assigned to theory and practical for each course.

vii. Final examination covering the full syllabus with at least 25% of the course of mid-semester as well shall be held at the end of each semester.

ix. Question paper for the mid and final semester examinations shall be set by the respective teacher. However, DPS or Chairman / member BOASRATD shall ensure the quality and standard of the question paper set by the teacher.

x. To qualify a course, it is essential to pass separately in the theory and practical examinations.

xii. Teacher shall send the final award list along with answer sheets of mid, final and practical for the course to the office of the Controller of Examinations through DPS within 10 days after the end of a semester. BOASRATD may condone the delay in result submission. A soft copy of the award list should also be sent to the office of the DPS.

9. Evaluation

a) The evaluation of the students shall be done by following assessment methods for each course during each Semester. These shall be termed.
   i. Quizzes/Surprise Tests/Assignment/Presentation,
   ii. Mid-term test,
   iii. Practical Examination/Lab.
   iv. Semester Examination

b) The nature of examinations shall be determined by the teacher concerned who will be responsible for the final evaluation. The grade given in the course by the teacher/examiner shall be final.

9.1 Quizzes/Surprise Tests/Assignment/Presentation

a) At least two Assignments and two surprise tests/quizzes shall be given in each course during a semester. The first assignment and first surprise test/quiz shall be given, collected and assessed within 3rd & 5th week and the second assignment and second surprise test/quiz shall be given, collected and assessed within 12th and 14th week of the commencement of the semester.

9.2 Mid-Term test

a) There shall be a Mid-term Test in a course during a semester, which will be held during the 9th week after the commencement of the Semester.

b) The duration of the Midterm Test shall not be more than one hours.

c) The conduct (fixing of time, date and place) of Mid-term Test shall be the responsibility of the director postgraduate studies.

9.3 Practical Examination/Lab. Examination

The Practical/Lab. Examination may include:
   i. Journals, Reports-Evaluation.
   ii. Practical, Viva-Voce Examination.

9.4 Semester Examination

a) The Examination in all the courses shall be conducted by the Controller of Examinations.
b) The Examination shall be open to a student who has been on the rolls of the University prior to his/her examination form is duly certified and forwarded by the member BOASRATD of the Department.

c) The duration of Examination in all the courses (irrespective of the number of credit hours) shall not be more than three hours.

d) The Examination shall be held at the end of each semester. One week preparation leave shall be allowed to the students after the completion of 16 weeks teaching period and before the commencement of Semester Examination.

e) The Examination schedule / Program shall be prepared by the Controller of examinations in consultation with the director postgraduate studies and approved by the Vice Chancellor.

f) The examination schedule / program shall be notified by the Controller of examinations at least one week in advance of the commencement of the examination.

g) After holding the final term examination each teacher shall prepare three copies of the result/awards on the prescribed award list. He/she shall retain one copy with him/her, shall send one copy to the director postgraduate and last to the Controller of Examinations along with scripts and question paper. The Controller of Examinations shall prepare the final result and submit it to Vice Chancellor for approval. After the approval, the result shall be notified by the Controller of Examinations and a copy of the same shall be sent to the director postgraduate studies. After deciding the appeals / written complaints/incomplete results, if any, the scripts of each test shall be kept in record by the Controller of Examinations along with the copy of final result notification.

h) Results of each semester along with scripts shall be forwarded to Controller of Examinations, within the prescribed period as mentioned in Examinations Rules.

i) The Controller of Examination shall be responsible for compilation/tabulation of the results and for submitting it to the /Vice Chancellor for approval before its announcement.

j) The Controller of examination shall issue Marks / Grade certificate to each individual student appearing in the examination on the prescribed form and fees within two weeks from the date of declaration of the results on the request of the student.

k) If the courses qualified by a candidate do not provide adequate back-ground for the degree course which he intends to take up, the deficiency* shall be met by taking one or more additional course(s) as may be prescribed/ determined by the concerned department [Deficiency / Pre-requisite course(s) shall be mandatory to pass but it shall not be counted in calculating GPA/CGPA and shall not have any effect on the academic position of a student. However, in case of transfer of credit hours/migration from any other institution, deficiency course(s) shall be considered credit course(s).]

9.5 Distribution of Marks for each Course

The distribution of marks (weightage of grade) in semester will be as follows:

| For courses where laboratory Practicals are involved: | Surprize Tests/Quizzes | 05 Marks |
| (a) | Assignment | 05 Marks |
| (b) | Midterm Test | 20 Marks |
| (c) | Practical/Lab. Examination | 20 Marks |
| (d) | Semester Examination | 50 Marks |
| (e) | | |
| Total: | | 100 Marks |
10 Class Attendance

The students shall be expected to attend the classes regularly and submit the home-assignment when due. A candidate with less than 75 percent attendance in any course shall not be allowed to take the final examination in that course.

A candidate with less than 75% attendance in a particular course shall not be allowed to take the Semester Examination of that course. For genuine reasons the director postgraduate studies may condone 5% shortage in attendance on the recommendations of the member BOASRATD of the Department. In exceptional cases the Vice Chancellor may further condone 5% shortage in attendance on the recommendations of the dean. Beyond this limit the academic council shall be the competent authority.

11 Absence from Examination

A student, who fails to appear in the scheduled final examination in any course after having been allowed to take the examination for the same, shall be awarded grade ‘I’ in that course(s). For change of grade, such student shall be allowed to take (makeup) examination in that course(s) during the next semester by the director postgraduate studies.

12 Change of Grade/ Improvement

Registration in a course for change of grade/improvement will be subject to the following conditions:

i. A compulsory course which the student is required to repeat for obtaining a passing grade or a course selected by the student for improvement of his/her CGPA

ii. Any other credit course in lieu of an optional course

iii. Better grade(s), if any, will be considered for determining GPA / CGPA

13 Dissertation

Every student must be registered for dissertation after having completed 24 credit hour courses

13.1 Research Assignment and Supervision

i. A student will be assigned Supervisor(s) who possesses PhD Degree. However due to least number of PhD supervisors, master degree holder can be considered for nomination as supervisor. The Supervisor(s) shall be recommended by BOASRATD. The approval of the supervisor shall be given by the Vice Chancellor.

ii. The Supervisor shall be responsible for;

a. Initial definition/selection of the topic of the research and plan of the research assigned to the candidate.

b. Guiding the candidate in development of the research proposal, overall monitoring and guidance, dissertation writing and other matters related to the program.

c. Guiding the student is publishing his/her work in Journal/conference.

iii. The research proposal for dissertation is to be evaluated by a Postgraduate Research Committee comprising of three senior faculty members including Chairman. This Committee is to be constituted by director postgraduate studies for evaluation of the proposal whenever submitted. Final approval shall be granted be the BOASRATD.

iv. The Supervisor shall regularly monitor the progress of the candidate.

v. The candidate shall be required to present his/her work at one seminar during the period of research.

vi. The research work shall be carried out within the University. However a student duly recommended by the DPS and Dean of the faculty concerned to conduct
his/her complete/part of thesis research in other institution/laboratory, is allowed by the BOASRATD the helping teacher/scientist may be taken as co-supervisor/special member on the supervisory committee of the student.

13.2 Thesis Examination

i. Thesis must be submitted latest by the 60 days grace period after the closing date of the semester as otherwise candidate admitted to a degree programme shall so long as he/she has not submitted thesis, has to enroll for each semester

ii. A student shall be entitled to submit thesis for examination after he/she has qualified the approved courses work. He/she is required to submit thesis examination fee before the submission of semi-final thesis.

iii. The thesis shall be prepared according to the guidelines approved by the BOASRATD and shall be submitted to the office of the Director postgraduate Studies.

iv. The thesis duly certified by the supervisory committee that the contents and form of the thesis are satisfactory for submission shall be sent to the external examiner by the office of the Controller of Examinations for evaluation. A panel of three examiners per student shall be submitted to the Controller of Examinations office by the DPS on or before the submission of thesis.

v. The thesis shall be evaluated by a Board of Examiners comprising members of the supervisory committee and one external examiner appointed by the Vice Chancellor from the panel of names recommended by the BOASRATD. At least three members of the Boards of Examiners of whom one must be an external examiner shall “for the purpose of evaluating the thesis,” hold a viva voce examination and such other tests as they consider necessary. The external examiner shall be given reasonable time to go through the contents of the thesis critically. The viva voce examination shall be conducted at least one week after the receipt of thesis by the external examiner.

vi. The thesis evaluation shall be conducted within six months from the date of dispatch of thesis from the Controller of Examinations to the quarter concerned failing which the student will be declared/assumed fail in the thesis examination and shall be notified by the office of the Controller of Examinations. However, the Vice Chancellor may allow extension for thesis evaluation up to one year in hardship cases.

vii. The thesis evaluation should be completed within six months from the date of dispatch of thesis by the Controller of Examinations to the quarter concerned. The Controller of Examinations shall get the approval of the external examiner from the Vice Chancellor and thesis shall be dispatched to him/her accordingly. In case of regret from the first External Examiner nominee (s), second approval of External Examiner nominee (s) shall be sought within eight weeks from the Vice Chancellor by the Controller of Examinations. However, the Vice Chancellor may allow extension for thesis evaluation up to one year in hardship cases.

viii. Supervisor after consultation with external examiner shall write to the Controller Examination for notifying the date, time and venue of thesis evaluation.

ix. The supervisor shall send the award list of thesis examination after counter signature of the DPS to the office of the Controller of Examinations after making sure that the student has incorporated the suggested improvements. The
Controller of Examinations shall notify the result of the student after receiving three bound copies of thesis.

x. Original Plagiarism report along with the certificate from supervisor and declaration by the student must be submitted while submitting the thesis to the Directorate of Postgraduate Studies. The Directorate of Postgraduate Studies shall notify the dates for the semi-final and final phases of thesis submission.

xi. The color of hard bound cover of M.E. program shall be Black.

xii. In case of disagreement between the Supervisory Committee and the External Examiner regarding the acceptance of the thesis it shall be referred to another external examiner, with the due approval of the Competent Authority (the Vice Chancellor), whose decision shall be final.

xiii. If a candidate fails in the thesis examination, he/she may enroll again and will submit a revised thesis within six months after the date of declaration of the result of the last thesis examination, on payment of the prescribed thesis examination fee. He/she can avail this chance only once.

xiv. If the thesis, submitted by a candidate for final evaluation, is proved to be copied/plagiarized at the time of viva-voce examination, it will be liable to be rejected on the report of Board of Examiners and the Controller of Examinations will declare the candidate fail in thesis examination. The admission of such candidate shall be cancelled and he/she shall not be readmitted under any circumstances.

xv. If the thesis of a candidate is proved to be plagiarized after its evaluation and declaration of result, previous result of the candidate will be cancelled and he/she will be declared as fail in thesis examination. Such a candidate shall not be readmitted under any circumstances.

13.3 Attendance and Monitoring

i. Each candidate shall be expected to attend the University regularly and submit to the Supervisor. Quarterly Progress Reports (QPR). This report has to be submitted to DPS through the Supervisor.

ii. Any student who is unable to perform satisfactory in dissertation as reflected in QPR may be allowed by Dean on the recommendations of supervisor and chairman to complete remaining credit hours by course work provided that the maximum time period shall remain as is given in Para 8.1 (iv & v)

iii. Any candidate failing to attend the University regularly/ or not showing sufficient progress may not be allowed to continue enrolment in the program.

iv. A candidate, who is temporarily unable to continue research because of unavoidable circumstances, should file an application to the Chairman of the concerned Department through the Supervisor for temporary suspension from the program. Such leave of absence shall not exceed twelve months.

v. On return after availing the leave, director postgraduate studies on the recommendation of Supervisor may allow the student to continue.

vi. The maximum duration for completion of Master Degree with dissertation may be extended for up to twelve months on recommendations of Supervisor.
13.4 Evaluation of Dissertation

i. A candidate may be allowed by the director postgraduate studies to submit the dissertation only after:
   a. Fulfilling all requirements as suggested by the BOASRATD.
   b. Pursuing research work for at least six months.
   c. Presenting the research work in a satisfactory manner;
   d. Fulfilling all other regulatory requirements prescribed by the University.

ii. A candidate shall submit an application after fulfilling conditions of Section 19.2, to the director postgraduate studies for the examination and shall submit four copies of the dissertation for evaluation.

iii. The candidate shall be examined orally and will be provided an opportunity to defend his/her dissertation.

iv. The Vice Chancellor, on the recommendation of the BOASRATD, shall nominate an Examiner’s Committee comprising of at least three examiners including the Supervisor. Examiner may be from outside the University.

v. The result of final dissertation shall be declared in the following manner:
   a. Requirement fulfilled without any corrections
   b. Requirement fulfilled with corrections
   c. resubmit

vi. The Examiner’s Committee shall examine and grade the dissertation: .S. for satisfactory without any corrections or with corrections; otherwise .U. for unsatisfactory.

vii. In case of result as 13.4(v)b, one of the member of the Examiner’s Committee, as nominated by the Examiner’s Committee, shall certify that the corrections are carried out as recommended by the Examiner’s Committee.

viii. In the case of a failure, the Examiners’ Committee shall indicate in what respect the material of the dissertation should be modified and specify period for re-submission. Committee shall also decide whether to hold subsequent examination or not.

The Examiner’s Committee shall submit the result of the entire examination immediately after the oral examination and submit the result on the prescribed form to the Controller of Examinations.

13.5 Submission of Dissertation

i. A candidate, having qualified for Master’s Degree, shall submit four copies of the dissertation on a prescribed format to the director postgraduate studies.

ii. The Balochistan University of Engineering & Technology shall have the right to publish the dissertation or any part thereof irrespective of whether or not the research work is completed.
14 **Award of Degree**

Any student who has fulfilled following conditions shall be eligible for the award of Masters Degree in the relevant field;

i. Passed all non-credit courses, if required.

ii. Passed all credit courses counted towards degree with minimum 2.5 CGPA within specified time

iii. Satisfactorily completed Dissertation

iv. Satisfactorily completed all other requirements

15 **General Provision**

Regulations and rules of the Undergraduate Program shall not be applicable to any Post-graduate Program unless otherwise specified by the appropriate authority.