

# Department of Computer Science & IT

## Programs Offered:

Bachelor of Science in  
Computer Science

Master of Computer Science

Bachelor of Science in Electronics

Master of Electronics

Bachelor of Science in  
Telecommunication

Master of Telecommunication

Bachelor of Science in  
Software Engineering

Bachelor of Science in  
Computer Engineering Technology

## Vision

To become a prominent Department of Computer Science & IT in producing competent professionals with research and innovation skills, inculcating moral values and societal concerns.

## Mission

- Providing a strong theoretical and practical background across the computer science discipline with an emphasis on software development
- Imparting the skills necessary to continue education to grow professionally
- Empowering the youth in rural communities with computer education
- Inculcating professional behavior, strong ethical values, innovative research capabilities and leadership abilities
- Create facilities and expertise in advanced computer technology thereby promote research

# Bachelor of Science in Computer Science

Minimum Duration : 8 Semesters, 4 Years  
 Maximum Duration : 16 Semesters, 8 Years  
 Minimum CGPA required to earn degree 2.00

Program Code 001  
 Number of Courses 43 + Research Project  
 Credit Hours 135

## Program Objectives:

- ▶ To provide a solid foundation in Computer Science that supports an interdisciplinary education with liberal arts framework and prepares students for professions in computing sciences and information sciences in general
- ▶ To help students to develop the abilities to predict, to analyze, think critically, to deduct and consider alternatives to be creative as problem solvers
- ▶ To develop courses and human resources that view computer science as part of the human endeavor, that is, to see computer science in relation with more general intellectual development to the needs of society
- ▶ To foster an aptitude and desire for life-long learning and make the graduate capable to adopt new emerging technologies for the new generations
- ▶ To achieve a sound base to pursue if desire post graduate degree education and research. It demonstrate confidence in applying knowledge of computing and mathematics

## Eligibility

Intermediate (Pre-Engineering/ Computer Science) with at least 45% Marks or A-Levels (22 Points) with Equivalency Certificate from IBCC Islamabad or an equivalent certificate from a recognized institution.

Candidates need to pass an Entry test/aptitude interview conducted by the university.

Course Code	Course Title	Cr. Hrs.
<b>SEMESTER ONE</b>		
CS 110	Introduction to CS (GE)	2-1
MA 101	Calculus and Analytical Geometry (CS Supporting)	3-0
GS 111	Physics-I (UE)	2-1
ENG 111	Basic Communication Skills (GE)	3-0
CS 116	Programming Fundamentals (CS Core)	3-1
GS 123	Islamic Studies (for Muslims) OR	2-0
GS 240	Values Ethics & Society ( for Non-Muslims)	2-0
<b>SEMESTER TWO</b>		
MA 105	Multivariable Calculus (CS Supporting)	3-0
CS 125	Object Oriented Programming (pre-req.CS116) (CS Core)	3-1
ELC 216	Electronics I (CS Supporting)	2-1
MA 213	Discrete Maths (CS Core)	3-0
ENG 316	Effective Communication Skills (GE)	3-0
GS 128	Pakistan Studies (GE)	2-0
<b>SEMESTER THREE</b>		
CS 232	Data Structures (CS Core)	2-1
MGT 106	Principles of Management (UE)	3-0
EE 223	Digital Logic Design (CS Core)	2-1
MA 242	Differential Equations (CS Supporting)	3-0
MA 313	Probability & Statistics (CS Supporting)	3-0
IT 212	Database Concepts (CS Core)	3-1

**Program Outcomes:**

- ▶ An ability to apply knowledge of computing and mathematics to the appropriate discipline
- ▶ An ability to analyze a problem and identify and define the computing requirements appropriate to its solutions
- ▶ An ability to design, implement and evaluate a computer-based system, process, component, or program, including software systems of varying complexity, to meet desired needs
- ▶ An understanding of professional, ethical, legal, security and social issues and responsibilities
- ▶ An ability to analyze and evaluate performance tradeoffs of algorithms, data structures and hardware solutions
- ▶ An ability to function effectively on teams to accomplish a common goal

SEMESTER FOUR	Course Code	Course Title	Cr. Hrs.
	MA 235	Applied Linear Algebra (CS Supporting)	3-0
	SE 336	Software Engineering (CS Core)	3-0
	COM 204	Data Communication & Networks (CS Core)	3-1
	CS 241	Design and Analysis of Algorithms (pre-req CS 232) (CS Core)	2-1
	CS 323	Microprocessor Architecture & Assembly Languages (CS Core)	3-1

SEMESTER FIVE	Course Code	Course Title	Cr. Hrs.
	MA 306	Numerical Analysis (CS Supporting)	2-1
	CS 222	Operating System (CS Core)	3-1
	CS 236	Programming in JAVA (CS Core)	2-1
	CS 252	Computer Organization & Architecture (CS Core)	3-0
	CS 340	Automata Theory (CS Core)	3-0

SEMESTER SIX	Course Code	Course Title	Cr. Hrs.
	MGT 270	Entrepreneurship	3-0
	CS 345	Compiler Concepts (CS Core)	2-1
		Elective I	3-0
		Elective II	3-0
		Elective III	3-0
		Elective IV	3-0

SEMESTER SEVEN	Course Code	Course Title	Cr. Hrs.
	IT 314	Artificial Intelligence (CS Core)	3-0
	CS 438	Human Computer Interaction (CS Core)	2-1
	RES 491	Project Phase I (CS Core)	0-3
	ENG 322	Technical Report Writing (GE)	2-0
		Elective V	3-0
		Elective VI	3-0

SEMESTER EIGHT	Course Code	Course Title	Cr. Hrs.
	CS 355	Operation Research	3-0
	SE 668	Software Project Management (UE)	3-0
	CS 444	Professional Practices (GE)	3-0
	RES 492	Project Phase II (CS Core)	0-3
	RES 201	Seminar (UE)	0-1

## Bachelor of Science in Computer Science

### Electives

#### DATABASE DEVELOPMENT

Course Code	Course Title	Cr. Hrs.
CS 424	Database Security	3-0
IT 465	Distributed Database	2-1
IT 422	Data Warehousing	3-0
IT 335	Database Programming	2-1
CS 412	Big Data Analytical	3-0
CS 413	Enterprise System	3-0

#### SYSTEM DEVELOPMENT & ARTIFICIAL INTELLIGENCE

Course Code	Course Title	Cr. Hrs.
CS 332	Visual Programming	2-1
CS 403	Systems Programming	3-0
IT 310	Fundamentals of .Net	2-1
CS 415	Open Source Operating System	3-0
CS 442	Mobile Application Development-I	2-1
CS 443	Mobile Application Development-II	2-1

#### SYSTEM ADMINISTRATION AND NETWORKING

Course Code	Course Title	Cr. Hrs.
CS 632	Distributed Systems	2-1
CS 411	Embedded Systems	2-1
IT 450	Voice and Data Integration	2-1
COM 401	Wireless Applications Protocols	2-1
IT 302	Advanced Networking	2-1
CS 310	Network Security	3-0
COM 375	Next Generation Networks	3-0
COM 422	Routing and Switching	3-1

#### WEB DESIGN AND DEVELOPMENT

Course Code	Course Title	Cr. Hrs.
CS 334	Multimedia Design and Development	3-0
SUIT	Java Internet Programming	2-0
CS 406	Web Engineering	3-0
IT 275	Web Programming	2-1
CS421	Semantic Web	3-0
CS 414	Cyber Security	3-0
CS 417	Internet of Thing	3-0

#### SOFTWARE ENGINEERING

Course Code	Course Title	Cr. Hrs.
SE 450	Software Metrics and Testing	3-0
SE 451	Software Requirements Engineering	3-0
SE 452	OOP-Software Engineering	3-0
SE 323	Software Requirement and Validation	3-0
SE 312	Formal Methods in SE	3-0
SE 412	Design Pattern	3-0
SE 222	Software Constructions	3-0

#### UNIVERSITY ELECTIVES

Course Code	Course Title	Cr. Hrs.
GS 322	Sociology	3-0
MGT 106	Principles of Management	3-0
GS 302	Critical Logic and Thinking	3-0
HR 332	Human Resource Management	3-0

The facility for teaching of any of the elective course will be arranged only if reasonable number of students opt for.

# Master of Computer Science

Minimum Duration : 4 Semesters, 2 Years  
 Maximum Duration : 10 Semesters, 5 Years  
 Minimum CGPA required to earn degree 2.00

Program Code 011  
 Number of Courses 22 + Research Project  
 Credit Hours 69

## Eligibility

Candidates holding 14 years degree in Bachelor of Science (Mathematics) with at-least 45% marks (second division) are eligible. Candidates need to pass the entry test/aptitude interview conducted by the University.

## Program Objectives:

The MCS program is focused on providing an opportunity to those graduate students who are interested in pursuing careers in the fields of Computer Science and Information Technology. The program facilitates pursuing studies in a number of specializations including software engineering, systems development, artificial intelligence and management. The syllabus is periodically updated so as to keep our students abreast with the latest developments.

## Program Outcomes:

- ▶ An understanding of professional, ethical, legal, security and social issues and responsibilities.
- ▶ An ability to communicate effectively, both written and oral, with a range of audiences.
- ▶ An ability to analyze the local and global impact of computing on individuals, organizations and society.
- ▶ A recognition of the need for and an ability to engage in continuing professional development.
- ▶ An ability to use current techniques, skills and tools necessary for computing practice, including the ability of expressing algorithms in at least two of the most important computer languages.

SEMESTER ONE	Course Code	Course Title	Cr. Hrs. 18
	CS 110	Introduction to CS	2-1
	CS 116	Programming Fundamentals	2-1
	ENG 315	Effective Business Communications	3-0
	EE 350	Basic Electronics & DLD	2-1
	MA 301	Mathematical Theory for CS	3-0
	COM 304	Data Communication	3-0

SEMESTER TWO	Course Code	Course Title	Cr. Hrs. 18
	CS 125	Object Oriented Programming	2-1
	CS 222	Operating Systems	3-0
	CS 232	Data Structures & Algorithms	2-1
	CS 355	Operations Research	3-0
	SE 336	Software Engineering & CASE Tools	3-0
	IT 212	Database Systems	2-1

SEMESTER THREE	Course Code	Course Title	Cr. Hrs. 18
	IT 350	E-Commerce	3-0
	CS 236	Programming in Java	2-1
	EE 313	Microprocessor Architecture & Assembly Language	2-1
	CS 331	Object Oriented Analysis & Design	3-0
	IT 314	Artificial Intelligence	3-0
		Elective I	3-0

SEMESTER FOUR	Course Code	Course Title	Cr. Hrs. 15
	CS 345	Compiler Concepts	3-0
		Elective II	3-0
		Elective III	3-0
		Elective IV	3-0
	RES 480	Research Project	0-3

**Electives**

**DATABASE DEVELOPMENT**

Course Code	Course Title	Cr. Hrs.
CS 424	Database Security	3-0
IT 465	Distributed Database	2-1
IT 422	Data Warehousing	3-0
IT 335	Database Programming	2-1
CS 412	Big Data Analytical	3-0
CS 413	Enterprise System	3-0

**WEB DESIGN AND DEVELOPMENT**

Course Code	Course Title	Cr. Hrs.
CS 334	Multimedia Design and Development	3-0
SUIT	Java Internet Programming	2-0
CS 406	Web Engineering	3-0
IT 275	Web Programming	2-1
CS421	Semantic Web	3-0
CS 414	Cyber Security	3-0
CS 417	Internet of Thing	3-0

**SYSTEM DEVELOPMENT & ARTIFICIAL INTELLIGENCE**

Course Code	Course Title	Cr. Hrs.
CS 332	Visual Programming	2-1
CS 403	Systems Programming	3-0
IT 310	Fundamentals of .Net	2-1
CS 415	Open Source Operating System	3-0
CS 442	Mobile Application Development-I	2-1
CS 443	Mobile Application Development-II	2-1

**SOFTWARE ENGINEERING**

Course Code	Course Title	Cr. Hrs.
SE 450	Software Metrics and Testing	3-0
SE 451	Software Requirements Engineering	3-0
SE 452	OOP-Software Engineering	3-0
SE 323	Software Requirement and Validation	3-0
SE 312	Formal Methods in SE	3-0
SE 412	Design Pattern	3-0
SE 222	Software Constructions	3-0

**SYSTEM ADMINISTRATION AND NETWORKING**

Course Code	Course Title	Cr. Hrs.
CS 632	Distributed Systems	2-1
CS 411	Embedded Systems	2-1
IT 450	Voice and Data Integration	2-1
COM 401	Wireless Applications Protocols	2-1
IT 302	Advanced Networking	2-1
CS 310	Network Security	3-0
COM 375	Next Generation Networks	3-0
COM 422	Routing and Switching	3-1

The facility for teaching of any of the elective course will be arranged only if reasonable number of students opt for.

# Bachelor of Science in Electronics

Minimum Duration : 8 Semesters, 4 Years  
 Maximum Duration : 16 Semesters, 8 Years  
 Minimum CGPA required to earn degree 2.00

Program Code 008  
 Number of Courses 43 + Research Project  
 Credit Hours 133

## Program Objectives:

The BS Electronics program has been designed to equip our graduates with the necessary tools, teaching techniques and knowledge of the field. These graduates can prove their worth in industrial concerns, businesses, teaching or research. Owing to their knowledge and expertise, they can help the local industry in reaping the benefits of industrial automation in the real sense.

## Program Outcomes:

- ▶ An ability to select and apply the knowledge, techniques, skills and modern tools of the discipline to broadly-defined engineering technology activities.
- ▶ An ability to function effectively as a member or leader on a technical team.
- ▶ An ability to identify, analyze and solve broadly-defined engineering technology problems.
- ▶ An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature.
- ▶ An understanding of the need for and an ability to engage in self-directed continuing professional development.
- ▶ An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity.

## Eligibility

Intermediate (Pre-Engineering/ Computer Science/DAE in relevant field ) with at least 45% Marks or any equivalent certificate from a recognized institution are eligible to apply.

Candidates need to pass an Entry test and aptitude interview conducted by the university.

SEMESTER ONE	Course Code	Course Title	Cr. Hrs. 18
	CS114	Introduction to Computing	2-1
	MA 101	Calculus & Analytical Geometry	3-0
	GS 111	Physics I	2-1
	ENG 111	Basic Communication Skills	3-0
	ELC127	Circuit Analysis	3-1
	GS 123	Islamic Studies (for Muslims) OR	2-0
	GS 240	Values Ethics & Society ( for Non-Muslims)	2-0

SEMESTER TWO	Course Code	Course Title	Cr. Hrs. 19
	MA 105	Multivariable Calculus	3-0
	ELC 216	Electronics I	2-1
	GS 131	Physics II	2-1
	GS 125	Object Oriented Programming	3-1
	ENG 316	Effective Communication Skills	3-0
	COM 301	Intro to Telecommunication	3-0

SEMESTER THREE	Course Code	Course Title	Cr. Hrs. 18
	MGT 106	Principal of Management	3-0
	GS128	Pakistan Studies	2-0
	ELC 226	Electronics II	2-1
	MA313	Probability & Statistics	3-0
	MA 135	Applied Linear Algebra	3-0
	ELC223	Digital Logic Design	3-1

## Bachelor of Science in Electronics

SEMESTER FOUR	Course Code	Course Title	Cr. Hrs. 16
	MGT427	Industrial Management	3-0
	ELC 213	Electric Machine-I	2-1
	COM 204	Data Communication	3-0
	CS 323	Microprocessor & Assembly Language	3-0
	MA 242	Differential Equations	3-0
	RES 201	Seminar (Audit Basis)	0-1

SEMESTER SEVEN	Course Code	Course Title	Cr. Hrs. 14
	ELC 416	Power Electronics	2-1
	ELC321	Control Systems	3-1
	ELC338	Microprocessor Interfacing Technology	2-1
	RES 491	Research Project I	0-3
RES 401	Seminar (Audit Base)	0-1	

SEMESTER FIVE	Course Code	Course Title	Cr. Hrs. 18
	COM232	Signals and Systems	3-0
	ENG322	Technical Report Writing	3-0
	ELC 334	Industrial Electronics	3-0
	EE367	Electronics Communication Systems	2-1
	CS252	Computer Architecture	3-0
MA 226	Numerical Analysis	3-0	

SEMESTER EIGHT	Course Code	Course Title	Cr. Hrs. 15
		Elective I	3-0
		Elective II	3-0
		Elective III	3-0
		Elective IV	3-0
	RES 492	Research Project II	0-3

SEMESTER SIX	Course Code	Course Title	Cr. Hrs. 15
	ELC 229	Solid State Electronics	3-0
	ELC221	Instrumentation and Measurement	3-0
	GS 304	Laser Applied Optics	2-0
	EE411	Digital Signal Processing	3-1
ELC315	Electromagnetic Field Theory	3-0	

### Electives

Course Code	Course Title	Cr. Hrs.	Course Code	Course Title	Cr. Hrs.
COM 311	Antenna & Wave Propagation	3-0	GS 233	Optics & Modern Physics	2-1
COM 313	Mobile Communication I	3-0	ELC 327	Advanced Electronics	3-0
COM 350	Mobile Communication II	3-0	ELC 370	Linear Integrated Circuits	3-0
COM 375	Next Generation Networks	2-1	ELC 455	Microwave & Satellite Systems	3-0
COM 406	Digital Image Processing	3-0	ELC 456	PLC Programming	2-1
COM 549	Fiber Optic Communication Networks	3-0	ELC 475	VLSI & Digital Design	3-0
ELC 360	Digital Filter Design	2-1	IT308	Information Theory and Code	3-0

The facility for teaching of any of the elective course will be arranged only if reasonable number of students opt for.



# Master of Electronics

Minimum Duration : 4 Semesters, 2 Years  
 Maximum Duration : 10 Semesters, 5 Years  
 Minimum CGPA required to earn degree 2.00

Program Code 014  
 Number of Courses 22 + Research Project  
 Credit Hours 74

## Eligibility

Candidates holding 14 years degree in Bachelor of Science (with Physics and Math) with at-least 45% marks (second division) are eligible. Candidates need to pass the entry / aptitude interview conducted by the University.

## Program Objectives:

Electronics is regarded as the backbone of the modern technologies including information technology. No country can progress without keeping abreast with the latest developments in this field. The MSc Electronics program has been designed to meet the ever increasing demand of graduates who fulfill the deficiency in the industries of Power & Communication. The program is a good blend of theoretical and practical/lab work. It aim at preparing our graduates for challenging assignments in a variety of settings.

## Program Outcomes:

- ▶ Knowledge of the impact of engineering technology solutions in a societal and global context.
- ▶ A commitment to quality, timeliness, and continuous improvement.
- ▶ The ability to analyze, designs, and implement control systems, instrumentation systems, communications systems, computer systems, or power systems.
- ▶ The ability to apply project management techniques to electrical/electronic(s) systems.
- ▶ The ability to utilize statistics/probability, transforms methods, discrete mathematics, or applied differential equations in support of electronic(s) systems.
- ▶ An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity.

SEMESTER ONE	Course Code	Course Title	Cr. Hrs. 20
	MA311	Methods of Applied Mathematics	3-0
	EE130	Basic Electronics & Instrumentation	3-1
	EE318	Circuit Analysis & Synthesis	3-1
	EE223	Digital Logic & Design	2-1
	Cs116	Programming Fundamentals	2-1
	ELC216	Electronic 1	2-1

SEMESTER TWO	Course Code	Course Title	Cr. Hrs. 19
	ELC 229	Solid State Electronics	2-1
	ELC 315	Electromagnetic Field Theory	3-0
	COM232	Signal & Systems	3-0
	ELC226	Electronics II	2-1
	ELC 313	Microprocessor Architecture & Assembly Language	3-1
	COM 304	Data Communication and Computer Networks	3-0

SEMESTER THREE	Course Code	Course Title	Cr. Hrs. 20
	ELC 321	Control System	3-1
	ELC 344	Opto Electronics	2-1
	ELC 360	Digital Filter Design	2-1
	COM 207	Communication Theory	3-0
	ELC 411	Digital Signal Processing	3-1
	ELC 334	Industrial Electronics	2-1

SEMESTER FOUR	Course Code	Course Title	Cr. Hrs. 15
	ELC 338	Microprocessor and Interfacing Technology	2-1
	ELC 456	PLC Programming	2-1
	ELC 529	Advance Digital Design (FPGA based)	3-0
	ELC 416	Power Electronics	2-1
	RES 490	Project	0-3

# Bachelor of Science in Telecommunication

Minimum Duration : 8 Semesters, 4 Years  
 Maximum Duration : 16 Semesters, 8 Years  
 Minimum CGPA required to earn degree 2.00

Program Code 103  
 Number of Courses 44 + Research Project  
 Credit Hours 139

## Program Objectives:

The BS Telecommunication program is designed to provide students with the skills and knowledge needed to meet the requirements of a rapidly advancing and challenging field that is in great demand in Pakistan and abroad.

Emphasis is placed on providing students with the broadband telecommunications background skills required to adapt to the dynamic field of telecommunications. A number of mathematics courses have been included to give the direly needed strength to our graduates in modeling the real world problems. The syllabus is designed so as to keep our students abreast with the latest technologies. The program also aims at providing students with a firm base for undertaking higher studies in Telecommunication Systems.

## Program Outcomes:

- ▶ An ability to apply knowledge of mathematics, science, and engineering.
- ▶ An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data
- ▶ An ability to function on multi-disciplinary teams.
- ▶ An ability to identify, formulate and solve telecommunications engineering problems.
- ▶ An understanding of professional and ethical responsibility.
- ▶ An ability to communicate effectively.

## Eligibility

Intermediate (Pre-Engineering/Computer Science) with at least 45% Marks or A-Levels (22 Points) with Equivalency Certificate from IBCC Islamabad or an equivalent certificate from a recognized institution.

Candidates need to pass an entry test and an aptitude interview conducted by the University.

SEMESTER ONE	Course Code	Course Title	Cr. Hrs. 18
	CS 110	Introduction to Computing	2-1
	MA 101	Calculus and Analytical Geometry	3-0
	GS 111	Physics-I	2-1
	ENG 111	Basic Communication Skills	3-0
	ELC127	Circuit Analysis	3-1
	GS 123	Islamic Studies (for Muslims) OR	2-0
	GS 240	Values Ethics & Society ( for Non-Muslims)	2-0

SEMESTER TWO	Course Code	Course Title	Cr. Hrs. 17
	MA 105	Multivariable Calculus	3-0
	GS 131	Physics-II	2-1
	COM 301	Intro to Telecommunication	3-0
	ELC 216	Electronics-I	2-1
	ENG 316	Effective Communication Skills	3-0
	GS 128	Pakistan Studies	2-0

SEMESTER THREE	Course Code	Course Title	Cr. Hrs. 19
	MA 135	Applied Linear Algebra	3-0
	MGT 106	Principles of Management	3-0
	EE 226	Electronics II	2-1
	EE 223	Digital Logic Design	3-1
	MA 313	Probability & Statistics	3-0
	CS 116	Programming Fundamentals	1-2

## Bachelor of Science in Telecommunication

### SEMESTER FOUR

Course Code	Course Title	Cr. Hrs.
EE 121	Electric Machines I	2-1
MA 242	Differential Equations	3-0
IT 340	Network Management	3-0
COM 204	Data Communication	3-0
CS 323	Microprocessor Architecture & Assembly Language	3-1
RES 201	Seminar	0-1

### SEMESTER FIVE

Course Code	Course Title	Cr. Hrs.
CS 252	Computer Architecture	3-0
MA 226	Numerical Analysis	3-0
COM 232	Signals & Systems	3-0
EE 367	Communication Systems	2-1
COM 332	Transmission Media	3-0
CS 161	Computer Aided Drawing (Auto CAD)	2-1

### SEMESTER SIX

Course Code	Course Title	Cr. Hrs.
COM 213	Computer Networks and Internet Working	3-1
EE 315	Electromagnetic Field Theory	3-0
COM 337	Digital Communications	2-1
EE 411	Digital Signal Processing	3-1
RES 302	Seminar (Audit Basis)	0-1
COM 228	Telecom Switching	3-0

### Electives

Course Code	Course Title	Cr. Hrs.
COM 311	Antenna & Wave Propagation	3-0
COM 313	Mobile Communication-I	3-0
COM 315	Network Filters	3-0
COM 340	Telecom Standards	3-0
COM 433	Optical & Wireless System	3-0
COM 440	Telecom Traffic Engineering	3-0
COM 350	Mobile Communication-II	3-0
COM 375	Next Generation Networks	3-0
COM 408	Fiber Optic Communications	3-0
COM 422	Routing and Switching	3-0
COM 462	Advance Signaling Systems 7	3-0
EE 455	Microwave & Satellite System	3-0
MA 330	Stochastic Process	3-0

### SEMESTER SEVEN

Course Code	Course Title	Cr. Hrs.
EE 321	Control Systems	3-1
EE 338	Microprocessor Interfacing Technologies	3-1
ENG 322	Technical Report Writing	3-0
	Elective-I	3-0
RES 491	Project Phase I	0-3

### SEMESTER EIGHT

Course Code	Course Title	Cr. Hrs.
	Elective-II	3-0
	Elective III	3-0
	Elective IV	3-0
	Elective-V	3-0
RES 492	Project Phase-II	0-3

The facility for teaching of any of the elective course will be arranged only if reasonable number of students opt for.

*Our greatest weakness lies in giving up, the most certain way to succeed is always to try just one more time". SUIT provides a degree which is a key and is a support to open the door to a world of opportunities. A lot of people want a shortcut. I find the best shortcut is a long way which is basically two words" Work Hard.*

*Arif Khursheed, Alumnus,  
Department of Computer Science*

# Master of Telecommunication

Minimum Duration : 4 Semesters, 2 Years  
 Maximum Duration : 10 Semesters, 5 Years  
 Minimum CGPA required to earn degree 2.00

Program Code 013  
 Number of Courses 22 + Research Project  
 Credit Hours 72

## Program Objectives:

The MSc Telecommunication program is designed to provide students with the skills and knowledge needed to meet the requirements of a rapidly advancing and challenging field that is in great demand in Pakistan and abroad.

Emphasis is placed on providing students with the broadband telecommunications background required to adapt to the dynamic field of telecommunications. A number of mathematics courses have been included to give the direly needed strength to our graduates in modeling the real world problems. The syllabus is designed so as to keep our students abreast with the latest technologies. The program also aims at providing students with a firm basis for undertaking research in Telecommunication

## Program Outcomes:

- ▲ An ability to communicate effectively.
- ▲ The broad education necessary to understand the impact of telecommunications engineering solutions in a global, economic, environmental, and societal context.
- ▲ A recognition of the need for, and an ability to engage in, life-long learning.
- ▲ Knowledge of contemporary issues.
- ▲ An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## Eligibility

Candidates holding 14 years degree in Bachelor of Science (with Physics and Math) with at-least 45% marks (second division) are eligible. Candidates need to pass the entry test / interview conducted by the University.

SEMESTER ONE	Course Code	Course Title	Cr. Hrs.
	COM 301	Introduction to Telecommunication	3-0
	EE 318	Circuit Analysis & Synthesis	3-1
	MA 109	Mathematics for Telecom	3-0
	ENG 316	Elective Business Communication	3-0
	COM 204	Data Communication	3-0
	CS116	Programming Fundamentals	3-1

SEMESTER TWO	Course Code	Course Title	Cr. Hrs.
	COM 285	Telecom Switching	2-1
	COM 323	Signals and System	3-0
	COM 313	Mobile Communications I	3-0
	IT 340	Network Management	2-1
	COM 332	Transmission Media	2-1
	EE 315	Electromagnetic Field Theory	3-0

SEMESTER THREE	Course Code	Course Title	Cr. Hrs.
	COM 422	Routing & Switching	2-1
	COM 340	Telecom Standards & Policies	3-0
	EE 455	Microwave & Satellite Systems	3-0
	EE 411	Digital Signal Processing	3-1
	COM 412	Advance Signaling	3-0
	MA 330	Stochastic Processes	3-0

SEMESTER FOUR

Course Code	Course Title	Cr. Hrs.
IT 450	Voice & Data Integration	2-1
EE 367	Electronic Communication	3-0
	Elective I	3-0
	Elective II	3-0
RES 490	Project	0-3

Electives

Course Code	Course Title	Cr. Hrs.	Course Code	Course Title	Cr. Hrs.
IT 308	Information Theory & Code	3-0	COM 440	Telecom Traffic Engineering	3-0
COM 311	Antenna & Wave Propagation	3-0	COM 457	Telecom Systems	2-1
IT 340	Network Management	2-1	COM 408	Fiber Optic Communications	3-0
COM 340	Telecom Standards	3-0	COM 437	Communication Protocol	3-0
CS 311	Network Security	3-0	CS 355	Operation Research	3-0
COM 350	Mobile Communications II	3-0	MGT 106	Principles of Management	3-0
CS 344	Multimedia Design & Development	2-1	EE 307	Signaling and Technology	3-0
COM 375	Next Generation Networks	3-0	EE 318	Circuit Analysis and Synthesis	3-1
EE 221	Instrumentation & Management	2-1	COM462	Advance Signaling Systems 7	3-0
COM 433	Optical & Wireless System	3-0			
COM 401	Wireless Application Protocols	2-1			

The facility for teaching of any of the elective course will be arranged only if reasonable number of students opt for.



*I have learned to never give up during my academic years. The Faculty as well as the SUIT Administration work collaboratively to provide a Platform for students where they can utilized their skills and excel academically as well as socially. My message to all SUIT Students is to NEVER GIVE UP, YOU CAN SHINE, JUST TRUST YOURSELF”*  
*Abid Rehman, Alumnus,*  
*Department of Computer Science*

# Bachelor of Science in Software Engineering

Minimum Duration : 8 Semesters, 4 Years  
 Maximum Duration : 16 Semesters, 8 Years  
 Minimum CGPA required to earn degree 2.00

Program Code 002  
 Number of Courses 43 + Research Project  
 Credit Hours 136

## Eligibility

Intermediate (Pre-Engineering/ Computer Science) with at least 45% Marks or A-Levels (22 Points) with Equivalency Certificate from IBCC Islamabad or an equivalent certificate from a recognized institution.

Candidates need to pass an Entry test and aptitude interview conducted by the university.

## Program Objectives:

- ▶ Produce graduates who are able to be employed in industry, government, or start their entrepreneurial endeavors in the diverse field of computing
- ▶ To demonstrate professional advancement through technical achievements and leadership responsibility
- ▶ Demonstrate the ability to work effectively and ready to adopt new changes in professional environment
- ▶ Undertake advanced degree program or certificate programs in computing, science, engineering, businesses, and automation of industry

	Course Code	Course Title	Cr. Hrs.
<b>SEMESTER ONE</b>	CS 110	Introduction to CS (GE)	2-1
	MA 101	Calculus and Analytical Geometry (CS Supporting)	3-0
	GS 111	Physics-I (UE)	2-1
	ENG 111	Basic Communication Skills (GE)	3-0
	CS 116	Programming Fundamentals (CS Core)	3-1
	GS 123	Islamic Studies (for Muslims) OR	
	GS 240	Values Ethics & Society ( for Non-Muslims)	2-0
<b>SEMESTER TWO</b>	Course Code	Course Title	Cr. Hrs.
	MA 105	Multivariable Calculus (CS Supporting)	3-0
	CS 125	Object Oriented Programming (Pre req CS 116)	3-1
	ELC 216	Electronics-I (CS Supporting)	2-1
	MA 213	Discrete Math (CS Core)	3-0
	ENG 316	Effective Communication Skills (GE)	3-0
	GS 128	Pakistan Studies (GE)	2-0
<b>SEMESTER THREE</b>	Course Code	Course Title	Cr. Hrs.
	CS 232	Data Structures (CS Core)	3-1
	MGT 106	Principles of Management	3-0
	EE 223	Digital Logic Design (CS Core)	2-1
	MA 135	Differential Equations (CS Supporting)	3-0
	IT212	Database Systems (CS Core)	3-1
	MA 313	Probability & Statistics (CS Supporting)	3-0
<b>SEMESTER FOUR</b>	Course Code	Course Title	Cr. Hrs.
	MA 242	Applied Linear Algebra (CS Supporting)	3-0
	SE 336	Software Engineering (SE Core)	3-0
	COM 204	Data Communication & Networks (CS Core)	3-1
	CS 323	Microprocessor Architecture & Assembly Language (CS Core)	2-1
	CS 241	Design and Analysis of Algorithm (Pre req CS 232) (CS Core)	2-1

### Program Outcomes

The bachelor degree holders are expected to demonstrate the ability:

- ▶ To apply knowledge of mathematics, science, and engineering
- ▶ To analyze, design, verify, validate, implement and maintain software systems
- ▶ To design and conduct experiments, as well as to analyze and interpret data
- ▶ To design a system, component, or process to meet desired needs within realistic constraints
- ▶ To function on multi-disciplinary teams
- ▶ To identify and solve software engineering problems
- ▶ The broad education necessary to understand the impact of software engineering solutions in a global, economic and environmental context
- ▶ A recognition of the need for, and an ability to engage in life-long learning
- ▶ An ability to use the techniques, skills, and modern engineering tools necessary for Software Engineering practices
- ▶ An ability to process large scales information effectively in different areas of science and technology
- ▶ To serve industry in enhancing its efficiency and capacity

**SEMESTER FIVE**

Course Code	Course Title	Cr. Hrs.
SE 313	Software Requirement and Specification (SE Core)	3-0
CS 222	Operating System (CS Core)	3-1
CS 236	Programming using JAVA (CS Elective)	2-1
CS 252	Computer Organization and Architecture (CS Core)	3-0
CS 340	Automata Theory (CS Core)	3-0

**SEMESTER SIX**

Course Code	Course Title	Cr. Hrs.
CS 331	Object Oriented Software Engineering (SE Core)	3-0
CS 333	Visual/.NET Programming (CS Elective)	2-1
MGT 107	Human Resource Management	3-0
CS 345	Compiler Concepts (CS Core)	2-1
IT 421	Web Design & Development (CS Elective)	2-1
SE 323	Software Verification and Validation (SE Core)	3-0

**SEMESTER SEVEN**

Course Code	Course Title	Cr. Hrs.
CS 241	Artificial Intelligence (CS Core)	3-0
CS 455	Mobile Applications Development-I (CS Elective)	2-1
CS 438	Human Computer Interaction (CS Core)	2-1
SE 411	Software Architecture Design (SE Core)	3-0
RES 491	Project Phase-I (CS Core)	0-3
ENG 322	Technical Report Writing (GE)	2-0

**SEMESTER EIGHT**

Course Code	Course Title	Cr. Hrs.
CS 443	Mobile Applications Development-II (CS Elective)	2-1
SE 422	Software Project Management (UE)	3-0
CS 442	Professional Practices (GE)	3-0
RES 492	Project Phase II (CS Core)	0-3
RES 201	Seminar (UE)	0-1



## Bachelor of Science in Software Engineering

### Electives

#### DATABASE DEVELOPMENT

Course Code	Course Title	Cr. Hrs.
CS 424	Database Security	3-0
IT 465	Distributed Database	2-1
IT 422	Data Warehousing	3-0
IT 335	Database Programming	2-1
CS 412	Big Data Analytical	3-0
CS 413	Enterprise System	3-0

#### WEB DESIGN AND DEVELOPMENT

Course Code	Course Title	Cr. Hrs.
CS 334	Multimedia Design and Development	3-0
SUIT	Java Internet Programming	2-0
CS 406	Web Engineering	3-0
IT 275	Web Programming	2-1
CS421	Semantic Web	3-0
CS 414	Cyber Security	3-0
CS 417	Internet of Thing	3-0

#### SYSTEM DEVELOPMENT & ARTIFICIAL INTELLIGENCE

Course Code	Course Title	Cr. Hrs.
CS 332	Visual Programming Using C++	2-1
CS 403	Systems Programming	3-0
IT 310	Fundamentals of .Net	2-1
CS 415	Open Source Operating System	3-0
CS 442	Mobile Application Development-I	2-1
CS 443	Mobile Application Development-II	2-1

#### SOFTWARE ENGINEERING

Course Code	Course Title	Cr. Hrs.
SE 450	Software Metrics and Testing	3-0
SE 451	Software Requirements Engineering	3-0
SE 452	OOP-Software Engineering	3-0
SE 323	Software Requirement and Validation	3-0
SE 312	Formal Methods in Se	3-0
SE 412	Design Pattern	3-0
SE 222	Software Constructions	3-0

#### SYSTEM ADMINISTRATION AND NETWORKING

Course Code	Course Title	Cr. Hrs.
CS 632	Distributed Systems	2-1
CS 411	Embedded Systems	2-1
IT 450	Voice and Data Integration	2-1
COM 401	Wireless Applications Protocols	2-1
IT 302	Advanced Networking	2-1
CS 310	Network Security	3-0
COM 375	Next Generation Networks	3-0
COM 422	Routing and Switching	3-1

#### UNIVERSITY ELECTIVES

Course Code	Course Title	Cr. Hrs.
GS 322	Sociology	3-0
MGT 106	Principles of Management	3-0
GS 302	Critical Logic and Thinking	3-0
HR 332	Human Resource Management	3-0

The facility for teaching of any of the elective course will be arranged only if reasonable number of students opt for.



# Bachelor of Science in Computer Engineering Technology

Minimum Duration : 8 Semesters, 4 Years  
Maximum Duration : 16 Semesters, 8 Years  
Minimum CGPA required to earn degree 2.00

Program Code 180  
Number of Courses 33 + Research Project  
Credit Hours 134

## Program Educational Objectives (PEOs) :

- PEO-1: Engage in applications oriented work and management of computer systems, including software, hardware, computer networking and network management.
- PEO-2: Use appropriate theory, mathematics and computational technology to analyze and solve problems encountered in the applications of computer systems.
- PEO-3: Communicate, using oral, written and computer based communication technology, as well as function effectively as an individual and a team member in professional environment.
- PEO-4: Pursue lifelong learning and continuous improvement of their knowledge and skills in the design, development, and application of computer systems in diverse industries with the highest professional and ethical standards.
- PEO-5: Understand the local, national and global issues related to the development and applications of computer systems and to be considerate of the impact of this issue on different cultures.

## Eligibility

Intermediate (Pre-Engineering/Computer Science/DAE in relevant Field) with at least 50% Marks or any equivalent certificate from a recognized institution are eligible to apply.

Candidates need to pass an entry test and an aptitude interview conducted by the University.

	Course Code	Course Title	Cr. Hrs. 17
<b>SEMESTER ONE</b>	GH 101	Islamic Studies or	2-0
	GH 102	Values Ethics	2-0
	MA 103	Applied Mathematics-I	3-0
	GS 101	Applied Physics ( Electricity and Magnetism)	2-1
	CS 102	Introduction to Computer Fundamentals	2-1
	CET 101	Engineering Drawing	1-2
	ET 102	Linear Circuit Analysis	2-1
<b>SEMESTER TWO</b>	GH103	Pakistan Studies	2-0
	MA104	Applied Mathematics-II	3-0
	ET103	Electronics	2-1
	CET102	Programming Fundamentals	2-1
	CET103	Discrete Maths	3-0
	CET104	Workshop Practice	1-2

## Bachelor of Science in Computer Engineering Technology

### Program Learning Outcomes (PLOs) :

- PLO-01: **Technology Knowledge:**To apply knowledge of computer technology and the implementation of the technology to solve the technical problems and to find solution of complex technical scenarios
- PLO-02: **Problem Analysis:**To identify,analyze and understand the technical problems and to formulate an appropriate solution for them
- PLO-03: **Implementation of Design of Solution:** To develop the ability of implementing the formulated solution for technical problems
- PLO-04: **Investigation:**To investigate the technical problems in a step-wise manner including a thorough survey of the problem,understanding its design, formulating numerous solutions and experimenting with various solutions to finalize one according to the design
- PLO-05: **Modern Tool Usage:**To analyze all the updated tool sand to utilize most updated IT tools for designing of a solution for a technical problem including prediction and modeling of technical activities with an understanding of limitations
- PLO-06: **The Technology and Society:**To conduct a survey for the use of technology in the most professional and ethical manner
- PLO-07: **Environment and Sustainability:** To understand the impact of technical tools on the environment and to make sure the technological solutions demonstrate a safe environmenta long

SEMESTER THREE	Course Code	Course Title	Cr. Hrs. 15
	CET201	Digital Logic Design	3-0
	CET202	Data & Computer Communication	2-1
	ENG111	Communication Skills	3-0
	CET203	Operating Systems	3-0
	CET212	Object Oriented Programming	2-1

SEMESTER FOUR	Course Code	Course Title	Cr. Hrs. 14
	ENG212	Technical Report Writing	3-0
	CET204	Microprocessor Architecture & Assembly Lang	2-1
	CET205	Compiler Concepts	2-0
	ELT201	Electronics Devices & Technology	3-1
	ET214	Electromagnetic Field Theory	2-0

SEMESTER FIVE	Course Code	Course Title	Cr. Hrs. 18
	CET301	Micro-Processor Theory & Interfacing	2-1
	CET302	Amplifier & Oscillators	2-1
	CET303	Signals & Systems	2-2
	CS433	Professional Practices	2-0
	CET305	Digital System Design	3-0
	MGT302	Project Management	3-0

SEMESTER SIX	Course Code	Course Title	Cr. Hrs. 18
	CET312	Digital Signal Processing	2-1
	MGT303	Total Quality Management	3-0
	CET306	Hardware Descriptive Language	2-1
	CET307	System Programming	2-1
	CET308	Parallel & Distributed Computing	2-1
	RES391	Project Phase - I	0-3

SEMESTER SUMMER	Course Code	Course Title	Cr. Hrs. 3
	RES 392	Project Phase II	0-3

with the sustainable development of society

PLO-08: **Ethics:**To conduct ethical principles for the fulfillment of all the ethical norms of the technical practices

PLO-09: **Individual and Team Work:**To be able to work individually if needed and give an effective out put as well as to be able to produce best in team work

PLO-10: **Communication:** To communicate effectively with the engineering community and deliver the best of one's knowledge through effective communication skill sand to give/receive clear instructions

PLO-11: **Project Management:**To be able to demonstrate the impact of technical solutions of one's own work and to manage projects in a multi disciplinary environment

PLO-12: **Life-Long Learning:**To be able to recognize the importance of being always indulged in a learning environment and to pursue life-long learning for every new development in technical environment

Note: As per National Technology Council (NTC) The minimum requirement for theory are 100 Credit Hours and Practical work are 30 Credit hours  
Electives can be selected from Computing, Electronics or Telecommunication streams from allied programs.

SEMESTER SEVEN

Course Code	Course Title	Cr. Hrs. 16
CET401	Supervised Industrial/ Field Training	0-16

SEMESTER EIGHT

Course Code	Course Title	Cr. Hrs. 16
CET412	Supervised Industrial/ Field Training	0-16

Hierarchical Model of Outcomes at SUIIT

Vision and Mission Statements of SUIIT/Faculty/Department



Program Educational Objectives (PEOs)



Program Learning Outcomes (PLOs)



Course Learning Outcomes (CLOs)