WOMEN UNIVERSITY SWABI

KHYBER PAKHTUNKHWA-PAKISTAN

Department of Computing Sciences

Vice Chancellor's Message

Welcome to Women University Swabi, a university that is committed to empower women through higher education and provide them opportunities to work in a wide array of settings such as education, business, industry, health, and social services sectors.

To me, the job of a university is not only to produce degree holders and commercially marketable human resources, but I believe it is more than that. Universities are required to produce loyal, honest and enlightened human beings who can empathetically understand the needs of society, reverentially work in both national and international community, and take better care of the future generations.

PROF. DR. SHAHANA UROOJ KAZMI
WOMEN UNIVERSITY SWABI
KHYBER PAKHTUNKHWA-PAKISTAN

Department of Computing Sciences

Mission

- The mission of Computing Sciences will provide the core skills needed to shape businesses and organizations. New tools, programs, and development tools will help to develop knowledge and ability in areas such as IT, games development, software engineering, design, and security.
- Provide best-of-breed software products to enable students to run their businesses and operations better.
- Deliver effective IT solutions and quality services to enhance competitive advantages.
- Maintain a sustainable social environment and be a socially responsible corporate citizen.

BS
Computer Science

BS
Information Technology

BS
Software Engineering

Future Program

MS
Computer Science

About Us

The Department of Computing Sciences was established to meet the demand for well-qualified computer professionals. The Department offers a BS in Computer Science, BS in Information Technology, and BS in Software Engineering. The program focuses on theoretical computer science as well as software and application development. Department has well-qualified and vibrant faculty dedicated to the betterment of the students. Most of the students passed out are well placed or have opted for higher studies. The department has provided a well-equipped computer labs with the latest computer software. The Laboratories are installed with broadband internet facility. The department ensures that program objectives are constantly met and learning outcomes are monitored through periodical and assignments.

Values

- Be Passionate and Determined.
- Embrace and Drive Change.
- Take Ownership and Accountability.
- Think and Act as a Professional.
- Establish Trust with Communication.
- Revitalize through Learning and Growth.

Job Opportunities

- Software Developer
- Web Developer
- UX Designer
- Mobile App Developer
- IT Project Manager
- Information Security Analyst
- Systems Architect
- AI Engineer
- Computer Hardware Engineer
- Video Game Developer

BS Computer Science

The Department of Computing Sciences at Women's University Swabi aims to providing education and training at all levels to contribute to the national pool of female computer scientists who can meet the demands of the industry and academia. While the BS program primarily focuses on training students who would assume the role of developers, designers, and architects of computing systems, the MS and the Ph.D. programs focus on preparing researchers and academicians. The prospective practitioners in the field of Computer Science are provided with the necessary skills to construct reliable computing systems by applying scientific, engineering, and management skills, while the prospective researchers are put through rigorous training in the research methodologies. However, the design, the development, and the research activities are structured to supplement each other.

Program Educational Objectives (PEOs)

CS Graduate Attributes

i. **Knowledge:** Ability to apply knowledge of mathematics, science, computing fundamentals, and computing specialization to the solution of complex computing problems.

ii. **Problem Analysis:** An ability to identify, and formulate research literature, and analyze complex computer science problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, and computer sciences.

iii. **System Design:** An ability to design solutions for complex computer science problems and design systems, components, or processes that meet specified needs while maintaining computing standards, and cultural, societal, and environmental considerations.

iv. **Investigation:** An ability to investigate complex computer science problems in a methodical way including literature survey, design and development of systems, analysis and interpretation of computational data, and synthesis of the information to derive valid conclusions.

v. **Computing Tool Usage:** An ability to create, select and apply appropriate techniques, resources, and modern IT tools, including prediction and modeling, to complex computer science activities, with an understanding of the limitations.

vi. **Impact Analysis:** An ability to apply reason informed by the contextual knowledge to assess societal, legal, and cultural issues and the consequent responsibilities relevant to professional computer science practice and solutions to complex computer science problems.

vii. **Management Skills:** An ability to demonstrate management skills and apply computing principles to one's own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.

viii. **Teamwork:** An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.

ix. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of computing practice.

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

xi. **Lifelong Learning:** An ability to recognize importance of and pursue lifelong learning in the broader context of innovation and technological developments.

BS (4 Years)
Computer Science

(4 Years)
8 Semesters

Total Credit Hours 120

Admission Requirements

The minimum requirements for admission in a bachelor's degree program in any computing program is any of the of following:

a) At least 50% marks in the Intermediate (HSSC) examination with Mathematics or equivalent qualification with Mathematics, certified by IBCC.

OR

b) At least 50% marks in the Intermediate (HSSC) examination with pre-Medical or equivalent qualification, certified by IBCC. Deficiency: "Students with pre-medical, must have to pass deficiency courses of Mathematics of 6 credit hours in first two semesters."

Scheme of Studies BS Computer Science

COURSE CODE	COURSE TITLE	COURSE TYPE	CREDIT HOURS
Semester 1			
CS-311	Fundamental of ICT	Major	03(2+1)
	English-I	General Education	03(3+0)
	Islamic Studies	General Education	03(3+0)
	QR-I	General Education	03(3+0)
	Arts and Humanities-I (Languages)	General Education	03(3+0)
Semester 2			
CS-321	Programming Fundamentals	Major	03(2+1)
	English-II	General Education	03(3+0)
	Pakistan Studies	General Education	03(3+0)
	Arts and Humanities-II	General Education	03(3+0)
	QR-II	General Education	03(3+0)
Semester 3			
CS-411	Object Oriented Programming	Major	03(2+1)
BSCS-411	Theory of Automata	Major	03(3+0)
	English-III	General Education	03(3+0)
	Natural Sciences-I	General Education	03(3+0)
	Social Sciences-I	General Education	03(3+0)

Semester 4			
COURSE CODE	**COURSE TITLE**	**COURSE TYPE**	**CREDIT HOURS**
CS-421	Data Structure and Algorithms	Major	03(2+1)
CS-422	Introduction to Software Engineering	Major	03(3+0)
	CS Supporting-I	Major	03(3+0)
	Social Sciences-II	General Education	03(3+0)
	Natural Sciences-II	General Education	03(2+1)
Semester 5			
BSCS-511	Digital Logic Design	Major	03(2+1)
BSCS-512	Design and Analysis of Algorithms	Major	03(3+0)
BSCS-513	Comp Organization & Assembly Lang.	Major	03(3+0)
CS-514	Operating Systems	Major	03(2+1)
	CS Supporting-II	Major	03(3+0)
Semester 6			
CS-521	Database Systems	Major	03(2+1)
CS-522	Human Computer Interaction	Major	03(3+0)
BSCS-521	Compiler Construction	Major	03(3+0)
CS-523	Computer Networks	Major	03(2+1)
	CS Elective-I	Major	03(3+0)
Semester 7			
BSCS-611	Parallel and Distributed Computing	Major	03(2+1)
BSCS-612	Artificial Intelligence	Major	03(2+1)
BSCS-621	FYP-I CS	Major	03(0+3)
	CS Elective II	Major	03(3+0)
	CS Elective III	Major	03(3+0)
Semester 8			
CS-621	Information Security	Major	03(2+1)
CS-622	Professional Practices	Major	03(2+1)
BSCS-621	FYP-II CS	Major	03(0+3)
	CS Elective IV	Major	03(3+0)
	CS Elective V	Major	03(0+3)

BS Information Technology

Program Objectives:

The strategic objectives of BSIT program are:

1. Equip eLearning students with knowledge of concepts, applications, and practices associated with the IT world.
2. Enlighten eLearning students with innovative practices related to IT application for solving Information Technology/business operations and strategies productivity on a local and global platform.
3. Empower eLearning students with the ability to use and analyze software program tools effectively.
4. Develop the awareness of ethical, social, interpersonal, and communication skills in eLearning students effectively.
5. Enable eLearning students to work with the refinement of analytical, logical, and critical thinking.
6. Inculcate and enhance the research abilities of students in their respective fields.
7. Equip eLearning students with the ability to properly use electronic media technologies for interacting with teachers appropriately in a virtual environment.

BS (4 Years)
Information Technology

(4 Years)
8 Semesters

Total Credit Hours 120

Admission Criteria

The minimum requirements for admission in a bachelor's degree program in any computing program is any of following:

a) At least 50% marks in Intermediate (HSSC) examination with Mathematics or equivalent qualification with Mathematics, certified by IBCC.

OR

b) At least 50% marks in Intermediate (HSSC) examination with pre-Medical or equivalent qualification, certified by IBCC. Deficiency: "Students with pre-medical, must have to pass deficiency courses of Mathematics of 6 credit hours in first two semesters."

Scheme of Studies BS Information Technology

Semester 1			
COURSE CODE	**COURSE TITLE**	**COURSE TYPE**	**CREDIT HOURS**
CS-311	Fundamental of ICT	Major	03(2+1)
	English-I	General Education	03(3+0)
	Islamic Studies	General Education	03(3+0)
	QR-I	General Education	03(3+0)
	Arts and Humanities-I	General Education	03(3+0)
Semester 2			
CS-321	Programming Fundamentals	Major	03(2+1)
	English-II	General Education	03(3+0)
	Pakistan Studies	General Education	03(3+0)
	Arts and Humanities-II	General Education	03(3+0)
	QR-II	General Education	03(3+0)
Semester 3			
CS-411	Object Oriented Programming	Major	03(2+1)
BSIT-411	IT Infrastructure	Major	03(3+0)
	English-III	General Education	03(3+0)
	Natural Sciences-I	General Education	03(3+0)
	Social Sciences-I	General Education	03(3+0)

Semester 4			
COURSE CODE	**COURSE TITLE**	**COURSE TYPE**	**CREDIT HOURS**
CS-421	Data Structure and Algorithms	Major	03(2+1)
CS-422	Introduction to Software Engineering	Major	03(3+0)
	IT Supporting-I	Major	03(3+0)
	Social Sciences-II	General Education	03(3+0)
	Natural Sciences-II	General Education	03(2+1)
Semester 5			
BSIT-511	IT Project Management	Major	03(3+0)
BSIT-512	Cyber Security	Major	03(3+0)
BSIT-513	Database Administration and Management	Major	03(3+0)
CS-514	Operating Systems	Major	03(2+1)
	IT Supporting-II	Major	03(3+0)
Semester 6			
CS-521	Database Systems	Major	03(2+1)
CS-522	Human Computer Interaction	Major	03(3+0)
BSIT-523	Web Technologies	Major	03(2+1)
CS-523	Computer Networks	Major	03(2+1)
	IT Elective-I	Major	03(3+0)
Semester 7			
BSIT-611	System and Network Administration	Major	03(2+1)
BSIT-612	Virtual Systems and Services	Major	03(3+0)
BSIT-621	FYP-I IT	Major	03(0+3)
	IT Elective II	Major	03(3+0)
	IT Elective III	Major	03(3+0)
Semester 8			
CS-621	Information Security	Major	03(2+1)
CS-622	Professional Practices	Major	03(3+0)
BSIT-621	FYP-II IT	Major	03(0+3)
	IT Elective VI	Major	03(3+0)
	IT Elective V	Major	03(3+0)

BS Software Engineering

Introduction:

The Department of Computing Science of Women University Swabi offers a 4-year BS in Software Engineering program to fulfill the needs of the rapidly growing market of software development in the country. The BS in Software Engineering degree will equip students with technical knowledge of the fundamentals of computer systems, programming languages, and the basic concepts of algorithms and data structures that are required to establish reliability and safety in software. The course emphasizes the development of professional skills in the technical area of software engineering, that is, the systematic application of analysis, design, and construction techniques for computer systems and applications.

Program Objectives:

The objective of the program is to prepare students for professional careers in software engineering. The Strategic objectives of the BSSE program are as follows:

1. Enhance students' skills to apply theoretical, technical, and practical knowledge of the software development life cycle.
2. Enable students to develop state-of-the-art solutions to the given problem using software engineering approaches.
3. Empower students to work in one or more application domains.
4. Provide students with an awareness of current industry standards and practices.
5. Enlighten students to function as proficient software developers and effective team members.
6. Empower and enhance communication and interpersonal skills.
7. Inculcate and enhance professional responsibility and application of s principles.

BS (4 Years)
Software Engineering

(4 Years)
8 Semesters

Total Credit Hours 120

Admission Criteria

The minimum requirements for admission in a bachelor's degree program in any computing program is any of following:

a) At least 50% marks in the Intermediate (HSSC) examination with Mathematics or equivalent qualification with Mathematics, certified by IBCC. OR

b) At least 50% marks in Intermediate (HSSC) examination with Pre-Medical or equivalent qualification, certified by IBCC. Deficiency: "Students with pre-medical, must have to pass deficiency courses of Mathematics of 6 credit hours in first two semesters."

Scheme of Studies BS Software Engineering

Semester 1			
COURSE CODE	**COURSE TITLE**	**COURSE TYPE**	**CREDIT HOURS**
CS-311	Fundamental of ICT	Major	03(2+1)
	English-I	General Education	03(3+0)
	Islamic Studies	General Education	03(3+0)
	QR-I	General Education	03(3+0)
	Art and Humanities-I	General Education	03(3+0)
Semester 2			
CS-321	Programming Fundamentals	Major	03(2+1)
	English-II	General Education	03(3+0)
	Pakistan Studies	General Education	03(3+0)
	Art and Humanities-II	General Education	03(3+0)
	QR-II	General Education	03(3+0)
Semester 3			
CS-411	Object Oriented Programming	Major	03(2+1)
BSSE-411	Web Engineering	Major	03(3+0)
	English-III	General Education	03(3+0)
	Natural Sciences-I	General Education	03(3+0)
	Social Sciences-I	General Education	03(3+0)

Semester 4			
COURSE CODE	**COURSE TITLE**	**COURSE TYPE**	**CREDIT HOURS**
CS-421	Data Structure and Algorithms	Major	03(2+1)
CS-422	Introduction to Software Engineering	Major	03(2+1)
	SE Supporting-I	Major	03(3+0)
	Natural Sciences-II	General Education	03(2+1)
	Social Sciences-II	General Education	03(3+0)
Semester 5			
	SE Supporting-II	Major	03(3+0)
BSSE-511	Software Project Management	Major	03(2+1)
BSSE-512	Management Information Systems	Major	03(3+0)
CS-514	Operating Systems	Major	03(2+1)
	SE Elective-I	Major	03(3+0)
Semester 6			
CS-521	Database Systems	Major	03(2+1)
CS-522	Human Computer Interaction	Major	03(3+0)
BSSE-521	Software Requirement Engineering	Major	03(2+1)
CS-523	Computer Networks	Major	03(2+1)
	Elective-II	Major	03(3+0)
Semester 7			
BSSE-611	Software Design and Architecture	Major	03(2+1)
BSSE-612	Software Construction and Development	Major	03(3+0)
	Elective-III	Major	03(3+0)
	Elective-IV	Major	03(2+1)
BSSE-621	FYP-I SE	Major	03(0+3)
Semester 8			
BSSE-621	Software Quality Engineering	Major	03(3+0)
BSSE-622	Information Security	Major	03(3+0)
BSSE-623	Software Re-Engineering	Major	03(2+1)
	Elective-V	Major	03(2+1)
BSSE-621	FYP-II SE	Major	03(2+1)

MS Computer Science (MSCS)

Program Objectives:

The MS Computer Science comprises on course work as well as a research component. There are four 'core courses' aimed at strengthening the understanding and competence of students in Computer Science fundamentals. The University expects its MS graduates to pursue careers either as 'Computer Science Faculty Members' or as 'Software Development Managers' in the industry.

Learning Outcomes:

1. Students will be able to possess advanced knowledge of the Computer Science field.
2. Students will be able to think creatively and critically; to solve non-trivial problems.
3. Students will be able to use computing knowledge to develop efficient solutions for real-life problems.
4. Students will be able to design solutions and can conduct

Future Program

MS (2 Years)
Computer Science (MSCS)

(2 Years)
4 Semesters

Total Credit Hours 30

Admission Criteria

- A degree earned after sixteen years of education in computing or a related discipline, with a minimum CGPA of 2.5 (out of 4.0 in the semester system) or 2nd division in the annual system.
- Candidate must fulfill GAT/NTS requirements or qualify for screening test conducted by the University by securing the required score as per the University guidelines

Scheme of Studies MS Computer Science

1st Semester (Core Courses)		
Course Code	**Course Title**	**Credit Hours**
CS-711	Advanced Analysis of Algorithms	3
CS-712	Advanced Operating Systems	3
CS-713	Theory of Automata – II	3
CS-714	Advanced Computer Architecture	3
2nd Semester (Elective Courses)		
Course Code	**Course Title**	**Credit Hours**
	Elective – I	3
	Elective – II	3
	Elective – III	3
	Elective-IV	3
Thesis		
CS-752	MS Thesis	06

The above are the elective courses that can be taught in the semester 2nd, however, these subjects can be taught as per the below list and the course code given

Course Code	Course Name
CS-711	Advanced Analysis of Algorithms
CS-712	Advanced Operating Systems
CS-713	Theory of Automata – II
CS-714	Advanced Computer Architecture
SE-721	Advanced Requirements Engineering
SE-722	Component Based Software Engineering
CS-723	Advanced Computer Networks
CS-724	Wireless Networks
CS-725	Advanced Analysis of Algorithm
CS-726	Advanced Formal methods
CS-727	Advanced Human-Computer Interaction
CS-728	Advanced Software Project Management
SE-729	Advanced Software System Architecture
CS-730	Agile Software Development
CS-731	Advanced Topics in Applied Cryptography
CS-732	Complex Networks
CS-733	Information Privacy and Security
CS-734	Distributed Data Processing
CS-735	Machine Learning
CS-736	Natural Language Processing
CS-737	Research Methodology
CS-738	Securing the Internet of Things
CS-739	Software Configuration Management
CS-740	Software Process Management
CS-741	Advanced Software Project Management
CS-742	Software metrics
SE-743	Software Testing and Quality Assurance
CS-744	Statistical and Mathematical Methods for Data Science
CS-745	Tools and Techniques in Data Science
CS-746	Advanced Data Mining
CS-747	Distributed Systems
CS-748	Networks Security
CS-749	Advanced Computer Networking
CS-750	Soft Computing
CS-751	Wireless Sensor Networks
CS-752	MS Thesis CS
SE-752	MS Thesis SE

Faculty Members of Computing Sciences

Dr. Rehman Ullah
Associate Professor
Chairperson

Dr. Muhammad Furqan
Assistant Professor

Dr. Abdul Waheed
Assistant Professor

Dr. Ayaz Ullah
Assistant Professor

Mr. Tariq Ullah
Lecturer

Ms. Nousheen Amjad
Lecturer

Ms. Madeeha Ishtiaq
Lecturer

Ms. Ayesha Zafar Jarral
Lecturer

Ms. Firdous Ayub
Lecturer

Departmental Activities