

# FACULTY OF COMPUTING AND ENGINEERING SCIENCES

## BS SOFTWARE ENGINEERING

The BS Software Engineering program at SZABIST is a full-time four year degree program comprising eight semesters with minimum of 132 credit hours. The degree program is designed around a set of courses pertaining to the principles of software analysis, design, architecture, development, testing, and maintenance techniques that are necessary to produce high-quality software systems. Some additional courses from the disciplines of Computer Science, Mathematics, Management Science, and Humanities are part of the degree program to develop a broader knowledge base of the students.

The BS Software Engineering program is offered through a trained foreign qualified faculty. It consists of 47 courses with a total of 132 credits hours. The maximum duration to complete the degree is six years.

### BS (SOFTWARE ENGINEERING) COURSE PLAN (ROADMAP)

Sem.	Codes	Course Title	Cr.Hrs.		Pre-Req.
<b>First Year</b>					
<b>Fall Semester</b>					
	CSC 1101	Calculus and Analytical Geometry	3, 0	3	
	CSC 1102	English Composition and Comprehension	3, 0	3	
	CSC 1103	Fundamentals of Programming	3, 0	3	
	CSCL 1103	Lab : Fundamentals of Programming	0, 1	1	
	CSC 1108	Introduction to Computer Science	2, 0	2	
	CSC L1108	Lab : Introduction to Computer Science	0, 1	1	
	CSC 1107	Applied Physics	2, 0	2	
	CSCL 1107	Lab: Applied Physics	0, 1	1	
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<b>Spring Semester</b>					
	CSC 1208	Object Oriented Programming Techniques	3, 0	3	CSC 1103, CSCL 1103
	CSCL 1208	Lab: Object Oriented Programming Techniques	0, 1	1	CSC 1103, CSCL 1103
	CSC 1206	Probability and Statistics	3, 0	3	
	CSC 1207	Digital Logic Design	2, 0	2	
	CSCL 1207	Lab: Digital Logic Design	0, 1	1	
	CSC 1209	Islamic Studies/ Humanities	2, 0	2	
	CSC 1109	Pakistan Studies	2, 0	2	
	CSC 2101	Communication and Presentation Skills	3, 0	3	CSC 1102
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<b>Second Year</b>					
<b>Fall Semester</b>					
	CSC 2102	Data Structures and Algorithms	3, 0	3	CSC 1208, CSCL 1208
	CSCL 2102	Lab: Data Structures and Algorithms	0, 1	1	CSC 1208, CSCL 1208
	CSC 1201	Discrete Mathematical Structures	3, 0	3	
	CSC 2206	Linear Algebra	3, 0	3	
	CSC 3105	Computer Organization and Assembly Language	2, 0	2	CSC 1207, CSCL 1207
	CSCL 3105	Lab: Computer Organization and Assembly Language	0, 1	1	CSC 1207, CSCL 1207
	CSC 3109	Software Engineering	3, 0	3	
	SEC xxxx	University Elective-1	2, 0	2	
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Sem.	Codes	Course Title	Cr.Hrs.		Pre-Req.
<b>Spring Semester</b>					
	CSC 3107	Operating Systems	2, 0	2	
	CSCL 3107	Lab: Operating Systems	0, 1	1	
	CSC 2203	Database Systems	3, 0	3	CSC 2102, CSCL2102
	CSCL 2203	Lab: Database Systems	0, 1	1	CSC 2102, CSCL2102
	SEC 2406	Software Design and Architecture	3, 0	3	
	CSC 1202	Multivariate Calculus	3, 0	3	CSC 1101
	SEC 2407	Software Requirement Engineering	2, 0	2	CSC 3109
	SECL 2407	Lab: Software Requirement Engineering	1, 0	1	CSC 3109
	CSC 1211	Ideology and Constitution of Pakistan	2, 0	2	
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<b>Third Year</b>					
<b>Fall Semester</b>					
	SEC 3604	Software Construction and Development	2, 0	2	SEC 2406
	SECL 3604	Lab: Software Construction and Development	0, 1	1	SEC 2406
	CSC 3209	Computer Networks	2, 0	2	
	CSCL 3209	Lab: Computer Networks	0, 1	1	
	CSC 1205	Technical and Business Writing	3, 0	3	CSC 1102
	CSC 3202	Design and Analysis of Algorithms	3, 0	3	CSC 2102, CSCL2102
	CSC 3110	Community Service	1, 0	1	
	CSC 3111	Entrepreneurship	2, 0	2	
	CSC 3115	Understanding of Holy Quran-I/Ethics and Morality-I	1, 0	1	
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<b>Spring Semester</b>					
	SEC 3608	Software Quality Engineering and Testing	3, 0	3	SEC 3604, SECL 3604
	CSC 4107	Information Security	2, 0	2	
	CSC 4107	Lab: Information Security	0, 1	1	
	CSC 4109	Professional Practices	2, 0	2	
	SEC xxxx	SE Elective-1	3, 0	3	
	SEC xxxx	SE Elective-2	3, 0	3	
	CSC 3206	Artificial Intelligence	2, 0	2	
	CSCL 3206	Lab: Artificial Intelligence	0, 1	1	
	CSC 3215	Understanding of Holy Quran-II/Ethics and Morality-II	1, 0	1	CSC 3115
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<b>Fourth Year</b>					
<b>Fall Semester</b>					
	CSC 4105	Final Year Project-I	0, 3	3	
	SEC 3603	Software Project Management	3, 0	3	CSC 3109
	SEC xxxx	SE Elective-3	3, 0	3	
	SEC xxxx	SE Elective-4	3, 0	3	
	CSC 4106	Parallel and Distributed Computing	3, 0	3	CSC 3107, CSCL 3107
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<b>Spring Semester</b>					
	CSC 4205	Final Year Project-II	0, 3	3	CSC 4105
	SEC xxxx	University Elective-2	2, 0	2	
	SEC xxxx	SE Elective-5	3, 0	3	
	SEC xxxx	SE Elective-6	3, 0	3	
	SEC xxxx	SE Elective-7	3, 0	3	
			<b>14</b>		
<b>TOTAL CR. HR</b>			<b>132</b>		

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Following Two mathematics deficiency courses will be offered to those students who have limited mathematical background if deemed necessary by relevant PM.

CSC 1110 Algebraic Foundations and Applications in Computing

CSC 1111 Differential and Integral Calculus in Computing

## SE Electives

- SEC 3612 Mobile Application Development
- SEC 3614 Computer Graphics
- SEC 4511 e-Commerce
- SEC 4514 Introduction to Data Science
- SEC 4515 Digital Image Processing
- SEC 4518 Visual Programming
- SEC 4519 Software Engineering Economics
- SEC 4521 Agent Based Software Engineering
- SEC 4522 Big Data Analytics
- SEC 4523 Computational Intelligence
- SEC 4524 Computer Vision
- SEC 4525 Data Encryption and Security
- SEC 4526 Design Patterns
- SEC 4528 Game Development
- SEC 4529 Global Software Development
- SEC 4531 Information Systems Audit
- SEC 4532 Introduction to Cloud Computing
- SEC 4533 Management Information Systems
- SEC 4534 Modeling and Simulation
- SEC 4535 Multimedia Communication
- SEC 4536 Natural Language Processing
- SEC 4538 Real Time Systems
- SEC 4539 Semantic Web
- SEC 4542 Software Metrics
- SEC 4543 Systems Programming
- SEC 4544 Technopreneurship
- SEC xxxx User Interface Design
- SEC xxxx Virtual and Argument Reality
- SEC xxxx AI in Game Development
- SEC xxxx Introduction to Development Operations
- SEC xxxx Algorithmic Trading
- SEC xxxx Formal Methods in Software Engineering

## UNIVERSITY ELECTIVES (2,0)

- SEC xxxx Financial Accounting
- SEC xxxx Human Resource Management
- SEC xxxx Sociology
- SEC xxxx Foreign Languages
- SEC xxxx Management Principles
- SEC xxxx Organizational Behavior
- SEC xxxx Psychology

## DISTRIBUTION OF CREDIT HOURS

Areas	Cr. Hrs.	Courses
Computing Core	46	14
Domain Core	18	6
Domain Elective	21	7
Mathematics and Supporting Courses	9	3
Elective Supporting Courses	4	2
General Education Requirement	34	15
<b>Total</b>	<b>132</b>	<b>47</b>

## Internship

The internship is scheduled at the end of the third year. After completing the six-week internship, all students must submit a comprehensive report, giving details of their experience and learning.

All courses may not be offered in every semester. Elective courses may vary from time to time. Alternative courses may be substituted as and when required.

