PROGRAM SPECIFICATION PROFORMA

INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD

Program Name: BS in Software Engineering
Qualification Level: Undergraduate
Department: Software Engineering
Faculty: Computing and Information Technology

Content

A. Program Identification and General Information

1. Program Name:
BS in Software Engineering
2. Department/Faculty Offering the Program:
Department of Software Engineering / Faculty of Computing and Information Technology
3. Reasons for Establishing the Program (New Program Proposals): (Economic, social, cultural, and technological reasons, and national needs and development, etc.)
Not a New Program
4. Total Credit Hours for Completing the Program:
136 credit hours
5. Professional Occupations/Jobs:
Software Developer/Engineer Business Analyst Systems Analyst Database Administrator Quality Assurance (QA) Engineer DevOps Engineer Network Engineer Cyber Security Analyst Project Manager Technical Consultant IT Manager/Director Data Scientist UI/UX Designer Mobile App Developer AI/Machine Learning Engineer

6. Major Tracks/Pathways (if any)**:**

Major track/pathway	Credit hours (For each track)	Professional Occupations/Jobs (For each track)
1. None		

7. Intermediate Exit Points/Awarded Degree (if any)**:**

Intermediate exit points/awarded degree	Credit hours
1. None	

B. Mission, Goals, and Learning Outcomes

1. Program Mission:
Our mission is to empower students with a comprehensive understanding of software engineering principles, methodologies, and technologies, fostering a commitment to innovation, ethical practices, and lifelong learning. This mission aligns with our vision of being the premier university for technical education, rooted in Islamic principles, and dedicated to the betterment and improvement of the Muslim Ummah.
2. Program Educational Objectives:

S No.	Statement

PEO1	Attain a deep understanding of foundational software engineering principles, methodologies, and theories, enabling the ability to analyze, synthesize, and evaluate software solutions effectively
PEO2	Demonstrate the application of latest programming skills, algorithms, and tools in developing innovative software systems to solve the real world societal problems for the benefit of mankind, while continuously learning cutting edge technology.
PEO3	Demonstrate effective communication skills and time management skills.
PEO4	Demonstrate a commitment to ethical behavior not only within the scope of software engineering practices but also in considering the broader safety and societal implications, ensuring that software solutions adhere to ethical standards and contribute positively to societal well-being while being sustainable.
PEO5	Collaborate effectively in self-organizing teams and the ability to work harmoniously with diverse cultural team members towards the common goal of creating software solutions that positively impact society.

3. Relationship between Program Mission and Goals and the Mission and Goals of the Institution/College.

Vision Statement of IIUI	**PEO1**	**PEO2**	**PEO3**	**PEO4**	**PEO5**
To be an excellent University in diversity, knowledge, research, and innovation for the benefits of society and the Muslim Ummah.	✓	✓	✓	✓	✓
Mission Statement of IIUI					
To transform the society by promoting education, training, research, technology, and collaboration for reconstruction of human thought in all its forms on the foundations of Islam.	✓	✓	✓	✓	✓

4. Program Learning Outcomes (PLOs)

PLO	**Description**
PLO1	Academic Education: Define and explain the knowledge of software engineering principles, methodologies, and practices to solve the complex software engineering problems.
PLO2	Knowledge for Solving Software Engineering Problems: Apply knowledge of software engineering fundamentals, including algorithms, data structures, and software design principles, to analyze and conceptualize software models for specific real-world problems and requirements.
PLO3	Problem Analysis in Software Engineering: Identify, formulate, and solve complex software engineering problems via effective team work by conducting literature reviews, applying fundamental principles of mathematics, computer sciences, and relevant domain knowledge.
PLO4	Design/Development of Software Solutions: Design and evaluate software solutions for complex problems, and assess systems, components, or processes that meet specified needs with consideration for public health and safety, cultural, societal, and environmental factors.
PLO5	Modern Tool Usage in Software Engineering: Create, select, adapt, and apply appropriate techniques, resources, and modern software engineering tools to address complex software development activities, understanding their limitations.
PLO6	Individual and Team Work: Operate effectively both as an individual and as a member or leader in diverse software engineering teams and multi-disciplinary settings.
PLO7	Communication: Use articulation and communication skills in industry during software development, demonstrating the ability to communicate and negotiate within the team and the clients along with producing clear reports, design documentation, presentations, and instructions.
PLO8	Professionalism and Society: Weigh societal, health, safety, legal, and cultural factors within glocal contexts, recognizing the consequential responsibilities relevant to professional software engineering practice.

PLO9	Ethics in Software Engineering: Demonstrate professional ethics, responsibilities, and norms specific to software engineering practice, demonstrating integrity and accountability.
PLO10	Life-long Learning: Develop skill of the continual and independent learning as a software engineering professional, keeping pace with evolving technologies and industry advancements.

5. Mapping of PLOs to PEOs	PEO1	PEO2	PEO3	PEO4	PEO5
PLO1	√				
PLO2	√	√	√		
PLO3	√	√	√		√
PLO4				√	√
PLO5		√	√		
PLO6			√		√
PLO7			√		√
PLO8				√	√
PLO9				√	√
PLO10		√			√

C. Curriculum

This document presents the scheme of study of the BS in Software Engineering (136 credit hours) program, which is applicable to all batches of BSSE students admitted in the fall 2024 semester and subsequent semesters. This scheme conforms to the Revised Curriculum – Computing Disciplines as stipulated by the Higher Education Commission (HEC) in the year 2023.

1.1. Eligibility Criteria

The admission requirements for the BS in Software Engineering program state that candidates **must achieve a minimum of 50% marks** in the Intermediate (HSSC) examination, with at least one of the following conditions:

a. Intermediate with Mathematics **OR**
b. Intermediate with pre-medical background with additional Mathematics OR are required to pass the deficiency courses of Mathematics of 6 credit hours within the first year of their regular studies as per the National Computing Education Accreditation Council (NCEAC) vide notification No. NCEAC/HEC/General/3-20, dated 20th March 2020 **OR**
c. Equivalent foreign qualification with Mathematics certified by Inter Board Committee of Chairmen (IBCC)

1.2. Degree Requirements

In order to qualify for the award of a BSSE degree, the student must meet the following criteria:

- Must have studied and passed all the prescribed courses, totaling at least 136 credit hours.
- The stipulated passing criterion for all courses is of minimum grade D.
- Must have earned a CGPA (Cumulative Grade Point Average) of at least 2.0 on a scale of 4.0 for the entire degree.

- The minimum duration for the completion of the BS Computing degree is four years. However, the Higher Education Commission (HEC) allows a maximum period of six years to fulfill all the degree requirements.
- Must have passed the University Hifz test as mandated by the International Islamic University Islamabad (IIUI).

1.3. Course Registration Requirements

During the course registration process, the following must be ensured as per Academic Regulations for Undergraduate Studies, IIUI, Spring 2024:

- **Pre-Requisite Course:** Successful completion of the prerequisite course is mandatory to register for the next course in the curriculum.
- **Core Course:** Core course is an essential course of the degree and must be studied and passed. In case a student has failed a core course, he/she is not allowed to study an alternative course and must repeat the failed course to improve their grade.
- **Elective Course:** A Student who has failed an elective course, may study an alternative elective course (from the elective course list). Provided that the department offers that course to complete the number of credit hours in that course group.
- **Repeat Course:**
    - If a student gets an 'F' grade in any course, he/she will be required to repeat the course or its recommended alternative course (in case of an elective course).
    - Students may be allowed to repeat the course(s), that they have passed with a “D or D+” grade(s). A maximum number of six (6) such courses (passed with “D or D+”) will be allowed to be repeated in a degree program.
- **Max/Min Course Load:** For the Fall / Spring semesters, the student is not allowed to register and study more than a total of nineteen (19) credit hours of courses in any case. However, in the last semester of the degree program a student is allowed to register maximum of 24 credit hours including Final Year Project with the approval of Director (Acad. & Exams).
- **Summer Semester:** In the summer semester, students are allowed to register only those courses that they have failed in previous semesters or have D/D+ grade. Up to a maximum of nine (9) credit hours can be registered only, if offered by the department. Lab based courses or dropped courses are not allowed to register in the summer semester.
- **Cross-Department Registration:** Students are eligible to register for a course offered by another department at IIUI, only if the desired course is not offered within the parent department, provided that the subject matter of the course aligns with the majority of the contents covered in the parent department's subject. The courses that are from General category but Software Engineering students cannot study in any other department are explicitly mentioned under the category.
- **Supervision:** No course can be registered in tutorship / supervisory mode during any semester, due to the technical nature of the BS in Software Engineering courses.

1.4. Software Engineering Courses

The degree program has two major course categories, Software Engineering Courses and General

Education Courses. The course division conforms to the revised National Curriculum of Software Engineering stipulated by HEC. Courses to study are categorized and grouped with credit hours as follows:

Category	Course Group	Type	Credit Hours
Software Engineering Courses	Computing Courses	Core	46
	Software Engineering Courses	Core	18
	Software Engineering Courses	Electives	21
General Education Courses	General Courses	Core	30
	Mathematics & Supporting Courses	Core	12
	Supporting courses	Elective	3
	University Required courses	Elective	6
	Field Experience / Internship	Core	0
		Total Credit hours	136

1.4.1 Computing Courses - Core (46 credit hours-14 courses)

An enrolled student is required to study and pass all the listed 14 courses from this group.

S. No.	Code	Course Title	Cr. Hr.	Pre-requisite Course
1.	CS111	Programming Fundamentals	4 (3-3)	
	CS111L	Programming Fundamentals Lab		
2.	CS212	Object Oriented Programming	4 (3-3)	PF (CS111+CS111L)
	CS212L	Object Oriented Programming Lab		
3.	CS231	Database Systems	4 (3-3)	
	CS231L	Database Systems Lab		
4.	CS141	Digital Logic Design	3 (2-3)	
	CS141L	Digital Logic Design Lab		
5.	CS221	Data Structures	4 (3-3)	OOP (CS212+CS212L)
	CS221L	Data Structures Lab		
6.	CS352	Information Security	3 (2-3)	
	CS352L	Information Security Lab		
7.	AI201	Artificial Intelligence	3 (2-3)	OOP (CS212+CS212L)
	AI201L	Artificial Intelligence Lab		
8.	CS251	Computer Networks	3 (2-3)	
	CS251L	Computer Networks Lab		
9.	SE111	Software Engineering	3 (3-0)	
10.	CS343	Computer Organization & Assembly Language	3 (2-3)	Digital Logic Design (CS141+CS141L)
	CS343L	Computer Organization & Assembly Language Lab		

11.	CS342	Operating Systems	3 (2-3)	Data Structures CS221+ CS221L
	CS342L	Operating Systems Lab		
12.	CS322	Analysis of Algorithms	3 (3-0)	Data Structures (CS221+CS221L)
13.	SE483	Final Year Project – I	2 (0-6)	passing a minimum of 90 credit hours AND all offered core courses must be passed with minimum Grade Letter D
14.	SE484	Final Year Project – II	4 (0-12)	FYP–I (SE483)
	Total credit hours		**46**	

1.4.2 Software Engineering Courses – Domain Core (18 credit hours – 6 courses)

An enrolled student has to pass all the listed 6 courses.

S. No.	Code	Course Title	Cr. Hr.	Pre-requisite Course
1.	SE241	Software Requirement Engineering	3 (2-3)	Software Engineering (SE111)
	SE241L	Software Requirement Engineering Lab		
2.	SE421	Software Project Management	3 (2-3)	Software Engineering (SE111)
	SE421L	Software Project Management Lab		
3.	SE333	Software Design & Architecture	3 (2-3)	OOAD (CS232+CS232L), Software Engineering (SE111)
	SE333L	Software Design & Architecture Lab		
4.	SE461	Software Quality Engineering	3 (2-3)	Software Engineering (SE111)
	SE461L	Software Quality Engineering Lab		
5.	SE351	Software Construction & Development	3 (2-3)	Software Engineering (SE111)
	SE351L	Software Construction & Development Lab		
6.	IT331	Parallel & Distributed Computing	3 (2-3)	OOP (CS212+CS212L) AND OS (SE342+SE342L)
	IT331L	Parallel & Distributed Computing Lab		
	Total credit hours		**18**	

1.4.3 Software Engineering Courses - Domain Electives (21 credit hours – 7 courses)

An enrolled student has to pass a minimum of 21 credit hours from the listed courses of this group. This is a not an exhaustive list of elective courses and the department may offer other courses as electives. Department may announce a pre-requisite course for any elective based on its contents.

S. No.	Code	Course Title	Cr. Hr.	Pre-requisite Course
1.	SE362	Software Verification and Validation	3 (2-3)	
	SE362L	Software Verification and Validation Lab		
2.	SE332	Object Oriented Analysis & Design	3 (2-3)	OOP (CS212+CS212L)
	SE332L	Object Oriented Analysis & Design Lab		
3.	IT433	Cloud Computing	3(2-3)	
	IT433L	Cloud Computing Lab		
4.	DS271	Introduction to Data Science	3 (2-3)	Artificial Intelligence (AI201 + AI201L)
	DS271L	Introduction to Data Science Lab		
5.	SE371	User Experience Design	3 (2-3)	
	SE371L	User Experience Design Lab		
6.	CS313	Advanced Programming	3 (2-3)	OOP (CS212+CS212L) AND Database Systems (CS231+ CS231L)
	CS313L	Advanced Programming Lab		
7.	SE 385	Web Frameworks	3 (2-3)	
	SE 385	Web Frameworks Lab		
8.	CS332	Advanced Database Management Systems	3 (2-3)	Database Systems (CS231+ CS231L)
	CS332L	Advanced Database Management Systems Lab		
9.	DS341	Big Data Analytics	3 (2-3)	
	DS341L	Big Data Analytics Lab		
10.	SE312	Software Re-Engineering	3 (2-3)	SRE (SE241+SE241L)
	SE312L	Software Re-Engineering Lab		
11.	SE481	Mobile Application Development	3 (2-3)	
	SE481L	Mobile Application Development Lab		
12.	SE373	E-Commerce	3 (3-0)	
13.	SE374	Management Information Systems	3 (3-0)	
14.	SE375	Real Time Systems	3 (3-0)	Software Engineering (SE111)
15.	SE372	Formal Methods in Software Engineering	3 (3-0)	
16.	SE331	Business Process Engineering	3 (3-0)	
17.	IT411	Cyber Security	3(2-3)	Information Security (CS352+CS352L)
	IT411L	Cyber Security Lab		
18.	SE413	DevOps	3(2-3)	
	SE413	DevOps Lab		
19.	DS271	Introduction to Data Sciences	3(2-3)	
	DS271	Introduction to Data Sciences Lab		

1.4.4 General Education Courses – Core (30 Credit Hours – 12 courses)

An enrolled student has to pass all the prescribed 12 courses in this group. **Non-Muslim students** can study Ethics in replacement of Islamic Studies only. The courses at S. No. 4 ,5 & 9 can be

studied only within the Faculty of Computing & Information Technology, due to different contents as per the HEC Curriculum 2023. The department has specially designed Course Specification Performa (CSP) for these courses.

S. No.	Code	Course Title	Cr. Hr.	Pre-requisite Course
1.	GEC114	Application of Information & Communication Technologies	3 (2-3)	
	GEC114L	Application of Information & Communication Technologies Lab		
2.	GEC102	Functional English	3 (3-0)	
3.	GEC205	Expository Writing	3 (3-0)	Functional English (GEC102)
4.	GEC113	Quantitative Reasoning-1 (Discrete Structures)	3 (3-0)	
5.	GEC215	Quantitative Reasoning-2 (Calculus and Analytical Geometry / Calculus I)	3 (3-0)	
6.	GEC206	Ideology and Constitution of Pakistan	2 (2-0)	
7.	GEC 112	Introduction to Social Sciences (Introduction to management)	2 (2-0)	
8.	PHY251	Basic Electronics (Natural Sciences: Applied Physics)	3 (2-3)	
	PHY251L	Basic Electronics Lab (Natural Sciences: Applied Physics)		
9.	GEC101	Introduction to Arts & Humanities (Professional Practices)	2 (2-0)	
10.	GEC207	Civics and Community Engagement	2 (2-0)	
11.	GEC216	Entrepreneurship	2 (2-0)	
12.	GEC103 GEC 104	Islamic studies OR Ethics (Non-Muslims Only)	2(2-0)	
	Total credit hours		**30**	

1.4.5 Mathematics & Supporting Courses - Core (12 credit hours – 4 courses)

An enrolled student has to pass all the prescribed 4 courses from the course list given below. The courses at S. No. 2 & 3 can only be studied with Faculty of Computing & Information Technology, due to different contents from Mathematics Department.

S. No.	Code	Course Title	Cr. Hr.	Pre-requisite Course

1.	MAT223	Calculus III (Multivariable Calculus)	3 (3-0)	
2.	SEA412	Linear Algebra	3 (3-0)	GEC215
3.	SEA211	Probability & Statistics	3 (3-0)	
4.	GEC306	Technical & Business Writing	3 (3-0)	GEC102
		Total credit hours	**12**	

1.4.6 Supporting Courses – Electives (3 credit hours – 1 course)

An enrolled student has to pass a minimum of 3 credit hours from the course list given below. This is not an exhaustive list and the Department of Software Engineering may offer other courses as Supporting Courses.

Code	Course Title	Cr. Hr.	Pre-requisite Course
FBF251	Business Finance	3 (3-0)	
KDM323	Digital Marketing	3 (3-0)	
PSY106	Introduction to Psychology	3 (3-0)	

1.4.7 Field Experience / Internship (Non-credit Course)

The field experience of eight weeks offered in the summer semester after the 6th semester must be graded by a faculty member in collaboration with the supervisor in the field. This is a mandatory degree award requirement for the BSSE degree program.

1.4.8 Deficiency Courses

Students who have not studied Mathematics at the intermediate level have to pass the following two deficiency courses (DC) of Mathematics. These are non-credit hour courses i.e. these courses will not be counted to the Cumulative Grade Point Average but are mandatory to study and pass within the first year of their regular studies.

Course Code	Course Title	Cr. Hrs.	Remarks
M101	Math I (Pre-Calculus – I)	NCC	Only Pre-Medical Students
M102	Math II (Pre-Calculus – II)	NCC	Only Pre-Medical Students

1.4.9. University Required Courses

An enrolled student has to pass the following courses of 6 credit hours as university required courses. This is a mandatory degree awarding requirement for the BSSE degree program.

Course Code	Course Title	Cr. Hr.	Pre-requisite Course
URC 201	Functional Arabic	3 (3-0)	**Nil**
URC 302	Understanding Quran	3(3-0)	**Nil**
	Total credit hours	**6(6-0)**	

1.5 Tentative Semester Wise Course Offering Plan

The tentative course offering plan for the BS in Software Engineering degree offered from Fall 2024 and onwards is given below in a semester-wise format. This may differ in actual offering to any particular batch.

Semester 1

Code	Course Title	Domain	Contact Hours	Work-load	Credit Hours (Contact hrs)	Pre-Reqs.
GEC114	Application of Information & Communication Technologies	GEC	2	5	3 (2-3)	
GEC114L	Application of Information & Communication Technologies Lab		3			
CS111	Programming Fundamentals	Core	3	6	4 (3-3)	
CS111L	Programming Fundamentals Lab		3			
GEC113	Quantitative Reasoning I (Discrete Structures)	GEC	3	3	3 (3-0)	
GEC 215	Quantitative Reasoning II (Calculus and Analytical Geometry/Calculus-I)	GEC	3	3	3 (3-0)	
GEC102	Functional English	GEC	3	3	3 (3-0)	
M101	Math I (Pre-Calculus – I)	DC	3	3	DC	
GEC112	Intro to social sciences (Intro to management)	GEC	2	2	2(2-0)	
	Total Credit Hours (Contact Hours)				**18 (16-6)**	

Semester 2

Code	Course Title	Domain	Contact Hours	Work-load	Credit Hours (Contact hrs)	Pre-Reqs.
CS212	Object Oriented Programming	Core	3	6	4 (3-3)	CS111+CS111L
CS212L	Object Oriented Programming Lab		3			
CS141	Digital Logic Design	Core	2	5	3 (2-3)	
CS141L	Digital Logic Design Lab		3			
MAT223	Multivariable Calculus (Calculus III)	Math	3	3	3 (3-0)	
GEC101	Introduction to Arts & Humanities (Professional Practices)	GEC	2	2	2 (2-0)	
SE111	Software Engineering	Core	3	3	3 (3-0)	
M102	Math II (Pre-Calculus- II)	DC	3	3	DC	M101
GEC103	Islamic studies	GEC	2	2	2(2-0)	
	Total Credit Hours				**17(15-6)**	

Semester 3

Code	Course Title	Domain	Contact Hours	Work-load	Credit Hours (Contact hrs)	Pre-Reqs.
GEC205	Expository Writing	GEC	3	3	3 (3-0)	GEC102
PHY251	Basic Electronics	GEC	2	5	3 (2-3)	

	(Natural Sciences: Applied Physics)					
PHY251L	Basic Electronics Lab (Natural Sciences: Applied Physics)		3			
CS251	Computer Networks	Core	2	5	3 (2-3)	
CS251L	Computer Networks Lab		3			
CS221	Data Structures	Core	3	6	4 (3-3)	CS212 + CS212L
CS221L	Data Structures Lab		3			
GEC207	Civics and Community Engagement	GEC	2	2	2 (2-0)	
SEA211	Probability & Statistics	Math	3	3	3 (3-0)	
	Total Credit Hours				**18 (15-9)**	

Semester 4

Code	Course Title	Domain	Contact Hours	Work-load	Credit Hours (Contact hrs.)	Pre-Reqs.
AI201	Artificial Intelligence	Core	2	5	3 (2-3)	CS212+CS212L
AI201L	Artificial Intelligence Lab		3			
CS231	Database Systems	Core	3	6	4 (3-3)	
CS231L	Database Systems Lab		3			
GEC216	Entrepreneurship	GEC	2	2	2 (2-0)	
GEC206	Ideology and Constitution of Pakistan	GEC		2	2 (2-0)	
SE241	Software Requirement Engineering	SE Core	2	5	3 (2-3)	SE111
SE241L	Software Requirement Engineering Lab		3			
URC201	Functional Arabic *	URC	3	3	3 (3-0)	
	Total Credit Hours				**17 (14-9)**	

*** Marked course is mandatory university required course and must be passed to receive the degree.**

Semester 5

Code	Course Title	Domain	Contact Hours	Work-load	Credit Hours (Contact hrs.)	Pre-Reqs.
SE385	Domain Elective 2 / Web Frameworks	SE Elective	2	5	3 (2-3)	
SE385	Domain Elective 2 / Web Frameworks Lab		3			
CS342	Operating Systems	Core	2	5	3 (2-3)	CS221+CS221L
CS342L	Operating Systems Lab		3			
CS343	Computer Organization & Assembly Language	Core	2	5	3 (2-3)	CS141+CS141L
CS343L	Computer Organization & Assembly Language Lab		3			
URC302	Understanding Quran *	URC	3	3	3 (3-0)	
CS352	Information Security	Core	2	5	3 (2-3)	
CS352L	Information Security Lab		3			
CS322	Analysis of Algorithms	Core	3	3	3 (3-0)	CS221+CS221L
	Total Credit Hours				**18 (14-12)**	

*** Marked course is mandatory university required course and must be passed to receive the degree.**

Semester 6

Code	Course Title	Domain	Contact Hours	Work-load	Credit Hours (Contact hrs.)	Pre-Reqs.
IT331	Parallel & Distributed Computing	SE Core	2	5	3 (2-3)	CS212+CS212L, CS342+ CS342L
IT331L	Parallel & Distributed Computing Lab		3			
SE332	Domain Elective 3 / Object Oriented Analysis & Design *	SE Elective	2	5	3 (2-3)	CS212+CS212L
SE332L	Domain Elective 3 / Object Oriented Analysis & Design Lab *		3			
SE333	Software Design & Architecture	SE Core	2	5	3 (2-3)	CS232+CS232L, SE111
SE333L	Software Design & Architecture Lab		3			
SE371	Domain Elective 4 / User Experience Design	SE Elective	2	5	3 (2-3)	
SE371L	Domain Elective 4 / User Experience Design Lab		3			
GEC306	Technical & Business Writing	EN	3	3	3 (3-0)	GEC102
CS313	Domain Elective 1 / Advanced Programming *	SE Elective	2	5	3 (2-3)	CS212+CS212L, CS231+CS231L
CS313L	Domain Elective 1 / Advanced Programming Lab *					
	Total Credit Hours				**18 (13-15)**	

*** Marked courses are mandatory elective courses and must be passed to receive the degree.**

Summer Semester

Code	Course Title	Domain	Pre-Reqs.
TBD by University	Field Experience / Internship	Non-Credit	None

Semester 7

Code	Course Title	Domain	Contact Hours	Work-load	Credit Hours (Contact hrs.)	Pre-Reqs.
SE483	Final Year Project – I	Core	6	6	2 (0-6)	passing a minimum of 90 credit hours AND all offered core courses must be passed with minimum Grade Letter D
SE451	Software Construction & Development	SE Core	2	5	3 (2-3)	SE111
SE451L	Software Construction & Development Lab		3			
SE421	Software Project Management	SE Core	2	5	3 (2-3)	SE111
SE421L	Software Project Management Lab		3			
	Domain Elective 5	SE Elective	TBD	TBD	3 (-)	
	Domain Elective 6	SE Elective	TBD	TBD	3 (-)	
SEA412	Linear Algebra	Maths	3	3	3 (3-0)	GEC
	Total Credit Hours				**17 (-)**	

Semester 8						
Code	**Course Title**	**Domain**	**Contact Hours**	**Work-load**	**Credit Hours (Contact hrs.)**	**Pre-Reqs**
SE484	Final Year Project – II	Core			4 (0-12)	SE483
	Domain Elective 7	SE Elective	TBD	TBD	3 (-)	
SE461	Software Quality Engineering	SE Core	2	5	3 (2-3)	SE111
SE461L	Software Quality Engineering Lab					
PSY106	Introduction to Psychology *	SC	3	3	3 (3-0)	
	Total Credit Hours				**13 (-)**	

* The department can offer any course from the supporting course category.

1.6 Course Coding Scheme

The course codes of software engineering domain courses are designed by the Department of Software Engineering as per the coding scheme as follows:

- The letter code consists of 2 characters followed by 3 numerical digits without any space in between.
- The first two characters are "**SE**".
- 1st numerical digit represents the specific year in which the course may be offered.
- 2nd numerical digit represents the category of software engineering domain to which the course belongs. Categories of course along with their codes are given in the table below.

Course Category Name	Code
Software Lifecycle	**'1'**
Project Management	**'2'**
Business & System Modelling	**'3'**
Requirements Engineering	**'4'**
Implementation	**'5'**
Quality Engineering	**'6'**
Supplementary Skills	**'7'**
Applications	**'8'**

- 3rd numerical digit represents the sequence of the course in that course category.
- For Example: The course Code for the Course Title **Object Oriented Analysis & Design** is **SE332**. Where SE, the first two characters, represent that the course is from the Software Engineering domain. Subsequent 3 digits: 1st digit **'3'** represents that this course is offered in 3rd year of the degree; 2nd digit **'3'** represents the course category **Business & System Modelling** i.e. assigned the number 3; 3rd digit **'2'** represents the sequence of this course in this category as it is assigned after Introduction to Software Engineering course.

1.7 Course Specification Performa

Course contents of Software Engineering domain courses are attached with the document as per HEC Course Development Performa.

1.8 Course Specification Performa

Course contents of Software Engineering domain courses are attached with the document as per HEC Course Development Performa.

5. Mapping Matrix

5.1 PLO Mapping Matrix

	Courses										
Code	Course Name	1	2	3	4	5	6	7	8	9	10
CS111	Programming Fundamentals	✓	✓					✓			✓
CS111L	Programming Fundamentals Lab			✓							
CS231	Database Systems	✓	✓					✓			
CS231L	Database Systems Lab		✓		✓				✓		
CS141	Digital Logic Design	✓	✓		✓			✓			
CS141L	Digital Logic Design Lab		✓		✓			✓			
CS212	Object Oriented Programming	✓	✓		✓			✓			✓
CS212L	Object Oriented Programming Lab		✓	✓							
CS352	Information Security	✓		✓		✓			✓		
CS352L	Information Security Lab				✓		✓			✓	
CS342	Operating Systems	✓	✓								✓
CS342L	Operating Systems Lab			✓		✓					✓
CS251	Computer Networks	✓	✓		✓			✓			
CS251L	Computer Networks Lab		✓		✓			✓			
SE111	Introduction to Software Engineering	✓	✓					✓		✓	
CS221	Data Structures	✓		✓	✓			✓			
CS221L	Data Structures Lab			✓	✓			✓			

CS343	Computer Organization & Assembly Language	✓	✓	✓	✓			✓			
CS343L	Computer Organization & Assembly Language Lab		✓	✓	✓	✓		✓			
SE241	Software Requirement Engineering	✓	✓	✓				✓	✓		
SE241L	Software Requirement Engineering Lab	✓	✓					✓		✓	
SE232	Object Oriented Analysis & Design	✓	✓					✓	✓		
SE232L	Object Oriented Analysis & Design Lab				✓	✓					
AI201	Artificial Intelligence	✓	✓								✓
AI201L	Artificial Intelligence Lab		✓	✓							
SE461	Software Quality Engineering	✓	✓	✓				✓	✓		
SE461L	Software Quality Engineering Lab		✓		✓		✓				✓
SE333	Software Design & Architecture	✓	✓					✓	✓		
SE333L	Software Design & Architecture Lab		✓	✓		✓				✓	
SE351	Software Construction & Development	✓	✓			✓		✓			
SE351L	Software Construction & Development Lab					✓					✓
CS313	Advance Programming	✓		✓	✓						✓
CS313L	Advance Programming Lab				✓	✓					✓
IT331	Parallel & Distributed Computing	✓	✓		✓						✓
IT331L	Parallel & Distributed Computing Lab		✓		✓	✓					✓
SE321	Software Project Management	✓	✓	✓			✓				
SE321L	Software Project Management Lab		✓			✓	✓				
SE385	Web Frameworks	✓	✓		✓						✓
SE385	Web Frameworks Lab		✓	✓				✓			
SE371	User Experience Design		✓		✓	✓		✓	✓		

SE371L	User Experience Design Lab		✓	✓	✓	✓					
CS322	Analysis of Algorithms	✓	✓								✓
SE331	Business Process Engineering	✓	✓	✓					✓		✓
SE481	Mobile Application Development	✓	✓		✓						✓
SE481L	Mobile Application Development Lab		✓	✓				✓			
SE312	Software Re-Engineering	✓	✓					✓			✓
SE312L	Software Re-Engineering Lab		✓		✓		✓				✓
SE362	Software Verification and Validation	✓	✓			✓		✓			
SE362L	Software Verification and Validation Lab		✓			✓					
GEC114	Introduction to Information and Communication Technologies	✓									✓
GEC114L	Introduction to Information and Communication Technologies Lab			✓	✓			✓			
SE374	Management information systems	✓								✓	
SE373	E-Commerce	✓		✓		✓				✓	
SE375	Real Time Systems	✓	✓	✓				✓			✓
CS323	Theory of Automata	✓	✓	✓							
SE 372	Formal Methods in Software Engineering	✓		✓	✓	✓				✓	
CS332	Advanced Database Management Systems		✓	✓	✓						✓
CS332L	Advanced Database Management Systems Lab			✓	✓						✓
DS341	Big data Analytics	✓	✓	✓		✓					✓
DS341L	Big data Analytics Lab		✓	✓							
Number of Subjects where PLO is Used		33	44	27	27	17	7	26	8	7	22
PLO Occurrence		39	48	29	30	17	7	26	8	7	22

5.2 Taxonomy Mapping Matrix

Code	Taxonomy	C1	C2	C3	C4	C5	C6	S1	S2	S3	S4	S5	V1	V2	V3	V4	V5
	Title	Remember	Understanding	Applying	Analyzing	Evaluating	Creating	Imitating	Manipulating	Precising	Articulating	Neutralizing	Receiving	Responding	Valuing	Organization	Characterization
CS111	Programming Fundamentals	✓	✓	✓	✓		✓										
CS111L	Programming Fundamentals Lab	✓							✓	✓	✓						
CS231	Database Systems		✓	✓		✓											
CS231L	Database Systems Lab								✓	✓	✓	✓					
CS141	Digital Logic Design		✓	✓	✓									✓			
CS141L	Digital Logic Design Lab								✓	✓				✓			
CS212	Object Oriented Programming		✓	✓			✓										
CS212L	Object Oriented Programming Lab								✓	✓							
CS352	Information Security		✓	✓											✓		
CS352L	Information Security Lab							✓	✓	✓							
CS342	Operating Systems	✓	✓		✓	✓											
CS342L	Operating Systems Lab							✓	✓		✓						
CS251	Computer Networks		✓	✓	✓									✓			
CS251L	Computer Networks Lab								✓	✓				✓			
SE111	Software Engineering	✓	✓	✓										✓			

CS221	Data Structures		✓	✓	✓		✓									
CS221L	Data Structures Lab				✓				✓		✓					
CS343	Computer Organization & Assembly Language		✓	✓	✓											
CS343L	Computer Organization & Assembly Language Lab								✓	✓	✓				✓	
SE241	Software Requirement Engineering	✓	✓	✓	✓	✓						✓	✓			✓	
SE241L	Software Requirement Engineering Lab								✓				✓	✓	✓		✓
SE232	Object Oriented Analysis & Design		✓	✓		✓										
SE232L	Object Oriented Analysis & Design Lab								✓	✓						
AI201	Artificial Intelligence		✓	✓			✓									
AI201L	Artificial Intelligence Lab								✓	✓						
SE461	Software Quality Engineering	✓	✓	✓									✓			✓	
SE461L	Software Quality Engineering Lab		✓	✓	✓			✓	✓					✓		✓	
SE333	Software Design & Architecture		✓	✓										✓			
SE333L	Software Design & Architecture Lab			✓							✓					✓	
SE351	Software Construction & Development		✓	✓									✓	✓	✓	✓	
SE351L	Software Construction & Development Lab								✓		✓						
CS313	Advance Programming	✓		✓	✓		✓										
CS313L	Advance Programming Lab								✓	✓							
IT331	Parallel & Distributed Computing		✓		✓	✓											
IT331L	Parallel & Distributed Computing Lab								✓	✓	✓	✓					
SE321	Software Project Management		✓	✓													

SE321L	Software Project Management Lab								✓	✓				✓			
SE385	Web Frameworks		✓	✓			✓										
SE385L	Web Frameworks Lab							✓		✓							
SE371	User Experience design		✓	✓	✓	✓	✓										
SE371L	User experience design Lab							✓	✓	✓							
CS322	Analysis of Algorithms		✓	✓	✓												
SE331	Business Process Engineering		✓	✓	✓	✓	✓										
SE481	Mobile Application Development		✓	✓			✓										
SE481L	Mobile Application Development Lab							✓	✓	✓							
SE312	Software Re-Engineering	✓	✓	✓	✓									✓		✓	
SE312L	Software Re-Engineering Lab			✓	✓			✓	✓					✓	✓		
SE362	Software Verification and Validation		✓	✓													
SE362L	Software Verification and Validation Lab								✓		✓						
GEC114	Introduction to Information and Communication Technologies	✓	✓				✓										
GEC114L	Introduction to Information and Communication Technologies Lab						✓		✓		✓						
SE374	Management information systems		✓	✓		✓	✓										
SE373	E-Commerce		✓	✓													
SE375	Real Time Systems	✓	✓	✓		✓	✓										
CS323	Theory of Automata		✓	✓													
SE 372	Formal Methods in Software Engineering		✓	✓	✓										✓		

CS332	Advanced Database Management Systems		✓	✓			✓										
CS332L	Advanced Database Management Systems Lab								✓		✓	✓					✓
DS341	Big data Analytics	✓	✓	✓	✓												✓
DS341L	Big data Analytics Lab								✓	✓	✓						
Number of Subjects where Taxonomy is Used		**11**	**34**	**34**	**18**	**9**	**14**	**7**	**24**	**16**	**12**	**4**	**5**	**12**	**6**	**6**	**3**
Taxonomy Occurrence/frequency		**11**	**39**	**53**	**21**	**10**	**14**	**7**	**29**	**23**	**18**	**4**	**5**	**12**	**6**	**6**	**3**

5.3 Sustainable Development Goals (SDGs) Mapping Matrix

Code	SDGs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Title	**No Poverty**	**Zero HunGEC**	**Good Health and Well-being**	**Quality Education**	**Gender Equality**	**Clean Water and Sanitation**	**Affordable and Clean Energy**	**Decent Work and Economic Growth**	**Industry, Innovation and Infrastructure**	**Reduced Inequality**	**Sustainable Cities and Communities**	**Responsible Consumption and Production**	**Climate Action**	**Life Below Water**	**Life on Land**	**Peace & Justice Strong Institutions**	**Partnerships to achieve SDGs**
CS111	Programming Fundamentals				2				3									
CS231	Database Systems												4					
CS141	Digital Logic Design									3		4				5		2
CS212	Object Oriented Programming									2		3						
CS352	Information Security												3				2	
CS342	Operating Systems							2						1		2		
CS251	Computer Networks											4		1				
SE111	Software Engineering					1											2	
CS221	Data Structures									2								

SE241	Software Requirement Engineering									4							
SE232	Object Oriented Analysis & Design									4							2
AI201	Artificial Intelligence			3				3		1				2	1	5		
SE461	Software Quality Engineering																5
SE333	Software Design & Architecture									2							
SE351	Software Construction & Development							3				2				2		5
CS313	Advance Programming											2				3		
IT331	Parallel & Distributed Computing							2		4				3				2
SE321	Software Project Management				2	1			4		1						2	
SE385	Web Frameworks									4								
SE371	User Experience Design									2								
CS322	Analysis of Algorithms									4								
SE331	Business Process Engineering									4								
SE481	Mobile Application Development	1							4	4	1			2		5		5
SE312	Software Re-Engineering												4					
SE362	Software Verification & Validation									4								
GEC114	Introduction to Information and				4				3									

	Communication Technologies																
SE374	Management Information Systems												1				5
SE373	E-Commerce	1	1			2			4		1		3					3
SE375	Real Time Systems						1						4			5		3
CS323	Theory of Automata									2								
SE372	Formal Methods in Software Engineering									4								
CS332	Advanced Database Management Systems									2								
DS341	Big Data Analytics			2				1	4	4								

1 = indirectly or unknowingly including topics related to the SDG
2 = provides insight into the SDG from the perspective of one's own discipline
3 = uses inter- or trans-disciplinary approach to address at least one SDG Target (specific sub-goal)
4 = assessment of SDG knowledge or skills in relation to course and/or program learning outcomes
5 = Students act to address the SDGs with community or industry partners

Frequency and Number of SDGs Achieved

The integration of SDGs is achieved at varying levels across our curriculum, with some courses addressing multiple SDGs simultaneously. Below is a summary of the number of courses that contribute to each SDG and the frequency of each level of integration:

SDG	No. of courses	Freq [1]	Freq [2]	Freq [3]	Freq [4]	Freq [5]
No. Poverty (SDG-1)	2	2				
Zero HunGEC (SDG-2)	1	2				
Good Health and Well-being (SDG-3)	2		1	1		
Quality Education (SDG-4)	3		2		1	
Gender Equality (SDG-5)	3	2	1			
Clean water and Sanitation (SDG-6)	1		1			
Affordable and Clean Energy (SDG-7)	3	1	2	2		
Decent work and Economic Growth (SDG-8)	6			2	4	

Industry, Innovation and Infrastructure (SDG-9)	18	1	6	1	10	
Reduced Inequality (SDG-10)	3	3				
Sustainable Cities and Communities (SDG-11)	5		2	1	2	
Responsible Consumption and Production (SDG-12)	5			2	3	
Climate Action (SDG-13)	6	3	2	1		
Life Below water (SDG-14)						
Life on Land (SDG-15)	7		2	1		4
Peace & Justice Strong Institutions (SDG-16)	3		3			
Partnerships to achieve SDGs (SDG-17)	9		3	2		4

Our undergraduate Software Engineering program is designed to comprehensively address the United Nations Sustainable Development Goals through a variety of methods. By embedding SDG-related content, teaching strategies, and assessment methods, we aim to equip our students with the knowledge and skills to contribute positively to global challenges.

6. Teaching and learning strategies to achieve program learning outcomes

Describe policies, teaching and learning strategies, learning experience, and learning activities, including curricular and extra-curricular activities, to achieve the program learning outcomes.

S. No.	Teaching/Learning Strategy	Learning Activities
1	Active Learning	- Interactive problem-solving sessions - Coding exercises - Group projects/Tasks
2	Blended Learning	- Combination of face-to-face instruction and online components - Online lectures and resources
3	Hands-On Labs	- Practical sessions in computer labs - Software development tasks - Workshops on current technologies and practices
4	Collaborative Learning	- Group assignments - Peer reviews
5	Workshops and Seminars	- Deep dive sessions on specific topics
6	Hackathons	- Competitive programming events
7	Guest Lectures and Workshops	- Sessions with industry experts - Presentations by industry professionals on current trends and career advice
8	Internships	- Professional experience in industry settings

7. Assessment Methods for program learning outcomes.

Describe assessment methods (Direct and Indirect) that can be used to measure achievement of program learning outcomes in every domain of learning.				
S. No.	Type	Measurement Tool	Domains	Threshold
1	Direct	Exams (Mid-terms, Finals),	Cognitive (Knowledge and Comprehension)	50% Pass rate
		Quizzes	Cognitive (Knowledge and Comprehension)	50% Pass rate
2	Direct	Coding Exercises	Cognitive, Psychomotor (Application, Skills)	50% correctness
		Lab Assignments	Cognitive, Psychomotor (Application, Skills)	50% completion
		Presentations	Cognitive, Affective (Communication)	50% Clarity and Content
		Project Reports	Cognitive, Affective (Professionalism)	50% Professional Standard
3	Indirect	Surveys (Student Feedback)	Affective (Satisfaction, Engagement)	60% Positive Feedback
		Self-Assessment (Student Reflections)	Cognitive, Affective (Self-Evaluation)	60% Positive Reflection
		Employer Survey	Cognitive, Affective (Professional Growth)	60% Positive Feedback
		Alumni Surveys	Affective (Career Preparedness)	60% Positive Feedback

D. Student Admission and Support:

1. Student Admission Requirements

The admission requirements for the BS in Software Engineering program state that candidates must achieve a minimum of 50% marks in the Intermediate (HSSC)/A-levels examination, with Mathematics as a compulsory subject, or possess an equivalent foreign qualification with Mathematics, duly certified by the Inter Board Committee of Chairmen (IBCC). Furthermore, in accordance with the revised eligibility criteria outlined in the notification No. NCEAE/HEC/General/3-20, dated 20th March 2020, issued by the National Computing Education Accreditation Council (NCEAC), students with a background in Pre-Medical at the Intermediate level are also eligible to apply for admission in the BSSE program. However, they are required to successfully complete the deficiency courses in Mathematics, totaling 6 credit hours, within one year of their regular studies.

2. Guidance and Orientation Programs for New Students

S. No.	Type
1	Orientation Week
2	Welcome Sessions

3	Campus Tours
4	Academic Advising Sessions
5	Introduction to Campus Resources
7	Social Events and Networking

3. Student Counseling Services
(academic, career, psychological and social)

Academic Advisors, Faculty Mentors, Career Services Office, Industry Professionals, Trained Student Leaders, Student Affairs

1. The department assigns batch advisors to each batch who are available for counselling hours, and mentorship. The batch advisors report to the chairperson for academic as well as other issues of the different batches.
2. The universities has a strong network of alumni who visit university for seminars and supervise Final Year Project Students as well. The alumni are engaged in multiple initiatives that keep them involved with current students. Recently a conference was organized with help of alumni "**InnovateU"** which provided a networking and learning opportunity to students of faculty of computing.
3. The Directorate of Student affairs arranges multiple events on regular basis that deal with the psychological and social needs of the students such as sports gala, career consoling services, extravaganza, e-gaming etc.

4. Special Support
(low achievers, disabled, gifted and talented)

- Support for Low Achievers:
  - **Remedial Classes**: Extra classes focusing on fundamental concepts.
  - **Tutoring Services**: Additional academic help from academic advisors.

- Support for Disabled Students
  - **Personalized Support Plans**: Individualized plans tailored to meet specific needs.
  - **Physical Accessibility**: Ensuring campus facilities are accessible.
  - **Counseling Services**: Psychological support tailored to students with disabilities.

- Support for Gifted and Talented Students
  - **Mentorship Programs**: Pairing with faculty mentors for guidance and development.
  - **Leadership Programs**: Involvement in leadership development workshops and activities.

General Support Programs
- **Workshops and Seminars**: Skills development in areas such as time management, stress reduction, and study techniques.
- **Peer Mentoring**: Programs that connect students with peers for academic and social support.

E. Teaching and Administrative Staff

1. Needed Teaching and Administrative Staff

Academic Rank	Specialty		Special Requirements / Skills (if any)	Required Numbers		
	General	Specific		M	F	T
Professors		Software Engineering		01	01	02
Associate Professors		Software Engineering		02	02	04
Assistant Professors		Software Engineering		02	02	04
Lecturers						
Teaching Assistants						
Technicians and Laboratory Assistants		Software Engineering	Lab staff and Lab Engineers	4	4	8
Administrative and Supportive Staff			Naib Qasid and LDC required at male campus One LDC and UDC required at female campus	2	2	4
Others (specify)						

2. Professional Development

2.1 Orientation of New Faculty

Describe briefly the process used for orientation of new, visiting and part-time teaching staff

S. No.	Faculty Status	Activities
1	Teaching Staff	Initial Welcome Session, Introduction to Campus Resources, Policy and Procedure Overview
		Teaching Expectations, Technology Orientation, Mentorship Program, Professional Development
2	Non-Teaching Staff	Initial Welcome Session, Introduction to Campus Resources, Policy and Procedure Overview, Job Role Clarification
		Technology Orientation, Mentorship Program, Professional Development, Networking Opportunities, Feedback Mechanisms, Resource Materials

2.2 Professional Development for Faculty

Describe briefly the plan and arrangements for academic and professional development of teaching staff (e.g., teaching & learning strategies, learning outcomes assessment, professional development, etc.)

S. No.	Type	Details	Assessment
1	Learning Outcomes Assessment	Training sessions on developing, implementing, and assessing learning outcomes effectively.	Evaluation of course assessments, student performance metrics, and faculty feedback.

2	Professional Development	Opportunities for attending conferences, obtaining certifications, and participating in industry workshops.	Tracking participation, post-event reports, and application of new skills in teaching.
3	Peer Collaboration	Facilitating peer mentoring programs	Peer evaluation reports, collaborative work outcomes, and faculty satisfaction surveys
4	Research Support	Providing resources and support for faculty research activities, including grant writing workshops.	Number of research projects initiated, publications, and successful grant applications

F. Learning Resources, Facilities, and Equipment

1. Learning Resources.
Mechanism for providing and quality assurance of learning resources (textbooks, references and other resource materials, including electronic and web-based resources, etc.)

S. No.	Type	Details
1	Textbook Selection	Faculty select textbooks based on course objectives and latest industry standards.
2	Reference Materials	Inclusion of supplementary materials such as academic journals, reference books, and articles.
3	Electronic Resources	Provision of access to online databases, e-books, and digital libraries.
4	Web-Based Resources	Integration of web-based learning platforms and resources (e.g., Khan Academy, Coursera).
5	Faculty Training	Training faculty to effectively use and integrate learning resources into their teaching.
6	Student Feedback	Collecting and analyzing student feedback on the quality and accessibility of learning resources. Manual feedback is collected before midterm and automated feedback is collected before final examination. Both are these feedbacks are shared with the faculty for improvement and learning.
7	Quality Assurance Reviews	Periodic reviews by quality assurance committees to ensure resources meet academic standards.
8	Resource Updates	Regular updates and acquisition of the latest editions of textbooks and references.
9	Collaboration with Libraries	Collaboration with university libraries to provide comprehensive support and resource access.

2. Facilities and Equipment
(Library, laboratories, medical facilities, classrooms, etc.).

S. No.	Facility	Quantity
1	State-of-the-art computer labs equipped with the latest software development tools, servers, and hardware an ACs. Recently the department has acquired 40 new computers of Lenovo 12th generation intel core i5.	144 systems in 3 labs
2	Modern classrooms with multimedia capabilities and ACs.	4(male campus) 2 (female campus)
3	Comprehensive IT support for troubleshooting, software installation, and maintenance.	Separate IT department for male and female campus
4	High-speed Wi-Fi access and secure networking infrastructure.	LAN and WIFI both working
5	A separate medical center that provides 24 hour services to on campus and hostel students.	Separate for Male and Female Campus

3. Arrangements to Maintain a Healthy and Safe Environment (According to the nature of the program)		
S. No.	**Arrangement**	**Details**
1	Clean and Hygienic Facilities	Routine cleaning and maintenance of all facilities, including classrooms, labs, and common areas.
2	Medical Support	On-campus medical center staffed with qualified healthcare professionals for health concerns and emergencies.
3	Emergency Preparedness	Establishment of emergency response plans, including fire drills, evacuation procedures, and first-aid training.
4	Safety Signage and Information	Posting clear safety signage and information about emergency exits, first-aid stations, and safety protocols.

G. Program Management and Regulations

1. Program Management

1.1 Program Structure

(including councils, boards, committees, etc.)

S. No.	**Boards/Committees**
1	Departmental Board comprising of Chairperson, Incharge male /female campus, Incharge Academics
2	Board of Studies
3	Board of Faculty
4	Industry Advisory Board
5	Board of Advanced Studies and Research (BASR)
6	Academic Council

1.2 Stakeholders Involvement

Describe the representation and involvement of stakeholders in the program planning and development. (students, professional bodies, scientific societies, alumni, employers, etc.)

S. No.	**Stakeholder**
1	Educational Experts for HEC
2	Members of BoS, BOF and academic council.
3	Industry Advisory Board

2. Program Regulations

Provide a list of related program regulations, including their link to online version: admission, study and exams, recruitment, appeals and complaint regulations, etc.)

All academic rules and regulations are available on university website and updated time to time.
Online Academic Rules/Guidelines

H. Program Quality Assurance

1. Program Quality Assurance System

Provide online link to quality assurance manual

2. Program Quality Monitoring Procedures

The developed schemes of study of BSSE is aligned with the new HEC curriculum 2023 that is according to the requirements of the NCEAC. It is dully reviewed by the Departmental Curriculum Revision Committee, Chairperson, Dean FCIT and Steering Committee of IIU. It is also improved and approved by BOS, BOF. Moreover the Scheme of Study is also approved and revised as per the suggestions of the industry advisory board.

3. Arrangements to Monitor Quality of Courses Taught by other Departments.

Students are required to provide their feedback on courses and teachers at the end of each semester. The classroom is also audited twice a semester by the LMS audit team.

4. Arrangements Used to Ensure the Consistency between Main Campus and Branches (including male and female sections)
The scheme of studies is same and discussion sessions are held for improvement in program and uniformity of standards. Moreover the department has implemented the same course contents, midterm and terminal examination from Spring 2024 between male and female campus.
5. Arrangements to Apply the Institutional Regulations Governing the Educational and Research Partnerships (if any).
N/A

* Programs under accreditation bodies/councils should use the relevant templates

7. Program Evaluation Matrix *

Evaluation Areas/Aspects	Evaluation Sources/ References	Evaluation Methods	Evaluation Time
Quality of Degree/ Course Contents	Scheme of Study evaluation by Teachers, BOS Experts,and Industry	Scheme of Study discussion in Scheme of Study Revision Committee, Board of Studies, Board of Faculty, Steering Committee	During Semester multiple times Once a semester Once a semester
Effectiveness of Teaching and Quality of Contents	Course plans, LMS classrooms	Document evaluation via LMS Audit	Start and end of semester
Effectiveness of Teaching	Teacher and Course feedback forms	Manual Survey (before Midterm) LMS Survey(Online)	Before Mid Term and End of Semester
Graduate Attributes	Employer	Graduate Survey Form	Annual During Internship

8. Program KPIs*

The period to achieve the target is throughout the 4 year degree program.

KPI's for Course learning objectives (CLO's)

Assessment Method	KPI	Measurement	Target	Measurement Time
Direct Outcome Assessment	**Course Grades**	Examination (Midterm and Final)	50% Pass rate	Twice a semester
		Quizzes	50% Pass rate	Throughout the Semester
		Assignments	50% correctness	Throughout the Semester
	Practical Exam Scores	Lab Work and Demonstration	60% completion	Throughout the Semester
	Team Project Performance	Presentations	50% Clarity and Content	At end of semester

	Design Project Evaluations	Term Project Report	50% Professional Standard	At end of semester

KPIs for Program Learning Objectives

	KPI	Measurement	Target	Measurement Time
Direct Outcome Assessment	**Student Assessment**	Quizzes, Assignments, Project and Presentations	50% Pass rate	Throughout the semester
		Examination (Midterm and Final)	50% Pass rate	Twice a Semester
		Lab Demonstrations and Lab Exams	At least 60% pass rate	Throughout the semester
Indirect Outcome Assessment	**Graduate Attribute Surveys**	from Employers regarding skill set and attributes such as leadership skills, ethics, communication etc. during internship	50% of employers reporting positive response	Measured During internship once in 4 year degree

KPIs for Program Education Objectives

Assessment Method	KPI	Measurement	Target	Measurement Time
Indirect Outcome Assessment	**Employer Survey**	(Feedback from employer regarding professionalism, life-long learning, communication, ethics and many other skills)	50% positive evaluations from Employer	After 4 years of degree
	Alumni Survey	from Alumni regarding career progression	50% of employers reporting positive career progression within 5 years of graduation.	After 5 years

I. Bi-Annual Review

Date	
Recommendations	
Corrective Actions	

J. Specification Approval Data

Committee / BoS / BoF / Academic	**BOS 28 AUGUST, BOF 30 AUGUST, 87 ACM JUNE 5 2024**
Steering Committee	**22ND JANUARY 2025**
Reference No.	
Date	