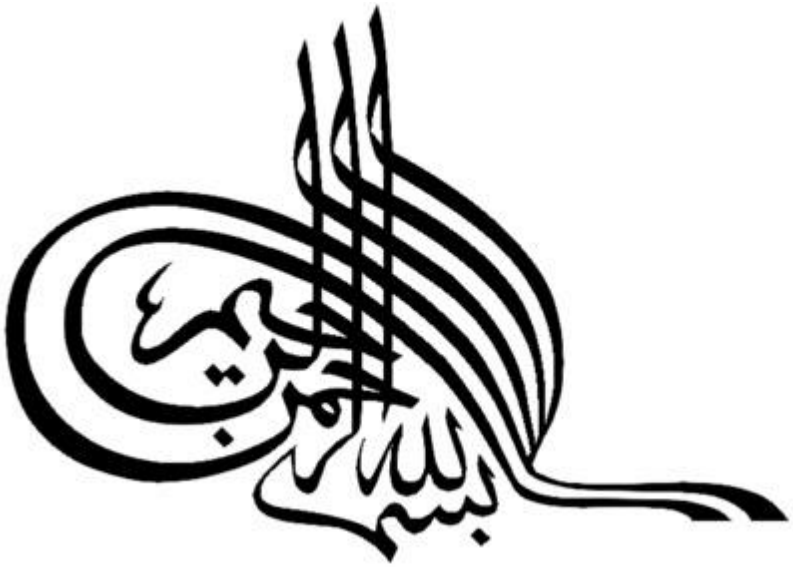
STUDENT'S QUICK GUIDE

Software Engineering Program

2023-2024


بسم الله الرحمن الرحيم

Overview of Software Engineering

Software Engineering is a discipline that involves the application of engineering principles to the creation and development of software. This encompasses a wide range of activities including the design, development, maintenance, testing, and evaluation of software and software systems.

In essence, software engineering is all about using engineering principles to create efficient, reliable software solutions that solve real-world problems or meet specific user needs. Whether it's creating a new app, developing a cloud-based system, or designing a critical piece of software for a spacecraft, the work of software engineers plays a vital role in our increasingly digital world. They take a problem or a set of requirements, and they design a software solution that meets those needs.

Software engineering isn't just about writing code. While coding is an essential part of the process, software engineering also involves a significant amount of planning, design, testing, and maintenance. Software engineers need to understand the needs of the users or the problems they're trying to solve, design a solution, implement the solution in code, test the solution to ensure it works as expected, and then maintain the solution over time as needs change and new problems arise.

Software engineers employ a variety of engineering concepts in their work. For example, they use principles of computer science and mathematics to create efficient algorithms. They use principles of engineering design to create software that's robust and reliable. They use principles of project management to ensure their work is completed on time and within budget. And they use principles of quality assurance to ensure the software they create is free of defects.

Importance of Software Engineering

Software engineering has become a cornerstone of our modern society. Its importance cannot be overstated as it powers the technologies and systems that enable our digital lives. From the applications on our smartphones and the software in our computers, to the complex systems that run our banks, hospitals, and transportation networks, software engineering is integral to our daily operations. Here's a closer look at the role software engineering plays in some aspects of society:

1. **Technology**: Software engineers are responsible for creating the technologies that have revolutionized our lives. Whether it's social media platforms that connect people across the globe, streaming services that have changed the way we consume media, or search engines that provide instant access to vast amounts of information, software engineers make these innovations possible.

2. **Healthcare**: In the healthcare sector, software engineers contribute to systems for electronic health records, telemedicine platforms, and medical imaging software. Their work aids in improving patient care, enhancing accessibility of services, and automating administrative tasks for healthcare providers.

3. **Finance**: The financial industry relies heavily on software for managing transactions, analyzing market trends, and safeguarding financial information. Software engineers develop the systems that power online banking, digital payments, and financial planning tools.

4. **Transportation**: From navigation systems and ride-sharing apps to software controlling public transit systems and self-driving cars, software engineers are at the forefront of transforming how we travel.

5. **Education**: Software engineers are shaping the future of education through the creation of digital classrooms, online learning platforms, and educational apps that make learning more accessible and engaging.

In essence, the work of software engineers is woven into the fabric of our society. As we continue to advance technologically, the importance and demand for skilled software engineers is expected to continue to grow. Their contributions are vital in driving innovation, improving efficiency, and enhancing the quality of life for people around the world.

Software Engineering Program at PSAU

The Standing Committee for Study Programs and Plans at Prince Sattam bin Abdulaziz University (PSAU) recommended that the software engineering program be made available to students at its eighth meeting of the 2018/2019 academic year. The College of Computer Engineering and Sciences (CCES) council, at its eighteenth meeting of the same academic year, made a recommendation based on this to allow students to choose a specialization in the Bachelor of Software Engineering (SE) program starting from the second semester of the academic year 2019/2020. This recommendation was based on the software engineering department council's recommendation at its second meeting of the same academic year. Because the specialization begins at level 4 (when the university was operating on the semester-based system), the first batch of female students enrolled in the SE program during the first semester of the academic year 2018/2019. During 2021-2022, students from the first batch start to receive a bachelor's degree in software engineering.

Program Vision

The program aims to be among the top educational programs and to become a center of excellence for studies and research in the Software Engineering field according to national, regional, and international standards.

Program Mission

To introduce a competitive educational program in the field of software engineering to produce highly qualified software engineers, who can actively participate in the fulfillment of the national needs and contribute to transform the society into a knowledge-based society.

Program Educational Objectives

PEO1: Advance successfully in their career or postgraduate studies.

PEO2: Practice professionally and ethically as individuals, team members or leaders in software engineering or related fields.

PEO3: Maintain currency through self-learning or other professional development.

Student Outcomes

The program must enable students to attain, by the time of graduation:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Degree Awarded

The Department awards a Bachelor of Science (B. Sc.) Degree in Software Engineering.

SE Study Plan

First Year – Semester (1)								
Course Code	Course Number	Course Name	Pre-requisite	Co-requisite	Credit hours	Units		
						L	P	T
PHYS	1010	General physics(I)	---	---	4	2	1	1
MATH	1050	Differential Calculus	---	---	3	2	0	1
ENGL	1210	Reading Skill	---	---	3	2	0	1
ENGL	1220	Writing Skills	---	---	3	2	0	1
Total					**13**	**8**	**1**	**4**

First Year – Semester (2)								
Course Code	Course Number	Course Name	Pre-requisite	Co-requisite	Credit hours	Units		
						L	P	T
ARAB	101	Language Skills	---	---	2	2	0	0
MATH	1060	Integral calculus	MATH 1050	---	3	2	0	1
ENGL	1230	Conversation and listening skills	---	---	3	2	0	1
CT	1400	Computer Skills	---	---	3	1	2	0
MC	1400	Communication Skills	---	---	2	2	0	0
ENG	1604	English for Technical Purposes	---	---	3	2	0	1
Total					**16**	**11**	**2**	**3**

Second Year – Semester (3)								
Course Code	Course Number	Course Name	Pre-requisite	Co-requisite	Credit hours	Units		
						L	P	T
CE	1111	Logic Design	---	---	3	3	0	0
CS	1112	Discrete Mathematics	---	---	4	4	0	0
CS	1301	Computer Programming 1	---	---	4	2	2	0
MATH	2220	Linear Algebra for Computer Students	---	---	3	3	0	0
Total					**14**	**12**	**2**	**0**

Second Year – Semester (4)								
Course Code	Course Number	Course Name	Pre-requisite	Co-requisite	Credit hours	Units		
						L	P	T
STAT	1050	Probability and Statistics for Computer Students	---	---	3	3	0	0
SE	2111	Software Engineering Foundations	CS 1301	---	3	3	0	0
CS	2301	Computer Programming 2	CS 1301	---	4	2	2	0
CS	2321	Algorithms and Data Structures	CS 1301	---	3	3	0	0
CE	2401	Computer Organization & Design	---	---	3	3	0	0
SE	3131	Formal Specifications	CS 1112	---	2	2	0	0
Total					**18**	**16**	**2**	**0**

Third Year – Semester (5)								
Course Code	Course Number	Course Name	Pre-requisite	Co-requisite	Credit hours	Units		
						L	P	T
ARAB	103	Arabic Editing	---	---	2	2	0	0
PHYS	1040	General Physics (II)	---	---	4	3	1	0
SE	3121	Software Requirements Engineering	SE 2111	---	3	3	0	0
MATH	3310	Differential Equations for Computer Students	MATH 1060	---	3	3	0	0
CS	3701	Operating systems	CS 2321	---	3	3	0	0
Total					**15**	**14**	**1**	**0**

Third Year – Semester (6)								
Course Code	Course Number	Course Name	Pre-requisite	Co-requisite	Credit hours	Units		
						L	P	T
IS	2511	Fundamentals of Database Systems	---	---	3	2	1	0
MATH	2540	Numerical Methods	MATH 2220	---	3	2	0	1
SE	3111	Human Computer Interaction	---	---	3	3	0	0
SE	3201	Software Design and Architecture	SE3131	---	3	3	0	0
CE	3761	Computer Network Systems	CE 2401 STAT 1050	---	3	3	0	0
Total					**15**	**13**	**1**	**1**

Fourth Year – Semester (7)								
Course Code	Course Number	Course Name	Pre-requisite	Co-requisite	Credit hours	Units		
						L	P	T
CS	3821	Web Applications Programming	IS 2511	---	3	2	1	0
SE	4111	Software Construction	SE 3201	---	3	3	0	0
SE	4221	Software Quality Assurance	SE 3121	---	3	2	1	0
SE	4231	Software Project Management	SE 2111	---	3	3	0	0
CS	4831	Mobile Applications Development	CE 3761	---	3	2	1	0
SE	4911	Graduation Project 1	80 CHs	---	2	2	0	0
Total					**17**	**14**	**3**	**0**

Fourth Year – Semester (8)								
Course Code	Course Number	Course Name	Pre-requisite	Co-requisite	Credit hours	Units		
						L	P	T
CS	3501	Introduction to Artificial Intelligence	CS 2321	---	3	3	0	0
xxxx	---	Selected Elective 1	---	---	3	3	0	0
xxxx	---	Selected Elective 2	---	---	3	3	0	0
SE	4921	Graduation Project 2	SE 4911	---	3	3	0	0
Total					**12**	**12**	**0**	**0**
Course Code	Course Number	Course Name	Pre-requisite	Co-requisite	Credit hours	Units		
						L	P	T
xxxx	xxxx	Free course	---	---	2	---	---	---
Total					**2**	**2**	**0**	**0**
Field Training								
Course Code	Course Number	Course Name	Pre-requisite	Co-requisite	Credit hours	Units		
						L	P	T
SE	4901	Field Training	80 CHs	---	3	3	0	0
Total					**3**	**3**	**0**	**0**

- **L:** Lecture
- **P:** Practical
- **T:** Tutorial

Elective Courses

Selected Elective Courses (1) (8 CHs)

Code	Course Name	Requisite	Credit hours
IC 101	Introduction of Islamic Culture	-	2
IC 102	The Islam and Society Building	-	2
IC 103	The Foundation of the Economic System in Islam	-	2
IC 104	Foundations of the political system in Islam	-	2
IC 106	Biography of the Prophet	-	2

Selected Elective Courses (2) (6 CHs)

Code	Course Name	Requisite	Credit hours
SE 4561	Software Engineering for Big Data	SE 2111 -/ P	3
SE 4571	Component Based Development	SE 3201 - / P	3
SE 4591	Developing Reusable Software	SE 3201 - / P	3
SE 4631	Software Engineering for the Web	CS 3701 - / P	3
SE 4011	Emerging software engineering tools	SE 4111 - / P	3
SE 4222	Software maintenance and evolution	SE 4111 - / P	3
SE 4971	Quantum computing	SE 3230 - / P	3
SE 4961	Software Entrepreneurship	SE 4231 - / P	3
SE 4112	Game development	SE 4111 - / P	3
SE 4541	Advanced Software Engineering	SE 2111 - / P	3
SE 4981	Selected Topics in Software Engineering	SE 3201 - / P	3
CS 4531	Neural Networks	CS 3501 - / P	3
CS 4551	Machine learning	CS 3501 - / P	3
IS 4571	Data Mining	IS 2511 - / P	3
CS 4651	Digital Image Processing	CS 2321 - / P	3

Career Pathways

Software engineering is a versatile field that provides numerous career pathways. Here are some common career pathways that one might consider after completing a software engineering program:

1. **Software Developer/Engineer:** The most direct career pathway for those graduating with a software engineering degree. Software developers are responsible for designing, coding, testing, and improving software applications.

2. **Systems Architect:** Systems architects are responsible for creating, designing, and implementing computer systems for a company. This role requires a deep understanding of complex systems and software.

3. **Software Development Manager:** After gaining experience, software engineers can transition into managerial roles. Development managers oversee teams of software developers and coordinate large-scale projects.

4. **Security Engineer:** With the increasing importance of data security, many software engineers opt to specialize in cybersecurity. These professionals are responsible for protecting systems against digital attacks.

5. **DevOps Engineer:** DevOps engineers work on both development and operations, aiming to shorten the development life cycle and provide continuous delivery with high software quality.

6. **Quality Assurance (QA) Engineer:** These professionals are responsible for ensuring the quality of software products by planning and executing testing regimes.

7. **Software Project Manager:** A software project manager is a key figure in a software development project. They act as the link between the client, stakeholders, and the software development team. Their primary role is to define, plan, track, and manage software projects. As a software project manager, you would be in charge of managing resources, scheduling, budgeting, and risk assessment.

8. **User Interface (UI) / User Experience (UX) Designer:** If you're more artistically inclined, a career in UI/UX might be fitting. These professionals focus on improving the user's experience when using a software application.

Remember, the pathway you choose will depend on your interests, skills, and career goals. It's a good idea to explore different areas of software engineering to find what you enjoy the most.

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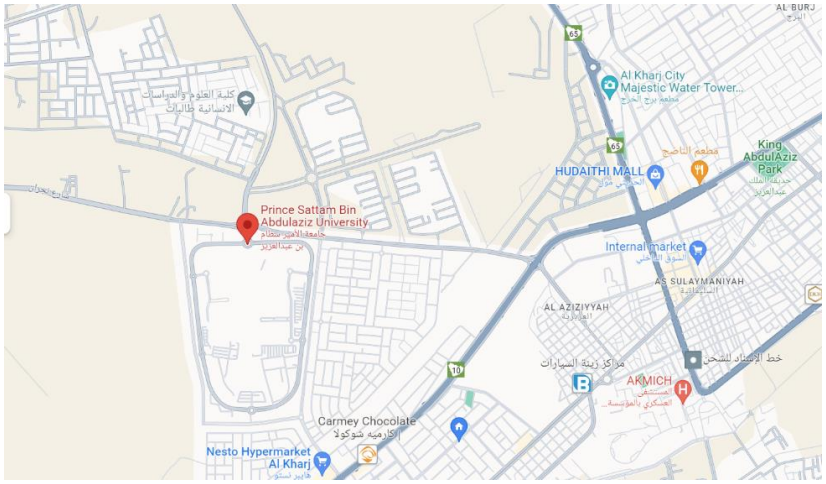
Click here

Male section location map:



Female section location map: