Al-Hussein Bin Talal University

College of

Information Technology

Department of Software Engineering

Study plan

Objectives:

1. To provide students with an understanding of the fundamental knowledge prerequisite for the practice of or for advanced study in Software Engineering, including its scientific principles, rigorous analysis, and creative design.

2. To provide students with the broad education, including knowledge of important current issues in engineering with emphasis on Software Engineering, necessary for productive careers in the public or private sectors or for the pursuit of graduate education.

3. To develop skills for clear communication and responsible teamwork and to inculcate professional attitudes and ethics, so that students are prepared for the complex modern work environment and for lifelong learning.

4. To provide an environment that enables students to pursue their goals in an innovative program that is rigorous and challenging, open and supportive.

1. Framework for B.Sc. Degree (132 Semester Credits)

Classification	Credit Hours		
	Compulsory	Elective	Total
University Requirements	21	6	27
College Requirements	25	-	25
Department Requirements:	68	9	77
Free Electives	-	3	3
Total =	105	27	132

2. University Requirements: (27 Credit Hours)

2. 1. Compulsory : (21Credit Hours)

Course No.	Course Title	Cr. Hr.	Lecture	Lab.	Prerequisite or *Corequisite
0100101	Military Sciences	3	3	-	-
0201101	Arabic Language	3	3	-	0201099
0202101	English Language	3	3	-	0202099
0205100	National Education	3	3	-	-
	Total	12			

2. 2. Elective: (6 Credit Hours)

Elective Courses with Total of (6) Credit Hours. Student must select six credit hours from each of the following:

Course No.	Course Title	Cr. Hr.	Lecture	Prerequisite or *Corequisite
Package of Humanity Courses				
0214099	French Language	3	3	-
0206101	Introduction to Libraries' Science	3	3	-
0209101	Spanish Language	3	3	-
0207101	German Language	3	3	-
0202102	Communication Skills in English	3	3	0202101
0201102	Communication Skills in Arabic	3	3	0201101
Package of Economic & Social Science Courses				
0701100	Jordan's Contribution in the Human Civilization	3	3	-
0412100	Economy In our Lives	3	3	-
0411101	Principles of Management	3	3	-
0704105	Cultural Heritage and People	3	3	-
0100111	Islamic Culture	3	3	-
0113112	Principles of Psychology	3	3	-
0205131	Law in our Life	3	3	-
0102141	Principles of Education	3	3	-
0100172	History of Jerusalem	3	3	-
0100173	History of the Arabic-Islamic Culture	3	3	-
0111222	Skill	3	3	-
Package of Science & Technology , Agriculture , & Health Courses				
0502100	Environmental Issues	3	3	-
0303100	Introduction to Astronomy	3	3	-
0100171	Principles of Physical Education	3	3	-

3. College Requirements: (25 Credit Hours)

Course No.	Course Title	Cr. hr.	Lecture	Lab.	Prerequisite or *Corequisite
0302101	Calculus I	3	3	-	-
0302102	Calculus II	3	3	-	0302101
0303106	General Physics for Computer Students	3	3	-	-
0303107	General Physics Lab for Computer Students	1	-	1	0303106
0612102	Discrete Mathematics	3	3	-	-
0612114	C++ Programming	3	2	3	0612099
0612213	Object-Oriented Programming I	3	2	3	0612114
0612331	Computer Operating Systems	3	3	-	0612114
0613101	Fundamentals of Information Technology	3	3	-	-
	Total	**25**			

4. Department Requirements (77Credit Hours)

Course Numbering

The indications of the course subject's digits:

Field Number	Specialization
0	Fundamental
1	Software Requirements Engineering, Economics, Documentation
2	Software Modeling, Designing, and implementation
3	Software Verification and Validation
4	Software Construction and Evolution
5	Software Project Management and Quality
6	Software Engineering Tools and Techniques
9	Graduation Project, Filed Training, Special Topics

Example

Software Requirements Engineering					0614212	
0	6	1	4	2	1	2
College		Department		Level	Field	Sequence

4. 1. Department Core: (68 Credit Hours)

Course No.	Course Title	Cr. hr.	Lecture	Lab.	Prerequisite or *Co requisite
0302131	Principles of Probability and Statistics	3	3	-	0612102
0612224	Algorithms and Data Structures	3	2	3	0612213
0612332	Introduction to Computer Networks	3	3	-	0612331
0612342	Artificial Intelligence	3	3	-	0612224
0612443	Digital Image Processing	3	3	-	0612224
0613201	Introduction to Information Systems	3	3	-	0613101 0411102&
0613212	Systems Analysis	3	3	-	0613201
0613313	Database Systems	3	3	-	0613210
0613322	A Fourth Generation Language	3	2	3	0613313
0613341	Internet Programming	3	2	3	0612213
0613434	Multimedia Systems	3	2	3	0612213
0613442	Electronic Commerce	3	2	3	0613341
0614201	Technical Writing Skills	1	1	-	0202101
0614202	Professional and Ethical Practices	1	1	-	0613101
0614214	Software Requirements Engineering	3	3	-	0613101
0614321	Software Design and Implementation	3	3	-	0614214
0614332	Software Verification and Validation	3	3	-	0614321
0614351	Software Project Management and Quality	3	3	-	0614214
0614390	Field Training	3	-	3	Completing 60 C.H.
0614421	Human-Computer Interaction	3	3	-	0614321
0614441	Software Construction and Evolving	3	3	-	0614321
0614452	Fault-Tolerant Systems	3	3	-	0614332
0614490	Graduation Project – Software Engineering	3	-	3	Completing 90 C.H.
0451100	Principles of Management and Marketing	3	3	-	-
	Total	**68**			

4. 2. Department Electives: (9 Credit Hours)

Course No.	Course Title	Cr. Hr.	Lecture	Lab.	Prerequisite or *Co requisite
0612313	Visual Programming Language I	3	2	3	0612213
0612315	Object-Oriented Programming II	3	2	3	0612213
0613324	Computer Modeling and Simulation	3	2	3	0612224
0613355	Genetic Algorithms	3	2	3	0612224
0613453	Information Retrieval	3	3	-	0613313
0614361	Information Systems Aided Tools	3	2	3	0614321
0614442	Software Re-Engineering Techniques	3	3	-	0614441
0614453	Formal Methods in Software Engineering	3	3	-	0614321
0614491	Special Topics in Software Engineering	3	3	-	Department Approval

5. Free Elective (3 Credit Hours)

Courses to be taken from University wide open Courses.

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Study Plan Guide for the Bachelor Degree in Software Engineering

First Year				
First Term				
Course No.	**Course Title**	**Cr. hr.**	**Prerequisite**	**Co-requisite**
-	University Requirements Compulsory	3	-	-
0302101	Calculus I	3	0201099	-
0303106	General Physics for computer science	3	-	-
0613101	Principles of Information Technology	3	-	-
	Total	**12**		
Second Term				
Course No.	**Course Title**	**Cr. hr.**	**Prerequisite**	**Co-requisite**
-	University Requirements Electives	3	-	-
0451100	Principles of Management and Marketing	3	-	-
0302102	Calculus II	3	0302101	-
0303107	General Physics Lab for computer science	1	0303106	-
0612102	Discrete Mathematics	3	-	-
0612114	C++ Programming	3	0612099	-
	Total	**16**		

Second Year				
First Term				
Course No.	**Course Title**	**Cr. hr.**	**Prerequisite**	**Co-requisite**
0302131	Fundamentals of Probability and Statistics	3	0612102	-
0612213	Object-Oriented Programming I	3	0612114	-
0613201	Fundamentals of Information Systems	3	0613101 0451100	-
0614201	Technical Writing Skills	1	0202101	-
-	University Requirements Compulsory	3	-	-
-	University Requirements Elective	3	-	-
	Total	**16**		
Second Term				
Course No.	**Course Title**	**Cr. hr.**	**Prerequisite**	**Co-requisite**
0612224	Algorithms and Data Structures	3	0612213	-
0613212	Systems Analysis	3	0613201	-
0614202	Professional and Ethical Practices	1	0613101	-
0614214	Software Requirements Engineering	3	0613101	-
-	Department Elective	3	-	-
-	University Requirements Compulsory	3	-	-
	Total	**16**		

Third Year				
First Term				
Course No.	**Course Title**	**Cr. hr.**	**Prerequisite**	**Co-requisite**
0612331	Computer Operating Systems	3	0612114	-
0613313	Database Systems	3	0613210	-
0613341	Internet Programming	3	0612213	-
0614321	Software Design and Implementation	3	0614214	-
0614351	Software Project Management and Quality	3	0614214	-
-	University Requirements Compulsory	3	-	-
	Total	**18**		
Second Term				
Course No.	**Course Title**	**Cr. hr.**	**Prerequisite**	**Co-requisite**
0612332	Introduction to Computer Networks	3	0612331	-
0612342	Artificial Intelligence	3	0612224	-
0613434	Multimedia Systems	3	0612213	-
0613442	Electronic Commerce	3	0613341	-
0614332	Software Verification and Validation	3	0614321	-
-	University Requirements Electives	3	-	-
	Total	**18**		

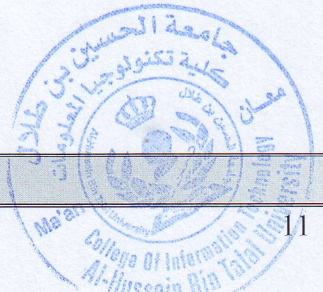
Fourth Year				
First Term				
Course No.	**Course Title**	**Cr. hr.**	**Prerequisite**	**Co-requisite**
0612443	Image Processing	3	0612224	-
0614421	Human Computer Interaction	3	0614321	-
0614441	Software Construction and Evolving	3	0614321	-
-	Department Elective	3	-	-
-	University Requirements Elective	3	-	-
-	University Requirements Elective	3	-	-
	Total	**18**		
Second Term				
Course No.	**Course Title**	**Cr. hr.**	**Prerequisite**	**Co-requisite**
0613322	A Fourth Generation Language	3	0613313	-
0614390	Field Training *	3	Finishing 60 C.H.	-
0614453	Formal Methods in Software Engineering	3	0614321	-
0614490	Graduation Project – Software Engineering	3	Finishing 90 C.H.	-
-	Free Elective	3	-	-
-	Department Elective	3	-	-
	Total	**18**		

*** this Course must be Registered in a Separate Semester.**

Description of Courses Offered by Department of Software Engineering

Course Number	Course Name and Description
0614201	**Technical Writing Skills** مهارات الكتابة الفنية Practice in effective writing and clear thinking at all levels, including the sentence and paragraph, with emphasis on the essay and research report. Specific steps reviewed within the writing process include formulating purpose, identifying an audience, and selecting and using research resources and methods of development. Practical work on written research reports is also included. **Prerequisite:(0202101)**
0614202	**Professional and Ethical Practices** ممارسات مهنية وأخلاقية Introduction to the topic; Problems of ethical decision-making; Professional Societies and their codes of conduct and practice; Professionals and Professional Behavior; Formal laws do not make for ethics; Graduate careers in the 21st century; Building the foundations to future career success; Group working and distributed enterprises; The law and contracts Safety critical systems and legal liability; A business view of contracts; IPR and copyright; IPR and patents; Computer misuse and the law; Case studies. **Prerequisite: (0613101)**
0614204	**Introduction to Software Engineering** مقدمة في هندسة البرمجيات Introduction to current techniques used in large-scale software development. Topics include requirements analysis, functional specifications, system design, implementation, testing and maintenance. **Prerequisite: (0613101)**
0614214	**Software Requirements Engineering** هندسة متطلبات البرمجيات Methodologies, approaches, and techniques associated with software requirements analysis and definition; process for defining requirements of a system including feasibility study, requirements elicitation, formal specification, modeling, validation, verification, and documentation; other topics include cooperative teamwork and project management; first semester of a two-semester capstone project in which students work with a customer. **Prerequisite: (0613101)**
0614321	**Software Design and Implementing** تصميم وتنفيذ البرمجيات Methodologies, approaches, and techniques associated with software design and implementation of a software system; other topics include software design for reuse using patterns, cooperative teamwork, project management, and documentation; second semester of a two-semester capstone project in which students design and implement a real-world application specified in 0614212. Practical work for three hours weekly is also included. **Prerequisite: (0614214)**

Course Number	Course Name and Description
0614332	**Software Verification and Validation** تحقيق وتدقيق البرمجيات Methodologies, approaches, and techniques associated with ensuring that a software product correctly implements a specific function (verification) and meets the customer requirements (validation). The main topics include: Management Review, Technical Review, Walkthrough, Inspection, Audit, Black Box Testing, White Box Testing, Control Flow Graphs, Coverage Metrics, Cyclomatic Complexity, Testing Framework, Defect Tracking, Strategies for Object-Oriented Testing and Model Checking. **Prerequisite: (0614321)**
0614351	**Software Project Management and Quality** إدارة المشاريع البرمجية وجودتها Issues involved in software project management and the factors that affect software quality; range of standards, techniques and tools developed to support software project management and the production of high quality software; and techniques to develop software project plans, supporting software quality plans and risk management plans. Topics also covered include project management issues: client management; management of technical teams, project planning, and scheduling, risk management, configuration management, quality assurance and accreditation, legal issues. Practical work for three hours weekly is also included. **Prerequisite: (0614214)**
0614361	**Information Systems Aided Tools** أدوات تطوير نظم المعلومات Techniques used for the development of Computer Aided Software Engineering Tools: Analysis tools, Projects management tools, Configuration Management tools, Code generation. Practical work for three hours weekly is also included. **Prerequisite: (0614321)**
0614390	**Field Training** التدريب الميداني The Training Consists of (8)Week after Completing about (60) C.H According to Field Training in Striations . **Prerequisite: (Completing 60 C.H.)**
0614421	**Human-Computer Interaction** تفاعل الإنسان مع الحاسوب Models and methods of human-computer interaction. Theory of human-computer interaction. Development methods for interfaces such as user-centered design, prototyping, and participatory design. Evaluation and testing techniques, such as heuristic evaluation, the cognitive walkthrough, and usability testing. User-interface programming. Ethical and societal issues. **Prerequisite: (0614321)**



Course Number	Course Name and Description

0614441	**Software Operation and Maintenance**	تشغيل البرمجيات وصيانتها

Installation strategies for information systems: direct, parallel, single location and phased installation. Preparing training plans for installed the systems. Documenting systems including preparing user documentation. Training and supporting users. Introduction to Maintenance of information systems: types of maintenance, cost of maintenance, and maintenance management issues including alternative organizational structures, quality measurement, handling change requests, and configuration management. Maintaining websites and Electronic commerce systems. Practical work for three hours weekly is also included.

Prerequisite: (0614321)

0614442	**Software Re-Engineering Techniques**	تقنيات اعادة هندسة البرمجيات

Software maintenance through reengineering; computer-aided techniques to recover information from pre-existing systems; Refactoring, migration, Program transformation, Data reverse engineering, Object Oriented Reengineering. Practical work for three hours weekly is also included.

Prerequisite: (0614441)

0614452	**Fault-Tolerant Systems**	النظم ذات القابلية للأعطال

Techniques for achieving high reliability and fault-tolerance in computing systems including fault modeling and testing, reliability evaluation, and use of redundancy for fault-tolerance.

Prerequisite: (0614332)

0614453	**Formal Methods in Software Engineering**	الطرق الرسمية في هندسة البرمجيات

Methodologies, approaches, and techniques associated with applying rigorous techniques that have a solid mathematical and logical foundation to support major software development stages, including requirement specification, software design, and software verification and validation. The main topics include: Propositional logic and Predicate logic: their syntax, semantics, and use as a formal language, Temporal Logic, Model checking and Theorem Proving.

Prerequisite: (0614321)

0614490	**Graduation Project – Software Engineering**	مشروع تخرج – هندسة البرمجيات

Students will work in teams on to computerize the procedures of a suggested system. Work includes performing systems' requirements analysis, functional specification, system design, and implementation. Documentation reports : interview, feasibility, software requirement specifications, and progress report at the completion of the course is required.

Prerequisite: (Completing 90 C.H.)

0614491	**Special Topics in Software Engineering**	موضوعات خاصة في هندسة البرمجيات

Advanced topics of contemporary interest in Software Engineering.

Prerequisite: (Department Approval)