

**Faculty of King Abdullah II School for Information  
Technology  
Department of Computer Information Systems  
Study Plan  
Master in Computer Information  
(Thesis Track)**

	Serial #	Degree	Dep #	Faculty #	Year	Track
Plan Number		8	2	19	2015	thesis

**First: General Rules & Conditions:**

1. This plan conforms to the valid regulations of the programs of graduate studies.
2. Specialties of Admission:
  - The First Priority: Bachelor's in Computer Information Systems, Bachelor's in Computer Science, Bachelor's in Software Engineering.
  - The second Priority: Bachelor's in Business Information Systems, Bachelor's in Computer Engineering, Bachelor's in Computer Networks.
  - The third Priority: Bachelor's in Other IT Degrees.

**Second: Special Conditions:**

- None.

**Third: Study Plan: Studying (33) Credit Hours as following:**

1. Obligatory Courses (15) Credit Hours:

Course No.	Course Title	Credit Hrs	Theor y	Practical	Pre/Co-requisite
1901715	Theory of Algorithms	3	3	-	-
1902713	Software Engineering	3	3	-	-
1902723	Database Systems	3	3	-	-
1902733	Artificial Intelligence and Expert Systems	3	3	-	-
1902760	Research Methodologies	3	3	-	-

2. Elective Courses: Studying (9) Credit hours from the following:

<b>Course No.</b>	<b>Course Title</b>	<b>Credit Hrs</b>	<b>Theory</b>	<b>Practical</b>	<b>Pre/Co-requisite</b>
1901761	Operating Systems	3	3	-	-
1902714	Software Design	3	3	-	-
1902715	Software Verification and Validation	3	3	-	-
1902724	Distributed Databases	3	3	-	-
1902734	Machine Learning	3	3	-	-
1902736	Natural Language Processing	3	3	-	-
1902744	Image Processing and Applications	3	3	-	-
1902745	Multimedia	3	3	-	-
1902746	E-Learning	3	3	-	-
1902754	Geographical Information Systems	3	3	-	-
1902757	Information Security	3	3	-	-
1902768	Special Topics in Information Systems	3	3	-	-
1902753	Information Systems	3	3	-	-

3. Thesis: (9) Credit hours (1902799).

\*notes



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Plan Number		8	2	19	2015	Non-Thesis

**First: General Rules & Conditions:**

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2. Specialties of Admission:
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  - The third Priority: Bachelor's in Other IT Degrees.

**Second: Special Conditions:**

- None.

**Third: Study Plan: Studying (33) Credit Hours as following:**

1. Obligatory Courses (24) Credit Hours:

Course No.	Course Title	Credit Hrs	Theory	Practical	Pre/Co-requisite
1901715	Theory of Algorithms	3	3	-	-
1902713	Software Engineering	3	3	-	-
1902723	Database Systems	3	3	-	-
1902733	Artificial Intelligence and Expert Systems	3	3	-	-
1902744	Image Processing and Applications	3	3	-	-
1902745	Multimedia	3	3	-	-
1902753	Information Systems	3	3	-	-
1902760	Research Methodologies	3	3	-	-

2. Elective Courses: Studying (9) Credit hours from the following:

<b>Course No.</b>	<b>Course Title</b>	<b>Credit Hrs</b>	<b>Theory</b>	<b>Practical</b>	<b>Pre/Co-requisite</b>
1901761	Operating Systems	3	3	-	-
1902714	Software Design	3	3	-	-
1902715	Software Verification and Validation	3	3	-	-
1902724	Distributed Databases	3	3	-	-
1902734	Machine Learning	3	3	-	-
1902736	Natural Language Processing	3	3	-	-
1902746	E-Learning	3	3	-	-
1902754	Geographical Information Systems	3	3	-	-
1902757	Information Security	3	3	-	-
1902768	Special Topics in Information Systems	3	3	-	-

3. A comprehensive exam (1902798).

\*notes



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**1902713 Software Engineering**

**(3) Credit Hours**

Software processes; component based development and software reuse. Formal methods in software engineering: formal specification; formal specification languages, Examples of formal specifications. Software cost estimation techniques: algorithmic cost modeling. Quality management and software measurement; Software evolution; software re-engineering; reverse engineering.

**1902714 Software Design**

**(3) Credit Hours**

Architectural design: architectural design decision, system organization, architectural styles; modular decomposition style, control styles, reference architecture; designing patterns. Object-oriented design: object and object classes, an object oriented design methods. Evolution and evolution of designs. Component-based design; Real-time software design: system design real-time operating system, monitoring and control system, data acquisition system. User interface design: design issues, the user interface process, user analysis, user interface prototyping, interface evolution.

**1902715 Software Verification and Validation**

**(3) Credit Hours**

Planning verification and validation; verification and validation techniques. Software testing: Component testing, integration testing and system testing. Testing techniques; Verification and formal methods. Critical systems validation. Transition Systems, Kripke Structure, Linear Temporal Logic (LTL), Computational Tree Logic (CTL), Binary Decision Diagrams, Modeling Real-Time Systems, Algorithms for Verifying Real Time Systems.

**1902723 Database Systems****(3) Credit Hours**

Advanced data modeling concepts: Advanced Relational data modeling, Object-Oriented data modeling; Database Design Theory: Advanced Relational Algebra, Database Normalization, Object-Oriented database design; Advanced Query Languages: Advanced Relational SQL constructs, Object-Oriented query languages; Database Integrity; Concurrency Control: concurrency problems, concurrency approaches; Database Recovery: Recovery solutions and approaches; Database Security.

**1902724 Distributed Databases****(3) Credit Hours**

Distributed Database Management System (DDBMS) Architecture: Standardization, Models, Alternatives; Distributed Database Design: Strategies, Design issues, Fragmentation, Allocation; Distributed Query Processing; Distributed Database Interoperability: Distributed database heterogeneity, schema translation, global schema construction, global and local query processing; Distributed Transaction Management; Distributed DBMS concurrency control; Distributed DBMS recovery and reliability.

**1902733 Artificial Intelligence and Expert System****(3) Credit Hours**

Knowledge representation, reasoning and search techniques, nonmonotonic reasoning, truth maintenance systems, rule-based systems, model-based reasoning, case based reasoning, principles of artificial neural networks and evolutionary algorithms.

**1902734 Machine Learning****(3) Credit Hours**

Version spaces and the candidate elimination algorithm; Decision trees: the C4.5 algorithm, over fitting and pruning techniques, neural Networks-based learning. Bayesian learning: naïve Bayesian, and Bayesian networks; Instance-Based Learning: the knn algorithm, locally weighted regression, Radial Basis functions; Genetic algorithms; Sequential Covering algorithms; Learning Sets of first order rules (FOIL); Explanation-Based learning, Reinforcement learning

**1902736 Natural Language Processing****(3) Credit Hours**

Statistical approaches and algorithms used in NLP, applications of NLP: question answering, text summarization, text mining, machine translation, text categorization, text classification, information retrieval, information extraction, voice recognition, text-to-speech synthesis.

**1902744 Image Processing and Applications****(3) Credit Hours**

Techniques of digital image processing and their applications. Digital image processing in the spatial and frequency domains; continuous, discrete convolution and filtering; feature identification and extraction, grey-level and color transforms, image enhancements; image compression and segmentation; wavelet manipulation; image watermarking; applications to model human and machine vision, image archiving and communication, satellite image, medical image, industrial inspection, Case study.

**1902745 Multimedia****(3) Credit Hours**

The theory and practice of multimedia information systems. The concepts and methods of the multimedia production cycle comprising the creation, description, retrieval, editing, management, distribution, and reuse of digital media will be presented. Current commercial and academic research systems for media production, editing, annotation, retrieval, and reuse. The design of next-generation multimedia information systems and prototypes.

**1902746 E-Learning****(3) Credit Hours**

This course provides techniques involved in planning and developing e-courses. Designing and managing an e-learning environment, instructional strategies for e-learning, e-learning approaches, and e-learning evaluation techniques. Emphasis is placed on the importance of multimedia authoring programs in producing web-based training materials/courses. Current learning theory as it pertains to e-learning is also examined.

**1902753 Information Systems****(3) Credit Hours**

Principles and themes of information systems. Methodologies of information systems. Information systems development techniques. System thinking, knowledge Management. Information Systems Developments Tools. Types and Applications of information systems:

Large-scale enterprise systems and enterprise computing, decision support information systems, Expert Systems, Data Mining, Ethical and Social issues.

**1902754 Geographical Information Systems**

**(3) Credit Hours**

Theory and techniques whereby diverse kinds of geographical data are processed into new knowledge. Map data structure, advanced analysis, map topologies, temporal and spatial data, quality of geographic data, geographic data modeling and presentation. The combination of theory, application and practical training, inputting, processing, and outputting geographic data within the scope of a GIS, case study.

**1902757 Information Security**

**(3) Credit Hours**

Classical Encryption Techniques; Data Encryption standards (DES and 3DES); Advanced Encryption Standards (AES); Traffic Confidentiality; key distribution; public key encryption: the RSA algorithm, Diffie-Hellman key exchange, Elliptic Curve Cryptography; Message Authentication; Hash algorithms; Digital signature and authentication protocols.

**1902768 Special Topics in Information Systems**

**(3) Credit Hours**

Lectures on and study of selected topics in current research and recent developments in computer information systems.

**1901715 Theory of Algorithms**

**3 Credit Hours**

This course provides Strategies of algorithms synthesis and analysis. Design methodologies of classical algorithm categories such as: divide-and-conquer, greedy method, dynamic programming, search and traversal, backtracking, and branch-and-bound. Computational complexity and important theoretical results from lower-and upper-bound studies, NP-hard, and NP-complete problems will be addressed.

**1901761 Operating Systems**

**3 Credit Hours**

This course provides Distributed operating systems; Synchronization in distributed operating systems; Process Management in distributed operating systems; Distributed file systems; Distributed shared memory; Real-time operating systems; Scheduling in real-time operating systems.



**1902760 Research Methodologies****(3) Credit Hours**

This course focuses on research methods in the field of Computer Science and Information Technology (IT). It covers the research process, use of research tools and techniques, writing and presentation skills to researchers. It provides an introduction with applied exercises of best practice in dealing with IT research problems in a systematic approach, evaluating background literature, adhering to ethics, documentation strategies, and communication in the form of both concise as well as detailed written reports, and oral and written communication of complex IT concepts. Several research methods will be discussed focusing on research methods specific to Computer Science and artifacts development such as Modeling; Theoretical Computer Science, Experimental Computer Science; Computer Simulation