



Definitions:

Competency: “A general statement that describes the desired knowledge, skills, and behaviors of a student graduating from a program (or completing a course). Competencies commonly define the applied skills and knowledge that enable people to successfully perform in professional, educational, and other life contexts”.

Outcome: “A very specific statement that describes exactly what a student will be able to do in some measurable way. There may be more than one measurable outcome defined for a given competency”.

Knowledge: “Thinking”.

Skills: “Doing”.

Attitude: “Feeling”.

** For more details about definitions, please find attachment.



المملكة الأردنية الهاشمية
Hashemite Kingdom of Jordan



هيئة اعتماد مؤسسات التعليم العالي وضمان جودتها
Accreditation and Quality Assurance Commission for Higher Education Institutions



First: Major Program

| Selected Major Program | knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
|---|---------------------------------|--|----------|--------------|---|---|--|--|---|--|
| Computer Science Information Technology Software Engineering Computer Information Systems | Computer Science and Algorithms | <p>Employ basic mathematical structures and logic to solve computational problems</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to:</p> <ul style="list-style-type: none"> ++ Explain and practice basic proof techniques. ++ Use different mathematical theories such as, sets, number, probability, and graph theories. ++ Distinguish and use functions and relations. ++ Analyze and solve problems in Computer Science using suitable mathematical structures and logic. | |
| | | K | S | A | | | | | | |
| | | √ | √ | | | | | | | |
| <p>Select/Create, and employ appropriate data structures for solving problems in optimal way</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to:</p> <ul style="list-style-type: none"> ++ Explain the concept and the role of data types in software development. ++ Analyze and use a wide range of data types. ++ Design appropriate user-defined data types to solve problems. ++ Optimize solutions to improve performance using best data types and their implementations. | | | |
| K | S | A | | | | | | | | |
| √ | √ | | | | | | | | | |
| <p>Analyze, and design computer algorithms</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td></td> <td>√</td> <td></td> </tr> </table> | K | S | A | | √ | | <p>Ability to:</p> <ul style="list-style-type: none"> ++ Apply advanced techniques for performing complexity analysis of algorithms. ++ Apply various advanced techniques for solving algorithmic problems, including divide-and-conquer, greedy, dynamic programming, graph algorithms, backtracking and enumeration. ++ Apply the right combination of advanced algorithmic techniques and data structures for solving a problem based on complexity analysis. ++ Apply important algorithmic design pattern and methods of analysis. | | | |
| K | S | A | | | | | | | | |
| | √ | | | | | | | | | |



| Selected Major Program | knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
|--|---------------------|---|----------------|--------------|---|---|---|--|--|--|
| Computer Science Information Technology Software Engineering Computer Information Systems | Programming | <p>Apply logical problem solving skills to devise a program</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to: ++ Analyze a problem. ++ Determine the steps needed to solve a problem. ++ Create a method to solve a problem. ++ Formulate the problem solution using pseudo-code or flowchart. ++ Transform pseudo-code/flowcharts into programs using programming languages.</p> | |
| | | K | S | A | | | | | | |
| | | √ | √ | | | | | | | |
| | | <p>Develop applications using the Object-Oriented programming (O.O) paradigm</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to: ++ Explain and use the basic and advanced O.O concepts. ++ Demonstrate the use of Unified Modeling Language (UML) diagrams for analysis and design of object-oriented software. ++ Transform UML models into O.O programs.</p> | |
| K | S | A | | | | | | | | |
| √ | √ | | | | | | | | | |
| <p>Employ visual programming environments to develop good quality user interfaces</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to: ++ Describe and use the core concepts and constructs of visual programming. ++ Transform user interface designs into code using visual programming languages.</p> | | | |
| K | S | A | | | | | | | | |
| √ | √ | | | | | | | | | |
| <p>Develop modern web based applications</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to: ++ Categorize and describe different web development technologies. ++ Construct Websites using web development tools and technologies.</p> | | | |
| K | S | A | | | | | | | | |
| √ | √ | | | | | | | | | |
| Computer | تكنولوجيا المعلومات | Demonstrate | An ability to: | | | | | | | |



| Selected Major Program | knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
|---|--------------------------------------|--|----------|--------------|---|---|--|--|--|--|
| Science Software Engineering | | knowledge of the architecture and organization of computer systems <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | ++Design, analyze and interpret digital logic schema ++Identify the fundamental components of computers (CPU, memory, buses, peripherals) and describe their interrelationships. ++Identify and describe different memory levels and technologies ++Define and explain the concept of Instruction Set Architecture (ISA) ++Identify and work with different CPU architectures | |
| | | K | S | A | | | | | | |
| √ | √ | | | | | | | | | |
| Demonstrate knowledge, and practice of operating systems (OS) and system software <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | An ability to: ++Explain the role of the OS and its complete functionality. ++Identify the interrelationship between the OS and the computer architecture. ++Identify and explain the key components of operating systems (CPU manager, memory manager, File manager, I/O manager) ++Use and practice different operating systems. ++ Explain the role of various system software tools (loader, linker, assembler, compiler). | | | |
| K | S | A | | | | | | | | |
| √ | √ | | | | | | | | | |
| Information Technology and Software Engineering | Information Science and Applications | Apply the knowledge of information applications and tools <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | An ability to: ++ Collect and manage information. ++ Demonstrate a deep technical understanding of information applications. ++ Design and implement information systems. ++ Use current tools, methods and technologies of information systems. | |
| | | K | S | A | | | | | | |
| √ | √ | | | | | | | | | |
| Learn analysis | An ability to: | | | | | | | | | |



| Selected Major Program | knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
|------------------------------|-------------------|--|----------|--------------|---|---|---|---|--|--|
| | | and judgement. <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td></td> <td>√</td> <td></td> </tr> </table> | K | S | A | | √ | | ++ Insure the legal and ethical use of information. ++ Analyze and evaluate Information Systems. | |
| K | S | A | | | | | | | | |
| | √ | | | | | | | | | |
| | | Work in a team <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td></td> <td>√</td> <td>√</td> </tr> </table> | K | S | A | | √ | √ | An ability to: ++ Function effectively as a member or a leader of an information security team. | |
| K | S | A | | | | | | | | |
| | √ | √ | | | | | | | | |
| Computer Information Systems | Computer Networks | Understand computer networking <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | An ability to: ++Describe and explain layered network architecture. ++Explain the fundamental of TCP/IP networking. ++Explain functions of different layers in TCP/IP network model ++Practice with LANs and WANs. ++Categorize different protocols in computer network. ++Explain the fundamentals of TCP/IP Networking. ++Calculate performance analysis related to TCP/IP such as data rate, bandwidth. | |
| K | S | A | | | | | | | | |
| √ | √ | | | | | | | | | |

Second: Minor Program:



A. Computer Science:

1. Computer Science/ Computer Science

| knowledge Area in Computer Science/ Computer Science | | | | | | | | | |
|--|--|----------|--------------|---|---|---|--|--|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| Computer Networks | Demonstrate skillset to design and implement various computer networks <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Describe the functioning of layered network architectures (OSI and TCP/IP). ++ Explain the main network protocols at the different layers. ++ State the functions of different network devices and discuss their complementarity. ++ Categorize various computer networks types and technologies. ++ Discuss and evaluate various computer network design principles and techniques. ++ Design and implement computer networks using various network technologies. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Information Security | Demonstrate skillset to secure and protect computing assets <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Describe the main types of attacks and their categories. ++ Describe the main security objectives and define basic security concepts and principles. ++ Explain concepts and mechanisms related to cryptography, authentication, and authorization. ++ Analyze the common network vulnerabilities and attacks. ++ Select and apply appropriate security mechanisms to secure data, applications, systems and networks. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Software Engineering | Demonstrate skillset to produce good quality software <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Explain the importance of product and process quality in the software development. ++ Explain the phases and activities of software development lifecycle. ++ Describe the deliverables of each phase of the software lifecycle and various software engineer roles. ++ Apply appropriate processes, techniques, methods, and tools to perform various software development activities. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |



| knowledge Area in Computer Science/ Computer Science | | | | | | | | | |
|--|--|----------|--------------|---|---|---|--|--|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| Knowledge Engineering | Demonstrate skill set to analyze and produce knowledge based systems <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Explain the purpose and the core concepts related to the knowledge engineering discipline. ++ Elicit knowledge from experts by using various appropriate techniques. ++ Use different formalisms to express and model knowledge. ++ Specify, design, construct, evaluate, integrate, maintain, and evaluate knowledge based systems. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Database | Create, design and implement optimized databases <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Explain the concept of database and its benefits ++ Categorize and describe various database models (Relational, object oriented, network, hierarchical models). ++ Express database models using appropriate formalisms (entity relationship, class diagrams). ++ Optimize database relations using normalizing techniques. ++ Transform entity relationship class diagrams into database tables. ++ Use query languages (relational algebra, SQL, and others). | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| System Analysis and Design | Analyze and Design Information Systems <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Elicit and formulate the business needs and requirements of organizations using appropriate techniques and formalisms. ++ Transform the business requirements into system requirements. ++ Build analysis models and design models (processes, data, functions,...) using appropriate modeling languages. ++ Apply the structured design and object-oriented design methods. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Theory of Computation | Demonstrate knowledge in computation foundations <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Perform critical, logical-mathematical reasoning. ++ Formalize decision problems using languages ++ Relate languages, formal grammars, and computational machines. ++ Enumerate and describe various formal grammars. ++ Demonstrate the relationships between formal grammars and programming languages. ++ Explain the relationship between generative processes and recognition processes. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |



| knowledge Area in Computer Science/ Computer Science | | | | | | |
|--|---|---|--------------|---|---|---|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | |
| Computer Architecture | Demonstrate knowledge in basic and advanced computer architecture | Ability to: ++ Explain the basic and core concepts of computer architecture. ++ Identify and evaluate various computer architecture performance criteria. ++ Describe various techniques used to design high performance CPU. ++ Discuss memory hierarchy, storage and I/O issues. ++ Explain basics of parallel computing. | | | | |
| | <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td></td> <td></td> </tr> </table> | | | K | S | A |
| K | S | A | | | | |
| √ | | | | | | |

2. Computer Science/ Artificial Intelligence (AI)

| knowledge Area in Computer Science/ Artificial Intelligence(AI) | | | |
|---|--|--|--------------|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam |
| Artificial Intelligence | Demonstrate basic knowledge and skills in artificial intelligence | Ability to: ++ Identify and explain different types of AI agents. ++ Describe various AI search algorithms. ++ Describe various knowledge representation (logic-based, frame-based, semantic nets). ++ Apply inference and theorem proving in the context of AI problems. ++ Build simple knowledge-based systems. ++ Perform reasoning in the presence of incomplete and/or uncertain information. | |
| | Demonstrate basic knowledge and skills in expert systems and knowledge engineering | Ability to: ++ Describe various knowledge representation (logic-based, frame-based, semantic nets). ++ Apply inference and theorem proving in the context of AI problems. ++ Design and apply knowledge representation. | |
| | Demonstrate basic knowledge and skills in neural networks | Ability to: ++ Enumerate and discuss practical applications of neural networks. ++ Explain and use feedforward neural networks and Iterative neural networks. ++ Use neural networks to solve pattern recognition, classification association, and data clustering problems. | |



| knowledge Area in Computer Science/ Artificial Intelligence(AI) | | | | | | | | | |
|---|--|--|--------------|---|---|---|--|---|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| | | ++ Explain and differentiate the concepts of supervised and unsupervised learning. | | | | | | | |
| | Produce AI Applications using AI Programming <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Apply appropriate programming languages and tools to illustrate AI concepts. ++ Apply knowledge representation, reasoning, and machine learning techniques to real-world problems. ++ Identify the applications and scenarios where AI is applied. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| | Demonstrate basic knowledge and skills in Machine Learning <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Describe and explain the different fields of machine learning. ++ Build a repertoire of different algorithms and approaches to machine learning and state their various strengths and weaknesses. ++ Evaluate the typical trade-off between computational efficiency, model interpretability, and predictive accuracy effectively. ++ Combine both the theoretical and practical concepts to creative, real-world problem solving and having completed a project that can be optionally shared on a resume. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |

3. Computer Science/ Multimedia

knowledge Area in Computer Science/ Multimedia



| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
|--|---|----------|--------------|---|---|---|---|---|--|
| Multimedia | Formulate a multimedia programs <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td>√</td><td>√</td><td></td></tr></table> | K | S | A | √ | √ | | Ability to: ++ Apply the knowledge of computing, algorithms, and mathematics to develop computer graphics solutions. ++ Analyze a problem and define its computing requirements and its solutions. ++ Develop well-structured, modular, well documented, and efficient multimedia programs. ++ Build a structured interactive computer graphics program. | |
| | K | S | A | | | | | | |
| | √ | √ | | | | | | | |
| Demonstrate a basic knowledge of in multimedia <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td>√</td><td>√</td><td></td></tr></table> | K | S | A | √ | √ | | Ability to: ++ Describe various media and their characteristics. ++ Explain the concept of multimedia. ++ Analyze various kinds of multimedia processing. | | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Demonstrate skills in developing basic applications <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td></td><td>√</td><td></td></tr></table> | K | S | A | | √ | | Ability to: ++ Apply the concept of virtual reality. ++ Use the concept of game making. | | |
| K | S | A | | | | | | | |
| | √ | | | | | | | | |

4. Computer Science / Computer Graphics and Animation

knowledge Area in Computer Science/ Computer Graphics and Animation



| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
|---------------------------------|--|----------|--------------|---|---|---|--|---|--|
| Computer Graphics and Animation | Produce computer graphics and animation systems and their applications <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++Describe the main areas of virtual reality(VR), augmented reality (AR) and mixed reality (MR). ++Exercise critical judgment to the evaluation of VR, AR and MR applications. ++Explain the essential concepts, principles and practices related to graphics and animation. ++Analyze, design and implement systems exhibiting high degree of animation and graphical capabilities. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |

5. Computer Science / Computer Network

| knowledge Area in Computer Science/ Computer Network | | | | | | | | | |
|--|--|--|--------------|---|---|---|--|---|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| Computer Science / Computer Network | Understand Fundamental knowledge of communication networks, network architecture and protocols <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Explain the concept, architecture and organization of communication networks. ++ explain how communication networks operate and their functionality. ++ Apply about communication networks and protocols. ++ Analyze protocol functions and services, as well as protocol stacks in order to select appropriate ones. ++ Analyze organization of public and private networks based on IP protocol. ++ Define security threats and available solutions in the Internet. ++ Design network models including local area networks, Internet subnetworks and Internet access. ++ Evaluate communication solutions based on TCP/IP protocol stack. ++ Define socket interfaces and specify their properties. ++Write simple UDP network applications. | |
| | K | S | A | | | | | | |
| √ | √ | | | | | | | | |
| Employs knowledge of the computer network | | Ability to: ++Identify the concept of concurrency, parallelism, message passing, remote procedure call and remote object access, object oriented network | | | | | | | |



| knowledge Area in Computer Science/ Computer Network | | | | | | | | | |
|--|--|----------|--------------|---|---|---|--|--|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| | layered architecture to different network protocols. <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | communication, mobile codes, and peer-to-peer systems. ++Solve problems related to network programming in a team work environment. ++Distinguish between connection and connectionless oriented applications. ++Distinguish the design process of iterative and concurrent servers. ++Analyze simple network applications and debug errors in own applications. ++Use the basic tools for design and testing of network programs in Unix environment. ++Define concept, architecture and organization of wireless communication networks. ++ Apply in-depth knowledge of wireless communications principles, systems, and networks to the solution of wireless engineering problem. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |

B. Information Technology:

1. Information Technology/ Mobile Computing:

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|--|
| knowledge Area in Information Technology/ Mobile Computing |
|--|



| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
|---|--|----------|--------------|---|---|---|--|---|------------------------------------|
| Mobile Computing | Understand mobile development <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td></td> <td>√</td> <td></td> </tr> </table> | K | S | A | | √ | | Ability to: ++ Apply knowledge of computing, algorithms, and math to develop programs solutions. ++ Analyze mobile computing requirements and its solutions. ++ Develop well-structured, modular, well documented, and efficient mobile programs. | Not specific to MOBILE Development |
| | K | S | A | | | | | | |
| | | √ | | | | | | | |
| Understand mobile concepts <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td></td> <td></td> </tr> </table> | K | S | A | √ | | | ++ Explain the concept of mobile programming in addition to its component, tools and applications. ++ Explain different digital communication networks wire and wireless. | | |
| K | S | A | | | | | | | |
| √ | | | | | | | | | |
| Analyze mobile tools <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td></td> <td>√</td> <td></td> </tr> </table> | K | S | A | | √ | | ++ Analyze the concept of game making and mobile apps design. | | |
| K | S | A | | | | | | | |
| | √ | | | | | | | | |

2. Information Technology/ Web Technology:

| knowledge Field | | | | | | | | | |
|---|--|----------|--------------|---|---|---|--|---|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| Web Technology | Develop backend/ frontend for web client-server applications <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Explain and apply client\server software architecture. ++ Analyze a development request for the construction of a web-based client / server application. ++ Develop current web backend/frontend technologies and tools. ++ Use programming techniques in conjunction with protocols to ensure data and system access. ++ Apply the design principles of typography, layout, composition, aesthetics and imagery in the production of interactive user interfaces. | |
| | K | S | A | | | | | | |
| √ | √ | | | | | | | | |
| Develop E-Commerce applications and Content | Ability to: ++ Analyze and select a suitable platform and a suitable environment for a given task ++ Model a Content Management System | | | | | | | | |



| knowledge Field | | | | | | | | | |
|-----------------|---|----------|--------------|---|---|---|--|--|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| | Management Systems. <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | (CMS) based on functionality requirements and data storage platform. ++ Explain the client/server infrastructure that supports electronic commerce. ++ Explain basic electronic commerce functions. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| | Analyze and construct knowledge from Data <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Describe the main concepts of data mining. ++ Perform the data preparation tasks and evaluate their implications. ++ Explain the alternative knowledge representations such as rules, decision trees, decision tables, and Bayesian networks. ++ Make use of the basic machine learning algorithmic methods that support knowledge discovery. ++ Evaluate what has been learned through the application of the appropriate statistics. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| | Demonstrate basic knowledge and skills in information storage and retrieval systems <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Identify the main concepts and issues of information retrieval system and its relationship to search engines. ++ Describe the architecture of the information retrieval system and the search engine ++ Describe the statistical nature of text and the techniques that are used to process it, recognize important features, and prepare it for indexing. ++ Explain the required phases to build information retrieval system. ++ Illustrate how data will be represented in information retrieval systems. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |

3. Information Technology/Information Security

| knowledge Area in Information Technology/ Information Security | | | |
|--|--|----------|--------------|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam |
| | | | |



| knowledge Area in Information Technology/ Information Security | | | | | | | | | |
|--|--|----------|--------------|---|---|---|--|--|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| Information Technology/ Information Security | Employ the knowledge of information security principles, methods and tools <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Describe information and network security concepts and terms. ++ Apply different information security protocols. ++ Design, implement and evaluate secure information systems and networks. ++ Apply best practices and standards. | |
| | K | S | A | | | | | | |
| | √ | √ | | | | | | | |
| Learn analysis and judgement. <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td></td> <td>√</td> <td></td> </tr> </table> | K | S | A | | √ | | Ability to: ++ Analyze and monitor information systems and networks against different types of vulnerabilities and attacks. ++ Handle breaches and incidents. | | |
| K | S | A | | | | | | | |
| | √ | | | | | | | | |
| Work in a team <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td></td> <td>√</td> <td>√</td> </tr> </table> | K | S | A | | √ | √ | Ability to: ++ Function effectively as a member or a leader of an information security team. | | |
| K | S | A | | | | | | | |
| | √ | √ | | | | | | | |

4. Information Technology/ Information Security and Network Security (Information Security and cyber security)



| knowledge Area in Information Technology/ Information Security and cyber | | | | | | | | | |
|--|---|----------|--------------|---|---|---|---|--|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| Cyberspace Security | Understand Computer Networking <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td>√</td><td>√</td><td></td></tr></table> | K | S | A | √ | √ | | Ability to: ++ Explain information and network security concepts and terms. ++ Apply different information and network security protocols. ++ Use the best practices and standards. ++ Apply design, development and management principles in the construction of computer networks. ++ Use different network protocols. | |
| | K | S | A | | | | | | |
| | √ | √ | | | | | | | |
| | Employ the knowledge of network security principles, methods, and tools <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td></td><td>√</td><td></td></tr></table> | K | S | A | | √ | | Ability to: ++ Design, implement and evaluate secure computer networks. ++ Handle computer networks breaches and incidents. | |
| K | S | A | | | | | | | |
| | √ | | | | | | | | |
| Learn analysis and judgement <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td></td><td>√</td><td></td></tr></table> | K | S | A | | √ | | Ability to: ++ Analyze and monitor the flow of computer networks against different types of vulnerabilities and attacks. ++ Handle computer networks breaches and incidents. | | |
| K | S | A | | | | | | | |
| | √ | | | | | | | | |
| Work in a team <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td></td><td>√</td><td>√</td></tr></table> | K | S | A | | √ | √ | Ability to: ++ Function effectively as a member or a leader of an information security team. | | |
| K | S | A | | | | | | | |
| | √ | √ | | | | | | | |
| Information Security | Employ the knowledge of information security principles, methods and tools. <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td>√</td><td>√</td><td></td></tr></table> | K | S | A | √ | √ | | Ability to: ++ Understand information and network security concepts and terms. ++ Apply different information security protocols. ++ Design, implement and evaluate secure information systems and networks. ++ Apply the best practices and standards. | |
| | K | S | A | | | | | | |
| √ | √ | | | | | | | | |
| Learn analysis and judgement. <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td></td><td>√</td><td></td></tr></table> | K | S | A | | √ | | Ability to: ++ Analyze and monitor information systems and networks against different types of vulnerabilities and attacks. ++ Handle breaches and incidents. | | |
| K | S | A | | | | | | | |
| | √ | | | | | | | | |



| knowledge Area in Information Technology/ Information Security and cyber | | | | | | | | | |
|--|---|----------|--------------|---|--|---|---|--|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| | Work in a team. <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td></td> <td>√</td> <td>√</td> </tr> </table> | K | S | A | | √ | √ | Ability to: ++ Function effectively as a member or a leader of an information security team. | |
| K | S | A | | | | | | | |
| | √ | √ | | | | | | | |

5. Information Technology/ Business Information Technology

| knowledge Area in Information Technology/ / Business Information Technology | | | | | | | | | |
|--|--|----------|--------------|---|---|---|--|---|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| Software Development and Management | Demonstrate basic knowledge and skills in the software development lifecycle and process <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Describe and use the stages of software development life cycle including the requirements analysis, design, implementation, testing validation and verification. ++ Apply different software development methodologies. | |
| | K | S | A | | | | | | |
| | √ | √ | | | | | | | |
| Evaluate related issues facing an IT project and develop a project plan <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Discuss key elements of the project management framework, including project stakeholders, the project management knowledge areas, and project success. ++ Create and manage an effective project plan. | | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Effectively manage a variety of resources to achieve organizational goals and business results <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Explain the importance of human resources and their effective management in organizations. ++ Use different tools in forecasting and planning human resource needs. | | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| System Paradigms | Demonstrate basic knowledge and skills of ERP systems <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td></td> <td></td> </tr> </table> | K | S | A | √ | | | Ability to: ++ List define and differentiate the concepts of enterprise-wide resource planning systems. ++ Describe the elements and process related to the design and development of various enterprise information system modules using the selected ERP software enterprise-wide resource planning systems. | |
| K | S | A | | | | | | | |
| √ | | | | | | | | | |



| knowledge Area in Information Technology/ / Business Information Technology | | | | | | | | | |
|---|--|----------|--------------|---|---|---|--|--|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| Data Analytics | Show capacity for solving business problems & making rational decisions <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td></td> <td>√</td> <td></td> </tr> </table> | K | S | A | | √ | | Ability to: ++Use IT solutions and best practices to solve business problems. ++Analyze a problem, and identify, and define computing requirements appropriate to its solution and evaluate the impact of computing on individuals and organizations. | |
| | K | S | A | | | | | | |
| | √ | | | | | | | | |
| Demonstrate knowledge of business intelligence solutions to support decision-making <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Describe and explain business intelligence technologies and their contribution to organizational success. ++Explain the process of data analytics. ++Apply different analytics methods used in business intelligence to analyze data in various situations. | | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |

C. Software Engineering:

1. Software Engineering/ Software Engineering

| knowledge Area in Software Engineering/ Software Engineering | | | |
|--|--|--------------------|--------------|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam |
| | Employ the | Ability to: | |



| knowledge Area in Software Engineering/ Software Engineering | | | | | | | | | |
|--|--|---|--------------|---|---|---|--|---|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| Fundamentals of Software Engineering | principles, methodologies and practices related to the development of high-quality software products <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <ul style="list-style-type: none"> ++Identify the benefits of applying a systematic approach to software development. ++Categorize and apply different software development methodologies to develop software systems. ++Identify and apply different phases of software development. ++Select an appropriate software lifecycle model for a given project. | |
| | K | S | A | | | | | | |
| √ | √ | | | | | | | | |
| Grasp the expectations of the users of software and deliver them as expected in an appropriate formalism <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to:</p> <ul style="list-style-type: none"> ++Formulate a problem statement using standard analysis techniques. ++Identify the appropriate stakeholders, scope and priorities. ++Elicit stakeholders requirements using multiple standard techniques ++Negotiate, analyze, document software requirements specification (SRS), validate, and model the elicited requirements. | | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Software Specification and Design | Use different design methods to bring appropriate software solutions to domain problems <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td></td> <td>√</td> <td></td> </tr> </table> | K | S | A | | √ | | <p>Ability to:</p> <ul style="list-style-type: none"> ++Create solutions from stakeholder requirements given known system constraints. ++Use fundamental design principles, methods, patterns and strategies in the creation of a software system. | |
| K | S | A | | | | | | | |
| | √ | | | | | | | | |
| Software Architecture | Use and customize various architectures styles and patterns to develop software products | <p>Ability to:</p> <ul style="list-style-type: none"> ++Identify the benefits of using software architecture for software systems. ++Identify the core elements of software architecture (component, connector,..) | | | | | | | |



| knowledge Area in Software Engineering/ Software Engineering | | | | | | | | | |
|---|--|---|--------------|---|---|---|--|---|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| | <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>++Describe and apply software architectural styles, architectural patterns, and frameworks.</p> <p>++Select appropriate architectures for software project consistent with their quality attributes.</p> | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Software Project Management | <p>Plan, conduct, and monitor software projects</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to:</p> <p>++Identify and explain the benefits of managing software project.</p> <p>++Develop a work plan to complete a project with identified constraints.</p> <p>++Identify, categorize, and mitigate risks of software projects.</p> <p>++Develop critical path method (CPM) and program evaluation review technique (PERT) charts.</p> | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Software Testing | <p>Apply appropriate testing techniques and methods to deliver high quality and reliable code</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to:</p> <p>++Explain core concepts related to software testing.</p> <p>++Distinguish between verification and validation activities.</p> <p>++Apply different testing methods and techniques.</p> <p>++Develop test plan, test process, test scenarios</p> | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Software Construction and Documentation | <p>Use appropriate coding techniques, technologies and tools to build working code adhering to best</p> | <p>Ability to:</p> <p>++Map design models to code.</p> <p>++ Apply APIs, libraries and frameworks to develop software.</p> <p>++Apply best coding practices to write code.</p> | | | | | | | |



| knowledge Area in Software Engineering/ Software Engineering | | | | | | | | | |
|--|---|----------|-----------------|---|---|---|--|---|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| | practices <table border="1"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td></td><td>√</td><td></td></tr></table> | K | S | A | | √ | | | |
| K | S | A | | | | | | | |
| | √ | | | | | | | | |
| | Create and maintain appropriate software technical documentation <table border="1"><tr><td>K</td><td>S</td><td>A</td></tr><tr><td>√</td><td>√</td><td></td></tr></table> | K | S | A | √ | √ | | Ability to ++ Write various technical documentations (software requirements specification (SRS), user manual, ...) according to recognized standards. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |

D. Computer Information Systems:

1. Computer Information Systems/ Computer Information Systems

knowledge Area in Computer Information Systems



| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
|---|---|--|--------------|---|---|---|---|--|--|
| Information management | Demonstrate knowledge of analyzing, designing, and building real database systems <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Explain the basic concepts of database systems and their theoretical and mathematical foundations. ++ Define, analyze, design, and build real database systems using ER, extended entity–relationship (EER), UML, and Relational Data models and enhance the quality of the database design using the normalization process. ++ Perform some operations on the database using Relational Algebra operations and Construct, Modify, and Query the database using the SQL Language. | |
| | K | S | A | | | | | | |
| | √ | √ | | | | | | | |
| Understand the main concepts and techniques of database management and optimization <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Describe of database transactions management, concurrency control and recovery techniques. ++ Analyze Basic and Advanced Normal forms. ++ Understand query processing and Optimization techniques. ++ Apply database administration and security. | | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Employ knowledge of information retrieval to store, manipulate, and retrieve data <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | Ability to: ++ Define and explain the basic concepts of information retrieval systems, their types and utilities, and different indexing and query optimizations techniques to evaluate IR system and define its efficiency. ++ Explain different IR data structures and algorithms, such as lexical analysis, stemming, term weighting, string searching and matching techniques. | | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Data Analytics | Demonstrate knowledge of analyzing and building real data warehouse | Ability to: ++ Define and explain the basic concepts of data warehouse. ++ Analyze, design and implement multi- | | | | | | | |



| knowledge Area in Computer Information Systems | | | | | | | | | |
|--|--|----------|--------------|---|---|---|--|--|--|
| knowledge Field | Competencies K: Knowledge S: Skills A: Attitude | Outcomes | Compet. Exam | | | | | | |
| | <p>systems</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | dimensional data warehouse (DW) with different schemas. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| | <p>Demonstrate knowledge of performing data pre-processing and modeling techniques to solve real-world problems</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to:</p> <ul style="list-style-type: none"> ++ Identify and distinguish the data mining such as association rules, classification, prediction, clustering and outlier analysis. ++ Prepare raw data for processing. ++ Evaluate and interpret the performance results of different data mining algorithms and techniques. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |
| Cyber Security Principles | <p>Demonstrate basic knowledge and skills in information security</p> <table border="1"> <tr> <td>K</td> <td>S</td> <td>A</td> </tr> <tr> <td>√</td> <td>√</td> <td></td> </tr> </table> | K | S | A | √ | √ | | <p>Ability to:</p> <ul style="list-style-type: none"> ++ Explain different types of attacks and countermeasures and responsibilities with security and privacy of information systems. ++ Use data encryption techniques, anonymization techniques, and some ethical hacking strategies. ++ Develop principles, procedures and systems needed to protect assets. | |
| K | S | A | | | | | | | |
| √ | √ | | | | | | | | |



وعليه ترحو اللجنة عرض التقرير على مجلس الهيئة لاتخاذ ما يراه مناسباً، وتقترح اللجنة تشكيل لجنة أخرى لإعداد وكتابة أسئلة امتحان الكفاءة الجامعية بحيث تكون مطابقة للمجالات المعرفية لتخصصات تكنولوجيا المعلومات المقررة سابقاً من قبل هيئة الاعتماد ونتائج التعلم والكفايات المذكورة في هذا التقرير.

أمين السر عضواً عضواً عضواً عضواً

عضواً عضواً عضواً عضواً مقررأ