جامعة الملك سعود
King Saud University

College of Computer & Information Sciences

Information Technology Department

King Saud University
College of Computer Science & Information
Department of Information Technology

Guidance to Bachelor Program of Science in Information Technology

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1 Program History

The last revision of the current program had been done in 1426 (2005) when the "Computer Applications" major was changed to "Information Technology". At that time it was proposed that the second phase of the program change should include tracks or concentrations within the program. After observing the strengths and weaknesses of the current program over the past years, the faculty members and administration saw it was necessary to adjust the program to finally include tracks and to make room for practical training in the program.

It has been apparent during the past decade that Information Technology will play an increased role in the lives of people, in business, law, science, arts, and health. There will be continued need within Saudi Arabia for people with software development skills and for people with specialized knowledge in leading edge technologies. Public and private sectors will be drivers of domestic demand for Information Technology graduates.

As businesses, government agencies, and other organizations rely ever more on massive amounts of data that need to be stored, managed, securely transmitted, and effectively displayed there will be need for professionals with various capabilities. There will be need for professionals who understand data mining and manage data warehouses, and professionals who understand communication networks, their vulnerabilities to threats, and mechanisms to increase their security to avoid the threats of cyber crime and cyber terrorism, and professionals who bring information and services to customers over the web.

Our program fosters diversification through offering a wider selection of courses that is in tune with the market requirements and provides the necessary specialization by offering a set of new concentrations (tracks).We believe this will render our graduates more marketable.

2 Strength of the IT Program

The program follows closely the guidelines of the Association of Computing Machinery – the governing body that influences computer science education around the world – as defined in its 2008 publication "Computing Curricula – Information Technology Volume" [1]. This in turn will enable graduates to achieve the student outcomes mentioned in the ABET CAC accreditation criteria and will ensure that our proposed new program meets both the general and the IT specific curriculum criteria.

The image of the program is built around the following key strengths:

- A sound program in information technology with focus on areas beyond programming or immersive software development.
- The potential to conduct projects, internships, and research with faculty having broad professional experience.

Moreover, from a curricular point of view, the program is designed to possess the following strengths:

- A core that focuses on courses that enhance the learning outcomes.
- A practical training to enhance the practical experience of the students.
- Satisfy accreditation requirement on both national and international levels.
- Adaptability to changes in job market needs as the new program provides the in-depth knowledge through specific concentrations that can be exchanged with another.

3 Degrees Offered

The program offers multiple concentrations (tracks) thereby allowing students to gain their degree in any of the following:

1. Bachelor of Science in Information Technology – Data Sciences Track(DS)
2. Bachelor of Science in Information Technology – Cyber Security Track(CYS)
3. Bachelor of Science in Information Technology – Networks & IoT Engineering Track(NIE)

4 Duration and Structure of Program

The program is a 4 year program. It requires at least 127 credit hours distributed as follows:

- University Requirements: 8 credit hours.
- College Requirements: 46 credit hours.
- Department Requirements: 73 credit hours.

5 Language of Instruction

The courses of the program shall be taught in English.

6 Vision, Mission, and Objectives

During the development of this program, a clear vision has been kept in mind. Moreover, the department is committed to fulfill the mission and objectives stated below, which will lead to the realization of the following vision.

6.1 Vision

Excellence in Information Technology education and research, and **commitment** to effective fulfillment of the IT needs in our society.

6.2 Mission

Provide high quality education in Information technology through the combination of theory, practice, and real-world experience to equip graduates with the necessary knowledge and skills to make them competitive in the computing workplace and capable of undertaking research. And create a motivating work environment to engage faculty in innovative research and activities in ways that serve the society.

6.3 Program Educational Objectives

The program educational objectives (PEOs) of the IT program graduates are:

- ✓ **PEO1:** Enable students to master the fundamental principles of computing and to develop the skills needed to solve practical problems using latest technologies and practices.
- ✓ **PEO2:** Provide solid theoretical background and knowledge in the core courses and selected concentration track to enable IT graduates to pursue higher studies
- ✓ **PEO3:** Enable students to understand professional, ethical, legal, security and social issues and responsibilities and to function effectively on teams as members or leaders
- ✓ **PEO4:** Enable students to recognize the need for, and an ability to engage in, continuing professional development.

7 Market

In 2017, a research team of the Information Technology department conducted a study to define the main Saudi Arabia's market needs for IT professionals. The key objective of this study was to conduct an exhaustive survey of all IT jobs in the Kingdom of Saudi Arabia by employing two data collection approaches: screening job advertisement websites and surveying newly employed IT graduates. The key findings of the study are summarized below. [1]

1. The demand on IT developers is starting to emerge as new startups are created in the local market.
2. There is a need for IT graduates with business skills.
3. Network and Security are two areas that are in need in the current market.
4. The shift from government jobs to private sector jobs has increased in the past couple of years.
5. New IT market requires professionals with International certificates and mastery of specific programming languages.

The program with its concentrations and its compulsory practical training will help students to close the gaps needed to meet such demands.

7.1 Job Prospects for Graduates

The program will provide broad coverage of Information Technology field and concentrations that will enable graduates to fill such positions as:

1. Developer
2. System Analyst
3. Quality Assurance
4. Security Analyst
5. Project Manager
6. Academic
7. Database Administrator
8. Business Analyst

7.2 Adherence to ABET objectives for IT programs

In 2017, the ACM along with IEEE-CS revised the IT2008 to produce a document that equip with development of IT competencies. The mission of the IT2017: *"Having just knowledge is not sufficient to be productive in the changing information technology world. IT competencies require skills and dispositions that complement knowledge to achieve professional expectations of a modern workplace."*[2] These guidelines were followed in the development of this program, thereby ensuring ABET standards are met.

7.3 Adherence to EEC-HEC objectives for IT programs

A National Qualifications Framework (NQF) has been established for accreditation and quality assurance in the Kingdom of Saudi Arabia to ensure the quality of higher education. As stated in the EEC-HEC guidelines: *"The framework describes the expected increasing levels of knowledge and skill in these areas for each qualification."*[3]. These guidelines were followed in the development of this program, thereby ensuring EEC-HEC accreditation standards are met.

8 Curriculum

The following set of concentration tracks within the Bachelor of Science major in Information Technology is offered:

1. Bachelor of Science in Information Technology – Data Science Track (DS)
2. Bachelor of Science in Information Technology – Cyber Security Track (CYS)
3. Bachelor of Science in Information Technology – Network and IoT Engineering Track (NIE)

It is envisioned that new tracks emerge in the future that may extend or replace the current tracks. The concentrations are structured in a manner that meets the following general objectives. In the first five semesters, all BS-IT students will experience a streamlined introduction to information technology with an emphasis on conceptual, theoretical, and programming aspects. The intent of this common foundation is to provide a solid basis for all BS-IT majors and the ultimate pursuit of the specialty majors. The mathematical and science requirements are kept consistent with what is expected for information technology majors.

Students have the opportunity to start focusing on a specific concentration of their choice after their 5th semester. During the third and fourth years, the program is structured to emphasize the choice and exploration of a concentration in depth.

Students must pursue practical training (in industry) to join an IT firm in the summer semester prior to their graduation year, on a full-time basis for at least 8 weeks.

8.1 Common Learning Outcomes

The IT program learning outcomes expected of students are grouped into four domains as follows:

8.1.1 Knowledge

Graduates will be able to:

- Describe knowledge of fundamentals of IT (e.g. programming, networking, databases, web systems, system integration and architecture)
- Present knowledge of best practices and their applications.

- Outline the different standards and their applications.
- Describe the local and global impact of computing on individuals, organizations and society.

8.1.2 Cognitive skills:

Graduates will be able to:

- Analyze a problem, and identify the computing requirements appropriate to its solution.
- Design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.
- Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
- Use and apply current technical concepts and practices in the core information technologies

8.1.3 Interpersonal skills & responsibility:

Graduates will be able to:

- Work effectively on teams to accomplish a common goal.
- Engage in continuing professional development.
- Assist in the creation of an effective project plan.
- Identify professional, ethical, legal, security, and social issues and responsibilities.

8.1.4 Communication, information technology, and numerical skills:

Graduates will be able to:

- Apply knowledge of computing and mathematics appropriate to the discipline.
- Communicate effectively with a range of audiences.
- Use current techniques, skills, and tools necessary for computing practices.
- Integrate effectively IT-based solutions into the user environment.

8.2 Courses

As illustrated in Table 1 the program requires the completion of 127 credit hours, which are distributed among 111 credit hours of required courses and 16 credit hours of elective courses.

Table 1: Distribution of credits in the department study plan

Requirements	Type	Credit Hours
University Requirements	Compulsory	4
	Electives	4
College Requirements	Compulsory from common 1st year	32
	Compulsory from departments	14
Department Requirements	Core IT	49
	Core Science	3
	Core Math	9
	Track Electives	12
	Program Requirements	**127**

8.2.1 Common Courses

All students are required to complete 115 credit hours apart from track concentration. Those credits include university requirements, college requirements, and department requirements. They are shown in Table 2, Table 3, Table 4 and Table 5.

Table 2: University Requirements

Course Number	Course Name	Credit Hours		Pre(Co)
IC 107	Professional Ethics	2	(2+0+0)	
IC 108	Current Issues	2	(2+0+0)	
IC xxx	IC Elective #1	2	(2+0+0)	
IC xxx	IC Elective #2	2	(2+0+0)	
	University Requirements	**8**		

Table 3: IC Electives

Course Number	Course Name	Credit Hours		Pre(Co)
IC 100	Studies in the Biography of the Prophet	2	(2+0+0)	
IC 101	Introduction to Islamic Culture	2	(2+0+0)	
IC 102	Islam and Society Building	2	(2+0+0)	
IC 103	The Islamic Economic System	2	(2+0+0)	
IC 104	Fundamentals of Islamic Political System	2	(2+0+0)	
IC 105	Human Rights	2	(2+0+0)	
IC 106	Islamic Jurisprudence	2	(2+0+0)	
IC 109	Woman and Her Developmental Role	2	(2+0+0)	

Table 4: College Requirements

Course Number	Course Name	Credit Hours		Pre(Co)
ENGL 100	English I	6		
STAT 101	Probability & Statistics	3		
CHEM 101	General Chemistry I	4		
ENT 101	Entrepreneurship	1		
ARAB 100	Writing Skills	2		
ENGL 110	English II	6		
MATH 101	Differential Calculus	3		
CT 101	Computer Skills	3		
EPH 101	Health education and Fitness	1		
CUR 101	University Skills	3		
CSC111	Computer Programming I	4	(3-2-1)	CT 101
CSC113	Computer Programming II	4	(3-2-1)	CSC111
CSC 212	Data Structures	3	(3-0-1)	CSC 113
CSC 227	Operating Systems	3	(3-0-1)	CSC 212
	College Requirements	**46**		

Table 5: Department Requirements

Course Number	Course Name	Credit Hours	Pre(Co)	
Math 106	Integral Calculus	3	(3-0-2)	Math 101
Math 151	Discrete Mathematics	3	(3-0-2)	Math 101
Math 244	Linear Algebra	3	(3-0-2)	Math 106
	Core Math	**9**		
IT 219	Physics for IT	3	(2-2-0)	
	Core Science	**3**		
IT 210	Information Technology Fundamentals	3	(2-2-0)	
IT 223	Computer Organization & Architecture	3	(3-0-2)	Math 151 + IT219
IT 214	User Experience Design	3	(2-2-0)	CSC111
IT 222	Database Principles	3	(2-2-1)	IT210
IT 324	Information Security	3	(3-0-2)	(IT 328)
IT 312	Web Applications Engineering	3	(2-2-0)	CSC 113 + IT 222
IT 328	Network Principles	4	(3-2-0)	IT 219
IT 320	Practical Software Engineering	4	(3-2-1)	IT 214+Co(329)
IT 326	Data Mining	3	(2-2-0)	IT 222 + CSC 212
IT 329	Advanced Web Technologies	3	(2-2-0)	IT 312 + IT 328
IT 426	Artificial Intelligence Systems	3	(3-0-2)	CSC212 + Math 244
IT 423	Introduction to Project Management	3	(2-2-0)	IT 320
IT 427	IT Entrepreneurship & Innovation	3	(3-0-0)	IT 320
IT 479	Practical Training	2	(2-0-0)	completing 90 credit hours
IT 496	Project -1	3	(3-0-0)	IT320, CSC212 + completing 90 credit hours
IT 497	Project -2	3	(3-0-0)	IT 496
	Core IT	**49**		
	Department Requirements	**61**		

8.2.2 IT Tracks

There are 12 credit hours that depend on the student's selection of concentration (track). As illustrated in Table 6, two of the courses from the concentration track are required concentrations cores; the remaining two course could be any elective from the chosen track. The courses for each concentration and the electives are given in Table 7.

Table 6: Distribution of Concentration Courses

Course	Credit Hours	Possible Choices
Concentration Core # 1	3	Fixed for chosen track
Concentration Core # 2	3	Fixed for chosen track
Concentration Elective	3	Any elective from chosen track
Concentration Elective	3	Any elective from chosen track
	12	

Table 7: Department Tracks Electives

Course Number	Course Name	Track	Credit Hours		Pre(Co)
IT 362	Principles of Data Science **(Concentration Core # 1)**	Data Science (DS)	3	(3+0+2)	CSC212(IT 326)
IT 461	Practical Machine Learning **(Concentration Core # 2)**		3	(2+2+0)	IT 326
IT 462	Big Data Systems		3	(2+2+0)	IT 326
IT 463	E-Commerce		3	(3+0+1)	IT 461
IT 464	Data Management Systems		3	(2+2+1)	IT 222
IT 465	Data Analytics & Visualization.		3	(2+2+0)	IT362
IT 466	Selected Topics in Data Science		3	(3+0+1)	IT 362
IT 371	Application Security **(Concentration Core # 1)**	Cyber Security (CYS)	3	(2+2+0)	IT 324(IT 329)
IT 471	Cyber Security Governance **(Concentration Core # 2)**		3	(3+0+1)	IT 324
IT 472	Cybercrime and Digital forensics		3	(2+2+0)	IT 371
IT 473	System Security		3	(2+2+0)	IT 371
IT 474	Network Security		3	(2+2+0)	IT 324
IT 475	Information Assurance Compliance and Audit		3	(3+0+1)	IT 471
IT 476	Selected Topics in Cyber Security		3	(3+0+1)	IT 371

Course Number	Course Name	Track	Credit Hours		Pre(Co)
IT 381	Wireless & Mobile Computing **(Concentration Core # 1)**	Networks & IOT Engineering (NIE)	3	(2+2+1)	IT 328
IT 481	Introduction to IoT **(Concentration Core # 2)**		3	(3+0+2)	IT 328
IT 482	Sensor and Ad hoc Networks		3	(2+2+0)	IT381
IT 483	IoT Services & Applications		3	(2+2+0)	IT481 , IT312
IT 484	Cloud Computing		3	(2+2+1)	IT 328
IT 485	Robotics fundamentals		3	(2+2+1)	
IT 486	Selected Topics in Networks &IoT		3	(3+0+1)	IT481
	Track elective		**12**		

8.2.3 Practical Training

Students who successfully completed 90 credits of the program must take up practical training. The practical training comprises 2 credit hours that are earned after completing 8 weeks of a full-time work experience during the summer. It is possible to be at other times, and it is possible to be part-time. In case of part-time work experience, the timeframe will be open (i.e., September-December). The training may be paid or unpaid.

Students benefit from this option in the following ways:

- Develop professional skills and gain transferable, relevant work experience
- Develop maturity, leadership, and clarity regarding their career direction
- Improve employment prospects at graduation
- Establish relationships with potential employers
- May receive a higher starting salary at graduation than graduates who have not had training.

8.2.4 Graduation Project

The BSIT program offers 2 Capstone courses, IT 496 (Project 1) and IT 497 (Project 2). These courses cover the two parts of a typical capstone project:

- Analysis and Design in IT 496 (Project 1): during which students identify a problem domain, define the problem, perform system analysis and identify requirements. Then a system is designed as an IT solution to the problem being tackled.
- Implementation and evaluation in IT 497 (Project 2): during which students make use of selected tools, packages platforms and technologies to implement the system they designed in the first part. The final product is expected to pass through system integration, testing and evaluation before it is delivered.

Students are divided into groups of 3 to 5 members. Seminars are given during the semester to support students in their projects. Furthermore, students meet with their supervisor weekly who guides them and assesses their progress.

Table 8 presents full details of the four year plan described previously in this manual.

8.3 Four Year Plan

Table 8: The 4-year study plan

Level	ONE			
Course Number	Course Name	Credit Hours		Pre(Co)
ENGS 100	English	6		
MATH 101	Differential Calculus	3		
CHEM 101	General Chemistry	4		
ARAB 100	Writing Skills	2		
		15		

Level	THREE			
Course Number	Course Name	Credit Hours		Pre(Co)
CSC 111	Computer Programming 1	4	(3+2+1)	CT 101
IT 219	Physics for IT	3	(2-2-0)	
Math 151	Discrete Mathematics	3	(3+0+2)	Math 101
IT 210	Information Technology Fundamentals	3	(2+2+0)	
IC xxx	IC Elective #1	2	(2+0+0)	
		15		

Level	FIVE			
Course Number	Course Name	Credit Hours		Pre(Co)
CSC 212	Data Structures	3	(3+0+1)	CSC 113
IT 324	Information Security	3	(3+0+2)	(IT328)
IT 312	Web Applications Engineering	3	(2+2+0)	CSC113, IT 222
Math 244	Linear Algebra	3	(3+0+2)	Math 106
IT 328	Network Principles	4	(3+2+0)	IT219
IC 107	Professional Ethics	2	(2+0+0)	
		18		

Level	SEVEN			
Course Number	Course Name	Credit Hours		Pre(Co)
IT 426	Artificial Intelligent Systems	3	(3+0+2)	CSC212, Math244
IT 423	Introduction to Project Management	3	(2+2+0)	IT 320
IT 496	Project -1	3	(3+0+0)	IT320,CSC212 + completing 90 credit hours
IT xxx	Concentration core #2	3		
IT 479	Practical Training	2		completing 90 credit hours
		14		

Level	TWO			
Course Number	Course Name	Credit Hours		Pre(Co)
ENGS 110	English	6		ENGS 100
STAT101	Introduction to Statistics	3		
CT 101	IT Skills	3		
EPH 101	Fitness and Health education	1		
CI 101	University Skills	3		
ENT 101	Entrepreneurship	1		
		17		

Level	FOUR			
Course Number	Course Name	Credit Hours		Pre(Co)
CSC 113	Computer Programming 2	4	(3+2+1)	CSC 111
IT 223	Computer Organization & Architecture	3	(3+0+2)	Math151, IT219
IT 222	Database Principles	3	(2+2+1)	IT 210
IT 214	User Experience Design	3	(2+2+0)	CSC111
Math 106	Integral Calculus	3	(3+0+2)	Math 101
IC xxx	IC Elective #2	2	(2+0+0)	
		18		

Level	SIX			
Course Number	Course Name	Credit Hours		Pre(Co)
IT 326	Data Mining	3	(2+2+0)	IT 222, CSC212
CSC 227	Operating Systems	3	(3+0+1)	CSC 212
IT 320	Practical Software Engineering	4	(3+2+1)	IT 214(IT 329)
IT 329	Advanced Web Technologies	3	(2+2+0)	IT312, IT328
IT xxx	Concentration core #1	3		
IC 108	Current Issues	2	(2+0+0)	
		18		

Level	EIGHT			
Course Number	Course Name	Credit Hours		Pre(Co)
IT xxx	Concentration (Elective)	3		
IT 427	IT Entrepreneurship & Innovation	3	(3+0+0)	IT320
IT 497	Project -2	3	(3+0+0)	IT496
IT xxx	Concentration (Elective)	3		
		12		

Total Credit Hours = 127

References

[1] Hend S. Al-Khalifa, "A Survey of IT Jobs in the Kingdom of Saudi Arabia 2017", Information Technology Jobs Report at CCIS, KSU, 2017.

[2] Curriculum Guidelines for Baccalaureate Degree Programs in Information Technology. ACM IT2017

[3] National Qualifications Framework for Higher Education in the Kingdom of Saudi Arabia.

Appendix A - Common Foundation Courses

Course Code: CSC 111	*رقم المقرر و رمزه:* **111 عال**
Course Name: Computer Programming 1	*اسم المقرر:* **برمجة حاسبات 1**
Credits (lecture +lab +tutorial): 4 (3+2+1)	*Pre-requisites:* CT 140
Level: 3	*Co-requisites:*

Course Description:

This course aims at giving the students a broad foundation in the fundamental concepts of object oriented programming. It presents in a very simple way the basic concepts and principles of the Object Oriented approach such as abstraction and encapsulation principles, classes, objects and the constructor concepts, information hiding principle and the accessors concept, methods, the message passing and the overloading principles. It also introduces the array data structure.

Text Books:

1. Java How to program, Deitel and Deitel, Pearson International, Latest Edition

Reference:

2. Java Programming from Problem Analysis to Program Design, D.S. Malik, Course Technology, Latest Edition

Approved by the College Council in its 10th meeting on 26/1/1431H

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Course Code: CSC 113	*رقم المقرر و رمزه:* **113 عال**
Course Name: Computer Programming 2	*اسم المقرر:* **برمجة الحاسبات -2**
Credits (lecture +lab +tutorial): 4 (3+2+1)	*Pre-requisites:* CSC 111
Level: 4	*Co-requisites:*

Course Description:

This course continues the coverage of the fundamental concepts of Object Oriented Programming started in Programming I (CSC 111). It covers more advanced concepts and topics such as relationships between classes, inheritance, polymorphism, abstract classes, error handling, interfaces, generics and data structures such as linked lists, stacks and queues, in addition to graphical user interface.

Text Books:

1. An Introduction To Object-Oriented Programming With JAVA, Latest Edition, C. Thomas WU, McGraw-Hill Higher Education, ISBN 0-07-111680-X

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Course Code: CSC 212	*رقم المقرر و رمزه:* **212 عال**
Course Name: Data Structures	*اسم المقرر:* **هياكل البيانات**
Credits (lecture +lab +tutorial): 3 (3+0+1)	*Pre-requisites:* CSC 113
Level: 5	*Co-requisites:*

Course Description:

Fundamental concepts of data structures. Performance measurement of algorithms. Implementation and use of lists, stacks, queues, priority queues, trees, heaps, hash tables and graphs. Recursion. Students will do programming assignments.

Text Books:

1. Data Structures and Algorithms in Java, 6th edition, by M.T. Goodrich and R. Tamassia. John Wiley and Sons, Inc.ISBN: 1118771338.

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Course Code: CSC 227	*رقم المقرر و رمزه:* **227 عال**
Course Name: Operating Systems	*اسم المقرر:* **نظم التشغيل**
Credits (lecture +lab +tutorial): 3 (3+0+1)	*Pre-requisites:* CSC 212
Level: 6	*Co-requisites:*

Course Description:

This is an introductory course in Operating Systems. As such, it is intended to cover many of the concepts related to most of the actual Operating Systems. Although the study of a particular Operating System is out of the scope of this course, nevertheless, we will cover most of the concepts found in any existing Operating System. We will review computer system and operating system structures, processes and threads (concepts of, communication, synchronization and deadlocks), CPU Scheduling, memory management and virtual memory.

Text Books:

1. Operating Systems Concepts, 9th Edition by Abraham Silberschatz et al, John Willey & Sons, 2013.

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Head of Department Dean of College

Course Code: IT 210	***رقم المقرر و رمزه:*** **210 تم**
Course Name: Information Technology Fundamentals	***اسم المقرر:*** *المبادئ الأساسية لتقنية المعلومات*
Credits (lecture +lab +tutorial): 3 (2-2-0)	*Pre-requisites:*
Level: 3	*Co-requisites:*

Course Description:

This course provides an introduction to the fundamental principles of information technology and its pillars. It introduces students to the discipline of IT and its applications in industry. Topics include: techniques used in problem solving, solution representation, and ethical issues regarding legal, privacy and intellectual property rights concerns and their application to information technology.

Text Books:

1. Michael J. Quinn; Ethics for the Information Age; Addison-Wesley; 2016

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Course Code: IT 214	***رقم المقرر و رمزه:*** **214 تم**
Course Name: User Experience Design	***اسم المقرر:*** تصميم تجربة المستخدم
Credits (lecture +lab +tutorial): 3 (2-2-0)	*Pre-requisites:* CSC111
Level: 4	*Co-requisites:*

Course Description:

This course provides an introduction to the field of Human-Computer Interaction (HCI) and an overview of software architectures used in modern interfaces. The course will describe and apply theoretical concepts for analyzing observed problems in interfaces, models and frameworks from the field. The interaction design process, rules and principles that support the usability will be described and applied theoretically and in practice via interaction prototypes. A variety of user interface evaluation techniques (e.g. GOMS. heuristic evaluation, User-Centered Design and contextual design techniques) in the field of HCI will be covered and applied according to usability and accessibility standards. The course will also cover principles of universal design.

Text Books:

1. Alan Dix, Janet Finlay; Human-Computer Interaction; Prentice Hall; 2004

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Head of Department Dean of College

Course Code: IT 219	***رقم المقرر و رمزه:*** **219 تم**
Course Name: Physics for IT	***اسم المقرر:*** **الفيزياء لتقنية المعلومات**
Credits (lecture +lab +tutorial): 3 (2-2-0)	*Pre-requisites:*
Level: 3	*Co-requisites:*

Course Description:

This course aims at covering the fundamental principles behind computer and network technologies. It is divided into three main sections. The first section focuses on electronics and digital circuits, semiconductors and the use of transistors and Integrated circuits in building digital circuits, digital electronics and the binary system. The second section focuses on electromagnetic waves, the different types of signals, frequency spectrum, signal propagation and amplification, analogue/digital conversion and modulation techniques. The third section covers force, motors and magnetic fields, conversion of mechanical/electrical energy, and motion principles.

Text Books:

1. Garcia, Narciso, Damask, Arthur, Schwarz, Steven; Physics for Computer Science Students - With Emphasis on Atomic and Semiconductor Physics; Springer-Verlag New York Inc; 3rd Ed edition 2003

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Head of Department Dean of College

Course Code: IT 222	***رقم المقرر و رمزه:*** **222 تم**
Course Name: Database Principles	***اسم المقرر:*** **مبادئ قواعد البيانات**
Credits (lecture +lab +tutorial): 3 (2-2-1)	*Pre-requisites:* IT210
Level: 4	*Co-requisites:*

Course Description:

Characteristics of the database approach. Database concepts and architecture; Data models, schemas and instances; Program data independence, Database languages and interfaces. Data models for database systems; The E-R DM, Relational DM and Relational Algebra. Relational model constraints; Domain, key, and integrity constraints. SQL-relational DB language; Data definition, queries, update statements, and views in SQL. Database design; functional dependencies, Normal forms. Introduction to OO databases.

Text Books:

1. T. Connolly and C. Begg; Database Systems: A practical approach to design implementation and management; Latest Edition; Addison Wesley.

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Head of Department Dean of College

Course Code: IT 223	*رقم المقرر و رمزه:* **223 تم**
Course Name: Computer Organization & Architecture	*اسم المقرر:* **تنظيم وعمارة الحاسبات**
Credits (lecture +lab +tutorial): 3 (3-0-2)	*Pre-requisites:* Math 151 + IT219
Level: 4	*Co-requisites:*

Course Description:

This course introduces students to computer organization and architecture. Topics include: data representation, digital logic, fundamental building blocks (logic gates, flip-flops, decoders, encoder, multiplexer, arithmetic functions, counters, registers), register transfer notation, memory, bus and CPU (datapath and control unit) design.

Text Books:

1. Mano, Kime & Martin; Logic and Computer Design Fundamentals; Prentice Hall; 2015

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department Dean of College

Course Code: IT 312	*رقم المقرر و رمزه:* **312 تم**
Course Name: Web Applications Engineering	*اسم المقرر:* **هندسة تطبيقات الويب**
Credits (lecture +lab +tutorial): 3 (2-2-0)	*Pre-requisites:* CSC 113 + IT 222
Level: 5	*Co-requisites:*

Course Description:

Web Engineering course addresses the concepts, standards, methods and technologies related to developing Web applications. Topics covered include web standards, requirements engineering, design methods and technologies, accessibility and testing techniques for developing web applications. In this course, students will learn about client-side and server-side technologies and see how they all work together to deliver accessible web applications.

Text Books:

1. Robert Sebesta; Programming the World Wide Web, Pearson; 8th edition 2015

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department Dean of College

Course Code: IT 320	***رقم المقرر و رمزه:*** **320 تم**
Course Name: Practical Software Engineering	***اسم المقرر:*** *هندسة البرمجيات العملية*
Credits (lecture +lab +tutorial): 4 (3-2-1)	*Pre-requisites:* *IT 214*
Level: 6	*Co-requisites:* *IT 329*

Course Description:

This course covers the fundamentals of software engineering, including software process models, understanding system requirements, effective methods of design using object-oriented design methodology, architectural design, and interface design. The course will also introduce students to different approaches to software development, system integration, system validation and verification techniques, software evolution process, software maintenance, managing the code, documentation, configuration management, and software quality management including software measurements and metrics. The course will combine a strong technical focus with a capstone project providing the opportunity to practice software engineering knowledge, skills, and practices.

Text Books:

1. Roger Pressman, Bruce Maxim; Software Engineering A Practitioner's Approach eighth edition; McGraw-Hill 2015
2. I. Sommerville; Software Engineering, Edition 9th Edition; Pearson International; 2011

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 324	*رقم المقرر و رمزه:* **324 تم**
Course Name: Information Security	*اسم المقرر:* **أمن المعلومات**
Credits (lecture +lab +tutorial): 3 (3-0-2)	*Pre-requisites:*
Level: 5	*Co-requisites:* IT 328

Course Description:

This course defines information security. Topics include security services and its mechanisms, such as confidentiality, integrity, availability and non-repudiation, security policies, access control models, authentication methods, types of attacks (including social engineering, man in the middle, DoS…etc), malware, security principles (such as separation of duties, need to know…etc), basic principles of hashing, symmetric & asymmetric cryptography, digital certificates &PKI , Email security through S/MIME & PGP, Web Security, overview of firewalls and Intrusion detection system, Operating System security, physical security, risk assessment, incidence response, disaster recovery, business continuity and a general look into computer forensics.

Text Books:

1. Security + Guide to NETWORK SECURITY Fundamentals, Mark Ciampa, Thomson Course Technology, 4th edition, 2012.
2. Introduction to CRYPTOGRAPHY and NETWORK SECURITY, Behrouz A.Forouzan, McGraw-Hill International Edition, 2008.

Approved by the College Council in its 10th meeting on 26/1/1431H

Head of Department Dean of College

Course Code: IT 326	***رقم المقرر و رمزه:*** **326 تم**
Course Name: Data Mining	***اسم المقرر:*** **تنقيب البيانات**
Credits (lecture +lab +tutorial): 3 (2-2-0)	*Pre-requisites:* IT 222 + CSC 212
Level: 6	*Co-requisites:*

Course Description:

This course teaches data mining concepts and techniques, and basic machine learning techniques. Topics covered include basic statistical descriptions of data, measuring data similarity and dissimilarity, data preprocessing, mining frequent patterns and associations, classification, and clustering

Text Books:

1. Jiawei Han, Micheline Kamber, and Jian Pei; Data Mining: Concepts and Techniques; Morgan Kaufmann; 2011

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 328	*رقم المقرر و رمزه:* **328 تم**
Course Name: Network Principles	*اسم المقرر:* **مبادئ شبكات الحاسب**
Credits (lecture +lab +tutorial): 4 (3-2-0)	*Pre-requisites:* IT 219
Level: 5	*Co-requisites:*

Course Description:

This course provides an introduction to computer networks, including the Internet. It covers basic concepts and theory of computer networks and describes network technologies, architectures, protocols and standards in the different layers of the TCP/IP Internet suite of protocols. It introduces the basics of the physical layer, the application layer architectures and protocols for both client-server and Peer-to-Peer (P2P) applications and describes the architecture and design of local area networks including Ethernets. Topics include, but are not limited to, routing, addressing, TCP/UDP and process communication, reliability, network performance and management. The course provides theoretical background and hands on experience with focus on building network applications.

Text Books:

1. Behrous Forouzan; Data Communications & Networking; McGraw Hill; 5th edition 2012
2. James Kurose, Keith Ross; Computer Networking: A Top-Down Approach Featuring the Internet; Addison Wesley; 7th edition 2017

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 329	*رقم المقرر و رمزه:* **329 تم**
Course Name: Advanced Web Technologies	*اسم المقرر:* **تقنيات الويب المتقدمة**
Credits (lecture +lab +tutorial): 3 (2-2-0)	*Pre-requisites:* IT 312 + IT 328
Level: 6	*Co-requisites:*

Course Description:

This course aims to explore and discuss emerging technologies in the web arena. Emphasis is placed on exposure to up-and-coming technologies relating to the web, providing hands-on experience, and discussion of practical implications of such emerging technologies. It also allows students to gain an in-depth understanding of new web technologies, services, frameworks and business models. The course will cover topics such as XML and its technologies, Web services, Rich Internet Applications (RIA), Web application frameworks, and advanced topics such as Mobile Web.

Text Books:

1. Robert Sebesta; Programming the World Wide Web; Pearson; 8th edition 2015

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 423	***رقم المقرر و رمزه:*** **423 تم**
Course Name: Introduction to Project Management	***اسم المقرر:*** **مقدمة في ادارة المشاريع**
Credits (lecture +lab +tutorial): 3 (2-2-0)	*Pre-requisites:* IT 320
Level: 7	*Co-requisites:*

Course Description:

This course introduces students to the concepts and methodologies of Project Management (PM). Students will learn and apply basic project management concepts including planning, scheduling, work breakdown structures and project control, quality and risk management approaches and strategies, various cost estimation paradigms including estimation by analogy and algorithmic cost estimation techniques

Text Books:

1. A Guide to the Project Management Body of Knowledge: (Pmbok Guide); Project Management Institute; 5th edition, 2013
2. Software Extension to PMBOK® Guide); Project Management Institute; 5th edition, 2013

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 426	*رقم المقرر و رمزه:* **426 تم**
Course Name: Artificial Intelligence Systems	*اسم المقرر:* **أنظمة الذكاء الاصطناعي**
Credits (lecture +lab +tutorial): 3 (3+0+2)	*Pre-requisites:* CSC212 + Math 244
Level: 7	*Co-requisites:*

Course Description:

This course introduces students to the wide field of Artificial Intelligence (AI) and its use to solve real world problems. Topics covered will include foundation principles of Artificial Intelligence, namely Intelligent agents, problem solving, game playing, knowledge representation and reasoning, uncertainty, and machine learning. Students will be trained to tackle different real-world problems with AI tools and techniques. On completion of this course, students should understand what impact AI is making to society.

Text Books:

1. S. Russell, P. Norvig, Artificial Intelligence: A Modern Approach, Latest Edition, Prentice –Hall.

Approved by the College Council in its 15th meeting on 22/3/1433H

Head of Department | Dean of College

Course Code: IT 427	*رقم المقرر و رمزه:* **427 تم**
Course Name: IT Entrepreneurship & Innovation	*اسم المقرر:* **ريادة الأعمال والإبداع في تقنية**
Credits (lecture +lab +tutorial): 3 (3-0-0)	*Pre-requisites:* IT 320
Level: 8	*Co-requisites:*

Course Description:

This course will focus on teaching the basics of Innovation & Entrepreneurship in Information Technology, market analysis and customer engagement as well as open innovation. It will also tackle the creation of startups and managing their growth.

Text Books:

1. Yevgeniy Brikman; Hello, Startup: A Programmer's Guide to Building Products, Technologies, and Teams; O'Reilly Media, Inc.; 2015

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department Dean of College

Course Code: IT 479	***رقم المقرر و رمزه:*** **479 تم**
Course Name: Practical Training	***اسم المقرر:*** **تدريب عملي**
Credits (lecture +lab +tutorial): 2 (2-0-0)	*Pre-requisites:* completing at least 90 credit hours
Level: 7	*Co-requisites:*
Course Description: Students join a company or an IT center in a government or private sector on a full-time basis for at least 8 weeks in the last summer prior to their graduation. It may be for a longer time if taken on part-time basis. The aim of the practical training is to gain experience by applying knowledge and skills they acquire in the program in real-life and in team working. The training is evaluated by the training supervisor at the Organization and comprehensive reports are sent to the IT department.	
Text Books: Not applicable	
Approved by the College Council in its 20th meeting on 26/6/1439H	
Head of Department	Dean of College

Course Code: IT 496	*رقم المقرر و رمزه:* **496 تم**
Course Name: Project 1	*اسم المقرر:* **المشروع -1**
Credits (lecture +lab +tutorial): 3 (3-0-0)	*Pre-requisites:* IT320, CSC212 + completing at least 90 credit hours
Level: 7	*Co-requisites:*

Course Description:

This course is the first of a two-course sequence in which the students will develop a complete software system. The second stage will be carried out in IT 497. Students will work in groups of 3-5 students, each group will have a supervisor to guide them through the system development process using a specific methodology.

In this first part, each group must identify a problem domain, define the problem, identify and specify the requirements, document the current system, analyze it, propose alternative systems, and design a solution. The design must include the definitions of all the required system models, such as the data model and the functional model. At the end of the course, each group must submit a formal report documenting the complete process.

Text Books:

Not applicable.

Approved by the College Council in its 10th meeting on 26/1/1431H

Head of Department | Dean of College

Course Code: IT 497	*رقم المقرر و رمزه:* **497 تم**
Course Name: Project 2	*اسم المقرر:* **المشروع -2-**
Credits (lecture +lab +tutorial): 3 (3-0-0)	*Pre-requisites:* IT 496
Level: 8	*Co-requisites:*

Course Description:

In this course, each group will continue developing the software systems started in IT 496. Each group must use a particular tool to implement its system in a good programming practice. This implementation tool is preferably new –i.e. not taken in previous courses. Furthermore, students must generate a user manual for their information system in an appropriate format. At the end of the term, each group must submit a final report, which documents completely the information system from the problem definition phase to the implementation phase and contains a user manual for the information system. Team work, leadership, communication and writing skills are all important ingredients for a successful project.

Text Books:

Not applicable

Approved by the College Council in its 10th meeting on 26/1/1431H

Head of Department | Dean of College

Appendix B - Data Science (DS)

Course Code: IT 362	*رقم المقرر و رمزه:* 362 تم
Course Name: Principles of Data Science	*اسم المقرر:* أساسيات علم البيانات
Credits (lecture +lab +tutorial): 3 (3+0+2)	*Pre-requisites:* CSC 212
Level: 6	*Co-requisites:* IT 326

Course Description:

This course introduces students to the basics of Data Science, an essential emerging subject in the Information Technology field. It builds the foundation for other data management courses. It introduces the whole data science cycle from data collection, to exploratory data analysis, predictive and descriptive modeling, data interpretation and communication. Students will have exposure to hands-on state of the art tools.

Text Books:

1. Rachel Schutt and Cathy O'Neil, Doing Data Science, O'Reilly Media, 2014 .

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 461	*رقم المقرر و رمزه:* **461 تم**
Course Name: Practical Machine Learning	*اسم المقرر:* **تعلم الآلة التطبيقي**
Credits (lecture +lab +tutorial): *3 (2+2+0)*	*Pre-requisites:* IT 326
Level: *7*	*Co-requisites:*

Course Description:

This course introduces students to the basic concepts, techniques, and algorithms in Machine Learning (ML), with more emphasis on practical applications using real problems and data sets. It covers different types of learning algorithms, such as supervised and unsupervised learning. Students will learn how to analyze models' performance using different techniques and tackle some common performance problems such as over- and under- fitting.

Text Books:

1. S. Gollapudi; Practical Machine Learning.

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 462	***رقم المقرر و رمزه:*** **462 تم**
Course Name: Big Data Systems	***اسم المقرر:*** أنظمة البيانات الضخمة
Credits (lecture +lab +tutorial): *3 (2+2+0)*	*Pre-requisites:* IT 326
Level: *8*	*Co-requisites:*

Course Description:

This course introduces key concepts and state-of-the-art big data systems. Main topics to be covered include but not limited to: fundamentals of data storage systems, big data platforms, cluster computing and distributed file systems of intensive data.

Text Books:

1. Data Mining: Practical Machine Learning Tools and Techniques Learning Spark. Publisher: Language: English. ISBN-10: 1449358624. ISBN-13: 978-1449358624; O'Reilly Media; 2015

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 463	*رقم المقرر و رمزه:* **463 تم**
Course Name: E-commerce	*اسم المقرر:* **التجارة الالكترونية**
Credits (lecture +lab +tutorial): 3 (3+0+1)	*Pre-requisites:* IT 461
Level: 8	*Co-requisites:*

Course Description:

The purpose of this course is to provide the essentials of electronic commerce – how it is being conducted and managed as well as assessing its major opportunities, limitations, issues, and risks. Major topics include Internet consumer retailing, Business-to-Business e-commerce, m-commerce, e-commerce support services, and e-commerce strategy and implementation. Students will also learn how to build an online business from scratch.

Text Books:

1. K. C. Laudon & C. G. Traver, E- Commerce: Business Technology, society, Latest Edition, Addison Wesley

Approved by the College Council in its 10th meeting on 26/1/1431H

Head of Department | Dean of College

Course Code: IT 464	***رقم المقرر و رمزه:*** **464 تم**
Course Name: Data Management Systems	***اسم المقرر:*** **نظم إدارة قواعد البيانات**
Credits (lecture +lab +tutorial): 3 (2+2+1)	*Pre-requisites:* IT 222
Level: 8	*Co-requisites:*

Course Description:

This course teaches advanced concepts in Database implementation and administration. Components include transaction processing, concurrency control, DB recovery, query processing, distributed databases, data warehousing, data mining, and non-relational databases. It also teaches the students the main skills that need to be acquired by a DB Administrator.

Text Books:

1. T. Connolly and C. Begg; Database Systems:A practical approach to design implementation and management; Latest Edition; Addison Wesley

Approved by the College Council in its 10th meeting on 26/1/1431H

Head of Department Dean of College

Course Code: IT 465	***رقم المقرر و رمزه:*** **465 تم**
Course Name: Data Analytics & Visualization.	***اسم المقرر:*** تحليل البيانات وتمثيلها
Credits (lecture +lab +tutorial): 3 (2+2+0)	*Pre-requisites:* IT362
Level: 8	*Co-requisites:*

Course Description:

This course introduces the main principles in data analytic and visualization. It provides students with statistical and quantitative analysis, extensive use of data, exploratory and predictive models, business intelligence (BI), and information visualization. During the course, students will practice design, develop, analyze and visualize different types of data using most recent tools based on data type**.**

Text Books:

1. Venkat Ankam. "Big Data Analytics" Packet Publishing limited. 2016

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department Dean of College

Course Code: IT 466	***رقم المقرر و رمزه:*** **466 تم**
Course Name: Selected Topics in Data Science	***اسم المقرر:*** *مواضيع مختارة في علم البيانات*
Credits (lecture +lab +tutorial): 3 (3+0+1)	*Pre-requisites:* IT 362
Level: 8	*Co-requisites:*
Course Description: The course provides insight into selected state of the art relevant topics within data science. Students will be introduced to the most recently practical experience with data analysis, and industry related algorithms and technologies.	
Text Books: No textbook required	
Approved by the College Council in its 20th meeting on 26/6/1439H	
Head of Department	Dean of College

Appendix C - Cyber Security (CYS)

Course Code:	*رقم المقرر و رمزه:*
IT 371	**371 تم**
Course Name:	*اسم المقرر:*
Application Security	**أمن التطبيقات**
Credits (lecture +lab +tutorial):	*Pre-requisites:*
3 (2+2+0)	IT 324
Level:	*Co-requisites:*
6	IT 329

Course Description:

This course introduces students to the application engineering and design processes and how to integrate and apply cyber security tools and techniques in these processes. Topics include the methodology of secure application design, development and testing; application security best practices, methodologies and techniques; analysis of application-based attacks and defenses; and .Net security frameworks.

Text Books:

1. • Web Application Security: A Beginner's Guide, By Bryan Sullivan and Vincent Liu. McGraw Hill Education

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 471	*رقم المقرر و رمزه:* **471 تم**
Course Name: Cyber Security Governance	*اسم المقرر:* **إدارة الأمن الإلكتروني**
Credits (lecture +lab +tutorial): 3 (3+0+1)	*Pre-requisites:* IT 324
Level: 7	*Co-requisites:*

Course Description:

This course covers issues concerning management of risks, which both digital information and network assets in an organization are exposed to, and provides information and guidelines that can help with the establishment of a framework to assure that information security strategies are aligned with the objectives of the business and are consistent with legal and regulatory obligations. Topics include existing risk management frameworks, models, processes and tools to equip students with the theory, science and practical knowledge to deal appropriately with risk in an enterprise.

Text Books:

Michael E. Whitman and Herbert J. Mattoro, Management of Information Security, Course Technology, 5th Edition, 2016

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 472	*رقم المقرر و رمزه:* **472 تم**
Course Name: Cybercrime and Digital forensics	*اسم المقرر:* **الجريمة الإلكترونية والعلوم الجنائية الرقمية**
Credits (lecture +lab +tutorial): 3 (2+2+0)	*Pre-requisites:* IT 371
Level: 8	*Co-requisites:*

Course Description:

This course covers fundamentals of digital forensics, cybercrime scene analysis and electronic discovery. Digital forensics uses tools and techniques to collect and preserve evidence of computer crimes. Digital forensics focuses on the reconstruction of events that have led to the system corruption, with the goals of recovering critical data, aiding authorities in tracking those who may have caused the security breach, and learning techniques used by hackers to improve the protection of systems and prevent similar breaches in the future. Topics include file systems and storage analysis, data hiding techniques, network forensics; projects involving using, understanding, and designing digital forensic tools; anti-forensics; legal issues and standards.

Text Books:

1. B. Nelson, A. Philips, C. Steuart; Guide to Computer Forensics and Investigations; Course Technology, 2015.

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 473	*رقم المقرر و رمزه:* **473 تم**
Course Name: System Security	*اسم المقرر:* **أمن الانظمة**
Credits (lecture +lab +tutorial): 3 (2+2+0)	*Pre-requisites:* IT 371
Level: 8	*Co-requisites:*

Course Description:

Course topics are related to securing and hardening operating systems, securing virtual machine infrastructures, securing user management, identity infrastructures, threat assessment and detection, securing network infrastructures.

Text Books:

1. Mike Meyers; A+ Certification All-in-One Exam Guide; 2009

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 474	***رقم المقرر و رمزه:*** **474 تم**
Course Name: Network Security	***اسم المقرر:*** **أمن الشبكات**
Credits (lecture +lab +tutorial): 3 (2+2+0)	*Pre-requisites:* IT 324
Level: 8	*Co-requisites:*

Course Description:

The course covers theory and practice of network security giving detailed study of symmetric and asymmetric cryptography algorithms, pseudorandom functions and generators, hashing algorithms, message authentication codes, Key management through Diffie-hellman key agreement & Kerberos, entity authentication through CHAP. The course also provides the students with a closer look into security protocols at different network layers such as SSL/TLS, IP Sec, VPNs, network security devices and designing secure networks.

Through the use of lecture, and hands-on tutorials and labs, the key components of Network Security will be discussed and demonstrated.

Text Books:

1. Network Security Essentials: Applications and Standards, by William Stallings, Prentice Hall, Fifth edition, 2014

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department Dean of College

Course Code: IT 475	*رقم المقرر و رمزه:* **475 تم**
Course Name: Information Assurance Compliance and Audit	*اسم المقرر:* **التدقيق والمراجعة المعلوماتية**
Credits (lecture +lab +tutorial): 3 (3+0+1)	*Pre-requisites:* IT 471
Level: 8	*Co-requisites:*

Course Description:

The Internet raises a multitude of legal issues in many areas. Among the issues covered in this course are: privacy; electronic contracts; trademarks and domain names; software piracy and copyright infringements; content protection; jurisdiction; regulation; civil and criminal liability; and cybercrime. Additionally, the course presents the fundamental concepts of the IT-security audit and control process that is being conducted in a plethora of environments. The goal of this course is to enable the students to structure and perform audits based on the specifications of COBIT, HIPAA, FISMA, ISO 27001 and other audit programs.

Text Books:

1. Chris Davis, Mike Schiller, Kevin Wheeler; IT Auditing Using Controls to Protect Information Assets; McGraw-Hill Education; 2011

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 476	*رقم المقرر و رمزه:* **476 تم**
Course Name: Selected Topics in Cyber Security	*اسم المقرر:* **موضوعات مختارة في أمن المعلومات**
Credits (lecture +lab +tutorial): 3 (3+0+1)	*Pre-requisites:* IT 371
Level: 8	*Co-requisites:*
Course Description: This course covers new emerging Cyber Security methodologies, frameworks, technologies, research, etc..	
Text Books: No textbook required.	
Approved by the College Council in its 20th meeting on 26/6/1439H	
Head of Department	Dean of College

Appendix D - Networks & IOT Engineering (NIE)

Course Code:	*رقم المقرر و رمزه:*
IT 381	**381 تم**
Course Name:	*اسم المقرر:*
Wireless & Mobile Computing	**الحوسبة اللاسلكية و الجوالة**
Credits (lecture +lab +tutorial):	*Pre-requisites:*
3 (2+2+1)	IT 328
Level:	*Co-requisites:*
6	

Course Description:

This course will examine the area of mobile and wireless networking, looking at the unique network protocol challenges and opportunities presented by wireless communication and host or router mobility. Although, this course will touch on some of the important physical layer properties of radio and infrared communications, it will focus on network protocols above the physical layer, with an emphasis on the media access control, network, and transport protocol layers.

Text Books:

1. J. Schiller, Mobile Communication, Latest Edition, Pearson Education Limited.

Approved by the College Council in its 10th meeting on 26/1/1431H

Head of Department | Dean of College

Course Code: IT 481	***رقم المقرر و رمزه:*** **481 تم**
Course Name: Introduction to IoT	***اسم المقرر:*** مقدمة في إنترنت الأشياء
Credits (lecture +lab +tutorial): 3 (3+0+2)	*Pre-requisites:* IT 328
Level: 7	*Co-requisites:*

Course Description:

The course provides an overview of key Internet of Things (IoT) concepts and explores its potential. It introduces IoT architectures, applications, standards and regulations. It describes the typical components of IoT device, and the different IoT design considerations, constrains and challenges. It presents technologies relevant to the design and development of IoT including object identification, localization, sensing & actuation, data and security. It also explores the IoT effect on society and businesses, and describes the trends for the future.

Text Books:

1. A. Bahga, V. Madisetti; Internet of Things (A Hands-on-Approach); VPT 2014

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department Dean of College

Course Code: IT 482	*رقم المقرر و رمزه:* **482 تم**
Course Name: Sensor and Ad hoc Networks	*اسم المقرر:* **أجهزة الاستشعار والشبكات المخصصة**
Credits (lecture +lab +tutorial): 3 (2+2+0)	*Pre-requisites:* IT381
Level: 8	*Co-requisites:*

Course Description:

This course provides an introduction to ad hoc and sensor networks and describes the fundamentals behind their design and their role in ubiquitous and pervasive computing. It explains Wireless Sensor Networks (WSNs) architecture, sensor node hardware and operating systems, protocols, and applications. It covers several issues and challenges like data aggregation, information dissemination, power management, localization, coverage and self-organization. A primary focus of this course is to give students hands-on programming experience with various sensors and sensing platforms.

Text Books:

1. W. Dargie and C. Poellabauer; Fundamentals of Wireless Sensor Networks: Theory and Practice; Wiley Series on Wireless Communication and Mobile Computing; 2010

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department | Dean of College

Course Code: IT 483	***رقم المقرر و رمزه:*** **483 تم**
Course Name: IoT Services & Applications	اسم المقرر: **خدمات وتطبيقات إنترنت *الأشياء***
Credits (lecture +lab +tutorial): 3 (2+2+0)	*Pre-requisites:* IT481, IT312
Level: *8*	*Co-requisites:*

Course Description:

This course introduces development technologies, standards and applications for the Internet of Things (IoT). It also introduces the Web of Things and describes how to design and implement scalable, flexible, and open IoT solutions using web services and technologies. It describes the Internet of Things/Web of Things layered architecture and introduces several protocols. Moreover, it examines various IoT application areas such as smart homes, smart buildings, smart cities, smart health and smart education and discusses IoT smart concepts like smart sustainability, smart mobility, smart spaces and green computing. The module provides hands-on expertise in designing and developing IoT applications and services.

Text Books:

1. Dominique D Guinard, Vlad M Trifa; Manning publications; 2016

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department Dean of College

Course Code: IT 484	***رقم المقرر و رمزه:*** **484 تم**
Course Name: Cloud Computing	***اسم المقرر:*** الحوسبة السحابية
Credits (lecture +lab +tutorial): 3 (2+2+1)	*Pre-requisites:* IT 328
Level: *8*	*Co-requisites:*

Course Description:

This course presents the Cloud infrastructure, architecture, and different service models (Saas, Paas and Iaas). A comprehensive study of the Cloud reference model is provided, including: storage technologies, virtualization, resources control, services orchestration. The course also covers important concerns regarding Cloud deployment: security, business continuity and service management.

Text Books:

1. Cloud Infrastructure and Services Version 2, Student Guide Volumes 1&2, EMC Corporation, USA October 2014.

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department Dean of College

Course Code: IT 485	***رقم المقرر و رمزه:*** **485 تم**
Course Name: Robotics fundamentals	***اسم المقرر:*** **أساسيات الروبوتات**
Credits (lecture +lab +tutorial): 3 (2+2+1)	*Pre-requisites:*
Level: 8	*Co-requisites:*

Course Description:

This course provides an overview of robot mechanisms, dynamics, and intelligent controls. Topics include planar and spatial kinematics, motion planning; mechanism design for manipulators, multi-rigid-body dynamics, Topics also include robots programming tools such as control design, actuators, and sensors, localization, mapping, and navigation.

Text Books:

1. Saeed B. Niku,; to Robotics: Analysis, Control, Applications; Wiley ISBN-10: 0470604468, ISBN-13: 978-0470604465; 2nd edition; 2010

Approved by the College Council in its 20th meeting on 26/6/1439H

Head of Department Dean of College

Course Code: IT 486	***رقم المقرر و رمزه:*** **486 تم**
Course Name: Selected Topics in Networks &IoT	***اسم المقرر:*** *مواضيع مختاره في الشبكات وإنترنت الأشياء*
Credits (lecture +lab +tutorial): 3 (3+0+1)	*Pre-requisites:* IT481
Level: 8	*Co-requisites:*
Course Description: This course will cover advance topics in networking and IOT according to the state of the art in the area.	
Text Books: No textbook required	
Approved by the College Council in its 20th meeting on 26/6/1439H	
Head of Department	Dean of College

Appendix E - Pre/Co-requisite Graph