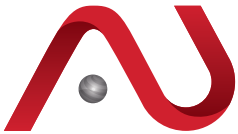


الجامعة الأهلية
AHLIA UNIVERSITY
BAHRAIN

COLLEGE OF INFORMATION TECHNOLOGY

CATALOGUE 2020/2021

www.ahlia.edu.bh

CONTENTS

COLLEGE OF
INFORMATION TECHNOLOGY

COLLEGE OF INFORMATION TECHNOLOGY

Dean Message

Welcome to the College of Information Technology at AHLIA University.

The College of Information Technology was established as a constituent college of Ahlia University since it was founded in 2001. Over the last few years, the College has seen a remarkable growth in several critical areas, including student enrollment, number of well-qualified faculty with international experience, research, and well-designed academic program offerings. Underlying all our College growth and development is a commitment to student learning, a commitment to deliver high quality education in accordance with international standards and in tune with the local needs of the industry and business and a commitment to ensuring a continuous improvement process that delivers a quality education to our students. The College aims to produce high quality professionals in the field of Information Technology and Computer Science to enable them to excel in their fields of work and make a significant and valuable contribution to society. Therefore, our programs apply a hands-on, reality-based approach to education that allows students to apply what they learn in class to solve real-life problems. Our teaching philosophy and problem solving based learning process prepare students to become innovators, and leaders of the future.

The College offers four degrees, B.Sc degrees in Information Technology (BSIT) and Multimedia Systems (BSMS), and masters' degree in Information Technology and Computer Science (MITCS). We are proud to announce that all College programs received full confidence in a review conducted by the Bahrain Quality Assurance Authority. All College programs are validated by NQF and listed.

We wish you all the best for your studies and your future growth in the field. I invite you to explore opportunities at our College, to visit our website, and to contact me directly at wawad@ahlia.edu.bh.

College Vision

To be a regional leader and an outstanding international centre of excellence in education, research and professional development in Information Technology.

College Mission

As a core constituency of the leading institution for higher education, College of Information Technology's Mission is to move forward in providing society with quality services, education and research in the field of Information Technology.

In support of this mission, the College of Information Technology is committed to:

- To provide high quality undergraduate and postgraduate educational programs in Information Technology.
- To prepare highly competent professionals to be tomorrow's leaders.
- To provide high quality services, expertise and resources to society in the form of projects, training and consultation.
- To conduct innovative computing research that advances the frontiers of knowledge and applied state-of-the art-solutions to local problems.

College Goals

1. To provide high quality educational programs that offer lifelong learning in developing and managing computational processes and systems, with emphasis on multimedia computing and information systems and technology.
2. To periodically revise the programs offered by the college to meet the current international standards and to satisfy the market needs.
3. To provide a student-centered integrated educational environment.
4. To continuously build and modernize college infrastructure including computing facilities and laboratories.
5. To attract highly qualified, motivated and greatly committed faculty.
6. To attract and nurture qualified undergraduate and graduate students.
7. To prepare competent qualified graduates in the areas of Information Technology.
8. To create and encourage partnership with industry, government, local / international institutions and alumni.
9. To encourage faculty to indulge in research activities that serve and sustain local and regional economic development.
10. To motivate students to be sensitive to issues such as ethics, social responsibilities and environmental protection.

College Departments

The College consists of two departments, Information Technology and Multimedia Science departments.

Department of Information Technology is aimed to provide quality education in the field of Information Technology. The goal is to prepare skillful IT professionals with the ability to analyze, design, innovate, automate and implement the real world solutions. It is also a focus of department to collaborate and conduct quality research in the field of Information Technology, hence to contribute to the society with innovative solutions. In relevance to the College of Information Technology's mission, department offers the educational programs both at Bachelor and Postgraduate Levels. The offered programs are Bachelors in Information Technology (BSIT), Masters in Information technology and Computer Science (MITCS) and Brunel PhD without Residence. Department is well equipped with modern facilities and resources to support all its programs and operations. Our faculty is highly qualified with diverse experience and is actively involved in teaching and research.

Department of Multimedia Science is aimed to provide quality education in the field of Multimedia. The goal is to prepare skillful Multimedia professionals with the ability to analyze, design, innovate, automate and implement the real world solutions. It is also a focus of department to collaborate and conduct quality research in the field of Multimedia, hence to contribute to the society with innovative solutions. In relevance to the College of Information Technology's mission, department offers the educational program Bachelor Level. The offered program is Bachelor in Multimedia Systems (BSMS). The Multimedia department is well equipped with modern facilities and resources to support the program and operations. Our faculty is highly qualified with diverse experience and are actively involved in teaching and research.

College Programs

The College offers B.Sc degrees in Information Technology (BSIT) and Multimedia Systems (BSMS), and masters' degree in Information Technology and Computer Science (MITCS). All College programs received full confidence in a review conducted by the Bahrain Quality Assurance Authority. All College programs are validated and listed by National Qualification Framework (NQF).

UNIVERSITY REQUIREMENTS

COURSE	CODE	COURSE TITLE	NO. OF CREDIT-HOURS
ARAB	101	ARABIC	3
ENGL	101	ACADEMIC ENGLISH I	3
ITCS	101	INTRODUCTION TO COMPUTERS & IT	3
HIST	121	MODERN HISTORY OF BAHRAIN	3
HUMR	101	PRINCIPLES OF HUMAN RIGHTS	2
ENGL	102	ACADEMIC ENGLISH II	3
STAT	101	INTRODUCTION TO STATISTICS	3
TOTAL		**7 COURSES**	**20 CREDIT-HOURS**

COLLEGE REQUIREMENTS

COURSE	CODE	COURSE TITLE	NO. OF CREDIT-HOURS
MATH	101	CALCULUS I	3
ENGL	202	ACADEMIC ENGLISH (IV)	3
ITCS	122	INTRODUCTION TO PROGRAMMING TECHNIQUES	3
ITCS	209	DISCRETE STRUCTUERES	3
MATH	102	CALCULUS II	3
PHYS	101	GENERAL PHYSICS I	3
ENGL	201	ACADEMIC ENGLISH III	3
TOTAL		**7 COURSES**	**21 CREDIT-HOURS**

The programs include Humanities and Social Sciences courses which are required to take one course from the below humanities and social sciences courses:

HUMANITIES AND SOCIAL SCIENCES

COURSE	CODE	COURSE TITLE	NO. OF CREDIT-HOURS
ARAB	102	COMPOSITION FOR NATIVE SPEAKERS OF ARABIC II	3
ARAB	201	INTRODUCTION TO MODERN ARABIC LITERATURE	3
CULT	101	INTRODUCTION TO CULTURE	3
CULT	102	ISLAMIC CULTURE	3
ENGL	215	READINGS IN ENGLISH LITERATURE	3
ENGL	216	READINGS LITERATURE II	3
ENGL	221	INTRODUCTION TO TRANSLATION	3
ENGL	218	WORKPLACE WRITING SKILLS	3
FREN	101	FRENCH I	3
FREN	102	FRENCH II	3
SPAN	101	INTRODUCTION TO SPANISH I	3
SPAN	102	INTRODUCTION TO SPANISH II	3
GERM	101	GERMAN LANGUAGE & CULTURE I	3
GERM	102	GERMAN LANGUAGE & CULTURE II	3
CHIN	101	INTRODUCTION TO CHINESE I	3
SOCI	101	SOCIOLOGY	3
SOCI	102	SOCIOLOGY II	3
HIST	101	MODERN HISTORY OF THE MIDDLE EAST & NORTH AFRICA	3
LAW	101	INTRODUCTION TO LEGAL SYSTEMS & LEGAL REASONING	3
ANTH	101	INTRODUCTION TO ANTHROPOLOGY	3
PSYC	101	INTRODUCTION TO PSYCHOLOGY	3
IREL	101	INTERNATIONAL RELATIONS	3
TOTAL		**ANY ONE OF THE ABOVE COURSES**	**3 CREDIT-HOURS**

FREE ELECTIVES

Student must take any two courses (6 credit-hours) as free electives

BACHELOR'S DEGREE IN

MULTIMEDIA SYSTEMS (BSMS)

Overview

This degree is designed to provide the students with knowledge and learning in the various areas of Multimedia. It is aimed to provide students with critical competences and cutting- edge skills of core multimedia, computer interaction, web programming, web design, 3D Design and animation, video processing, audio processing, graphic design, game development & digital marketing. It is also targeted to enable students to critically analyze, identify, and solve real-world multimedia problems; to design, implement, and evaluate a complete multimedia system to meet desired needs. Moreover, the students acquire skills to manage multimedia effectively and integrate the multimedia systems into the user environment. It is also targeted that the students acquire an ability of a keen appreciation to demonstrate, professionalism and ethical behavior, including responsible teamwork, creativity and communication skills with professional attitudes, and be prepared for the complexity of the actual work environment and life-long learning.

Department/Center	Multimedia Science Department
Program Title	Bachelor of Multimedia Systems (BSMS)
Title of Final Award	Bachelor's Degree in Multimedia Systems
Awarded Level (NQF)	8
Modes of Attendance offered	Attendance is compulsory for full-time and part-time students

Program Facts

- The program runs over 4 years period
- The program is taught in English Language
- The program is consists of 134 credit-hours covering 45 courses
- The program achieved full confidence in 2013 by Bahrain Quality Assurance Authority (BQA)
- The program has been placed on Bahrain's National Qualification Framework (NQF)

BSMS Program Educational Objectives

- To provide a high quality undergraduate educational program in Multimedia Systems needed for their career opportunities or postgraduate education.
- To enable students to critically analyze, identify and solve real-world problems
- To design, implement, and evaluate a multimedia system, or component, to meet desired needs.
- To instil in students a keen appreciation of and to demonstrate professionalism and ethical behaviour. This includes responsible teamwork, creativity and communication skills with professional attitudes and to prepare them for the complex actual work environment and for life-long learning.

General View of Course Intended Learning Outcomes

A. Knowledge and Understanding

A1: Concepts and Theories: Demonstrate solid knowledge and understanding of the essential concepts, principles, and techniques in Multimedia.

A2: Contemporary Trends, Problems and Research: Demonstrate an informed and critical awareness of the modern and, up-to-date practices, trends, problems, methods, technological advancements, and the contemporary diverse horizons within the Multimedia field.

A3: Professional Responsibility: Demonstrate adherence to the professional and legal responsibility, and develop continuing awareness of the best practices and cutting-edge solutions involved in the development and application of Multimedia technology.

B. Subject-specific skills

B1: Problem Solving: Identify, formulate, and analyze specific real life problems; and plan, design, and implement computable strategies for their solutions.

B2: Modeling and Design: Model and design a multimedia system, website, to meet desired needs within realistic constraints.

B3: Application of Methods and Tools: Employ appropriate cutting-edge, techniques, tools and technologies used in Multimedia practices to solve considerably important and current problems.

C. Critical-Thinking Skills

C1: Analytic: Analyze and evaluate the complexity of significantly important and challenging real world problems, identify the appropriate multimedia resources needed to solve them efficiently.

C2: Synthetic: Design, plan, implement and manage a computerized system/process within certain constraints in a team or individually to meet certain desirable outcomes.

C3: Creative: Create new or improve existing ideas, projects, techniques, and methods in multimedia and identify ways in which these can be applied to solve existing and new problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

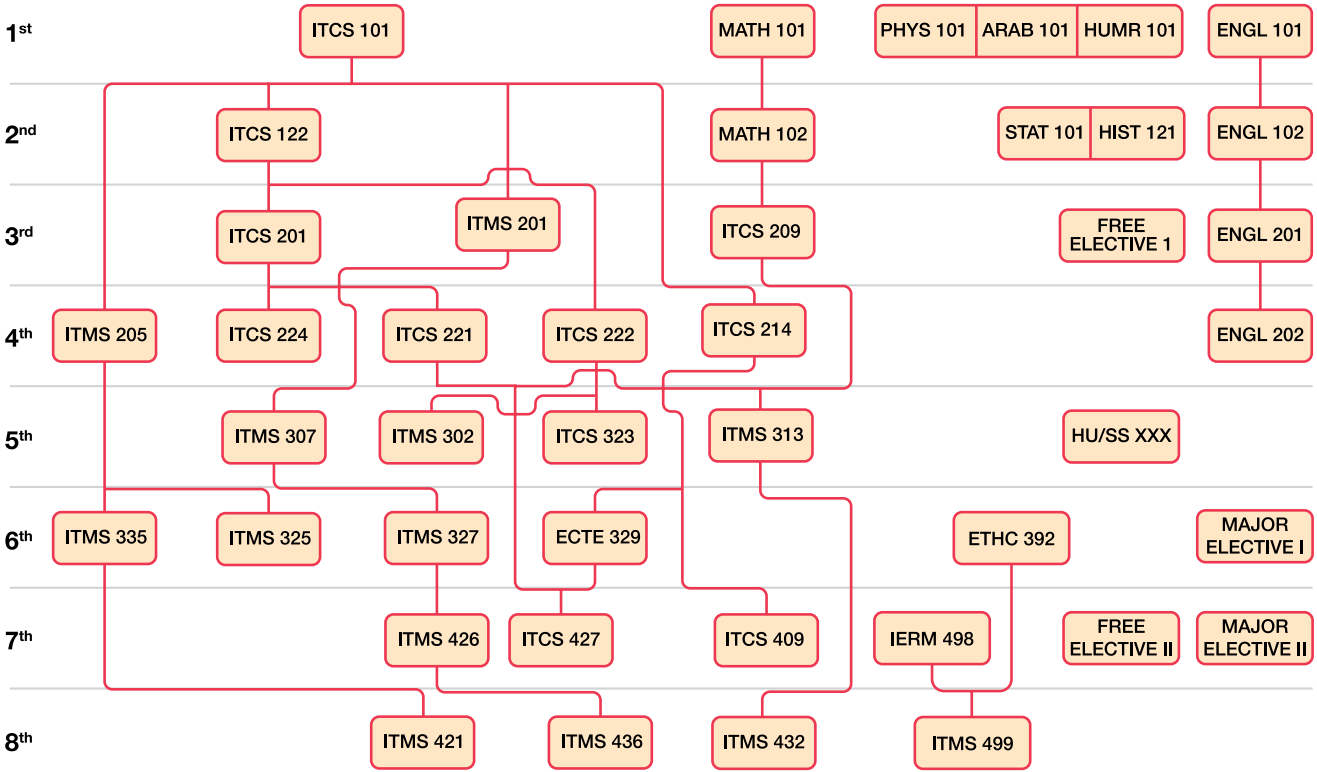
D1: Communication: Express and communicate ideas effectively, in written and oral form

D2: Teamwork and Leadership: Work effectively as a member/leader of a team of technical people who may design, plan, implement, manage, monitor and evaluate a multimedia project.

D3: Organizational and Developmental Skills: Work effectively as a member/leader of a team of technical people who may design, plan, implement, manage, monitor and evaluate a multimedia project.

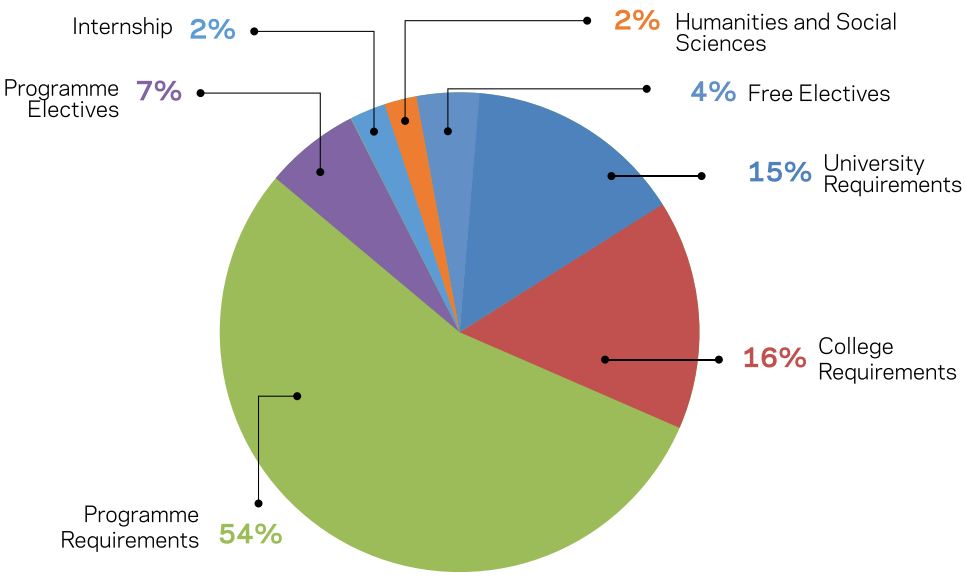
D4: Ethical and Social Responsibility: Recognize, accept, and follow ethical and social responsibility and develop positive alertness and responsiveness to the needs ofsociety by identifying, employing and utilizing effectively the multimedia solutions and technologies.

Prerequisite Structure of BSMS Program



PROGRAM COMPONENTS

COURSE TYPE	NO. OF CREDIT-HOURS	NO. OF COURSES
UNIVERSITY REQUIREMENTS	20	7
COLLEGE REQUIREMENTS	21	7
PROGRAM REQUIREMENTS	72	24
MAJOR ELECTIVES	9	3
INTERNSHIP	3	1
HUMANITIES AND SOCIAL SCIENCES	3	1
FREE ELECTIVES	6	2
TOTAL	**134**	**45**



DETAILED STUDY PLAN (BSMS)

FIRST YEAR (32 CREDITS)

FIRST SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ARAB	101	COMPOSITION FOR NATIVE SPEAKERS OF ARABIC I	3	0	3	
ENGL	101	ACADEMIC ENGLISH I	3	0	3	(ENGL 052 AND ENGL 055) OR PASSING PLACEMENT TEST
ITCS	101	INTRODUCTION TO COMPUTERS & IT	2	2	3	
MATH	101	CALCULUS I	3	0	3	(MATH 053) OR PASSING PLACEMENT TEST
HUMR	101	PRINCIPLES OF HUMAN RIGHTS	2	0	2	
PHYS	101	GENERAL PHYSICS I	3	0	3	(MATH 053) OR PASSING PLACEMENT TEST
		TOTAL PER SEMESTER			**17**	

SECOND SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ENGL	102	ACADEMIC ENGLISH II	3	0	3	ENGL 101
HIST	121	MODERN HISTORY OF BAHRAIN	3	0	3	
ITCS	122	INTRODUCTION TO PROGRAMMING TECHNIQUES	2	2	3	ITCS 101
MATH	102	CALCULUS II	3	0	3	MATH 101
STAT	101	INTRODUCTION TO STATISTICS	3	0	3	(MATH 053) OR PASSING PLACEMENT TEST
		TOTAL PER SEMESTER			**15**	

SECOND YEAR (33 CREDITS)

FIRST SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ENGL	201	ACADEMIC ENGLISH III	3	0	3	ENGL 102
ITCS	201	OBJECT-ORIENTED PROGRAMMING I	2	2	3	ITCS 122
XXXX	XXX	FREE ELECTIVE I	X	X	3	
ITCS	209	DISCRETE STRUCTURES	3	0	3	MATH 102
ITMS	201	INTRODUCTION TO MULTIMEDIA SYSTEMS	3	0	3	ITCS 101
		TOTAL PER SEMESTER			**15**	

SECOND SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ENGL	202	ACADEMIC ENGLISH IV	3	0	3	ENGL 201
ITMS	205	INTERNET APPLICATIONS AND SERVICES	2	2	3	ITCS 101
ITCS	214	COMPUTER SYSTEMS	3	0	3	ITCS 101
ITCS	221	OBJECT-ORIENTED PROGRAMMING II	2	2	3	ITCS 201
ITCS	222	VISUAL PROGRAMMING	2	2	3	ITCS 122
ITCS	224	DATA STRUCTURES	2	2	3	ITCS 201
		TOTAL PER SEMESTER			**18**	

THIRD YEAR (36 CREDITS)

FIRST SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITMS	313	GAME DEVELOPMENT I	2	2	3	ITCS 221 & ITCS 209
ITMS	302	HUMAN COMPUTER INTERACTION	2	2	3	ITCS 222
ITCS	323	DATABASE SYSTEMS: DESIGN AND APPLICATION	2	2	3	ITCS 222
ITMS	307	MULTIMEDIA SOFTWARES I	2	2	3	ITMS 201
HU/SS	XXX	HUMANITIES/ SOCIAL SCIENCES	3	0	3	
TOTAL PER SEMESTER					**15**	

SECOND SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ETHC	392	ETHICS AND PROFESSIONAL PRACTICE IN IT AND ENGINEERING	3	0	3	COMPLETION OF AT LEAST 66 CREDITS
ITMS	325	WEB APPLICATIONS DESIGN	2	2	3	ITMS 205
ITMS	327	MULTIMEDIA SOFTWARES II	2	2	3	ITMS 307
ITMS	335	WEB PROGRAMMING I	2	2	3	ITMS 205
ITMS	3XX	MAJOR ELECTIVE I	2	2	3	
ECTE	329	COMPUTER NETWORKS	2	2	3	ITCS 214
TOTAL PER SEMESTER					**18**	

SUMMER SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
INTR	464	BSMS INTERNSHIP	0	0	3	COMPLETION OF AT LEAST 90 CREDITS HOURS WITH CGPA >=2.00
TOTAL PER SEMESTER					**3**	

FOURTH YEAR (33 CREDITS)

FIRST SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITCS	409	OPERATING SYSTEMS	3	0	3	ITCS 214 OR ECCE 303
ITMS	426	3D GRAPHICS SOFTWARES	2	2	3	ITMS 327
ITCS	427	MOBILE COMPUTING	2	2	3	ITCS 221 & ECTE 329
IERM	498	RESEARCH METHODS IN INFORMATION TECHNOLOGY & ENGINEERING	3	0	3	COMPLETION OF AT LEAST 90 CREDITS
ITMS/CS	4XX	MAJOR ELECTIVE II	2	2	3	
XXXX	XXX	FREE ELECTIVE II	X	X	3	
		TOTAL PER SEMESTER			**18**	

SECOND SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITMS	432	GAME DEVELOPMENT II	2	2	3	ITMS 313
ITMS	436	MULTIMEDIA APPLICATIONS	2	2	3	ITMS 426
ITMS/CS	4XX	MAJOR ELECTIVE III	2	2	3	
ITMS	421	WEB PROGRAMMING II	2	2	3	ITMS 335
ITMS	499	MAJOR PROJECT	0	6	3	IERM 498 & ETHC 392
		TOTAL PER SEMESTER			**15**	

LIST OF MAJOR ELECTIVE COURSES

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITMS	347	VIDEO POST PRODUCTION	2	2	3	ITMS 327
ITMS	350	DESKTOP PUBLISHING	2	2	3	ITMS 327
ITCS	422	DISTRIBUTED SYSTEMS	2	2	3	ITCS 409
ITMS	435	WEB PROGRAMMING III	2	2	3	ITMS 421
ITMS	437	CLOUD SERVICES DEVELOPMENT	2	2	3	ITMS 435
ITMS	445	MODELLING AND ANIMATING CHARACTERS IN 3D	2	2	3	ITMS 426
ITCS	431	INTRODUCTION TO DATA ANALYTICS	2	2	3	ITCS 323
ITCS	452	ADVANCED MOBILE COMPUTING	2	2	3	ITCS 427
ITMS	341	DIGITAL MAKETING TECHNOLOGIES	2	2	3	ITMS 325


الجامعة الأهلية
AHLIA UNIVERSITY
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BACHELOR'S DEGREE IN

INFORMATION TECHNOLOGY (BSIT)

Overview

This degree is designed to provide the students with knowledge and learning in the various areas of Information Technology. It is aimed to provide students with critical competences and cutting-edge skills of core information technologies of human computer interaction, information management, programming, networking, software engineering, databases, system administration and web systems and technologies. It is also targeted to enable students to critically analyze, identify, and solve real-world problems; to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs. Moreover the students acquire skills to manage information effectively and integrate IT-based solutions into the user environment. It is also targeted that the students acquire an ability of a keen appreciation to demonstrate, professionalism and ethical behavior, including responsible teamwork, creativity and communication skills with professional attitudes, and be prepared for the complexity of the actual work environment and life-long learning.

Department/Center	Information Technology Department
Program Title	Bachelor of Information Technology (BSIT)
Title of Final Award	Bachelor's Degree in Information Technology
Awarded Level (NQF)	8
Modes of Attendance offered	Attendance is compulsory for full-time and part-time students

Program Facts

- The program runs over 4 years period
- The program is taught in English Language
- The program is consists of 134 credit-hours covering 45 course
- The program achieved full confidence in 2013 by Bahrain Quality Assurance Authority (BQA)
- The program has been placed on Bahrain's National Qualification Framework (NQF)
- Confidence by BQA in 2021 and NQF Placement re-validation in 2020

BSIT Program Educational Objectives

- Exhibit the relevant skills and knowledge for pursuing the IT career in industry including corporate as well as government sector.
- Pursue life-long learning leading to entrepreneurship, research and development.
- Contribute to the society through their ethical and professional norms by demonstrating them in IT professions.

Student Outcomes

Graduates of the program will have an ability to:

1. Analyse a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Identify and analyze user needs and to take them into account in the selection, creation, integration, evaluation and administration of computing-based systems.

General View of Course Intended Learning Outcomes

A. Knowledge and Understanding

A1 Concepts and Theories: Demonstrate critical knowledge and understanding of mathematics and current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

A2 Contemporary Trends, Problems and Research: Be cognizant of up-to-date trends, problems, research issues, and methods in information technology.

A3 Professional Responsibility: Demonstrate an understanding of best practices and standards of information technology and their application

B. Subject-specific skills

B1 Problem Solving: An ability to critically analyze and identify user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

B2 Modeling and Design: An ability to model, design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.

B3 Application of Method and Tools: An ability to use current techniques, skills and tools necessary for computing practice.

C. Critical-Thinking Skills

C1 Analytic: Critically analyze the complexity of real problems, evaluate the possible alternative computable solutions and analyze their performance and impact on individuals, organizations and society.

C2 Synthetic: Demonstrate the ability to integrate existing and new technologies into unified computer systems and effectively integrate IT-based solutions into the user environment.

C3 Creative: Innovate and apply new alternative methods to solve IT and real world problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1 Communication: Express and communicate ideas effectively in written and oral form.

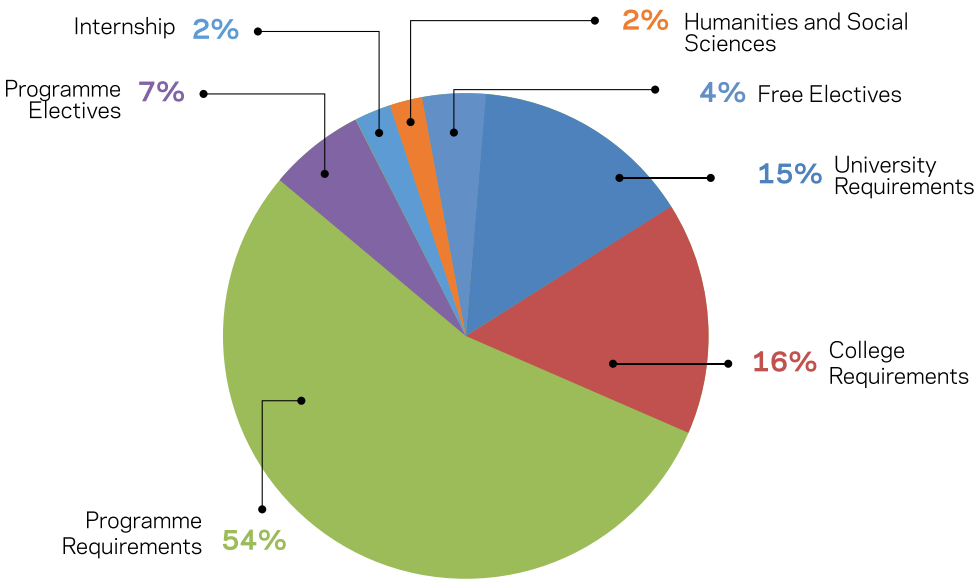
D2 Teamwork and Leadership: An ability to function effectively on teams, as member or leader with decision making responsibilities, to accomplish a common goal.

D3 Organizational and Development Skills: Demonstrate an ability to manage learning tasks independently and professionally with a view to inculcating skills for self development and life long learning in order to effectively prioritize, plan, manage and allocate appropriate resources to implement tasks.

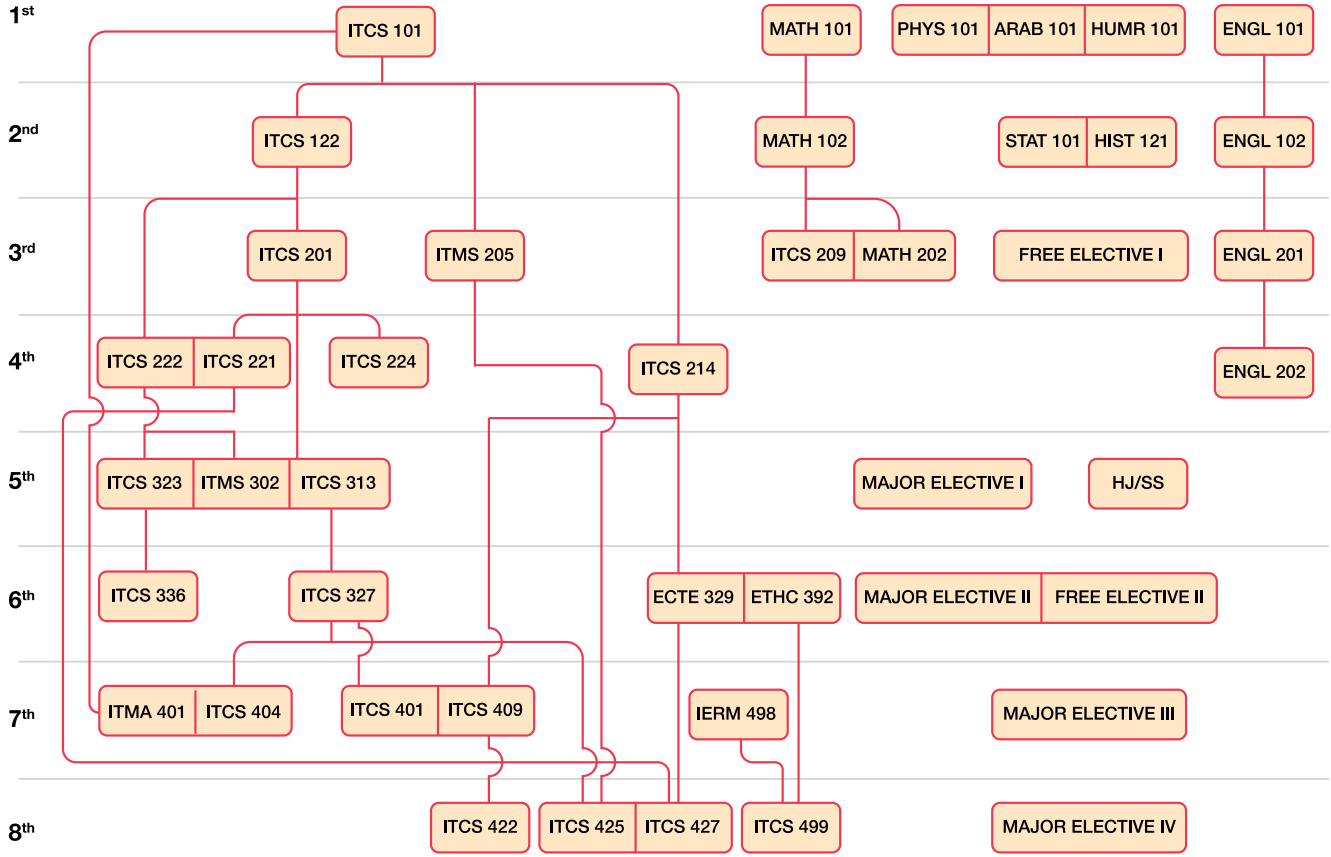
D4 Ethical and Social Responsibility: Demonstrate an understanding of professional, ethical, legal security and social issues and responsibilities.

PROGRAM COMPONENTS

COURSE TYPE	NO. OF CREDIT-HOURS	NO. OF COURSES
UNIVERSITY REQUIREMENTS	20	7
COLLEGE REQUIREMENTS	21	7
MAJOR REQUIREMENTS	69	23
MAJOR ELECTIVES	12	4
INTERNSHIP	3	1
HUMANITIES AND SOCIAL SCIENCES	3	1
FREE ELECTIVES	6	2
TOTAL	**134**	**45**



Prerequisite Structure of BSIT Program



DETAILED STUDY PLAN (BSIT)

FIRST YEAR (32 CREDITS)

FIRST SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ARAB	101	COMPOSITION FOR NATIVE SPEAKERS OF ARABIC I	3	0	3	
ENGL	101	ACADEMIC ENGLISH I	3	0	3	(ENGL 052 AND ENGL 055) OR PASSING PLACEMENT TEST
ITCS	101	INTRODUCTION TO COMPUTER & IT	2	2	3	
MATH	101	CALCULUS I	3	0	3	(MATH 053) OR PASSING PLACEMENT TEST
HUMR	101	PRINCIPALES OF HUMAN RIGHTS	2	0	2	
PHYS	101	GENERAL PHYSICS I	3	0	3	(MATH 053) OR PASSING PLACEMENT TEST
		TOTAL PER SEMESTER			**17**	

SECOND SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ENGL	102	ACADEMIC ENGLISH II	3	0	3	ENGL 101
HIST	121	MODERN HISTORY OF BAHRAIN	3	0	3	
ITCS	122	INTRODUCTION TO PROGRAMMING TECHNIQUES	2	2	3	ITCS 101
MATH	102	CALCULUS II	3	0	3	MATH 101
STAT	101	INTRODUCTION TO STATISTICS	3	0	3	(MATH 053) OR PASSING PLACEMENT TEST
		TOTAL PER SEMESTER			**15**	

SECOND YEAR (33 CREDITS)

FIRST SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ENGL	201	ACADEMIC ENGLISH III	3	0	3	ENGL 102
MATH	202	CALCULUS III	3	0	3	MATH 102
ITCS	201	OBJECT-ORIENTED PROGRAMMING I	2	2	3	ITCS 122
XXXX	XXX	FREE ELECTIVE I	3	0	3	
ITCS	209	DISCRETE STRUCTURES	3	0	3	MATH 102
ITMS	205	INTERNET APPLICATIONS AND SERVICES	2	2	3	ITCS 101
		TOTAL PER SEMESTER			**18**	

SECOND SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ENGL	202	ACADEMIC ENGLISH IV	3	0	3	ENGL 201
ITCS	221	OBJECT-ORIENTED PROGRAMMING II	2	2	3	ITCS 201
ITCS	214	COMPUTER SYSTEMS	3	0	3	ITCS 101
ITCS	222	VISUAL PROGRAMMING	2	2	3	ITCS 122
ITCS	224	DATA STRUCTURES	2	2	3	ITCS 201
		TOTAL PER SEMESTER			**15**	

THIRD YEAR (36 CREDITS)

FIRST SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITCS/MS	3XX	MAJOR ELECTIVE I	2	2	3	
ITCS	313	SOFTWARE ENGINEERING I	2	2	3	ITCS 201
ITCS	323	DATABASE SYSTEMS: DESIGN AND APPLICATION	2	2	3	ITCS 222
ITMS	302	HUMAN COMPUTER INTERACTION	2	2	3	ITCS 222
HU/SS	XXX	HUMANITIES/ SOCIAL SCIENCES	3	0	3	
TOTAL PER SEMESTER					**15**	

SECOND SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ETHC	392	ETHICS AND PROFESSIONAL PRACTICE IN IT AND ENGINEERING	3	0	3	COMPLETION OF AT LEAST 66 CREDITS
ITCS	327	SOFTWARE ENGINEERING II	3	0	3	ITCS 313
ECTE	329	COMPUTER NETWORKS	2	2	3	ITCS 214
ITCS	336	DATABASE ADMINISTRATION I	2	2	3	ITCS 323
ITCS/MS	3XX	MAJOR ELECTIVE II	2	2	3	
XXXX	XXX	FREE ELECTIVE II	X	X	3	
TOTAL PER SEMESTER					**18**	

SUMMER SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
INTR	463	BSIT INTERNSHIP	0	0	3	COMPLETION OF AT LEAST 90 CREDITS AND MINIMUM CGPA 2
TOTAL PER SEMESTER					**3**	

BSIT - FOURTH YEAR (33 CREDITS)

FIRST SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITCS	404	INFORMATION SECURITY ENGINEERING	2	2	3	ITCS 327
ITCS	401	SOFTWARE PROJECT MANAGEMENT	2	2	3	ITCS 327
ITCS	409	OPERATING SYSTEMS	3	0	3	ITCS 214
IERM	498	RESEARCH METHODS IN INFORMATION TECHNOLOGY & ENGINEERING	3	0	3	COMPLETION OF AT LEAST 90 CREDITS
ITCS/ECTE	4XX	MAJOR ELECTIVE III	2	2	3	
ITMA	401	E-COMMERCE	3	0	3	ITCS 101
		TOTAL PER SEMESTER			**18**	

SECOND SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITCS	425	WEB ENGINEERING	2	2	3	ITMS 205 & ITCS 327
ITCS	422	DISTRIBUTED SYSTEMS	2	2	3	ITCS 409
ITCS/ECTE	4XX	MAJOR ELECTIVE IV	2	2	3	
ITCS	427	MOBILE COMPUTING	2	2	3	ECTE 329 & ITCS 221
ITCS	499	MAJOR PROJECT	0	6	3	IERM 498 & ETHC 392
		TOTAL PER SEMESTER			**15**	

LIST OF MAJOR ELECTIVE COURSES

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ECTE	421	NETWORK DESIGN & SECURITY	2	2	3	ECTE 329
ITCS	303	DESIGN AND ANALYSIS OF ALGORITHMS	2	2	3	ITCS 224 & ITCS 209
ITCS	335	IT INFRASTRUCTURE	2	2	3	ITCS 214
ITCS	341	SYSTEM ADMINISTRATION I	2	2	3	ITCS 214
ITCS	413	INTELLIGENT SYSTEMS	2	2	3	ITCS 303
ITCS	435	DATABASE ADMINISTRATION II	2	2	3	ITCS 336
ITCS	441	SYSTEM ADMINISTRATION II	2	2	3	ITCS 341
ITCS	442	VIRTUALIZATION	2	2	3	ITCS 335
ITCS	443	SECURITY SERVICES	2	2	3	ITCS 404
ITCS	444	CLOUD SERVICES IMPLEMENTATION	2	2	3	ITCS 442
ITMS	351	GRAPHICS AND MULTIMEDIA	2	2	3	ITMS 205

MASTER OF SCIENCE DEGREE IN

INFORMATION TECHNOLOGY AND COMPUTER SCIENCE (MITCS)

Overview

Advanced information technology (IT) and computer science (CS) knowledge and skills are needed for Industry and related fields of research. Since 2003, the Department of IT has offered a Master's Degree in Information Technology and Computer Science (MITCS).

The MITCS graduates are professionally competent and the majority have secured responsible positions in the sphere of information technology in companies and governmental ministries.

The MITCS Program has gone through many reviews and revisions that considered the market needs, benchmarking results, external reference points and international standards, and feedback from stakeholders including students, alumni, employers and highly qualified academic staff with international experience. The last major review/revision of the program was conducted during the academic year 2012/13 and accordingly some modifications on the program structure were introduced. The newly modified program was implemented in the first semester of the academic year 2013/14. The program comprises a total of 36 American credits (144 NQF credits) including

- Six Core Courses (18 credits = 72 NQF credits),
- Two Elective Courses (6 credits = 24 NQF credits), and
- A dissertation (12 credits = 48 NQF credits).

Furthermore, the program has three foundation courses that are given to students who lack sufficient knowledge and skills in programming, computer systems, data-structures or algorithms.

The MITCS program consists of three major areas in IT and Computer Science: databases, networking and software development. Elective courses add more advanced and specialized topics to these areas where the students knowledge and skills are enhanced. Core skills such as generic problem solving and anlytical skills as well as communication, ICT and Numeracy skills are incorporated in all MITCS Courses. Students are expected to critically identify, analyze and solve complex problems using advanced techniques, tools and methods. Moreover, students are also expected to conduct research projects which may include programming and software development of computational solutions as well as collecting, interpreting, using and evaluating a wide range of numerical and graphical data. This is clearly emphasized in the course ITCS 599 where students are expected to utilize their knowledge and skills in writing a defendable dissertation. Many other courses have research assignments and projects through which students learn how to learn independently and how to be responsible and accountable for their decisions.

The program is offered and managed day-to-day by the Department of IT which is a part of the College of IT, and since September 2008, the courses of the program are offered in collaboration with the College of Engineering.

Program Facts

- The program is run over 2 years period
- The program is taught in English Language
- The program is consists of 36 credit-hours
- The program obtained full confidence twice in 2010 and 2013 by Bahrain Quality Assurance Authority (BQA)
- The program is placed at level 9 by Bahrain's National Qualification Framework (NQF)
- Confidence by BQA in 2021 and NQF Placement re-validation in 2021

MITCS Program Educational Objectives

- To equip students with advanced professional knowledge and skills in areas of information technology and computer science in accordance with international standards.
- To nurture an innovative research culture that encourages students and faculty to undertake independent and collaborative high-quality research.
- To enable students to identify multifaceted problems in their area of specialization and to design, analyze, implement and manage efficient solutions for them using current information technologies.
- To motivate graduates to apply tools, skills, and techniques of information technology in their current and future work environment to increase their organization's productivity and to gain a competitive advantage.
- To prepare graduates to demonstrate ethical behavior and to be professionally competent and motivated to life-long learning.

General View of Course Intended Learning Outcomes

The program outcomes are divided in four sections as following:

A. Knowledge and Understanding

A1: Concepts and Theories: Demonstrate knowledge and understanding of the advanced concepts, principles, techniques, paradigms and theories of computing and information technology.

A2: Contemporary Trends, Problems and Research: Demonstrate an informed and critical awareness of the current problems, research issues and methods, technological advancements pushing the frontier of knowledge in the field of Information Technology and Computer Science.

A3: Professional Responsibility: Demonstrate cognizance of and adhere to the professional and legal standards as an IT practitioner, and develop continuing awareness of best practices used by IT Professionals with respect to how to manage a computerized system.

B. Subject-specific skills

B1: Problem Solving: Identify, formalize, and solve IT/CS problems; plan, design, and implement their computable solutions.

B2: Modeling and Design: Design and develop models for computational systems, components, or processes to meet desired needs within realistic constraints.

B3: Application of Methods and Tools: Use effectively advanced methods and software tools used in modern computing practices.

C. Critical Thinking Skills

C1: Analytic: Evaluate the complexity of challenging real world problems in conceptual terms; identify the appropriate computational resources (input) needed to solve them and analyze the effectiveness and efficiency of output accordingly generated.

C2: Synthetic: Develop and integrate components of a complex computing system using modern approaches such as object-oriented methodology.

C3: Creative: Create new or improve existing ideas, concepts, techniques, methods, tools, and theories in the field of IT and Computer Science and identify ways in which these can be applied to solve existing, new or anticipated problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1: Communication: Express and communicate ideas cogently, persuasively and effectively, in written and oral form, to a diverse range of audiences and stakeholders.

D2: Teamwork and Leadership: Work effectively as a member/leader of a team of technical people who may plan, design, implement, manage, monitor and evaluate a computational system or process.

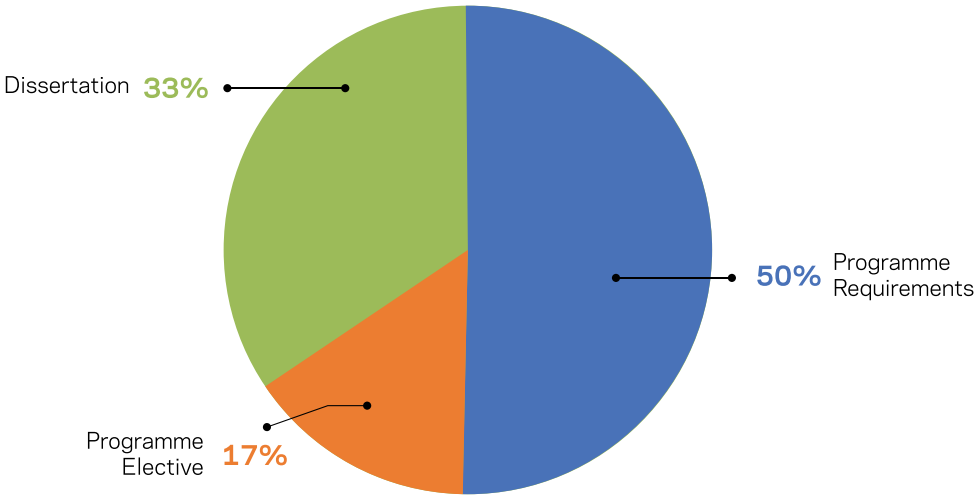
D3: Organizational and Developmental Skills: Engage in life-long learning and continuing self-development to hone professional and organizational skills. Assimilate effective work habits including but not limited to time management skills

D4: Ethical and Social Responsibility: Recognize, accept, and follow ethical and social responsibility and respond positively to the needs of society by identifying, employing and utilizing effectively the advanced computing and information solutions and technologies.

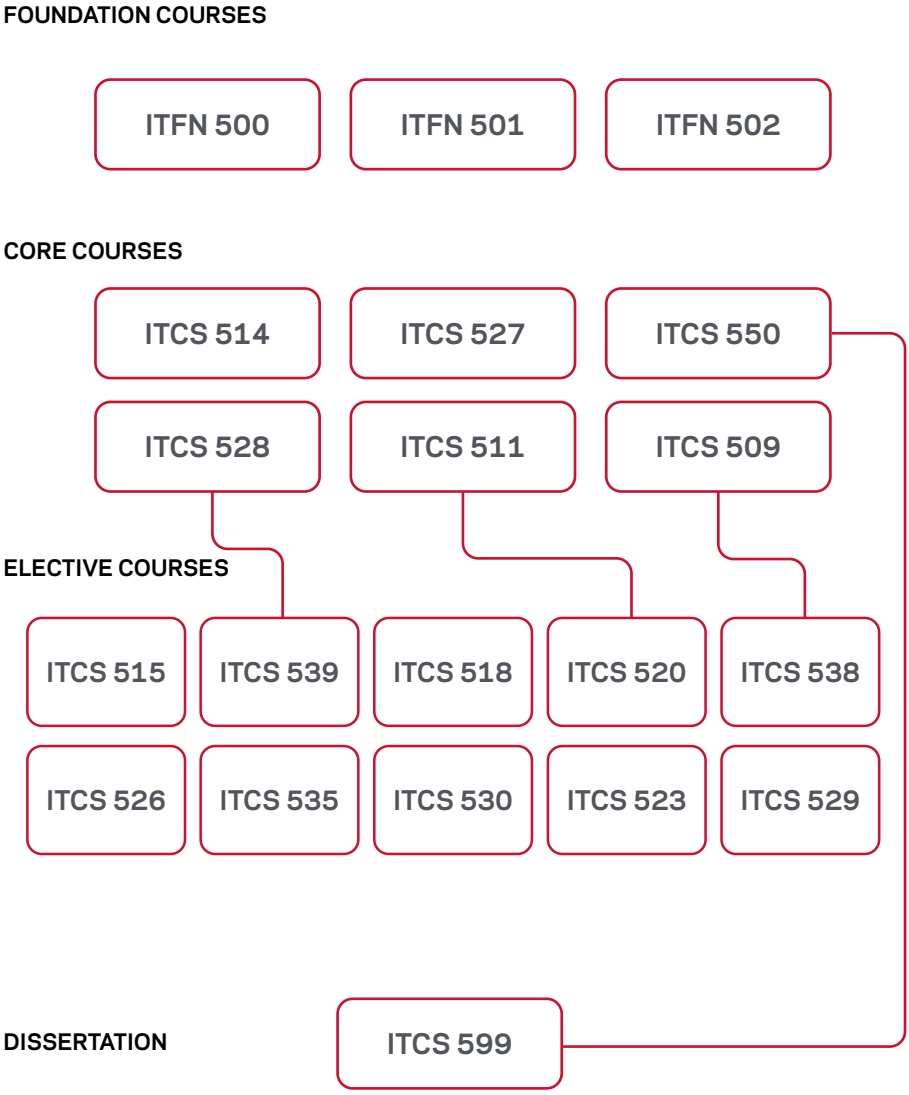
PROGRAM COMPONENTS

COURSE TYPE	NO. OF CREDIT-HOURS	NO. OF COURSES
FOUNDATION COURSES (IF REQUIRED) *	9*	3*
Program REQUIREMENTS	18	6
Program ELECTIVES	6	2
DISSERTATION	12	1
TOTAL	**36**	**9**

* Not counted towards the 36 credit-hours necessary for the Master's Degree in Information Technology and Computer Science



Prerequisite Structure of MITCS Program



DETAILED STUDY PLAN (MITCS)

ORIENTATION * (9 CREDITS)

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITFN	500	OBJECT ORIENTED PROGRAMMING	3	0	3	
ITFN	501	DATA STRUCTURES & ALGORITHMS	3	0	3	
ITFN	502	SYSTEM ARCHITECTURE	3	0	3	
		TOTAL PER SEMESTER			**9**	

* 1. IF ANY STUDENT REGISTERED FOUNDATION COURSE(S) ACCORDING TO THE ADMISSION REQUIREMENTS, HE/SHE MUST RECEIVED A GRADE OF B OR MORE IN ALL FOUNDATION COURSES HE/SHE REGISTERED.
2. THE GRADES OF THE FOUNDATION COURSES ARE NOT CONSIDERED IN THE CGPA.
3. THESE COURSES ARE NOT CONSIDERED AS PART OF THE MITCS PROGRAMME.

FIRST YEAR (18 CREDITS)

FIRST SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITCS	514	OBJECT ORIENTED SOFTWARE ENGINEERING	3	0	3	
ITCS	527	ADVANCED NETWORKING	3	0	3	
ITCS	511	ADVANCED DATABASE SYSTEMS	3	0	3	
		TOTAL PER SEMESTER			**9**	

SECOND SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITCS	509	ARTIFICIAL INTELLIGENCE	3	0	3	
ITCS	528	CYBER SECURITY	3	0	3	
ITCS	550	RESEARCH METHODS & MODELING	3	0	3	COMPLETION OF AT LEAST 9 CREDITS
		TOTAL PER SEMESTER			**9**	

SECOND YEAR (18 CREDITS)

FIRST SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITCS / MS	5XX	ELECTIVE I	3	0	3	
ITCS/MS	5XX	ELECTIVE II	3	0	3	
		TOTAL PER SEMESTER			**6**	

SECOND SEMESTER

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITCS	599	DISSERTATION IN INFORMATION TECHNOLOGY & COMPUTER SCIENCE	0	24	12	ITCS 550 AND COMPLETION OF AT LEAST 21 CREDITS AND MINIMUM CGPA 3
		TOTAL PER SEMESTER			**12**	

A STUDENT CAN REGISTER IN THE DISSERTATION COURSE ITCS 599 IF THE FOLLOWING CONDITIONS ARE SATISFIED:

1. COMPLETED SUCCESSFULLY AT LEAST 21 CREDIT HOURS INCLUDING ITCS 2 .550. RECEIVED A GRADE OF B OR MORE IN ITCS 3 .550. ATTAINED A CGPA OF AT LEAST 3.0.

LIST OF PROGRAMME ELECTIVE COURSES

COURSE	CODE	COURSE TITLE	LEC.	LAB	CRE.	PREREQUISITE
ITCS	515	BUSINESS INTELLIGENCE	3	0	3	
ITCS	518	MOBILE APPLICATION DEVELOPMENT	3	0	3	
ITCS	520	BIG DATA ANALYTICS	3	0	3	ITCS 511
ITCS	526	CLOUD COMPUTING	3	0	3	
ITCS	529	PARALLEL AND DISTRIBUTED SYSTEMS	3	0	3	
ITCS	530	BIOINFORMATICS COMPUTING	3	0	3	
ITCS	535	INTERNET OF THINGS (IOT)	3	0	3	
ITCS	538	MACHINE LEARNING	3	0	3	ITCS 509
ITCS	539	DIGITAL FORENSICS	3	0	3	ITCS 528
ITMS	523	MULTIMEDIA INFORMATION SYSTEMS	3	0	3	
TOTAL PER SEMESTER					**9**	

Elective Courses (6 Credits: two courses to chosen from the following list of elective courses)

DOCTOR OF PHILOSOPHY (PHD-WR) IN

INFORMATION SYSTEMS & COMPUTING

OFFERED BY BRUNEL UNIVERSITY, UK IN COLLABORATION WITH AHLIA UNIVERSITY

Overview

Brunel University London, UK, is working in partnership with Ahlia University, Bahrain, to deliver the PhD (Without Residence) program in Bahrain. The program was launched in 2007 and is helping to create a new generation of scholars and business leaders, benefiting society by developing a research culture and assisting the evolution from a knowledge-consuming society to a knowledge-producing society. The program offers a unique opportunity by facilitating a research degree in Doctor of Philosophy (PhD) in Information Systems and Computing Research from a UK university with an international and reputation is a highly sought-after qualification.

Program Facts

- Three to four years full time research program with no taught credit bearing courses
- Students will be based at Ahlia University and have full access to all of Ahlia's facilities including its extensive library.
- Students will be assigned two academic supervisors who will support and guide them during the PhD program.
- Students will be nominally attached to a research centre within the department of Computer Science at Brunel University London
- Students will be encouraged to attend conferences and to disseminate their research.
- Department of Computer Science at Brunel regularly runs seminars and workshops in Bahrain to help students with their study and research skills
- The only time students will need to go to Brunel will be for their viva voce at the end of the PhD.

Program Educational Objectives

The PhD WR aim to graduate PhD holders who are able to make informed judgements on complex issues in specialist fields, often in the absence of complete data, and be able to communicate their ideas and conclusions clearly and effectively to specialist and non-specialist audiences. It is expected that graduates will continue to undertake pure and/or applied research and development at an advanced level. They will have the qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex and unpredictable situations, in professional or equivalent environments.

Program Outcomes

- The creation and interpretation of new knowledge, through original research or other advanced scholarship, of a quality to satisfy peer review, extend the forefront of the discipline, and merit publication;
- A systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of an academic discipline or area of professional practice;
- The general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust project design in the light of unforeseen problems;
- A detailed understanding of applicable techniques for research and advanced academic enquiry.

Program Components

- 100% individual research
- Periodical non-credit bearing research skills support sessions
- Annual doctoral symposium

COURSE DESCRIPTIONS

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE

COLLEGE OF INFORMATION TECHNOLOGY

ETHC 392	**ETHICS AND PROFESSIONAL PRACTICE IN IT AND ENGINEERING**	**3**	**0**	**3**	**MINIMUM 66 CREDIT TO TAKE**

The course explores and discusses key ethical, legal and professional issues and responsibilities in Computing and other related fields. It examines emergent technologies within frameworks that highlight their ethical, legal and social implications. Topics include privacy, confidentiality, security, intellectual property, software piracy, cybercrime, digital identity, software reliability, risk and safety and professional standards of conduct and codes of ethics. The students critically examine current and relevant research and particular case studies to enhance their understanding of the subject. The students learn that careers in IT and Computer Engineering are not purely technical professions but ones with moral, legal and social implications that impact the everyday lives of professionals.

INTR 463	**BSIT INTERNSHIP**	**0**	**0**	**3**	**MINIMUM 90 CREDIT TO TAKE**

In today's turbulent economic environment, a country workforce is increasingly pivotal to business success. Stemmed from the desire and sense of responsibility that Ahlia University has against the society and their own students, and as part of their vision, of being leaders in the market of higher education, they do understand the need to invest in their capital made of partially their students in order to equip the market with talented workforce. Based on this INTR 463 course was introduced, representing a structured opportunity to incorporate academic, professional and personal skills development which enables the student to gain a planned and directed learning experience. It enables the student to integrate knowledge gained through their classroom learning with the competencies made available through actual experience in a professional setting. The internship program requires a minimum of 240 hours of work at the internship worksite. Students will receive academic credit after a successful completion of the program. The numbers of credits that are earned by the student as a result of successful completion of the internship program are 3 credits.

INTR 464	**BSMS INTERNSHIP**	**0**	**0**	**3**	**MINIMUM 90 CREDIT TO TAKE**

In today's turbulent economic environment, a country workforce is increasingly pivotal to business success. Stemmed from the desire and sense of responsibility that Ahlia University has against the society and their own students, and as part of their vision, of being leaders in the market of higher education, they do understand the need to invest in their capital made of partially their students in order to equip the market with talented workforce. Based on this INTR 464 course was introduced, representing a structured opportunity to incorporate academic, professional and personal skills development which enables the student to gain a planned and directed learning experience. It enables the student to integrate knowledge gained through their classroom learning with the competencies made available through actual experience in a professional setting. The internship program requires a minimum of 120 hours of work at the internship worksite. Students will receive academic credit after a successful completion of the program. The numbers of credits that are earned by the student as a result of successful completion of the internship program are 3 credits.

ITCS 101	**INTRODUCTION TO COMPUTERS & IT**	**2**	**2**	**3**	

This course is an introduction to computer and information technology. It introduces computers (their uses, development, components, hardware and software) to the students and to teach them how to use MS Office.

ITCS 121	**COMPUTER PROGRAMMING**	**2**	**2**	**3**	**ITCS 101**

This is an introductory course in programming using Visual Basic. Topics include elementary data types and structures, arithmetic and logical operators, declarations and input/output and control structures. Emphasis is placed on the development of problem-solving skills.

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE
ITCS 122	INTRODUCTION TO PROGRAMMING TECHNIQUES	2	2	3	ITCS 101

This course introduces the fundamental concepts of computer programming. The covered topics are primitive data types and operators, input/output, control statements, methods and functions, arrays and strings, classes and objects, and an introduction to Java applications and object-oriented design techniques. Emphasis is placed on the development of problem-solving skills.

ITCS 201	OBJECT-ORIENTED PROGRAMMING I	2	2	3	ITCS 122

This course emphasizes on object oriented programming techniques using Java. It covers the implementation of object oriented concepts, such as: classes, objects, inheritance and polymorphism.

ITCS 209	DISCRETE STRUCTURES	3	0	3	MATH 102

The course covers the fundamental concepts of discrete mathematics that are widely used in information technology and engineering. The covered topics are logic and mathematical reasoning, sets, functions, counting and combinatorial techniques, graphs and trees.

ITCS 214	COMPUTER SYSTEMS	3	0	3	ITCS 101

This course is an introduction to the fundamental concepts of computer systems and their performance analysis. It explores how computers execute programs and manipulate data. Topics covered include: data representation of primitive data types, machine-level programming, digital logic, memory organization and management, I/O devices and storage devices. In addition, it covers the techniques used to improve computer performance and to solve its problems.

ITCS 221	OBJECT-ORIENTED PROGRAMMING II	2	2	3	ITCS 201

This course is built on the information gained from the previous Java programming courses. It concentrates on modeling the GUI and advanced software programming issues such as: Java Applets, Multimedia (applets and applications) and Multithreading.

ITCS 222	VISUAL PROGRAMMING	2	2	3	ITCS 122

This course introduces Windows programming environment. Students learn how to write and develop programs with a polished graphical user interface (GUI) using event-driven programming language, which is Visual Basic. Topics include data types and structures, arithmetic and logical operators, declarations and input/output, control structures, and functions. Emphasis is placed on the development of problem- solving skills.

ITCS 224	DATA STRUCTURES	2	2	3	ITCS 201

This course introduces different data structures such as: arrays, linked list, stacks, queues, hash tables, and graphs. It covers the design and analysis of different algorithms to manipulate these data structures, such as: create, traverse, delete data, and insert data. The students will implement the data structure algorithms and apply them using a programming language.

ITCS 303	DESIGN AND ANALYSIS OF ALGORITHMS	2	2	3	ITCS 224 & ITCS 209

The course covers classical techniques and paradigms used in the design and analysis of algorithms. Some of the covered techniques are induction and recursion, divide and conquer, dynamic programming, and greedy approach. Techniques like backtracking and randomization are also introduced to deal with NP-Complete problems. Students will be able to practice their skills on many well-known algorithms and data structures designed to solve practical problems.

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE
ITCS 305	**INTERNET SERVICES & SECURITIES**	**3**	**0**	**3**	**ITMS 205**

The course focuses on the key aspects of Internet security. It imparts knowledge of internet services, vulnerabilities of computer networks and techniques for protecting data and networks, symmetric and asymmetric cryptography, authentication, malicious software, and issues in privacy.

ITCS 313	**SOFTWARE ENGINEERING I**	**2**	**2**	**3**	**ITCS 201**

This course is to give a clear understanding of the concepts of software engineering. It imparts knowledge of developing a software system from scratch, different software process models, software requirement engineering, and software design with object oriented technology using UML.

ITCS 323	**DATABASE SYSTEMS: DESIGN AND APPLICATION**	**2**	**2**	**3**	**ITCS 222**

This course provides a comprehensive knowledge of database (DB) development and management by using database management systems (DBMS). It details the concepts necessary for designing, implementing and using database systems. Topics include database and file system, database design, relational data model, normalization of relations and data modeling using entity-relationship diagrams.

ITCS 327	**SOFTWARE ENGINEERING II**	**3**	**0**	**3**	**ITCS 313**

The aim of this course is to hone skills in developing and testing of code, executing a program, and improving software's performance or locating certain types of faults. Students actively participate in the main software development activities that straddle the production of an initial implementation and the delivery of the complete system. The following topics are covered: software implementation, software testing in the broader context of software engineering, Software Quality that testing aims to achieve, Control flow testing, and Data flow testing.

ITCS 335	**IT INFRASTRUCTURE**	**2**	**2**	**3**	**ITCS 214**

This course provides the fundamental networking skills required to deploy and support Network Operating System (NOS) in most organizations. It covers IP fundamentals, remote access technologies, and more advanced content including Software Defined Networking. This course is intended for existing IT professionals who have some networking knowledge and experience and are looking for a single course that provides insight into core and advanced networking technologies in NOS.

ITCS 336	**DATABASE ADMINISTRATION I**	**2**	**2**	**3**	**ITCS 323**

This course gives students critical knowledge and expertise on administrating the industry's most advanced database (DB) management system. This includes: installing databases, controlling the databases, backup and recovery and administrating users' security.

ITCS 341	**SYSTEM ADMINISTRATION I**	**2**	**2**	**3**	**ITCS 214**

This course provides broad knowledge and experience for IT professional. Student will have the knowledge required to assemble components based on customer requirements, install, configure PCs and software for end users, and understand the basics of networking, properly and safely.

ITCS 401	**SOFTWARE PROJECT MANAGEMENT**	**2**	**2**	**3**	**ITCS 327**

The course focuses on the key aspects of software project management. It develops the ability of managing software projects, including organizing the software development team; selecting the best approach and tailoring the process model; estimating software cost and schedule; planning and documenting the plan; risk management and resource allocation.

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE
ITCS 404	**INFORMATION SECURITY ENGINEERING**	**2**	**2**	**3**	**ITCS 327**
This course is to cover technical and administrative aspects of Information Security and Assurance. Topics covered: Information Security Concepts, The Need for Security, Security Services and Mechanisms, Security System Development, and Security Mechanisms, such as: Cryptographic systems, Information Hiding, Entity Authentication, and Digital Signature.					
ITCS 409	**OPERATING SYSTEMS**	**3**	**0**	**3**	**ITCS 214**
This course is to cover the concepts, structure, and functions of operating system (OS). Students will learn how an operating system provides an environment in which users can execute programs in a convenient and efficient manner. Topics covered include computer system and OS structure; process management: process, threads, CPU scheduling, process synchronization, deadlocks; memory management; mass storage management, and file systems.					
ITCS 413	**INTELLIGENT SYSTEMS**	**2**	**2**	**3**	**ITCS 303**
This course is to cover the specialist theory, concepts, and methods of intelligent systems. It enables students to solve complex problems using various Artificial Intelligence (AI) techniques, and to develop effective intelligent systems using range of AI tools. It covers the concepts of intelligent agent and problem formulation; search-based problem solving techniques, such as A*; knowledge-based problem solving techniques: knowledge representation, knowledge reasoning, and expert systems.					
ITCS 422	**DISTRIBUTED SYSTEMS**	**2**	**2**	**3**	**ITCS 409**
The course focuses on the key aspects of distributed systems. It imparts knowledge of distributed systems principles, design, and implementation. It covers transparency in a distributed system, architectures, processes, virtualization, RPC, message passing, communication, quality of service, and naming.					
ITCS 425	**WEB ENGINEERING**	**2**	**2**	**3**	**ITMS 205 & ITCS 327**
Modern web applications are complex systems; therefore, a systematic approach is required for developing web-based information systems. This course is to study the concepts, methods, and techniques needed for developing web-based applications. Topics covered: concepts and architecture of web-based information systems, web system development phases, web technologies and the desired quality characteristics of web applications.					
ITCS 427	**MOBILE COMPUTING**	**2**	**2**	**3**	**ITCS 221 AND ECTE 329**
This course is to cover the concepts and technologies of mobile computing such as 2G/3G/4G networks, and mobile applications development. It imparts knowledge of mobile communication architectures and related communication protocols in addition to location management and messaging. The course also covers the mobile applications development tools and techniques needed to create efficient and effective mobile applications.					
ITCS 431	**INTRODUCTION TO DATA ANALYTICS**	**2**	**2**	**3**	**ITCS 323**
This course will introduce students to data analytics and equip them with some of its basic principles and tools. Students will learn concepts, techniques, and tools they need to deal with various facts of data analytics. Topics that will be covered include data formats, loading, and cleaning; data storage in relational and non-relational stores; data governance, data analysis using supervised and unsupervised learning using standard tools. In addition, this course would enable students to identify, locate, analyze, and report on business data sources both qualitatively and quantitatively.					
ITCS 435	**DATABASE ADMINISTRATION II**	**2**	**2**	**3**	**ITCS 336**
This course provides students with critical knowledge and advanced training on diagnostic resources, globalization support, managing resources, flashback databases and recovering from user errors. It also provides details on maintaining and management of memory as well as automating tasks with the scheduler.					

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE
ITCS 441	SYSTEM ADMINISTRATION II	2	2	3	ITCS 341

This course provides critical knowledge and experience for IT professionals. Student will have the knowledge required to assemble components based on customer requirements, install, configure and maintain devices, PCs and software for end users, understand the basics of networking and security/forensics, properly and safely diagnose, resolve and document common hardware and software issues while applying troubleshooting skills. Student will also provide appropriate customer support; understand the basics of virtualization, desktop imaging, and deployment.

ITCS 442	VIRTUALIZATION	2	2	3	ITCS 335

This course is designed primarily for IT professionals who have some experience with NOS. It is designed for professionals who will be responsible for managing storage servers and computing elements by using NOS, and who need to understand the scenarios, requirements, and storage and compute options that are available and applicable to NOS.

ITCS 443	SECURITY SERVICES	2	2	3	ITCS 404

This course provides layers of protection that helps to address both known and emerging threats. Students will learn how to secure the system and its infrastructure. Moreover, they can critically analyze how protections were built to mitigate an array of attack vectors and to deal with overall threat of ongoing attacks inside the datacenter both at hardware and software levels. Explore ways to configure network security, including firewalls, and look at secure virtualization, like encryption-supported virtual machines. Further, students will establish specialized skills in security service concepts such as data and network forensics, malware analysis, threat detection, privileged identity, desired state configuration and more.

ITCS 444	CLOUD SERVICES IMPLEMENTATION	2	2	3	ITCS 442

This course teaches IT students how to provide and manage services in cloud environment. Students will learn the critical knowledge about how to implement infrastructure components such as virtual networks, virtual machines, containers, web apps, and storage in cloud. Students will also establish the specialist ability to plan, configure and manage private, public and hybrid cloud infrastructures along with the integration of on-premises Active Directory domains. Moreover, dealing critically with non trivial issues in the cloud such as load balancing, caching, distributed transactions, and identity and authorization management is also meant to be learned. The course also provides the students with insight of intelligent and highly scalable services.

ITCS 452	ADVANCED MOBILE COMPUTING	2	2	3	ITCS 427

This course will provide students with both broad and in-depth knowledge, and a critical understanding of up-to-date mobile computing from different viewpoints: infrastructures, principles and theories, technologies, and applications in different domains. In addition, this course emphasizes concepts pertains to Mobile Adhoc Network and Wireless Sensor Network and different applications based on routing protocols. The course will provide an advanced in-depth overview of the mobile computing subject area including the latest research. This course aims at the discovery of comprehensive and important current issues in mobile computing and communications.

ITCS 499	MAJOR PROJECT	0	6	3	IERM 498 & ETHC 392

Each student is required to select a theoretical and/or a practical problem related to his major area, and work under the supervision of a faculty member. All stages of project development should be emphasized including problem identification, library search, planning, design and/or construction of equipment upon completion of the project, the student must submit a final written report outlining the various phases of the project and make an oral presentation.

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE
ITCS 509	**ARTIFICIAL INTELLIGENCE**	**3**	**0**	**3**	

This course focuses on solving real world problems using techniques and methods of Artificial Intelligence (AI) from a computer science perspective and familiarizes students with the present and future of AI. This course is to cover two types of problem solving approaches: search-based and knowledge-based. The course is also to explore advanced AI techniques, such as ANN, EC, and fuzzy logic.

ITCS 511	**ADVANCED DATABASE SYSTEMS**	**3**	**0**	**3**	

This course explores databases as the underlying framework of information system which store, manipulate and retrieve data with particulars emphasis on the relational model and relational systems. Students are expected to design and implement a relational database within the concept of an information system using appropriate analysis and modeling techniques and a modern Database Management System as well as to understand RDBMS, advantages and disadvantages of different query languages and concurrency control and basic query processing.

ITCS 514	**OBJECT ORIENTED SOFTWARE ENGINEERING**	**3**	**0**	**3**	

This course focuses on object-oriented approach necessary to solve advanced and complex real-world problems. It is to understand a range of specialized theories, principles and concepts of object-orientation; object oriented software development process; the use of object-oriented design tools such as UML for modeling problem solutions. Topics include: Problem analysis and specification of software requirements; object-oriented design; reusability and design patterns; unit testing; advanced software development methodology such as Adaptive Object-Oriented Software Development.

ITCS 515	**BUSINESS INTELLIGENCE**	**3**	**0**	**3**	

Business intelligence (BI) refers to the science of using advanced analysis and reporting tools to discover the necessary information used by an organization to make sound decisions. In this course, students will learn how to maximize business advantage by locating, extracting and dispersing information. Moreover, students will be introduced to some BI software and tools such as Microsoft BI. The covered topics include business intelligence framework, infrastructure, and current techniques used to extract, transform, and analyze business data, and to discover knowledge to support business decision-making.

ITCS 518	**MOBILE APPLICATION DEVELOPMENT**	**3**	**0**	**3**	

The course discusses the principles of design and development for mobile device applications. Students will learn how to develop, simulate, and test Android applications. The topics covered include Android platform; mobile hardware; cell networks; mobile architectures, operating systems, languages, development environments and simulators, and user interfaces; location-based services; data storage and retrieval.

ITCS 520	**BIG DATA ANALYTICS**	**3**	**0**	**3**	**ITCS 511**

This course covers foundational techniques and tools required for data science and big data analytics. The course focuses on concepts, principles, and techniques applicable to any technology environment and industry with emphasis on systems and algorithms for large-scale advanced data analysis. Topics covered include concepts and algorithms for building big data systems, data analytics lifecycle, basic and advanced analytics methods, and emerging big data technology and tools

ITCS 526	**CLOUD COMPUTING**	**3**	**0**	**3**	

This course provides an overview of cloud computing that uses Internet as the platform. It discusses cloud concepts and capabilities across the various available service models including: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS). In addition; it covers accessing cloud system, cloud computing security and performance.

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE
ITCS 527	**ADVANCED NETWORKING**	**3**	**0**	**3**	

This course is to describe the advanced concepts of networking, Networking and interconnectivity, Application networking services such as design the architecture and services of email systems and describe the role of networking in database and file service applications, network management, and wireless and mobile networking.

ITCS 528	**CYBER SECURITY**	**3**	**0**	**3**	

This course is to critically understand the advanced techniques of security systems development, different mechanisms used to protect the elements of information systems and specifically transmitted, stored, and processed data. Mechanisms, such encipherment, authentication, and information hiding.

ITCS 529	**PARALLEL AND DISTRIBUTED SYSTEMS**	**3**	**0**	**3**	

This course covers the architecture and enabling technologies of parallel and distributed computing systems and their innovative applications. It will cover scalable multiprocessors, distributed clusters, P2P networks, computational Grids, virtual machines, and Internet Clouds. Case studies include IBM BlueGene/L, Google search-engine, TeraGrid, e-Science, DataGrid, Gnuttela, BitTorrent, content-delivery networks, VM Monitors, IBM BlueCloud, Amazon Elastic Clouds, Google Clouds, etc. The course aims to acquaint students with state-of-the-art supercomputers and distributed computing systems for high-performance computing, e-commerce, and web-scale Internet applications.

ITCS 530	**BIOINFORMATICS COMPUTING**	**3**	**0**	**3**	

Bioinformatics is the study of the structure and function of genes and proteins through the use of computational analysis, statistics, and pattern recognition and the use of databases, search and web-based interfaces to store, annotate and retrieve gene, protein and other information. This course focuses on the computing aspects of Bioinformatics. It introduces the broad frontiers of bioinformatics topics from fundamental algorithms to practical tools. Course topics include an overview of some bioinformatics resources, pattern matching, sequence alignment, gene prediction, fragment assembly, multiple alignment, phylogeny, statistical and machine learning approaches.

ITCS 535	**INTERNET OF THINGS (IOT)**	**3**	**0**	**3**	

This course will give students a theoretical and practical grounding in Internet of Things (IoT), covering IoT systems architecture, hardware platforms, embedded programming and debugging, networking paradigms for IoT, secure operation, cloud integration, and simple data analytics. The course enables the students to design, build, evaluate, document, and demonstrate an IoT prototype.

ITCS 538	**MACHINE LEARNING**	**3**	**0**	**3**	**ITCS 509**

This is an advanced course on machine learning, focusing on recent advances in machine learning algorithms in different learning types, such as supervised, unsupervised and reinforcement. The course covers advanced machine learning algorithms and techniques, such as neural networks, classification of data, automatic regression and unsupervised model fitting. Applications are, for example, image and speech analysis, medical imaging, and exploratory data analysis in natural science and engineering.

ITCS 539	**DIGITAL FORENSICS**	**3**	**0**	**3**	**ITCS 528**

This course involves the investigation of computer-related crimes with the goal of obtaining evidence to be presented in a court of law. It will help the students to learn the principles and techniques for digital forensics investigation and the spectrum of available computer forensics tools. It emphasizes the core forensics procedures to ensure court admissibility of evidence, as well as the legal and ethical implications. In addition, Students will learn the forensic investigation on Windows operating systems with different file systems, forensic procedures, review and analyze forensics reports.

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE
ITCS 550	**RESEARCH METHODS & MODELING**	**3**	**0**	**3**	**MINIMUM 9 CREDIT TO TAKE**
The course provides knowledge and skills in useful qualitative and quantitative research methods with the aim of enabling Master students to carry out their independent research and to execute and plan their research projects in IT and Computer Science. Particular focus of the course is to enable students to independently do literature review, to formulate their research problem, to conceptualize their research design and to write their final report. It also familiarizes students with Ahlia University guidelines for Master dissertation.					
ITCS 599	**DISSERTATION IN INFORMATION TECHNOLOGY & COMPUTER SCIENCE**	**0**	**24**	**12**	**MINIMUM 21 CREDIT TO TAKE AND ITCS 550**
A structured supervised in-depth study on a pre-approved topic in the field of information technology can entail one of three methodologies: (1) a literature-focused study which aims to critically discuss the literature within a specified topic area; (2) a research focused study which aims to draw on practical data to assess critically a specified area or topic; or (3) a practical software development study which aims to explore an area or ideas, or demonstrate a concept through appropriate software development testing and critical analysis. The dissertation engages the student in a progressive course of intellectual discourse involving problem identification, methodology, research, evaluation and recommendation that culminates in the production of manuscript subject to public defense.					
ITFN 500	**OBJECT ORIENTED PROGRAMMING**	**3**	**0**	**3**	
An intensive course on object-oriented programming (OOP) paradigm and advanced techniques of the Java language. Topics include: Java, Object Model, Classes and Objects, Constructors and Destructors, Inheritance, Virtual Functions and Polymorphism, Operator Overloading, Exceptions, Generic Programming and Standard Template Library.					
ITFN 501	**DATA STRUCTURES & ALGORITHMS**	**3**	**0**	**3**	
This course emphasizes data structures and the development and analysis of their associated algorithms. Data structures and algorithms from a major component of any software system. Students learn to make intelligent decisions about alternative techniques, choosing from existing data structures and algorithms or designing his/her own when necessary. Topics span: asymptotic analysis of algorithms, methods for proving correctness, software implementation of data structures and their associated algorithms.					
ITFN 502	**SYSTEM ARCHITECTURE**	**3**	**0**	**3**	
This course provides students with a solid understanding of architectural techniques used to build today's high-performance systems. Course topics include the components of computer systems and different techniques to improve the system's performance. Some emphasis will be placed on hardware/software interaction to achieve performance. Compilers and operating systems will be touched upon.					
ITMS 201	**INTRODUCTION TO MULTIMEDIA SYSTEMS**	**3**	**0**	**3**	**ITCS 101**
This course focuses on building the theoretical knowledge about Multimedia Systems. It emphasizes on learning the architecture, techniques, tools and development phases of Multimedia Systems. Students will understand the underlying concepts of multimedia, and gain knowledge about the state-of-the-art in this field.					
ITMS 205	**INTERNET APPLICATIONS AND SERVICES**	**2**	**2**	**3**	**ITCS 101**
This course focuses on designing and implementing websites using HTML5 and CSS3. Students get hands-on practice working with fundamentals through superior techniques to get the most out of their experience by teaching them the basics coding for web design, HTML5 and CSS3. In addition, students learn the new features of HTML5 and CSS3 styles.					

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE
ITMS 302	HUMAN COMPUTER INTERACTION (HCI)	2	2	3	ITCS 222

The course is intended to introduce the concepts of human-computer interaction (HCI), a discipline concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them. It will cover theories of human psychology, human information processing, user interface design principles, information presentation, and issues involved in using technologies for different purposes.

ITMS 307	MULTIMEDIA SOFTWARE I	2	2	3	ITMS 205

This course is to cover the concepts and technologies as two dimensional: one dimension introduces the students to the essential practical packages such as the world of digital video, video-capture card, a quick tour of Premiere, Premiere editing video and transitions, a quick tour of Photoshop, adjusting colour in images, automatically fixing colours, working with text. The other dimension illustrates the multimedia project management process theoretically.

ITMS 313	GAME DEVELOPMENT I	2	2	3	ITCS 221 & ITCS 209

This course introduces the principles and essential concepts of game development. The course explores game-related concerns such as the game loop, rules, and game object design and implementation. During the course, students will be introduced to modern game platforms, and the effect of their differences, evolution, and limitations, on game programming. Through this course, the student will be able to develop 2D games through the gained tools and techniques. Students will experience the complete game development lifecycle and implementation using a high-level game development framework to design and develop a computer game.

ITMS 325	WEB APPLICATIONS DESIGN	2	2	3	ITMS 205

This course introduces students to the basic concepts and terminology of dynamic web sites. Students will have a better understanding of the different disciplines that collectively make up dynamic web sites: client side scripting (JavaScript) and server side scripting (PHP).

ITMS 327	MULTIMEDIA SOFTWARES II	2	2	3	ITMS 307

This course builds on the knowledge gained from a previous course (ITMS 307). The students will practice mainly two dimension graphs and animation professional software's. The course will cover vector graphics and sound processing, how it works and how to create them using the appropriate software.

ITMS 335	WEB PROGRAMMING I	2	2	3	ITMS 205

This course provides students with the knowledge and skills needed to understand, Core Programming, Object-Oriented Programming, General Software Development, Web Applications, Desktop Applications, Databases, Build the User Interface by Using HTML5, and Format the User Interface by Using CSS, Code by Using JavaScript.

ITMS 341	DIGITAL MARKETING TECHNOLOGIES	2	2	3	ITMS 325

Through this course, the students will acquire the ability to develop website planning, development and Search Engine Optimization strategy. The course will help the participant execute Keyword search, understand the tools to find keywords (paid and free); and learn Google Adwords. During the course, students will actually plan Search Engine Optimization (SEO) of a website, set up the SEO process; learn about Content Marketing, on-page, and off-page optimization; the tools for Webmaster as well as Mobile SEO. In addition, during this course, the students will learn about the opportunities for targeted advertising in social media and how to execute advertising campaigns that resonate with the audience.

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE
ITMS 347	**VIDEO POST PRODUCTION**	**2**	**2**	**3**	**ITMS 327**

This course introduces students to the basic concepts and terminology of video post- production as it is used in film and games. Students will have a better understanding of how stories are constructed in the editing room using various editing styles. Through demonstrations and hands-on experience, students will learn advanced editing techniques. To further enhance projects, students will create animated motion graphics using After Effects. Strong emphasis is placed on post-production techniques that improve the sound and image quality of the videos.

ITMS 350	**DESKTOP PUBLISHING**	**2**	**2**	**3**	**ITMS 327**

This course introduces students to the basic concepts and terminology of desktop publishing. Students will have a better understanding of desktop publishing design and production techniques. Through demonstrations and hands-on experience, students will learn how to design and create attractive publications.

ITMS 351	**GRAPHICS AND MULTIMEDIA**	**2**	**2**	**3**	**ITMS 205**

This course is to cover the concepts and technologies as two dimensional: one dimension introduces the students to the essential practical packages such as the world of digital video, video-capture card, a quick tour of Premiere, Premiere editing video and transitions. The other dimension deals with vector graphics.

ITMS 421	**WEB PROGRAMMING II**	**2**	**2**	**3**	**ITMS 335**

This course provides an introduction to HTML5, CSS3, and JavaScript. This course helps students gain basic HTML5/CSS3/JavaScript programming skills. This course is an entry point into both the Web application and Windows Store apps training paths. The course focuses on using HTML5/CSS3/JavaScript to implement programming logic, define and use variables, perform looping and branching, develop user interfaces, capture and validate user input, store data, and create well-structured application.

ITMS 426	**3D GRAPHICS SOFTWARE**	**2**	**2**	**3**	**ITMS 327**

This course introduces students to the basic concepts and terminology of 3D computer graphics as it is used in film, visual effects, games, and animation. Students will have a better understanding of the different disciplines that collectively make up 3D computer graphics production. It will also give students a foundation for 3D Animation and 3D Game Development.

ITMS 432	**GAME DEVELOPMENT II**	**2**	**2**	**3**	**ITMS 313**

This course focuses on gameplay interaction, artificial intelligence, networking and the use of industry standard middleware, game engines, and APIs. The students will develop a critical approach to the study of gameplay, interaction, and design. Through this course, the student will be able to develop and implement 3D games through the gained tools and techniques.

ITMS 435	**WEB PROGRAMMING III**	**2**	**2**	**3**	**ITMS 421**

This course introduces students to develop advanced ASP.NET MVC applications using .NET Framework 4.5 tools and technologies. The focus will be on coding activities that enhance the performance and scalability of the Web site application. ASP.NET MVC will be introduced and compared with Web Forms so that students know when each should/could be used.

ITMS 436	**MULTIMEDIA APPLICATIONS**	**2**	**2**	**3**	**ITMS 426**

This course introduces the principles and essential concepts of Multimedia Applications. Through this course the student will be guided to implement (theoretically and practically) the gained tools and techniques from previous courses in designing and producing a multimedia application.

COURSE CODE	COURSE TITLE	LEC CREDITS	LAB CREDITS	CREDIT HOURS	PREREQUISITE
ITMS 437	CLOUD SERVICES DEVELOPMENT	2	2	3	ITMS 435

This course introduces students to learn how to design and develop services that access local and remote data from various data sources. Students will also learn how to develop and deploy services to hybrid environments, including on-premises servers and Windows Azure.

ITMS 445	MODELLING AND ANIMATING CHARACTERS IN 3D	2	2	3	ITMS 426

This course introduces students to the basic concepts and terminology of 3D characters modeling and animating as it is used in film, and games. Students will have a better understanding of the different disciplines that collectively make up 3D characters. It will also give students a foundation for 3D characters modeling and animating.

ITMS 499	MAJOR PROJECT	0	6	3	IERM 498 & ETHC 392

Each student is required to select a theoretical and/or a practical problem related to his major area, and work under the supervision of a faculty member. All stages of project development should be emphasized including problem identification, library search, planning, design and/or construction of equipment upon completion of the project, the student must submit a final written report outlining the various phases of the project and make an oral presentation.

ITMS 523	MULTIMEDIA INFORMATION SYSTEMS	3	0	3	

This course constitutes an approach to multimedia information systems that are concerned with the capture, storage and presentation of information in a variety of forms, including text, image, video and audio. It presents a general overview of electronic multimedia documents, a deep coverage of XML and XML Databases with particular focus on: (1) developing skills in the design and management of multimedia information systems projects; (2) employing evaluation techniques for multimedia authoring systems and multimedia user interfaces; and (3) developing an understanding of the current state of multimedia applications and their impact on organizations.

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