

## Bachelor of Science in Information Technology

### Mission

The mission of the Information Technology program is to provide quality education in the field of information technology based on internationally recognized standards for undergraduate programs; produce information technology professionals who can deploy efficiently IT technologies and implement IT solutions according to market and society needs, particularly in the UAE and Gulf region; and prepare individuals for lifelong learning and research.

### Program Educational Objectives

Graduates of the Bachelor of Science in Information Technology program will have the following characteristics within few years of graduation:

- PEO\_1. Use their acquired skills and knowledge in information technology to pursue a rewarding and a successful career in public sector, private sector, or academia locally or globally.
- PEO\_2. Act as an effective individuals or leaders who can address information technology related technical, business, or ethical challenges.
- PEO\_3. Engaged in life-long learning and professional development through self-study, professional, or graduate studies in information technology or related fields.

### Program Learning Outcomes (PLO's)

#### Common Learning Outcomes (All concentrations)

##### Graduates will be able to:

- C1. **Demonstrate** general education knowledge in diverse fields.
- C2. **Demonstrate** an analytical and critical thinking ability for problem solving.
- C3. **Demonstrate** knowledge of fundamental concepts, principles and techniques of information technology.
- C4. **Analyze, identify, and define** the computing requirements that must be addressed to provide a solution to an IT problem.
- C5. **Manage** the information technology resources of an IT-based entity.
- C6. **Demonstrate** ethical and professional behaviour in an information technology environment.
- C7. **Communicate** effectively both orally and in writing.
- C8. **Function** independently and as an effective member of a team.

## Concentration Learning Specific Outcomes

### Networking & Security

#### Graduates will be able to:

- NS1. **Design** and **implement** basic network functionalities.
- NS2. **Maintain** and **administer** network systems.
- NS3. **Analyze** and **evaluate** network configurations and security needs.
- NS4. **Provide** solutions for network security needs.

### Databases & Web Systems

#### Graduates will be able to,

- DW1. Design and implement database-driven applications.
- DW2. Design and implement web-based client/server systems.
- DW3. Use Big Data analytical techniques and front-end tools.
  - DW4. Analyze un-modelled, multi-structured data using Big Data technologies such as Hadoop, MapReduce & Spark.

## Program Learning Outcomes and Alignment to UAE Qualification Framework (UAEQF)

Common Program Learning Outcomes	UAEQF Strands
C1. <b>Demonstrate</b> general education knowledge in diverse fields.	Knowledge
C2. <b>Demonstrate</b> an analytical and critical thinking ability for problem solving.	Skill
C3. <b>Demonstrate</b> knowledge of fundamental concepts, principles and techniques of information technology.	Knowledge
C4. <b>Analyze, identify, and define</b> the computing requirements that must be addressed to provide a solution to an IT problem.	Knowledge
C5. <b>Manage</b> the information technology resources of an IT-based entity.	Autonomy and Responsibility
C6. <b>Demonstrate</b> ethical and professional behavior in an information technology environment.	Self-Development
C7. <b>Communicate</b> effectively both orally and in writing.	Skill
C8. <b>Function</b> independently and as an effective member of a team.	Role in Context

## Concentration Specific Learning Outcomes

Networking and Security Concentration Learning Outcomes	UAEQF Strands
NS1. <b>Design</b> and <b>implement</b> basic network functionalities.	Knowledge & Skill
NS2. <b>Maintain</b> and <b>administer</b> network systems.	
NS3. <b>Analyze</b> and <b>evaluate</b> network configurations and security needs.	
NS4. <b>Provide</b> solutions for network security needs.	

Databases and Web Systems Learning Outcomes	UAEQF Strands
DW1. Design and implement database-driven applications.	Knowledge & Skill
DW2. Design and implement web-based client/server systems.	
DW3. Use Big Data analytical techniques and front-end tools.	
DW4. Analyze un-modelled, multi-structured data using Big Data technologies such as Hadoop, MapReduce & Spark	

### Admission Requirements

The normal entry requirement for an applicant is the U.A.E secondary school certificate or an equivalent qualification with a minimum average grade of 70% in addition to the English proficiency requirements.

### Career Opportunities

Graduates of the Information Technology program can undertake a variety of job positions at both the managerial and technical levels. Job opportunities may include but not limited to: IT resources management; IT project management; professional IT consultant; professional teacher or trainer; marketing of software and hardware; and pursuing postgraduate study and research. For those specializing in networks and security, additional job opening may include: network administration and management; network security management; and designing and implementing network solutions. Graduate of Databases and Web Systems may find additional job opportunities in database administration and management; developing database applications; and developing web applications.

### Graduation requirements

Students at Ajman University (AU) are eligible for a Bachelor in Information Technology in either concentration after the completion of 123 credits hours, which normally takes eight semesters or less (not counting summer semesters). Students must undertake 12 weeks of internship in a summer session, which is equivalent to 3 credit hours. The minimum accumulative grade point average for graduation is 2.0.

### Degree Requirements

The B.Sc. degree in Information Technology with its two concentrations requires the completion of 123 Cr. Hrs. distributed according to the following plan for the two concentrations:

Type of Courses	Credit/hour
<b>1. University General Education Requirements</b>	
(a) University Compulsory Courses	15
(b) University Elective Courses	9
<b>2. Information Technology Program Common Compulsory Courses</b>	
(a) General Courses	12
(b) Information Technology Core Courses	51
(c) Internship	3
<b>3. Information Technology Program Concentration Courses</b>	21
<b>4. Information Technology Program Elective Courses</b>	12
<b>Total Credit Hours</b>	<b>123</b>

## University General Education Requirements

### (a) University Required Courses (15 Cr. Hrs.)

Course No.	Course Title	Th.	Lab.	Tut.	Cr. Hrs.	Prerequisite
ARB 111	Communication Skills in Arabic Language	3	0	0	3	-
COM 111	IT Fundamentals	2	2	0	3	-
INN 311	Innovation & Entrepreneurship	3	0	0	3	-
ISL 114	Islamic Culture	3	0	1	3	-
STA 112	Statistics	2	2	0	3	-

### (b) University Elective Courses ( 9 Cr.Hrs.)

Course No.	Course Title	Th.	Lab.	Tut.	Cr. Hrs.	Prerequisite
<b>1. Humanities / Arts</b>						
ARB 113	The Art of Written Expression (Arabic)	3	0	0	3	-
ART 111	Introduction to Art	3	0	0	3	-
ART 211	Introduction to Digital Photography	3	0	0	3	-
ENG 113	Academic Writing (English)	3	0	0	3	-
ENG 211	The Art of Public Speaking (English)	3	0	0	3	-
FRE 211	French Language	3	0	0	3	-
ISL 211	Introduction to Hadeeth and Sunna	3	0	0	3	-
LAW 111	Legal Culture	3	0	0	3	-
<b>2. Natural Sciences</b>						
AST 211	Astronomy	3	0	0	3	-
BIO 111	General Biology	3	0	0	3	-
CHM 111	General Chemistry	3	0	0	3	-
PHY 111	Physics	3	0	0	3	-
<b>3. Social or Behavioral Sciences</b>						
ECO 211	Economic Concepts	3	0	0	3	-
EMS 111	Emirates Society (English)	3	0	0	3	-
ENG 111	English Communication Skills	3	0	0	3	-
INF 113	Library Information System	3	0	0	3	-
PSY 111	General Psychology (English)	3	0	0	3	-
SOC 112	Communication Between Cultures	3	0	0	3	-

## MAJOR REQUIREMENTS

### (a) Major Requirements - General Education Courses

(12 Credit Hours.)

Course No.	Course Title	Th.	Lab.	Tut.	Cr. Hrs.	Prerequisite
ACC 200	Principles of Accounting I	3	0	0	3	-
INT 101	Calculus for Information Technology	3	0	2	3	-
INT 208	Computerized Accounting	2	2	0	3	ACC 200

MGT 200	Introduction to Management	3	0	0	3	-
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**(b) Major Requirements - Core Courses & Internship  
(54 Cr. Hrs.)**

Course No.	Course Title	Th.	Lab.	Tut.	Cr. Hrs.	Prerequisite
INT 102	Algorithms and Problem Solving	2	2	0	3	-
INT 103	Information Technology in Business	2	2	0	3	1041100
INT 201	Object Oriented programming	2	2	0	3	INT 102
INT 202	Discrete Mathematics	3	0	0	3	INT 101
INT 203	Computer Organization	3	0	0	3	1041100
INT 204	Data Structures and Algorithms	2	2	0	3	INT 201, INT 202
INT 205	Fundamentals of Data Communications and Networking	2	2	0	3	INT 203
INT 206	Fundamentals of Web Systems	2	2	0	3	INT 201
INT 301	Operating Systems	2	2	0	3	INT 203
INT 302	Database Management Systems	2	2	0	3	INT 201
INT 303	Fundamentals of Information security	3	0	0	3	INT 205
INT 304	Human Computer Interaction	2	2	0	3	INT 201
INT 305	Fundamentals of Software Engineering	2	2	0	3	INT 204
INT 306	Computer Ethics and Professional Practices	3	0	0	3	INT 303
INT 307	Information Technology Project Management	2	2	0	3	INT 305
INT 308	Enterprise Systems	3	0	0	3	INT 302
INT 401	Information Technology Project	1	4	0	3	INT 307
INT 402	Information Technology Internship				3	90 Cr. Hrs

**(c) Major Requirements - Concentration Courses (21 Cr. Hrs.)**

**Networking and Security Concentration**

Course No.	Course Title	Th.	Lab.	Tut.	Cr. Hrs.	Prerequisite
INT 311	Advanced Computer Networks	2	2	0	3	INT 205
INT 312	Network Security	2	2	0	3	INT 303
INT 411	Network Design and Implementation	2	2	0	3	INT 311
INT 412	Wireless and Mobile Computing	2	2	0	3	INT 312
INT 413	Network Operating Systems	2	2	0	3	INT 301
INT 414	Enterprise Security	3	0	0	3	INT 308
INT 415	Network Management	2	2	0	3	INT 311

**Databases and Web Systems**

Course No.	Course Title	Th.	Lab.	Tut.	Cr. Hrs.	Prerequisite
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INT 321	Database Administration	2	2	0	3	INT 302
INT 322	Web Technologies	2	2	0	3	INT 206
INT 421	Web Application Design and Development	2	2	0	3	INT 322
INT 422	Information Architecture	2	2	0	3	INT 302
INT 423	Advanced Database Design and Implementation	2	2	0	3	INT 302
INT 424	E-Commerce	2	2	0	3	INT 322
INT 425	Distributed and Object Oriented Databases	2	2	0	3	INT 423

**(d) Major Requirements (Both Concentrations) - Elective Courses  
(12 Cr. Hrs.)**

Course No.	Course Title	Th.	Lab.	Tut.	Cr. Hrs.	Prerequisite
INS 307	Business Process Management	3	0	2	3	INT 305
INS 309	Knowledge Management	3	0	0	3	INT 308
INT 309	Cloud Computing	3	0	0	3	INT 302
INT 403	Selected Topics in Information Technology	3	0	0	3	INT 307
INT 404	Individual Project	2	2	0	3	INT 307
INT 405	Knowledge Based Systems	2	2	0	3	INT 305
INT 406	Computer Modeling and Simulation	2	2	0	3	INT 201
INT 416	Data Compression	2	2	0	3	INT 303
INT 417	Distributed Systems	3	0	0	3	INT 311
INT 418	Wireless Network Security	3	0	0	3	INT 312
INT 427	Advanced Web Topics	2	2	0	3	INT 322
INT 428	Data Warehousing and Data Mining	3	0	0	3	INT 308
INT 429	Mobile Applications	2	2	0	3	INT 301, INT 302

**Proposed Sequence of Study**

**FIRST SEMESTER (Both Concentrations)**

Course Code	Course Name	Lec	Lab	Tut	Cr. Hrs.	Prerequisite
ARB 111	Communication Skills in Arabic Language	3	0	0	3	-
COM 111	IT Fundamentals	2	2	0	3	-
ISL 1140	Islamic Culture	3	0	1	3	-
xxxxxx	University Elective I	3	0	0	3	-
xxxxxxx	University Elective II	3	0	0	3	-
<b>TOTAL</b>		<b>15</b>	<b>2</b>	<b>1</b>	<b>15</b>	

**SECOND SEMESTER (Both Concentrations)**

Course Code	Course Name	Lec	Lab	Tut	Cr.Hrs.	Prerequisite
INT 101	Calculus for Information Technology	3	0	2	3	-
INT 102	Algorithms and Problem Solving	2	2	0	3	-
INT 103	Information Technology in Business	2	2	0	3	1041100
STA 112	Statistics	2	2	0	3	-
xxxxxx	University Elective III	3	0	0	3	-
<b>TOTAL</b>		<b>12</b>	<b>6</b>	<b>2</b>	<b>15</b>	

**THIRD SEMESTER (Both Concentrations)**

Course Code	Course Name	Lec	Lab	Tut	Cr.Hrs.	Prerequisite
ACC 200	Principles of Accounting I	3	0	0	3	-
INT 201	Object Oriented Programming	2	2	0	3	INT 102
INT 202	Discrete Mathematics	3	0	0	3	INT 101
INT 203	Computer Organization	3	0	0	3	1041100
MGT 200	Introduction to Management	3	0	0	3	-
<b>TOTAL</b>		<b>14</b>	<b>2</b>	<b>0</b>	<b>15</b>	

**FOURTH SEMESTER (Both Concentrations)**

Course Code	Course Name	Lec	Lab	Tut	Cr.Hrs.	Prerequisite
INT 204	Data Structures and Algorithms	2	2	0	3	INT 201, INT 202
INT 205	Fundamentals of Data Communications and Networking	2	2	0	3	INT 203
INT 206	Fundamentals of Web Systems	2	2	0	3	INT 201
INT 208	Computerized Accounting	2	2	0	3	ACC 200
INT 301	Operating Systems	2	2	0	3	INT 203
<b>TOTAL</b>		<b>10</b>	<b>10</b>	<b>0</b>	<b>15</b>	

**FIFTH SEMESTER (Both Concentrations)**

Course Code	Course Name	Lec	Lab	Tut	Cr.Hrs.	Prerequisite
INN 311	Innovation & Entrepreneurship	3	0	0	3	60 Cr. Hrs.
INT 302	Database Management Systems	2	2	0	3	INT 201
INT 303	Fundamentals of Information Security	3	0	0	3	INT 205
INT 305	Fundamentals of Software Engineering	2	2	0	3	INT 204
INT 311	Advanced Computer Networks	2	2	0	3	INT 205
<b>TOTAL</b>		<b>12</b>	<b>6</b>	<b>0</b>	<b>15</b>	

## SIXTH SEMESTER

### 1. Networking and Security Concentration

Course Code	Course Name	Lec	Lab	Tut	Cr.Hrs.	Prerequisite
INT 304	Human Computer Interaction	2	2	0	3	INT 201
INT 306	Computer Ethics and Professional Practices	3	0	0	3	INT 303
INT 307	Information Technology Project Management	2	2	0	3	INT 305
INT 308	Enterprise Systems	3	0	0	3	INT 302
INT 312	Network Security	2	2	0	3	INT 303
<b>TOTAL</b>		<b>12</b>	<b>6</b>	<b>0</b>	<b>15</b>	

### 2. Databases and Web Systems Concentration

Course Code	Course Name	Lec	Lab	Tut	Cr. Hrs.	Prerequisite
INT 304	Human Computer Interaction	2	2	0	3	INT 201
INT 306	Computer Ethics and Professional Practices	3	0	0	3	INT 303
INT 307	Information Technology Project Management	2	2	0	3	INT 305
INT 308	Enterprise Systems	3	0	0	3	INT 302
INT 321	Database Administration	2	2	0	3	INT 302
<b>TOTAL</b>		<b>12</b>	<b>6</b>	<b>0</b>	<b>15</b>	

## SEVENTH SEMESTER

### 1. Networking and Security Concentration

Course Code	Course Name	Lec	Lab	Tut	Cr. Hrs.	Prerequisite
INT 411	Network Design and Implementation	2	2	0	3	INT 311
INT 412	Wireless and Mobile Computing	2	2	0	3	INT 312
INT 413	Network Operating Systems	2	2	0	3	INT 301
xxxxxxx	Major Elective I	x	x	0	3	xxxxxxx
xxxxxxx	Major Elective II	x	x	0	3	xxxxxxx
<b>TOTAL</b>		<b>x</b>	<b>x</b>	<b>0</b>	<b>15</b>	

### 2. Databases and Web Systems Concentration

Course Code	Course Name	Lec	Lab	Tut	Cr. Hrs.	Prerequisite
INT 421	Web Application Design and Development	2	2	0	3	INT 322
INT 422	Information Architecture	2	2	0	3	INT 302
INT 423	Advanced Database Design and	2	2	0	3	INT 302



	Implementation					
xxxxxxx	Major Elective I	x	x	0	3	xxxxxxx
xxxxxxx	Major Elective II	x	x	0	3	xxxxxxx
<b>TOTAL</b>		<b>x</b>	<b>x</b>	<b>0</b>	<b>15</b>	

## EIGHTH SEMESTER

### 1. Networking and Security Concentration

Course Code	Course Name	Lec	Lab	Tut	Cr. Hrs.	Prerequisite
INT 401	Information Technology Project	1	4	0	3	INT 307
INT 414	Enterprise Security	3	0	0	3	INT 308
INT 415	Network Management	2	2	0	3	INT 311
xxxxxxx	Major Elective III	x	x	0	3	xxxxxxx
xxxxxxx	Major Elective IV	x	x	0	3	xxxxxxx
<b>TOTAL</b>		<b>x</b>	<b>x</b>	<b>0</b>	<b>15</b>	

### 2. Databases and Web systems Concentration

Course Code	Course Name	Lec	Lab	Tut	Cr. Hrs.	Prerequisite
INT 401	Information Technology Project	1	4	0	3	INT 307
INT 424	E-Commerce	2	2	0	3	INT 322
INT 425	Distributed and Object Oriented Databases	2	2	0	3	INT 423
xxxxxxx	major elective iii	x	x	0	3	xxxxxxx
xxxxxxx	major elective iv	x	x	0	3	xxxxxxx
<b>TOTAL</b>		<b>x</b>	<b>x</b>	<b>0</b>	<b>15</b>	

## Courses Descriptions

### **INT 101 Calculus for Information Technology**

This course covers the essential mathematical topics that students specialized in information technology needs. The first part of the course deals with plane analytic geometry. The second part covers the basic knowledge about matrices and determinants. The third part is designed to provide students with notions of real functions: limits, continuity, differentiability, and integration with applications on simple derivatives

### **INT 102 Algorithms and Problem Solving**

This course provides knowledge and skill of problem solving and programming concepts using pseudo code and a computer programming language. Topics cover: the problem- solving process; data types; variables, constants, and memory locations; simple sequential programs; basic input/output; selection and repetition control structures; arrays and strings; and user-defined functions.

### **INT 103 Information Technology in Business**

This course aims to cover a range of general information technology topics that will make the student appreciate the role of IT in business. Topics include: information technology fundamentals; information technologies; business applications; development processes; and ethical, societal and security issues.

### **INT 201 Object Oriented Programming**

The primary objective of this course is to introduce the concepts of object-oriented programming: classes, objects, methods, object interaction, encapsulation, inheritance, container classes, polymorphism, exception handling, and recursive algorithms. This course is not meant as a comprehensive introduction to all of Java concepts such as applets and socket programming.

### **INT 202 Discrete Mathematics**

This course covers fundamental mathematical concepts and reasoning along with problem solving techniques. Topics covered include propositional logic, predicate logic, inference, proof methods including induction, set operations, recursion, binary relations including order relations, and equivalence relations, graphs, trees, and functions.

### **INT 203 Computer organization**

This course covers the organization of the von Neumann machine, explains how instructions are fetched from memory and executed, how numerical values are represented in digital computers, identifies the main types of memory used and design of simple computer interface.

### **INT 204 Data Structures and Algorithms**

The course covers concepts of program performance (time and space complexity); abstract data types; recursion; abstract data structures: lists, stacks, queues, graphs, trees, binary search trees, priority queues, heaps, and operations on them and their applications; sorting; searching and hashing.

### **INT 205 Fundamental of Data Communications and Networking**

Introduction to computer networks and the Internet. Protocol layers and the OSI model. Application layer: HTTP, FTP, SMTP, POP3, DNS and peer-to-peer applications. Transport layer: UDP, TCP and congestion control. Network layer: virtual circuits, routers, IP protocols and routing algorithms. Link layer: error detection and correction, multiple access, MAC addressing, switches, ARP, Ethernet, local area networks and wide area networks. Wireless and mobile networks.

### **INT 206 Fundamentals of Web Systems**

This course introduces the basics of Web systems and how it differs from desktop systems. Students will learn client-server architecture, and how it evolves to multitier system. The course will allow student to learn and use essential Web languages and technologies including XHTML, CSS, and XML. Students will apply this knowledge to generate essential web components like basic browser controls (buttons, links, and menus), forms and frames. They will also understand how these components are managed on the server side.

### **INT 208 Computerized Accounting**

The Computerized accounting information system joins together the skill sets of accounting and information technology. Information technology has created new challenges and opportunities for accountants who also have expertise in information systems. Many traditional accounting functions are now embodied in systems that require a different combination of technical and financial knowledge. The CAIS course is designed to provide this combination of knowledge and skill sets to meet the new challenges and opportunities of the information technology world. The main objective of the course is to introduce students to the design and implementation of a systematic structure for providing information for decision-making.

### **INT 301 Operating Systems**

This course covers the principles and concepts of modern operating systems. Operating system services: processes and process management, memory management, file systems, Input/Output and device control, deadlocks, distributed systems, case studies. To introduce the learner to the principles and practice of operating systems with respect to effective and convenient management and operation of a computer system.

### **INT 302 Database Management Systems**

This course is designed to give a theoretical and practical background in database techniques. It covers: database concepts, data models, data dictionary, entity relationship diagrams, and relational data model, converting E-R models to relational model, SQL language, and normalization. Oracle software is used in the Lab.

### **INT 303 Fundamental of Information Security**

This course aims at introducing fundamental security concepts to students. Main security threats and related countermeasures are presented. Students will learn the importance of protecting information stored on computer systems from unauthorized access. The students will also learn how to encrypt and decrypt information, control access to objects and recommend a secure system implementation.

### **INT 304 human Computer Interaction**

Concepts, human information processing (cognition, perception, movement, culture, communication, human diversity, motivation for computer interaction, human performance models, etc.), user interface design principles, information presentation, visual, auditory and tactile displays, speech communication, data entry, controls, tools and feedback, human factors in computer programming, workspace design, environmental and legal considerations. We will study the modeling, the building and the evaluation aspects.

### **INT 305 Fundamentals of Software Engineering**

The course emphasizes object-oriented techniques and the use of UML. Topics covered in this course include: overview of the software engineering process, software process models, UML syntax and semantics, software requirement analysis, software design principles and models, component-level design, and software testing. Student will work in teams on software projects.

### **INT 306 Computer Ethics and Professional Practices**

This course will examine the ethical issues that arise in the use of computers, and the responsibilities of those who work with computers, either as computer science professionals or end users. Topics covered include: legal, social and ethical issues surrounding computer technology and its use; privacy; intellectual property rights and copy right laws; information technology code of ethics; issues of privacy and confidentiality; risks of using computers; and computer crime: computer viruses, hacking, phishing & pharming, scams, etc.

### **INT 307 Information Technology Project Management**

This course aims cover: characteristics of IT Project management, initiating an IT project; project planning; defining and managing project scope, structuring a project, project schedule and budget, managing project risk, project communication, tracking, and reporting, IT project quality management, ethics and professional practices, and project implementation.

### **INT 308 Enterprise Systems**

This course introduces students to the new concept of enterprise systems and shows its role in the industry as used by medium and large enterprises. Students will understand the main architectural components of today's enterprise and its infrastructure. The course also introduce different business domain concepts and workflow management and will help student make the link between development and implementation issues on one side and practical enterprise applications on the other side.

### **INT 309 Cloud Computing**

This course aims to introduce students to theory and practice of cloud computing. Topics include: introduction to cloud computing; parallel and distributed systems; cloud infrastructure; applications and paradigms; resource virtualization; resource management and scheduling; networking support; cloud storage systems; cloud security.

### **INT 311 Advanced Computer Networks**

This course will cover the principles of networking with a focus on algorithms, protocols, and implementations for advanced networking services. We will examine a variety of ideas that were proposed to enhance the Internet, why some of these enhancements were successful while others were not. The emphasis in this course is on topics such as routing protocols, advanced routing and switching. It covers Internet architecture, congestion control, QoS, IPv6, and voice over IP. The student will use network simulators for some network models.

### **INT 312 Network Security**

This course introduces students to main security concepts related to the protection of a network from known threats and attacks. This includes digital signatures, authentication protocols, IP & Web security and e-mail security. It also emphasizes the importance of using firewalls in order to secure a network. Packet-filtering routers, application and circuit-level gateways are presented. Advanced cryptographic algorithms are also discussed in details such as AES, MAC & hash operations and cipher modes.

### **INT 321 Database Administration**

This course prepares students to administer and maintain databases by applying best practices and procedures to any database platform. With general, platform independent approach, students will be able to work as database administrators to any of the major industrial databases including Oracle, IBM BD2, Sybase, Microsoft and MySQL. Students will become familiar with DBA roles and responsibilities, be able to create a database environment with modeling and normalization as well as reporting while maintaining data integrity.

### **INT 322 Web Technologies**

This course will introduce students to different Web technologies, languages, and frameworks. The student will review the dynamics of these technologies, their advantages and disadvantages. Students will also learn the applicability of each of these technologies in different Web application settings and environment. Students will also learn how to mix and match these technologies and investigate their compatibility and integration challenges.

### **INT 401 Information Technology Project**

The course aims to give students the opportunity to work in a guided but independent fashion to investigate a problem by making use of information technology knowledge, techniques, and methodologies acquired in the previous semesters to provide a suitable solution to an IT problem. The course also aims to enhance team work and communication skills, both oral and written.

### **INT 402 Information Technology Internship**

Internship familiarizes students with actual working environments. It gives students the opportunity to integrate their knowledge and skills learned in the course by applying it to real world problems encountered in business and industry. Internship also gives the student a feeling of what is involved in working on actual information technology problems and develop communication and team-work skills as well as ethical issues relation to IT.

#### **INT 403 Selected Topics in Information Technology**

This course aims to introduce students to new developments in the area of information technology not specifically covered in the curriculum and in which a faculty member has developed interest and proficiency. The intention is to provide a rapid response to current trends and to widen student's knowledge in areas such as but not limited to: information storage, retrieval, security, processing, or transition. Specific content of the course will depend on the particular area taught at the time.

#### **INT 404 Individual Project**

This course aims to give students the opportunity to work alone in a guided but independent fashion to investigate a problem by making use of information technology knowledge, techniques, and methodologies acquired in the previous semesters to provide a suitable solution to an IT problem. The course also aims to develop communication skills, both oral and written.

#### **INT 405 Knowledge Based Systems**

The aim of this course is to introduce the concepts, principles, design and operation of a knowledge base systems (KBS) with particular emphasis on expert systems. Topics covered include: Knowledge representation with production rules; Inference using forward chaining and backward chaining; Uncertainty handling: Frame based expert systems; Fuzzy expert systems; Knowledge acquisition and data mining; Agents and multi-Agents systems. Practical assignments are used to emphasize these topics in the lab.

#### **INT 406 Computer Modeling and Simulation**

This course aims to introduce students to elements and methodology of simulation. Topics include: basic concepts and types of simulation, discrete-event simulation, a review of probability and statistics relating to simulation, selecting input probability distributions, generation of random variates, design of simulation experiments and output analysis, verification and validation of simulation models. Students are expected to submit a simulation project.

#### **INT 411 Network Design & Implementation**

The aim of the course is for the student to design a LAN solution detailing structured cabling components, desktop and server hardware, network operating systems, and network administration tools. He can document the design solution with materials and equipment lists, cable installation drawings, telecommunications and server room layouts, software versions and compatibility lists, and budget requirements. Also he demonstrates design feasibility by implementing a LAN prototype with all required functionality including servers, workstations and network infrastructure. This course defines a technical project plan and timeline for implementation, and discussing overall project benefits, possible technical issues and required resources to complete the project.

#### **INT 412 Wireless and Mobile Computing**

This course presents the student with the latest in wireless technologies. The first part includes wireless networks such as, cellular and short range wireless technologies, protocols for wireless and wireless resources management. The second part includes mobile computing such as, VoIP on wireless,

computing & programming over wireless. The student will study the legal and the private issues associated with wireless.

#### **INT 413 Network Operating Systems**

This course introduces network operating system NOS, which is the software that allows multiple computers to communicate, share files and hardware devices with one another. The course aims to provide the student with theoretical and practical knowledge of network operating systems. The student is exposed to some of the most commonly used network operating systems. The student will reinforce their theoretical knowledge in practical sessions where they will install configure, manage and troubleshoot network operating systems.

#### **INT 414 Enterprise Security**

This course aims at introducing students to enterprise security concepts, related risks and cost. It mainly presents a deep coverage of intrusion detection and prevention concepts, including architectures and a survey of most popular IDS implementations and deployments. Students are also introduced to the need of having proper security policies and procedures in order to handle threats properly in addition to forensics techniques to thwart computer attacks.

#### **INT 415 Network Management**

The course discusses typical architectures for network management including the management console, aggregators and device agents. This course introduces management paradigms and protocols (SNMP). Remote Monitoring (RMON), Network Management Tools and Systems are examined. The Web-Based Management and Network Management Applications are covered. Configuration of basic network resources and management of multiple servers' network and troubleshooting.

#### **INT 416 Data Compression**

The aim of this course is to introduce the theoretical underpinnings of data compression and cover many fundamental algorithms. Topics covered include: fundamentals of digital communication, communication channel, measure of information, encoding of source output, shannon's algorithms. Discrete and continuous channel entropy coding, variable length code, channel noise, compression & codes, lossless compression algorithms, lossy compression algorithms, audio compression, image and video compression.

#### **INT 417 Distributed Systems**

The aims of this course are to study the fundamental characteristics of distributed systems. Topics covered will include: low-level basics including sockets, internet-based inter-process communications, and threading; remote-procedure-calls and remote-method-invocations; modern synchronous and asynchronous style client server systems and supporting processes; messaging and transactional systems; peer-to-peer and grid technologies; supporting systems such as naming and directory services.

#### **INT 418 Wireless Network Security**

This course introduces students to modern wireless technologies (802.11, Bluetooth, RFID, ZIGBEE, and Infrared). It covers most aspects related to radio communication and various physical phenomena in a wireless environment. It also surveys most wireless security issues across the OSI layers and

technologies (1G, 2G, 2.5G and 3G). Students will also be introduced to basic and advanced security implementations (filtering by MAC, WAP, WAP2, VPN, RADIUS), including setting proper security procedures and policies.

#### **INT 421 Web Application Design and Development**

This course prepares students to apply different web technologies and integrate them into a web application. Topics covered include: Web applications and Rich Internet Applications (RIA), programmable Web applications, working with proxies, Yahoo and Google mash up services, Creating a Web application, model view controller pattern, from design, validation and usability, User Interaction Effects and Animation, and Tagging and Rating the Web Application.

#### **INT 422 Information Architecture**

Information is the heart of knowledge and one of the main pillars of information systems. This course introduces fundamental concepts and methods of understanding and modeling data as well as extracting information out of it. It also shows how to represent large volume of information and allow users to comprehend and interact with it in an effective way. The course focuses on data modeling and architecture approaches allowing student to build effective information architecture. Then the student will learn how to interact with information using different labeling, navigation, and search strategies. Students will finally learn about information architecture in practice and its applications in large organizations.

#### **INT 423 Advanced Database Design & Implementation**

This course builds on top of the first DBMS course by introducing advanced database concepts to allow students to effectively design and implement industrial quality database. The course revisits SQL in a deeper, more practical approach, with a focus on its PL/SQL extension. The student will learn database in a client-server setting, and see how to manage multi-user databases. Students will be able to design and implement functional databases that include major components of an industrial database.

#### **INT 424 E-Commerce**

This course aims to expose students to the theory and practice of e-commerce. Topics covered are: Introduction to E-Commerce, E-Commerce Technology Infrastructure, Revenue models, Marketing on the web, Business-to-business online strategies, Web server hardware and software, E-Commerce Commercial Software, E-Commerce security, Payment Systems, and Planning for e-commerce business

#### **INT 425 Distributed and Object Databases**

This course discusses new and emerging issues in the field of distributed database. It focuses on principles of db distribution from both data distribution approach and network technologies role in distribution. Students will have in depth coverage of advanced transaction model and workflow as well as parallel databases, distributed object DBMS, push-based technology, and mobile DBMS; all of which are pillars of enterprise information technology of today.

#### **INS 309 Knowledge Management**

This aim of this course is to introduce basic concepts, terminology, and techniques of Knowledge Management (KM). Topics covered include: the origins and units of organizational knowledge; evolution



of knowledge management; implementation and utilization of knowledge management systems, and how to measure their impact, outputs, and benefits.

#### **INT 427 Advanced Web Topics**

This course introduces students to the latest trends and technologies as used by today's information technology industry. The course focuses on advanced Web technologies that are strongly adapted as the next generation IT. Students will learn the role of Web 2.0 and Web 3.0 with special focus on Web services and Service-Oriented Architecture. The course will allow students to understand the current evolution from Personal Computing (1980s) to Network Computing (1990s) to Internet and Windows (2000s) to today's trends of cloud computing, Web tool kits, mashups, and social networking.

#### **INT 428 Data Warehousing and Data Mining**

Today's IT deals with gigantic amount of information. The success of any organization greatly depends on the ability to process and understand its information and extract essential knowledge to help managers take well informed decisions. This course aims to introduce students to concepts and techniques of Data Warehousing and Data Mining. Topics covered include: data warehouse architecture, development life cycle, logical data modeling for a data warehouse, physical data design; Data mining concepts and tasks, data preprocessing and reduction, classification techniques, association analysis and algorithms, clustering analysis and algorithms, anomaly detection methods, and web mining.