

# DIVISION OF SCIENCES AND ENGINEERING

**DIVISION HEAD:** DR. SHEREEF ABU AL-MAATI

## MAJOR DEGREE PROGRAMS

The Division of Sciences and Engineering oversees degree programs with Majors in the following academic disciplines:

- Bachelor of Engineering in Computer Engineering
- Bachelor of Science in Computer Science
- Bachelor of Science in Information Systems

## MINORS

The Division of Sciences and Engineering oversees the following Minor programs:

- Computer Science
- Environmental Studies
- Information Systems

## DISCIPLINES (FIELDS OF STUDY)

The Division of Sciences and Engineering includes the following disciplines (Fields of Study):

- Biology (BIOL)
- Chemistry (CHEM)
- Computer Engineering (CEG)
- Computer Science and Information Systems (CSIS)
- Electrical Engineering (ELEG)
- Engineering (ENGR)
- Environmental Studies (ENVS)
- Mathematics (MATH)
- Natural Sciences (NSCI)
- Physics (PHYS)
- Statistics (STAT)

# DEGREE PROGRAMS IN THE DIVISION OF SCIENCES AND ENGINEERING

## COMPUTER ENGINEERING (CEP)

The world we live in has become increasingly dependent on advances made in part by technology and computer engineering. The impact of technology spans a wide spectrum of products and services, ranging from communication systems, to computers and computer networks, to instruments for all sectors of society from entertainment to health care, from space exploration to ocean exploration. These products are in part the result of creations of computer engineers. Computer engineers embed computers in other machines and systems, build networks to transfer data, and develop ways to make computers, faster, smaller, and more capable. Computer engineers are improving the ability of computers to “see” and “think.” They are making computers more mobile, and even incorporating computers into fabrics, clothes, and building materials.

The Computer Engineering program at AUK prepares future engineering leaders through an innovative Computer Engineering education that bridges science and technology, enterprise and society. AUK’s Computer Engineering curriculum is built on four pillars: Math & Science; Computer Engineering Design; Arts Humanities & Social Sciences; and Entrepreneurship. The Math & Science sequence teaches fundamental ideas and techniques in science and math whose application makes engineering possible. Under the Design pillar, students complete design projects that enable them to apply technical and non-technical knowledge and skills, develop understanding of design process, identify and define problems and muster the resources necessary to realize solutions. This process comes to a synthesis in a year-long capstone design course. Under the Arts, Humanities & Social Sciences pillar, students develop a broad knowledge of social, cultural and humanistic contexts and foster the ability to apply contextual thinking in the study of computer engineering and other disciplines (fields of study). Entrepreneurship is the process of identifying opportunities, fulfilling human needs, and creating value. Under this pillar, AUK Computer Engineering students will demonstrate a capacity to identify social, technical, and economic opportunities, to predict challenges and the cost associated with the pursuit of opportunities, and to make decisions about which opportunities are worthy of pursuit.

Typical industries hiring computer engineers, include both private & government sectors such as financial services, computer software & hardware companies, petroleum & chemical companies, defense & interior contractors, consulting, transportation, manufacturing, and consumer goods, to name a few. Computer engineers are equally successful in large multinational firms and small startups. If you would like to be a part of this exciting development and would like to have a wide choice of career opportunities in industry, government, and graduate studies, then you will want to major in Computer Engineering at AUK.

The American University of Kuwait offers a Dual Degree Program in conjunction with Dartmouth College’s Thayer School of Engineering, which allows AUK students to earn a Bachelor of Engineering (BE) degree in Computer Engineering at AUK and a Bachelor of Engineering (BE) degree in General Engineering from the Thayer School of Engineering after five years of study. For more information on the Dual Degree Engineering Program, please refer to [page 138](#).

## BACHELOR OF ENGINEERING IN COMPUTER ENGINEERING

**Program Lead:** Dr. Issam Damaj

**Program E-Mail:** [CPEG@auk.edu.kw](mailto:CPEG@auk.edu.kw)

### COMPUTER ENGINEERING LEARNING OUTCOMES:

Upon completion of the AUK degree in Computer Engineering, the student will be able to:

- Have a solid grounding in fundamental principles of mathematics, science, and computer engineering, and the ability to apply this knowledge to the design, analysis, and implementation of engineering systems.
- Develop creative solutions that are responsive to technical, social, economic and other realistic constraints and considerations.
- Demonstrate the ability to recognize opportunity and to take initiative, communicate effectively and to work effectively on teams, and understand the broad social, economic, and ethical implications of their work, and will be cognizant of their professional responsibilities.
- Possess a broad understanding of the arts, humanities, social sciences, English, Arabic and entrepreneurship, and build on this foundation throughout their careers to identify and respond to emerging technical and social developments.

### ADMISSION TO PROGRAM:

Admission to the Computer Engineering program takes place in the 2nd year of the engineering program after the student has completed all required first year program prerequisites with an overall University GPA of 2.70 (B-) or higher on the selected program prerequisites shown below. The program prerequisites are MATH 201, MATH 203, CSIS 120, CSIS 130, PHYS 115, PHYS 116, and CHEM 101. These program prerequisites satisfy all General Education Requirements in the Sciences, Mathematics, and Computer Science fields. A program fee may apply upon certification of the declaration of the Major.

Transfer equivalencies from ABET accredited programs or equivalent will be considered.

We also do accept transfer from non accredited programs for the courses that do not fall under the prefixes CSIS, CPEG, ELEG or ENGR. However, it is possible to transfer 100 level CSIS courses. Students who took courses equivalent to CSIS 120 and/or CSIS 130 will have to take a placement test. Those who fail the placement test will be placed into CSIS 120 or 130 accordingly.

### UNIVERSITY DEGREE REQUIREMENTS (131 CREDIT HOURS)

To receive a Bachelor of Engineering in Computer Engineering, students must complete at least 131 credit hours:

- General Education Requirements (45 credit hours), composed of:
  - Program Prerequisites (16 credit hours) applicable to General Education Requirements
  - Remaining General Education Requirements (29 credit hours)
- Program Prerequisites (10 credit hours) not applicable to General Education Requirements
- Major Requirements (76 credit hours), composed of:
  - Computer Engineering Core (46 credit)
  - Computer Engineering Electives (9 credit hours)
  - Related Field Requirements (21 credit hours), composed of
    - Math (12 credit hours)
    - Entrepreneurship (9 credit hours)
- Minimum upper division courses (33 credit hours)

**Program Prerequisites (26 credit hours)**

MATH 201	Calculus I	(3) [M]
MATH 203	Calculus II	(3) [M]
CSIS 120	Introduction to Computer Programming I	(4) [T]
CSIS 130	Introduction to Computer Programming II	(4) [T]
PHYS 115	General Physics I	(4) [P]
PHYS 116	General Physics II	(4) [P]
CHEM 101	General Chemistry I	(4) [P]

**Major Requirements**

Students must complete all 14 courses (46 credit hours) listed in the Computer Engineering Core courses, 3 courses (9 credit hours) from the Computer Engineering elective courses and 7 courses (21 credit hours) in Related Field Requirements which is composed of Math 4 courses (12 credit hours) and Entrepreneurship 3 courses (9 credit hours).

**Computer Engineering Core Courses (46 credit hours)**

CPEG 210	Digital Logic Design	(4)
CPEG 220	Computer Organization and Architecture	(3)
CPEG 330	Microprocessors and Interfacing	(4)
CPEG 340	Embedded System Design	(3)
CPEG 470*	Senior Design Capstone I	(3)
CPEG 475	Senior Design Capstone II	(3)
CSIS 210	Data Structures & Algorithms	(3)
CSIS 310	Operating System	(3)
CSIS 322	Net-Centric Computing	(3)
CSIS 330	Software Engineering	(3)
ELEG 220	Electric Circuits	(4)
ELEG 270	Electronics	(4)
ELEG 320	Signals & Systems	(3)
ENGR 330	Engineering Economics	(3)

**Computer Engineering Elective Courses (9 credit hours)**

Three Computer Engineering elective courses (9 credits), selected in consultation with the Academic Advisor, from any 200-level or higher CSIS or CPEG courses. At least one of the elective courses should be 300-level or higher upper level courses.

**Related Field Requirements (21 credit hours)**

Students must complete:

Math Requirements: 4 courses (12 credit hours)

MATH 206	Calculus III	(3) [M]
MATH 210	Differential Equations	(3) [M]
MATH 213	Discrete Mathematics	(3) [M]
STAT 214	Statistics for Engineers	(3) [M]

Entrepreneurship Requirements: 3 courses (9 credit hours)

MGMT 201	Principles of Management	(3)
ENTR 201	Principles of Entrepreneurship	(3)
ENTR 301	Intermediate Entrepreneurship	(3)

\* Information on internship assessment for internships offered by the Division of Sciences and Engineering is also located at the end of the "Division of Sciences & Engineering" section of the Catalog.

## COMPUTER ENGINEERING 2010-2011 4-YEAR PLAN

Semester 1		
MATH 201	Calculus I	3
CHEM 101	General Chemistry I	4
CSIS 120	Computer Programming I	4
PHYS 115	General Physics I	4
ENGL 101	Critical Reading & Writing	3

**TOTAL 18**

Semester 2		
MATH 203	Calculus II	3
ENGL 102	Writing & Info. Literacy	3
CSIS 130	Computer Programming II	4
PHYS 116	General Physics II	4
CHEM 101	General Chemistry	4

**TOTAL 18**

Semester 3		
MATH 210	Differential Equations	3
CPEG 210	Digital Logic	4
CSIS 210	Data Structures & Algorithms	3
ELEG 220	Electric Circuit Analysis	4
MATH 213	Discrete Math	3

**TOTAL 17**

Semester 4		
MATH 206	Calculus III	3
ELEG 270	Electronics	4
CPEG 220	Computer Organizations & Architecture	3
ENGL 108	Public Speaking	3
MGMT 201	Principles of Mgmt	3

**TOTAL 16**

Semester 5		
CPEG 330	Microprocessors and Interfacing	4
CSIS 322	Net-Centric	3
	Arabic I	3
ENTR 201	Principles of Entrepreneurship	3
CSIS 310	Operating System	3

**TOTAL 16**

Semester 6		
ENGR 330	Engineering Economics	3
ELEG 320	Signals & Systems	3
STAT 214	Statistics for Engineers	3
CSIS 330	Software Engineering	3
CPEG 340	Embedded System Design	3

**TOTAL 15**

Semester 7		
CPEG 470	Senior Capstone Design I	3
ENTR 301	Intermediate Entrepreneurship	3
	Upper Level Engr Elect 1	3
	Upper Level Humanities I	3
	Social Sciences I	3
	Arabic II	3

**TOTAL 18**

Semester 8		
CPEG 475	Senior Capstone Design II	3
	Upper Level Engr Elect 2	3
	Upper Level Engr Elect 3	3
	Upper Level Social Sciences II	3
	Humanities II	3

**TOTAL 15**

**GRAND TOTAL: 131**

## DUAL DEGREE PROGRAM WITH DARTMOUTH'S THAYER SCHOOL OF ENGINEERING

This initiative provides an opportunity for AUK students to come to Thayer School of Engineering at Dartmouth for a summer term (preferably sophomore year), and then to return for a 5th year after completing the requirements for the AUK Bachelor of Engineering (BE) degree in Computer Engineering. Upon successful completion of their AUK BE and the 5th year at Dartmouth, students would earn an ABET-accredited BE degree at Dartmouth. The Thayer School of Engineering degree is in **General Engineering**, (not in Computer Engineering).

Thayer is one of the top engineering schools in the United States. It is known for a distinctive curriculum, which emphasizes breadth of engineering training in a highly collaborative learning environment.

AUK students admitted to this special program will study with Dartmouth faculty and students in Thayer's state of the art facilities.

See: <http://engineering.dartmouth.edu/about/maclean.html>

Admission to the summer program at Dartmouth is based on prior academic performance and recommendation letters. Admission to the 5th year program is based primarily on performance in the summer program at Dartmouth. No more than 10 students annually will be accepted into the program in its first two years; this is subject to admissions criteria. The cap may be adjusted after a trial period of two years.

Incoming students will receive program-specific orientation at Dartmouth, and AUK students will have seen substantial amounts of the material for Engineering Sciences 21 ( ENGS 21), which will ease their transition. ENGS21 is essential preparation for the 190-290 sequence of courses students will take upon their return to Dartmouth for the 5th Thayer BE year. AUK students will take all of the core courses required of Dartmouth AB and BE students (see list below). These courses are listed in the Thayer School of Engineering Catalog:

<http://engineering.dartmouth.edu/undergraduate/index.html>

### SUMMER TERM

ENGS 21

ENGS22

ENGS33 (or 25)

### SAMPLE BE YEAR PROGRAM (YEAR 5)

<u>Fall</u>	<u>Winter</u>	<u>Spring</u>
ENGS 190 (2A)	ENGS 290 (arr)	ENGS 112 (11)
ENGS 91 (12)	ENGS 27 (2)	ENGS 23 (9L)
ENGS 116 (10)	ENGS 24 (10)	ENGS 31 (12)

There are variations possible on this schedule depending on student interests; some students may choose to pursue a different branch of Engineering in this year, as they may have taken CS/CEng courses at AUK.

For more information on Thayer School of Engineering, see:

<http://engineering.dartmouth.edu/about/index.html>

# COMPUTER SCIENCE AND INFORMATION SYSTEMS PROGRAM (CSIS)

Computers are everywhere in our society. The infrastructure of business, government, science, and everyday life are increasingly based on computers and digital communication. Whether you are listening to your digital music player, text messaging with a friend, driving a modern car, trading stocks, producing a movie, buying anything on the Internet, flying an airplane, searching for information, performing or being subject to a medical procedure, or playing a video game, you depend on networks of computers that store, exchange and process information in increasingly elaborate ways. Understanding the foundations of this technology, what it can do, what its limitations are, how it relates to information processing in living things and society, and how you can use it will put you in a better position to understand, create, and decide in whatever career, further education, or personal pursuits you choose. Computing is a critical tool for controlling and shaping the processes of modern society. If you want to take advantage of what this Major has to offer, consider one of the several options that the Computer Science and Information Systems program at AUK offers, from single introductory courses through a Minor to a BS Major.

The Computer Science and Information Systems (CSIS) program at AUK encompasses the principles of computing that enables students to keep abreast of developments in a rapidly changing technology. CSIS students not only gain a solid foundation in the theory and design of modern computing systems, but are exposed to a variety of applied applications, both in lab assignments as well as in internships and in a semester based senior capstone project course. The students are also encouraged to explore cross-disciplinary connections by completing a Minor in a related field.

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE

**Program Lead:** Dr. Amir Zeid

**Program E-mail:** [CSIS@auk.edu.kw](mailto:CSIS@auk.edu.kw)

### COMPUTER SCIENCE LEARNING OUTCOMES

Upon completion of the AUK degree in Computer Science, the student will be able to:

- Demonstrate the ability to use fundamental concepts of computer science in the modeling, design, and implementation of computer based systems of varied complexity.
- Maintain a solid understanding of the math and sciences concepts used in computer science in addition to the core computer science concepts.
- Demonstrate the ability to verbally communicate ideas and concepts clearly and in an organized manner for a variety of audiences.
- Demonstrate the ability to write system documentation, user documentation, and research reports for a variety of audiences.
- Work effectively in teams in order to design and implement software systems.
- Demonstrate the awareness of key ethical and legal issues affecting computer science and their personal responsibilities as computer science professionals.
- Demonstrate proficiency in at least one high-level programming language with general knowledge of several programming languages.

### ADMISSION TO PROGRAM:

Once a student completes CSIS 120, CSIS 130, MATH 201, MATH 213, and eight (8) credit hours in Science in Biology, Chemistry, or Physics with a grade of “C” or higher, they can proceed to declare their Major and be accepted into the Computer Science Program. Students are encouraged to declare their Major by the end of their second (Sophomore) year.

Transfer equivalencies from ABET accredited programs or equivalent will be considered.

We also do accept transfer from non accredited programs for the courses that do not fall under the prefixes CSIS, CPEG, ELEG or ENGR. However, it is possible to transfer 100 level CSIS courses. Students who took courses equivalent to CSIS 120 and/or CSIS 130 will have to take a placement test. Those who fail the placement test will be placed into CSIS 120 or 130 accordingly.

## UNIVERSITY DEGREE REQUIREMENTS (120 CREDIT HOURS)

To receive a Bachelor of Science in Computer Science, students must complete at least 120 credit hours:

- General Education Requirements (45 credit hours), composed of:
  - Program Prerequisites (16 credit hours) applicable to General Education Requirements
  - Remaining General Education Requirements (29)
    - English (9)
    - Arabic (6)
    - Humanities and Social Sciences (12)
    - Health and Fitness, Essentials of learning (2)
- Program Prerequisites (6 credit hours) not applicable to General Education Requirements
- Major Requirements (69 credit hours), composed of:
  - Computer Science Core Course Requirements (39 credit hours)
  - Computer Science Elective Courses (12 credit hours)
  - Related Fields Requirements (18 credit hours)
    - Math (9 credit hours)
    - Science (3 credit hours)
    - Business (6 credit hours)
- Minimum upper division courses (24 credit hours)

**NOTE:** Some program prerequisites do not count toward the General Education Requirements, as that area has already been filled. For example, the student is asked to complete 8 credit hours of computer science for the program prerequisite, however, only 3 credits may be counted toward General Education.

### **Program Prerequisites (22 credit hours)**

CSIS 120	Computer Programming I	(4) [T]
CSIS 130	Computer Programming II	(4) [T]
MATH 201	Calculus I	(3) [M]
MATH 213	Discrete Mathematics	(3) [M]
BIOL 101	General Biology I	(4) [P]
	<b>AND</b>	
BIOL 102	General Biology II	(4) [P]
	<b>OR</b>	
CHEM 101	General Chemistry I	(4) [P]
	<b>AND</b>	
CHEM 102	General Chemistry II	(4) [P]
	<b>OR</b>	
PHYS 115	General Physics I	(4) [P]
	<b>AND</b>	
PHYS 116	General Physics II	(4) [P]

**Major Requirements (69 credit hours)***Computer Science Core Course Requirements (39 credit hours)*

Students should earn a grade of “C” or better in the Major courses.

CSIS 210	Data Structures and Algorithms	(3)
CSIS 150	Professional and Ethical Issues in CSIS	(3)
CSIS 220	Computer Architecture and Assembly Language	(3)
CSIS 250	Database Systems	(3)
CSIS 255	Web Technologies	(3)
CSIS 310	Introduction to Operating Systems	(3)
CSIS 320	Principles of Programming Languages	(3)
CSIS 330	Software Engineering	(3)
CSIS 405	Analysis of Algorithms	(3)
CSIS 475	Compiler Construction	(3)
CSIS 400	Theory of Computation	(3)
CSIS 490	Computer Science Capstone I	(3)
CSIS 491	Computer Science Capstone II	(3)

*Computer Science Elective Courses (12 credit hours)*

Four CSIS courses (12 credit hours), selected in consultation with the Academic Advisor, from any 200-level or higher CSIS, CPEG, or ELEG courses

For a double Major in CS and IS, core electives should be mutually exclusive. Students will need an additional 9 credit hours of MATH (if choosing CS as the additional Major) and 15 credit hours of Core Courses. The student must complete, therefore, an additional 24 credit hours.

In general, Computer Science and Information Systems Majors do not need to take CSIS 101 to fulfill their General Education Requirements, as CSIS 120 will automatically fulfill that requirement.

*Related Field Requirements (18 credit hours)***Math Requirements (9 credit hours):**

Students who plan on a BS degree in Computer Science will take the following courses:

STAT 201	Statistics	(3)
MATH 203	Calculus II	(3)
Any other 200 or 300-level Math course up to the student's choice		(3)

**Science Requirements (3 credit hours):**

Students who plan on a BS degree in Computer Science must also complete 1 of the following course sequences:

BIOL 101	General Biology I	(4) [P]
BIOL 102	General Biology II	(4) [P]
<b>OR</b>		
CHEM 101	General Chemistry I	(4) [P]
CHEM 102	General Chemistry II	(4) [P]
<b>OR</b>		
PHYS 115	General Physics I	(4) [P]
PHYS 116	General Physics II	(4) [P]

An additional course (3 credit hours) in BIOL, CHEM, or PHYS

**Business Requirements (6 credit hours)**

MGMT 201	Principles of Management	(3)
ENTR 201	Principles of Entrepreneurship	(3)

**NOTE:** Information on internship assessment for internships offered by the Division of Sciences & Engineering is also located at the end of the “Division of Sciences & Engineering” section of the Catalog.

## COMPUTER SCIENCE 2010-2011 4-YEAR PLAN

Year 1	Semester-1			
Prefix	Number	Title	Credits	Prerequisite/s
CSIS	120	Computer Programming I	4	
Math	201	Calculus I	3	
ENGL	101	Approaches to Critical Reading and Writing	3	
EDUC	100	Essentials of Learning	1	
		Science-1	4	
		<b>TOTAL</b>	<b>15</b>	
Year 1	Semester-2			
Prefix	Number	Title	Credits	Prerequisite/s
CSIS	130	Computer Programming II	4	CSIS 120
CSIS	150	Professional and Ethical Issues in CSIS	3	CSIS 120
Math	203	Calculus II	3	
General		GER-3	3	
		Science-2	4	
		<b>TOTAL</b>	<b>17</b>	
Year 2	Semester-1			
Prefix	Number	Title	Credits	Prerequisite/s
CSIS	210	Data Structures and Algorithms	3	CSIS 130 and MATH 213
CSIS	255	Web Technologies	3	CSIS 130
General		GR-4	3	
Math	213	Discrete Math	3	
General		GER-12	3	
		<b>TOTAL</b>	<b>15</b>	
Year 2	Semester-2			
Prefix	Number	Title	Credits	Prerequisite/s
General		GER-5	3	
Stat	201	Statistics	3	
CSIS	250	Database Systems	3	CSIS 130
Science		Elective	3	
CSIS	220	Computer Architecture and Assembly Language	3	CSIS 130
		<b>TOTAL</b>	<b>15</b>	

Year 3	Semester-1			
Prefix	Number	Title	Credits	Prerequisite/s
CSIS	310	Operating Systems	3	CSIS 210
Math		Math Elective	3	
General		GER-6	3	
General		GER-7	3	
CSIS	330	Software Engineering	3	CSIS 210
		<b>TOTAL</b>	<b>15</b>	
Year 3	Semester-2			
Prefix	Number	Title	Credits	Prerequisite/s
MGMT	201	Principles of Management	3	
CSIS		Upper Level CS Elective-1	3	
General		GER-8	3	
CSIS	320	Principles of Programming Languages	3	CSIS 210
CSIS	405	Algorithms	3	CSIS 210 and MATH 213
		<b>TOTAL</b>	<b>15</b>	
Year 4	Semester-1			
Prefix	Number	Title	Credits	Prerequisite/s
CSIS		Upper Level CS Elective-2	3	
CSIS	400	Theory of Computation	3	
ENTR	201	Principles of Entrepreneurship	3	MGMT 201
CSIS	490	Computer Science Capstone I	3	
General		Upper Level GER-9	3	
		<b>TOTAL</b>	<b>15</b>	
Year 4	Semester-2			
Prefix	Number	Title	Credits	Prerequisite/s
CSIS	475	Compiler Construction	3	
General		Upper Level GER-10	1	
CSIS		Upper Level CS Elective-3	3	
General		Upper Level GER-11	3	
CSIS	491	Computer Science Capstone II	3	CSIS 330
		<b>TOTAL</b>	<b>13</b>	

## BACHELOR OF SCIENCE IN INFORMATION SYSTEMS

**Program Lead:** Dr. Amir Zeid

**Program E-mail:** CSIS@auk.edu.kw

### INFORMATION SYSTEMS LEARNING OUTCOMES:

Upon completion of the AUK degree in Information Systems, the student will be able to:

- Demonstrate the ability to use theoretical knowledge and programming skills to design and implement software solutions to problems arising in the operations of business and commerce.
- Maintain a solid understanding of database concepts and fundamental information systems concepts, as well a general understanding of business concepts.
- Demonstrate the ability to verbally and technically communicate ideas and concepts clearly and in an organized manner as well as write clear system documentation, user documentation, and research reports for a variety of audiences.
- Work effectively in teams in order to design and implement software systems.
- Demonstrate the awareness of key ethical issues affecting information systems and their personal responsibilities as information system professionals.

### ADMISSION TO PROGRAM:

Once a student completes CSIS 120, CSIS 130, MATH 213, and eight (8) hours of Science in Biology, Chemistry, or Physics with a grade of “C” or higher, they can proceed to declare their Major and be accepted into the Information Systems Program. Students are encouraged to declare their Major by the end of their second (Sophomore) year.

Transfer equivalencies from ABET accredited programs or equivalent will be considered.

We also do accept transfer from non accredited programs for the courses that do not fall under the prefixes CSIS, CPEG, ELEG or ENGR. However, it is possible to transfer 100-level CSIS courses. Students who took courses equivalent to CSIS 120 and/or CSIS 130 will have to take a placement test. Those who fail the placement test will be placed into CSIS 120 or 130 accordingly.

### UNIVERSITY DEGREE REQUIREMENTS (120 CREDIT HOURS)

To receive a Bachelor of Science in Information Systems, students must complete at least 120 credit hours:

- General Education Requirements (42 credit hours), composed of:
  - Program Prerequisites (13 credit hours) applicable to General Education Requirement
  - Remaining General Education Requirements (29)
- Program Prerequisites (6 credit hours) not applicable to General Education Requirements
- Major Requirements (72 credit hours), composed of:
  - Information Systems Core Course Requirements (39 credit hours)
  - Information Systems Elective Courses (12 credit hours)
  - Related Fields Requirements (21 credit hours)
    - Math (6 credit hours)
    - Business (15 credit hours)
- Minimum upper division courses (21 credit hours)

**Program Prerequisites (19 credit hours)**

CSIS 120	Computer Programming I	(4) [T]
CSIS 130	Computer Programming II	(4) [T]
MATH 213	Discrete Mathematics	(3) [M]
BIOL 101	General Biology I	(4) [P]
	<b>AND</b>	
BIOL 102	General Biology II	(4) [P]
	<b>OR</b>	
CHEM 101	General Chemistry I	(4) [P]
	<b>AND</b>	
CHEM 102	General Chemistry II	(4) [P]
	<b>OR</b>	
PHYS 115	General Physics I	(4) [P]
	<b>AND</b>	
PHYS 116	General Physics II	(4) [P]

**Major Requirements (72 Credit hours)**

Information Systems Core Course Requirements (39 credit hours)

Students should earn a grade of "C" or better in the Major courses.

CSIS 110	Information Systems	(3)
CSIS 210	Data Structures and Algorithms	(3)
CSIS 150	Professional and Ethical Issues in CSIS	(3)
CSIS 220	Computer Architecture and Assembly Language	(3)
CSIS 250	Database Systems	(3)
CSIS 255	Systems Analysis and Design	(3)
CSIS 300	E-Commerce	(3)
CSIS 322	Net-Centric Computing	(3)
CSIS 330	Software Engineering	(3)
CSIS 440	Software Project Management	(3)
CSIS 490	Information Systems Capstone I	(3)
CSIS 491	Information Systems Capstone II	(3)

*Information Systems Elective Courses (12 credit hours)*

Four CSIS courses (12 credit hours), selected in consultation with the Academic Advisor, from any 200-level or higher CSIS, CPEG, or ELEG courses. At least one of the elective courses should be 300-level or higher upper level courses.

For a double Major in CS and IS, core electives should be mutually exclusive. Students will need an additional 9 credit hours of MATH (if choosing CS as the additional Major) and 15 credit hours of Core Courses. The student must complete, therefore, an additional 24 credit hours.

In general, Computer Science and Information Systems Majors do not need to take CSIS 101 to fulfill their General Education Requirements, as CSIS 120 will automatically fulfill that requirement.

*Related Field Requirements (21 credit hours)***Math Requirements (6 credit hours)**

Students who plan on a BS degree in Information Systems will take the following courses:

STAT 201	Statistics	(3) [M]
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Students will need one additional MATH course (3 credit hours)

**Business (15 credit hours)**

The following 2 courses are required for CSIS students:

MGMT 201	Principles of Management	(3)
ENTR 201	Principles of Entrepreneurship	(3)

Plus 3 other courses (9 credit hours) from the following prefix designation:  
ACCT, ECON, BEAL, ENTR, FINC, MGMT, and MRKT.

**NOTE:** Information on internship assessment for internships offered by the Division of Sciences & Engineering is also located at the end of the “Division of Sciences & Engineering” section of the Catalog.

## INFORMATION SYSTEMS 2010-2011 4-YEAR PLAN

Year 1	Semester-1			
Prefix	Number	Title	Credits	Prerequisite/s
CSIS	120	Computer Programming I	4	
CSIS	110	Information Systems	3	
ENGL	101	Approaches to Critical Reading and Writing	3	
EDUC	100	Essentials of Learning	1	
		Science-1	4	
		<b>TOTAL</b>	<b>15</b>	
Year 1	Semester-2			
Prefix	Number	Title	Credits	Prerequisite/s
CSIS	130	Computer Programming II	4	CSIS 120
CSIS	150	Professional and Ethical Issues in CSIS	3	CSIS 120
MATH	213	Discrete Mathematics	3	
MGMT	201	Principles of Management	3	
General		GER-5	3	
		<b>TOTAL</b>	<b>16</b>	
Year 2	Semester-1			
Prefix	Number	Title	Credits	Prerequisite/s
CSIS	210	Data Structures and Algorithms	3	CSIS 130 and MATH 213
CSIS	255	Web Technologies	3	CSIS 130
General		GER-4	3	
MATH		Elective	3	
ENTR	201	Principles of Entrepreneurship	3	MGMT 201
		<b>TOTAL</b>	<b>16</b>	
Year 2	Semester-2			
Prefix	Number	Title	Credits	Prerequisite/s
General		GER-6	3	
STAT	201	Statistics	3	
CSIS	250	Database Systems	3	CSIS 130
Electives		Business Electives	3	
CSIS	220	Computer Architecture and Assembly Language	3	CSIS 130
		<b>TOTAL</b>	<b>15</b>	

Year 3		Semester-1		
Prefix	Number	Title	Credits	Prerequisite/s
CSIS	260	System Analysis and Design	3	CSIS 210
Electives		Upper Level Business Electives	3	
General		Upper Level GER-7	3	
General		GER-8	3	
CSIS	330	Software Engineering	3	CSIS 210
		<b>TOTAL</b>	<b>15</b>	
Year 3		Semester-2		
Prefix	Number	Title	Credits	Prerequisite/s
Electives		Business Electives	3	
CSIS		Upper Level Elective-1	3	
General		GER-9	3	
General		Upper Level Elective	3	
CSIS	300	E-commerce	3	CSIS 210 and MATH 213
		<b>TOTAL</b>	<b>15</b>	
Year 4		Semester-1		
Prefix	Number	Title	Credits	Prerequisite/s
CSIS		Upper Level CS Elective-2	3	
CSIS	322	Net-Centric Computing	3	
		Science-2	4	
CSIS	490	Information Systems Capstone I	3	
General		Upper Level GER-10	3	
		<b>TOTAL</b>	<b>16</b>	
Year 4		Semester-2		
Prefix	Number	Title	Credits	Prerequisite/s
CSIS	470	Practicum in Computing and Information Systems	3	
General		GER-11	1	
CSIS		Upper Level CS Elective-3	3	
General		Upper Level GER-12	3	
CSIS	491	Information Systems Capstone II	3	CSIS 330
		<b>TOTAL</b>	<b>13</b>	

# MINORS IN THE DIVISION OF SCIENCES AND ENGINEERING

## MINOR IN COMPUTER SCIENCE (20 CREDIT HOURS)

Program Lead: Dr. Amir Zeid

Students must take the following four core courses (14 credit hours):

CSIS 120	Computer Programming I	(4) [T]
CSIS 130	Computer Programming II	(4) [T]
CSIS 210	Data Structures and Algorithms	(3)
CSIS 330	Software Engineering	(3)

AND any 2 additional courses (6 credit hours) from the Computer Science Major Core Course Requirements.

## MINOR IN ENVIRONMENTAL STUDIES (18 CREDIT HOURS)

**Program Lead:** Dr. Neamat Mosad

The Environmental Studies Minor Program allows students to concentrate courses from a variety of disciplines (fields of study) in order to increase their awareness of the complex environmental issues faced by the human society.

The objective of the program is to provide students with a basic understanding of the scientific, technical, social, cultural, economic, and political issues that are related to global and regional environmental concerns, including the policy dimension of environmental issues. In addition, this program will allow students to refine their knowledge of environmental values, and prepare them to translate these values into practical actions in the society or simply as better informed individuals.

### ADMISSION TO THE PROGRAM:

A grade of "C" or better in each course.

- At least 6 credit hours must be taken in upper level courses (300-level or above).
- To complete a Minor in Environmental Studies, students must complete the following courses:

### ENVIRONMENTAL STUDIES CORE COURSES (3 CREDIT HOURS)

Choose from one of the following:

BIOL 105	Environmental Biology	(3) [P]
CHEM 105	Environmental Chemistry	(3) [P]
PHYS 105	Environmental Physics	(3) [P]

### ENVIRONMENTAL STUDIES ELECTIVES (15 CREDIT HOURS)

Choose one natural science course, one math course, and three environmental studies courses:

### NATURAL SCIENCES (3 CREDIT HOURS)

Choose one course from the following:

BIOL 220	Ecology	(3) [P]
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CHEM 200	Aqueous Environmental Chemistry	(3) [P]
CHEM 201	Atmospheric Environmental Chemistry	(3) [P]
ENVS 220	Energy & the Environment	(3) [P]
ENVS 230	Environmental Geology	(3) [P]

**MATH (3 CREDIT HOURS)**

Choose one course from the following:

STAT 201	Statistics	(3) [M]
ENVS 215	Environmental Data Analysis	(3) [P]

**ENVIRONMENTAL STUDIES (9 CREDIT HOURS)**

Choose three courses from the following:

ENVS 305	Environmental Health	(3) [P]
ENVS 310	Environmental Ethics	(3) [P]
ENVS 320	Global Environmental Policy	(3) [P]
ENVS 388	Independent Study	(1 – 3)
ENVS 389	Special Topics	(1 – 3)

**MINOR IN INFORMATION SYSTEMS  
(20 CREDIT HOURS)**

**Program Lead:** Dr. Amir Zeid

Students must take the following four core courses (14 credit hours):

CSIS 110	Information Systems	(3) [T]
CSIS 120	Computer Programming I	(4) [T]
CSIS 130	Computer Programming II	(4) [T]
CSIS 210	Data Structures and Algorithms	(3)

AND any 2 courses (6 credit hours) from the Information Systems Major Core Course Requirements.

## DIVISION OF SCIENCES & ENGINEERING INTERNSHIP PROCESS AND ASSESSMENT

The Internship process and assessment is completed in the following stages:

*Program Discussion:* Potential Interns (Junior or Senior Majors) are advised on the nature and purpose of an internship. The essential point is that they learn that there is a significant difference between the theory they learn in the classroom and the practice they will encounter during their internship.

*Eligibility:* A student with a departmental average of at least “B-” at the beginning of the Junior or Senior year may elect to pursue an internship course.

*Internship Contract Signed:* The next stage is to have a meeting with the organization which has agreed to provide the internship. At this meeting the nature of the internship is discussed and the student, the off-campus supervisor and the 470 instructor all sign the form. At this meeting special details of the internship are agreed in the format of a contract between the three parties.

*Visit to Place of Work:* At the time of the contract signing, or at a time near to this meeting, the 470 instructor visits the place of work where the student is going to be working and checks that the environment is suitable and that the nature of the work and the place of work go together.

*Contact Off-campus Supervisor:* Contact is established between the off-campus supervisor and the 470 instructor to ensure that if any problems arise during the internship there is a clear understanding of the roles each party will play in making sure that the student has a quality learning experience.

*Bi-weekly Progress Reports from Intern:* During the period of the internship, interns are expected to email the 470 instructor at least once a week to report on progress and activity. Students are expected to record their activities so that they can in the future review what activities have occupied their time while they are on an internship.

*Mid-term Assessment of the Intern:* Is initially made by results of the bi-weekly progress reports. Also, the off-campus supervisor will be consulted by the 470 instructor before the mid-term grade is posted.

*Intern's Internship Final Report:* At the end of an intern's period of work the intern is required to present a Report of Activity. This report is to record the activities that the student has completed. The program will provide a general template for the report. Students may add to the template. Once the report is submitted it is reviewed by the 470 instructor, additions may be requested during an interview and discussion with the student.

*Final Presentation:* The student has to give a public presentation to the program/division about his/her experience.

*Final Assessment:* The final assessment begins with a final assessment by the off-campus supervisor. This is submitted by the off-campus supervisor. The 470 instructor then confirms the off-campus supervisor assessment. The student will have to present his/her findings, the 470 instructor will then submit the final grade, of either Pass or No Pass.

### GRADE DISTRIBUTION

1) Bi-weekly progress reports	30%
2) Work supervisor report	10%
3) Final report	40%
4) Final presentation	20%

## GUIDELINES

- 1) The Division of Sciences and Engineering sets the standards for the internship and reserves the right to decide on the suitability of the work experience.
- 2) The Division of Sciences and Engineering may assist students to find suitable employment.
- 3) Students are encouraged to find their own placements. However, the Division of Sciences and Engineering must be advised before a student approaches a prospective organization.
- 4) The 470 instructor will visit the place of work where the student will be working to determine if the environment is suitable and that the nature of the work and place of work are in synergy.
- 5) Contact will be established between the 470 instructor and on-site supervisor to ensure that if any problems arise during the internship, there is a clear understanding of the roles each party will play to ensure that the student has a quality learning experience.
- 6) A placement is not secured until it has been approved by the Program Lead and Division Head of Sciences and Engineering, and the student has signed and returned the Student Internship Agreement.
- 7) For the durations of the semester, students should work at least 2.5 hours per week (for 1 credit); 7.5 hours per week (for 3 credits); 10 hours per week (for 4 credits); and 15 hours per week (for 6 credits).
- 8) Students are required to meet with the 470 instructor at least once a week to report on progress and activity.
- 9) Any student who is dismissed from his/her internship must notify the Program Lead immediately, who, in turn, will notify the Division Head. Failure to do so within a reasonable amount of time will result in a failing grade.