

COLLEGE OF ARTS AND SCIENCES

DIVISION OF SCIENCES AND ENGINEERING

DIVISION HEAD: DR. SHEREEF ABU AL-MAATI

MAJORS

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

- Bachelor of Science 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
- Mathematics
- Natural Science

DISCIPLINES (FIELDS OF STUDY)

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

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

COLLEGE OF ARTS AND SCIENCES

DIVISION OF SCIENCES AND ENGINEERING

DEGREE PROGRAMS IN THE DIVISION OF SCIENCES AND ENGINEERING

COMPUTER ENGINEERING (CEG)

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 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.

Remaining General Education Requirements in these fields:

Humanities, Social Sciences, Arabic & English (29)

• **Major Requirements**

Students must complete all 16 courses (54 credit hours) listed in the Computer Engineering Core courses, 3 courses (9 credit hours) from the Computer Engineering elective courses and 11 courses (36 credit hours) in related field requirements which is composed of Math 6 courses (18 credit hours), Science 3 courses (12 credit hours) and Entrepreneurship 3 courses (9 credit hours).

• **Computer Engineering Core Courses (54 credit hours)**

• CPEG 210	Digital Logic Design	(4)
• CPEG 230	Microprocessor System Design	(4)
• CPEG 410	Embedded System Design	(4)
• CPEG 470*	Senior Design Capstone I	(3)
• CPEG 475	Senior Design Capstone II	(3)
• CSIS 120	Computer Programming I	[I] (4)
• CSIS 130	Computer Programming II	[I] (4)
• CSIS 210	Data Structures & Algorithms	(3)
• CSIS 220	Comp. Arch & Assembly Lang	(3)
• CSIS 310	Operating System	(3)
• CSIS 322	Net-Centric Computing	(3)
• CSIS 330	Software Engineering	(3)
• ELEG 220	Electric Circuit Analysis	(3)
• ELEG 270	Electronics I	(4)
• ELEG 320	Signals & Systems	(3)
• ENGR 330	Engineering Economics	(3)

*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 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.

• **Related Field Requirements (39 credit hours)**

Students must complete:

Math Requirements: 6 courses (18 credit hours)

• MATH 201	Calculus I	[M] (3)
• MATH 203	Calculus II	[M] (3)
• MATH 206	Calculus III	[M] (3)
• MATH 210	Differential Equations	[M] (3)

COMPUTER ENGINEERING 2008-2009 4 YEAR PLAN

Semester1

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

Semester2

MATH 203	Calculus II	3
ENGL 204	Business Writing	3
CSIS 130	Computer Programming II	4
PHYS 116	General Physics II	4
EDUC 100	Essentials of Learning	1
HFIT 101	Health & Wellness	1
	Total	16

Semester3

MATH 210	Differential Equations	3
CPEG 210	Digital Logic	4
CSIS 220	Comp. Arch & Assembly Lang.	3
ELEG 220	Electric Circuit Analysis	3
MATH 213	Discrete Math	3
	Total	16

Semester4

MATH 206	Calculus III	3
CPEG 230	Microprocessor System Design	4
CSIS 210	Data Structures & Algorithms	3
ENGL 108	Public Speaking	3
MGMT 201	Principles of Mgmt	3
	Total	16

Semester5

ELEG 270	Electronics I	4
CSIS 322	Net-Centric	3
	Arabic I	3
ENTR 201	Principles of Entrepreneurship	3
CSIS 310	Operating System	3
	Total	16

Semester6

ENGR 330	Engineering Economics	3
ELEG 320	Signals & Systems	3
STAT 201	Statistics	3
CSIS 330	Software Engineering	3
CPEG 410	Embedded System Design	4
	Total	16

Semester7

CPEG 470	Senior Capstone Design I	3
ENTR 301	Intermediate Entrepreneurship	3
	Upper Level Engr Elect1	3
	Upper Level Humanities I	3
	Social Sciences I	3
	Arabic II	3
	Total	18

Semester8

CPEG 475	Senior Capstone Design II	3
	Upper Level Engr Elect2	3
	Upper Level Engr Elect3	3
	Upper Level Social Sciences II	3
	Humanities II	3
	Total	15

Grand Total

131

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 B.S. 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 (B.S.) IN COMPUTER SCIENCE

Program Lead: Dr. Amir Zeid

Program E-mail: 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, and MATH 213 with a grade of C or higher, they can proceed to declare their Major and be accepted into the Computer Science Program. Students are recommended to declare their Major by the end of their second (Sophomore) year.

University Degree Requirements (120 credit hours)

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

- Major Requirements (88 credit hours) composed of:
 - Computer Science Core Course Requirements (47 credit hours)
 - Computer Science Elective Courses (9 credit hours)
 - Related Fields Requirements (32 credit hours)
 - Math (15 credit hours)
 - Science (11 credit hours)
 - Business (6 credit hours)
- Remaining General Education Requirements (32 credit hours) composed of:
 - English (9 credit hours)
 - Arabic (6 credit hours)
 - Humanities and Social Sciences (12 credit hours)
 - Computer Science literacy (3 credit hours)
 - Health and Fitness, Essentials of learning (2 credit hours)

Major Requirements (88 Credit hours)

- **Computer Science Core Course Requirements (47 credit hours)**

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

• CSIS 120	Computer Programming I	[I] (4)
• CSIS 130	Computer Programming II	[I] (4)
• 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 (9 credit hours)**

Three other CSIS courses (9 credit hours), 200-level or above, in consultation with the Academic Advisor.

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 2008-2009 4 YEAR PLAN

Year 1

Semester-1

Prefix	Number	Title	Credits	Prerequisite/s
CSIS	120	Computer Programming I	4	
Math	201	Calculus I	3	
General		GER-1	3	
General		GER-2	1	
		Science-1	4	
		Total	15	

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	
		Total	17	

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	
		Total	15	

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
		Total	15	

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
		Total	15	

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
		Total	15	

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	
		Total	15	

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
		Total	13	

BACHELOR OF SCIENCE (B.S.) 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, and MATH 213 with a grade of C or higher, they can proceed to declare their Major and be accepted into the Information Systems Program. Students are recommended to declare their Major by the end of their second (Sophomore) year.

University Degree Requirements (120 credit hours)

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

- Major Requirements (82 credit hours) composed of:
 - Information Systems Core Course Requirements (47 credit hours)
 - Information Systems Elective Courses (9 credit hours)
 - Related Fields Requirements (32 credit hours)
 - Math (9 credit hours)
 - Science (8 credit hours)
 - Business (15 credit hours)
- Remaining General Education Requirements (32 credit hours) composed of:
 - English (9 credit hours)
 - Arabic (6 credit hours)
 - Humanities and Social Sciences (12 credit hours)
 - Computer Science literacy (3 credit hours)
 - Health and Fitness, Essentials of learning (2 credit hours)

Major Requirements (82 Credit hours)

- **Information Systems Core Course Requirements (47 credit hours)**

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

- CSIS 110 Information Systems

[T] (3)

- CSIS 120 Computer Programming I [T] (4)
- CSIS 130 Computer Programming II [T] (4)
- 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 260 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 (9 credit hours)**

Three other CSIS courses (9 credit hours), 200-level or above, in consultation with the Academic Advisor. At least one of the elective courses should be in theoretical computing.

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.

- **Related Field Requirements (32 credit hours)**

Math Requirements (9 credit hours)

Students who plan on a B.B.A. degree in Information Systems will take the following courses:

- MATH 213 Discrete Mathematics [M] (3)
- STAT 201 Statistics [M] (3)
- Students will need one additional MATH course (3 credit hours)

Science Requirements (8 credit hours):

Students who plan on a B.S. degree in Information Systems must also complete 1 of the following course sequences:

- BIOL 101 General Biology I [P] (4)
- AND**
- BIOL 102 General Biology II [P] (4)
- OR**
- CHEM 101 General Chemistry I [P] (4)
- AND**
- CHEM 102 General Chemistry II [P] (4)
- OR**
- PHYS 115 General Physics I [P] (4)

INFORMATION SYSTEMS 2008-2009 4 YEAR PLAN

Year 1

Semester-1

Prefix	Number	Title	Credits	Prerequisite/s
CSIS	120	Computer Programming I	4	
CSIS	110	Information Systems	3	
General		GER-1	3	
General		GER-2	1	
		Science-1	4	
		Total	15	

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	
		Total	16	

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
		Total	16	

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
		Total	15	

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
		Total	15	

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
		Total	15	

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	
		Total	16	

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
		Total	13	

COLLEGE OF ARTS AND SCIENCES

DIVISION OF SCIENCES AND ENGINEERING

MINORS IN THE DIVISION OF SCIENCES AND ENGINEERING

MINOR IN COMPUTER SCIENCE (18 CREDIT HOURS)

Program Lead: Dr. Amir Zeid

Students must take the following four core courses (12 credit hours):

- | | | |
|------------|--------------------------------|---------|
| • CSIS 120 | Computer Programming I | [I] (4) |
| • CSIS 130 | Computer Programming II | [I] (4) |
| • 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 | [P] (3) |
| • CHEM 105 | Environmental Chemistry | [P] (3) |

Program Lead: Mr. Fernand Tessier

Mathematics is a group of related subjects that concern the study of numbers, geometry, shape, space, and pattern and their inter-relationships, applications, generalizations, and abstractions. After centuries of evolution, it has become a body of knowledge that intersects with logic and philosophy and effectively describes natural, social, and technological processes.

Although thinking mathematically is considered difficult by most students, everyone is born with mathematical ability. In fact, it is one of the most natural ways of thinking. Mathematics is also one of the most useful bodies of knowledge. In view of these features, the mathematics faculty members at AUK offer a Minor in this subject with the purpose of demonstrating its use as well as its relation to other subjects.

Admission to the Program:

- At least 9 credit hours must be taken at AUK.
- A minimum grade of “C” must be achieved in each mathematics course.

Mathematics Minor Learning Outcomes

Upon completion of the AUK Minor in mathematics, students will:

- Be able to use computational tools effectively and apply mathematics to several fields (e.g., Physics, Computer Programming, Business, etc).
- Have acquired sufficient knowledge and skill to succeed in a mathematics Major program.
- Will have reached a level of development that allows them to read and comprehend mathematical explanations and proofs.
- Will be able to summarize and articulate solutions to problems that require the use of known mathematics.

Mathematics Core Courses (9 credit hours)

To complete a Minor in Mathematics, students must complete the following core courses:

- | | | |
|------------|--------------|---------|
| • MATH 110 | Pre-Calculus | [M] (3) |
| • MATH 201 | Calculus I | [M] (3) |
| • MATH 203 | Calculus II | [M] (3) |

In addition, they must complete (in consultation with the academic advisor) 3 other courses (9 credit hours) chosen from among the following:

- | | | |
|------------|-----------------------------------|---------|
| • STAT 201 | Statistics | [M] (3) |
| • MATH 210 | Differential Equations | [M] (3) |
| • MATH 213 | Discrete Mathematics | [M] (3) |
| • MATH 325 | Numerical Computing | (3) |
| • MATH 359 | Principles of Operations Research | (3) |
| • MATH 389 | Special Topics | (1 – 3) |

MINOR IN NATURAL SCIENCES [BIOLOGY, CHEMISTRY, PHYSICS] (21 CREDIT HOURS)

Program Lead: Dr. Ali Charara

Natural Sciences are deeply involved in the activities that are essential to our modern civilization. The breadth of the Natural Sciences reflects the blurring of boundaries between the different sciences: biological problems are increasingly being solved using techniques which require an understanding of physics and chemistry, whilst many of the most pressing problems being addressed by chemists and environmental scientists require knowledge of physics and biology.

The mission of the Natural Science program is the development of literacy in the concepts, goals, and methods of a variety of science disciplines (fields of study), by offering courses in biology, chemistry, and physics. Students choose between a curriculum that stresses a solid knowledge base in biology, and a curriculum that emphasizes the physical or chemical sciences with less intense coverage of biology. Students can expect to deepen their knowledge through hands-on laboratory investigations, to develop observational and experimental skills. Students will develop critical thinking skills and a more detailed understanding of scientific concepts and methods through completion of a Minor in Natural Science.

The broad flexibility of the Program is intended to accommodate the needs and goals of students who wish to pursue a career in natural sciences as well as those from business, English literature, computer science, history and international studies, and other disciplines (fields of study). It provides a solid foundation in any of the Natural Science disciplines (fields of study) and still enables the student to focus on particular sub-disciplines (fields of study), such as human biology or astronomy.

The Minor in Natural Sciences, combined with any Major in liberal arts, prepares students for further studies and helps them in future employment in biology, physics, chemistry, medicine and allied health fields, engineering, bioinformatics, and environment management. Science-based career opportunities are widely distributed among business, industry, journalism, government, and education.

A Minor in Natural Sciences requires the completion of 21 credit hours of coursework in Natural Sciences. The 7 credit hours of science courses taken under General Education Requirements can be used to fulfill the Minor.

Program Admission:

- Students must have a minimum 2.00 GPA in Natural Science courses taken for the Minor.

Natural Sciences Core Courses (8 credit hours)

Students must complete, in consultation with the academic advisor, two courses from among the following core courses (8 credit hours):

- | | | |
|------------|----------------------------|---------|
| • BIOL 101 | General Biology I | [P] (4) |
| • BIOL 102 | General Biology II | [P] (4) |
| • PHYS 101 | Introduction to Physics I | [P] (4) |
| • PHYS 102 | Introduction to Physics II | [P] (4) |
| • CHEM 101 | General Chemistry I | [P] (4) |
| • CHEM 102 | General Chemistry II | [P] (4) |

Minor Electives (13 credit hours)

Students must choose in consultation with the academic advisor 13 credit hours in sciences courses, of which 6 hours must be upper level courses (300 or higher) from among **BIOL, CHEM, PHYS** and **NSCI** courses.

COLLEGE OF ARTS AND SCIENCES

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 students 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 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 findings then the 470 instructor will then submit the final grade, of either Pass or Fail.

Grade distribution:

Bi-weekly progress reports	30%
Work Supervisor report	10%
Final report	40%
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 the 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.