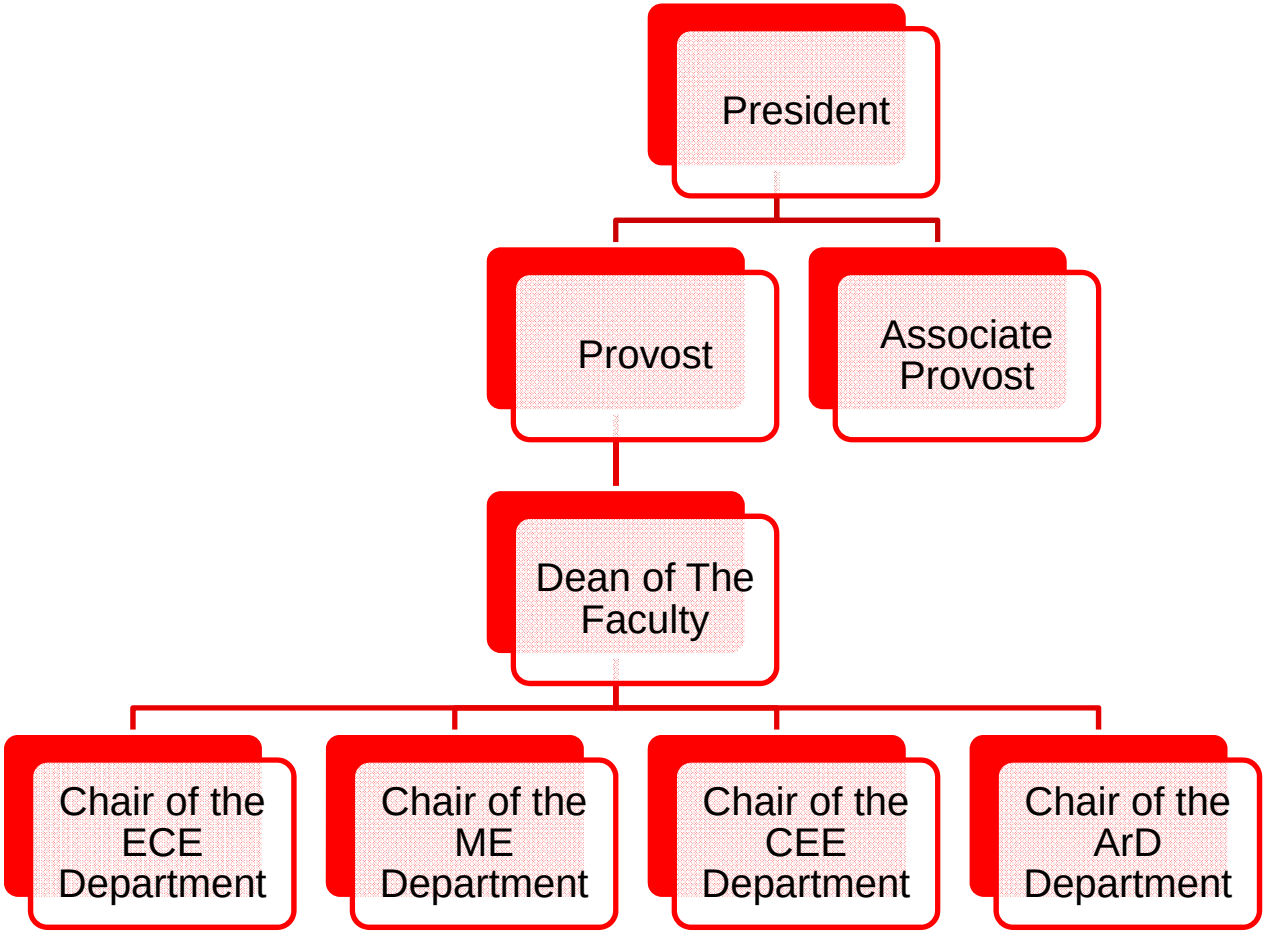
Introduction to ECE Department and ABET

September 28, 2010

Textbook: No Textbook is assigned for this course

Administrative Structure of the University



The Dean of the Faculty

Prof. Fadl Moukalled

Acting Dean and Member of the ME Department

ECE Faculty Members

- Currently, the Department has 28 full-time faculty members and 11 part-time faculty members
- 1 Administrative Assistant
- 1 Lab Manager
- 2 Lab Engineers
- 2 Lab Technicians
- 3 Lab Instructors

Faculty Members

Prof. Ibrahim Abou Faycal

Degree:
PhD, Massachusetts Institute of Technology;

Areas of interest: information theory, digital communication, optical communication, stochastic systems.

Faculty Members

Prof. Haitham Akkary

Degree:
PhD, Portland State University;

Areas of interest: Computer Architecture, VLSI Design.

Faculty Members

Prof. M. Adnan Al-Alaoui

Degree:
PhD, Georgia Institute of Technology.

Areas of interest: Analog and digital signal processing with applications to filters, communications, controls, and biomedical engineering; pattern recognition and neural networks with applications to character, speech, and image recognition.

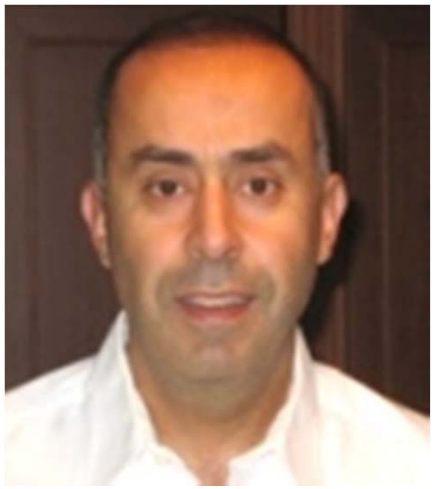
Faculty Members

Ms. Sally Antoun

Degree:
ME, American University of Beirut.

Areas of interest: Analog and digital signal processing with applications to filters, communications, and controls

Faculty Members



Prof. Hassan Artail

Degree:
PhD, Wayne State University

Areas of interest: Distributed computing and clusters; high-availability, real-time software over networked systems; embedded systems and smart sensors; communication protocol design; software project management and rollout

Faculty Members

Prof. Mariette Awad

Degree:
PhD, University of Vermont

Areas of interest: machine learning, data mining, data fusion, image recognition, ubiquitous computing, wireless and analog design, semiconductor technology, process and quality control

Faculty Members

Prof. Louay Bazzi

Degree:
PhD, Massachusetts Institute of Technology

Areas of interest: theory of error correcting codes, design and analysis of algorithms, cryptography, and number theory

Faculty Members

Prof. Farid Chaaban

Degree:
PhD, University of Liverpool

Areas of interest: design and analysis of electric machines and drives, energy systems and their impact on the environment, air pollution from power plants

Faculty Members

Prof. Riad Chedid

Degree:
PhD, University of London

Areas of interest: design and analysis of electric machines and drives, energy systems and their impact on the environment, air pollution from power plants

Faculty Members

Prof. Ali Chehab

Degree:
PhD, University of North Carolina at Charlotte

Areas of interest: VLSI testing and information security, dynamic power supply current (iDDT) testing, development of automatic test pattern generation (ATPG)

Faculty Members

Prof. Zaher Dawy

Degree:
Dr.-Ing., Munich University of Technology

Areas of interest: wireless communications (GSM/EDGE and UMTS), design of multihop based cellular networks, multiple user information theory, multimedia transmission over IP networks, bioinformatics and computational biology

Faculty Members

Prof. Hassan Diab

Degree:
PhD, University of Bath

Areas of interest: performance evaluation of parallel processing systems, application of fuzzy methodology to performance evaluation in parallel processing systems, performance evaluation of reconfigurable computer architectures, simulation for engineering education

Faculty Members

Prof. Imad Elhajj

Degree:
PhD, Michigan State University

Areas of interest: computer and sensor networking, internet security, medical and health informatics, robotics and automation, and human machine interfacing

Faculty Members

Prof. Ali El-Hajj

Degree:
Docteur Ingénieur, University of RennesI

Areas of interest: antenna theory, electromagnetic field computations, software development, telecommunication applications

Faculty Members

Prof. Hazem Hajj

Degree:
PhD, University of Wisconsin-Madison

Areas of interest: image processing, software engineering, process control systems, design to wafer, yield analysis, device analysis, and data mining

Faculty Members

Ms. Basma Hijazi

Degree:
ME: Université Joseph Fourrié in France

Areas of interest: Measurement electronics methods, Analog simulation, Electronic components, hardware system modeling and synthesis (VHDL, Verilog, place and route, digital simulations with modelSim and Leonardo ...).

Faculty Members

Prof. Rabih Jabr

Degree:
PhD, **Imperial College London**

Areas of interest: Mathematical Optimization Techniques. Power System Analysis, Computing, and Economics. Electric Power Applications

Faculty Members

Prof. Karim Kabalan

Degree:
PhD, Syracuse University

Areas of interest: antenna theory, electromagnetic field computations, software development, telecommunication applications

Faculty Members

Prof. Sami Karaki

Degree:
PhD, University of Manchester

Areas of interest: renewable energy systems modeling; generation expansion planning and production costing; application of neural networks, fuzzy systems, and genetic algorithms in energy systems

Faculty Members

Prof. Fadi Karameh

Degree:
PhD, Massachusetts Institute of Technology

Areas of interest: Areas of interest: system identification and control, biological systems, neural system modeling, and gene expression arrays

Faculty Members

Prof. Ayman Kayssi

Degree:
PhD, University of Michigan, Ann Arbor

Areas of interest: internet technologies; information security and trust; VLSI design, modeling, and simulation; digital system testing

Faculty Members

Prof. Mohamad Mansour

Degree:
PhD, University of Illinois at Urbana Champaign

Areas of interest: digital IC design; VLSI for communications, signal processing and general purpose computing systems; coding theory, code design on graphs, decoding algorithms and architectures; algorithm and architecture optimizations for VLSI using abstract algebra

Faculty Members

Mr. Ali Marmar

Degree:
ME; Lebanese American University

Areas of interest: Electronics, digital IC design; VLSI.

Faculty Members

Prof. Wassim Masri

Degree:
PhD, Case Western Reserve University

Areas of interest: Program Analysis and its Applications to Software Engineering. Specifically: Software Testing, Fault Localization, Program Comprehension, and Software Security

Faculty Members

Prof. Fouad Mrad

Degree:
PhD, Purdue University

Areas of interest: control, robotics, industrial automation, instrumentation

Faculty Members

Prof. Jean Saade

Degree:
PhD, Syracuse University

Areas of interest: communication systems, fuzzy sets and logic, design of intelligent systems using fuzzy logic and other tools, optimization techniques for intelligent and decision-making systems

Faculty Members

Prof. Nassir Sabah

Degree:
PhD, State University of New York, Buffalo

Areas of interest: electrophysiology of nerve and muscle, modeling of the electrical behavior of nerve and muscle cells, modeling of the behavior of the human neuromuscular system

Faculty Members

Prof. Fadi Zaraket

Degree:
PhD, University of Texas at Austin

Areas of interest: Static and dynamic analysis of software, formal verification, programming languages, parallel computation, and software engineering

ABET -Definition

Accreditation Board for Engineering and Technology, Inc. (ABET) is the recognized U.S. accreditor of college and university programs in applied science, computing, engineering, and technology. Accreditation ensures that a college or university program meets the quality standards established by the profession for which it prepares its students.

Why Is ABET Accreditation Important?

- Accreditation helps students and their parents choose quality college programs.
- Accreditation enables employers to recruit graduates they know are well-prepared. Many employers require their employees to possess ABET accredited degrees.
- Accreditation is used by registration, licensure, and certification boards to screen applicants.
- Accreditation gives colleges and universities a structured mechanism to assess, evaluate, and improve the quality of their programs.

ABET Basic Philosophy

1. Institutions and Programs define **objectives** to meet the needs of their **constituents**
2. Emphasis on **outcomes** -- preparation for professional practice
3. Programs demonstrate how outcomes and educational objectives are being met: **assessment**

What are Program Educational Objectives?

- Broad statements describing what our graduates should be doing 3-5 years after graduation.

  Example: Our alumni will:

  - Advance in their careers through leadership, innovation, critical thinking, integrity, life-long learning, and civic responsibility.

Program Constituents

- Undergraduate students
- Faculty
- Alumni
- Employers of Program Graduates

Program Outcomes: ABET (a)-(k)

Engineering programs must demonstrate that their graduates have:

a. An ability to apply knowledge of mathematics, science and engineering appropriate to the discipline
b. An ability to design and conduct experiments, analyze and interpret data
c. An ability to design a system, component, or process to meet desired needs

Program Outcomes: ABET (a)-(k) (continued)

d. An ability to function on multi-disciplinary teams

e. An ability to identify, formulate, and solve engineering problems

f. An understanding of professional and ethical responsibility

g. An ability to communicate effectively

Program Outcomes: ABET (a)-(k) (continued)

h. The broad education necessary to understand the impact of engineering solutions in a societal context

i. A recognition of the need for, and an ability to engage in life-long learning

j. A knowledge of contemporary issues

k. An ability to use the techniques, skills, and modern engineering tool necessary for engineering practice

Program Outcomes & Assessment

- Demonstrate that graduates have achieved desired outcomes
- Assess the level of outcome achievement
- Apply results to continuous improvement of program

Assessment Methods

(EE/CompE Program)

Direct: Rubrics

- ✓ Senior Design Project Evaluation
- ✓ Introduction to RCR; ABET Quiz
- ✓ Rubrics for summer internship

Indirect:

- ✓ Alumni Survey data
- ✓ Employer /IAB Survey data
- ✓ Senior Exit Interview data
- ✓ EBI Survey data
- ✓ Course Assessment data

EECE 200- Introduction to ECE

Overview of electrical and computer engineering; engineering as a profession; introduction to the different areas of ECE such as biomedical systems, circuits, communications, computer design, control, distributed systems, electro-magnetics, energy, machines, and signal processing; basic computer tools such as SPICE, MATLAB, and LabVIEW; basic laboratory instruments; laboratory experiments and design project

References

Introduction to Electrical Engineering, Sarma, Oxford University Press, 2001 (621.3:S246i)

Introduction to Electrical and Computer Engineering, Fleddermann and Bradshaw, Prentice Hall, 2003

Introduction to Engineering, Burghardt, Harper Collins, 1992 (620.002:B956i)

Tools and Tactics of Design, Prentice Hall, Wiley, 2001 (620.004:T671d).

Course Objectives

The objectives of this course are to:	*Correlates to program objectives*
Introduce students to the engineering profession	3,4
Provide students with an overview of engineering ethics	4
Present to the students the various areas of electrical and computer engineering	1,4
Introduce students to some basic mathematical and computing tools used in electrical and computer engineering	2
Foster effective communication and teamwork skills among students	3

Topics covered in this course

No.	*Subjects covered*	*50 min. lectures*
1	*Engineering as a profession* (engineering analysis and design, engineering ethics, engineering project management, professional communications, IEEE)	11
2	*ECE areas* (circuits & electronics, energy, communications, electro-magnetics & radio frequency, signal and image processing, computer hardware, software, networks & distributed systems, control, machines, and biomedical engineering.)	11
3	*Introduction to ABET*	1
4	*ECE tools* (PSpice, LabVIEW, MATLAB, information sources)	4

Experiment Topics

No.	*Experiment Topic*	*lab session (3 hrs)*
1	Familiarize students with FEA computer labs, the AUB email system, and the Moodle e-learning system	0.5
2	Introduction to MS Office	1
3	Introduction to SPICE	1
4	Introduction to MATLAB	1
5	SPICE/ MTALAB application on engineering problem	
6	Library resources and information sources usage	1
7	Getting familiar with LABVIEW	0.5
8	Getting familiar with LABVIEW DSP module and SPEEDY-33 Analog and Digital Applications	1
9	Introduction to Robotics	1
10	Audio Effects using LABVIEW and SPEEDY-33	1
11	Communication Systems using LABVIEW and SPEEDY-33	1
12	Image Processing using LABVIEW	1

Others

Class/laboratory schedule
Two 50-minute lectures per week.
One three-hour lab session per week.

Resources of the course
Textbook, reference books, online references, Moodle, manuals.

Computer usage
LabVIEW, PSpice, MATLAB, MS Office, Email/Web.

Evaluation Methods

Exam1	15%	individual
Exam 2	15%	individual
Computer assignments 6 x 3% =	18%	individual
Homework assignments 4 x 3% =	12%	individual
Lab experiments 5 x 3% =	15%	teams of two
Project	20%	teams of four
Contribution to online discussions & short quizzes	4%	individual
Assessment of course outcomes	1%	individual