

**Faculty of Engineering**

**Departments**

Electrical, Civil, Mechanical, Computer  
Engineering & Informatics, Industrial  
Engineering & Management, Surveying

Departments .....

History.....

Mission .....

Vision .....

Undergraduate Program .....

Offered Degrees.....

Program Description.....

Curriculum.....

Postgraduate Program .....

Offered Degrees.....

Program Description.....

Curriculum.....

# DEPARTMENTS

- 1- Electrical Engineering
- 2- Civil Engineering
- 3- Mechanical Engineering
- 4- Computer Engineering & Informatics
- 5- Industrial & Management Engineering
- 6- Surveying Engineering

## HISTORY

In 1975, the university recognized the national and regional need for engineering education and established the Faculty of Engineering. It started with the Electrical Engineering Department followed by the Civil Engineering Department. The first class graduated from the Electrical Engineering Department in June 1980, while that from the Civil Engineering Department graduated in June 1981.

In 1995, the Electrical Engineering Department has implemented its new curriculum which includes new and updated courses in electronics-communications, computers, and electric power and control divisions in order to keep up with the fast developments in these fields. The curriculum includes a number of courses in humanities, with special emphasis on environmental, economical, managerial, and marketing aspects of engineering. An updated version of the civil Engineering curriculum took effect in 1999.

A Mechanical Engineering Department was established in 1996. The first class graduated in June 2000.

In the year 2001, and to catch up with the fast development in the modern technology, three more departments were established. They are Computer Engineering & Informatics, Surveying Engineering, and Industrial Engineering & Management.

In 2005, the faculty changed its educational program to the Credit-Hour System so as to offer a more adaptable and responsive course of study spreading over a planned ten-semester period.

The first Diploma Degree in Electrical and Civil Engineering were introduced in 1986. Other programs have been added to meet the growing demand for advanced engineering education. During the period between September 1994 and September 1998, master's degrees were offered in Electrical, Civil and Mechanical Engineering.

In the year 2001, a new post graduate program offered a Diploma and Master Degree in the newly created branches of Computer Engineering and Informatics, Industrial Engineering & Management and Surveying Engineering.

A further graduate study program, offering a Doctor of Philosophy (PhD) Degree, started in 2002 in the domain of Electrical Engineering, Civil Engineering, Mechanical Engineering, Computer Engineering & Informatics, Industrial Engineering & Management & Surveying Engineering.

In 1997, the faculty established the initiative of the first Engineering Day, this was a combined effort from contacts built with industry, staff and students, and the aim of the Engineering Day was to allow students to participate in hands on work in projects demonstrating skills and technology. This meeting later became an annual event where students and staff members celebrate our common share vision of team work and creativity.

## MISSION

Our mission is to achieve global recognition as a beacon for education in the diverse fields of engineering sciences both in the Middle East and the world.

Our focus is to:

- provide excellent education to our students;
- attract and maintain high caliber faculty members in all fields of engineering;
- provide the necessary resources to prepare graduates that are capable of team work innovation and creativity;
- give students a balanced regime of theoretical and practical learning to serve the needs of the local regional, and international communities;
- provide an excellent environment for our students, and encourage students faculty interaction to enrich the educational experience in the faculty of engineering; and

- encourage student research and technical seminars to contribute to the growth of the knowledge base of individuals and prepare students for continuous learning.

## **VISION**

The Faculty of Engineering at BAU is recognized as a leading faculty of engineering in the region. Thus, the faculty seeks to continually improve the standard of its educational and graduate through:

- acquiring state of the art laboratory equipments in-line with the rapid technological advancements;
- promoting research activities among students and staff by providing them with the required tools and support over a broad range of academic interests;
- serving Lebanon and the region through promoting applied research and providing educational and professional services;
- supporting postgraduate interdisciplinary research and teaching;
- keeping commitment to the principles and values of academic and professional integrity in all the faculties' activities;
- keeping faculty's commitment to adopt a system containing moral codes and principles governing practices at all levels in different domains, and systems to insure neutrality an objectivity and to introduce tools for review and accountability pertaining to behavioral issues and practices; and
- keeping commitment to quality, excellence, creativity, evolution and the freedom of thought and research.

## **UNDERGRADUATE PROGRAMS**

### **OFFERED DEGREES**

The Faculty Of Engineering offers Bachelor degree in the following seven specializations:

- 1- Communication & Electronics Engineering
- 2- Electric Power & Control Engineering
- 3- Civil Engineering
- 4- Mechanical Engineering
- 5- Computer Engineering & Informatics
- 6- Industrial Engineering & Management
- 7- Surveying Engineering

### **PROGRAM DESCRIPTION**

The normal duration of study is 10 regular semesters within five calendar years. The first two stages of study are general (three semesters), offering a basic education in engineering and related sub-disciplines. Specialization is then pursued through focused studies and research work, carried out at the third, fourth and fifth stages (seven semesters).

The Bachelor Degree Requirements consist of a total of 164 credit hours taken in accordance to the field of specialization, as follows:

- Mandatory courses: 108 – 128 (varies according to the field of specialization).
- Faculty & Departmental Elective Courses: 20– 40 (varies according to the field of specialization)
- General University Requirements : 16 credits divided into:
  - \* University mandatory courses : 5 Cr.
  - \* University elective courses : 11 Cr.

# BACHELOR OF COMMUNICATION AND ELECTRONICS ENGINEERING

## Curriculum (164 Credit Hours)

<b>First Semester</b>			<b>Credit</b>
CHEM	109	Chemistry	2
CMPE	111	Introductory Computer Programming	3
EMAP	111	Algebra and Analytical Geometry	3
EMAP	121	Mechanics I (Statics)	3
EMAP	131	Physics I	3
EMAP	141	Engineering Drawing and Projection I	3
		Elective (General) <sup>1</sup>	2
			-----
			19
<b>Second Semester</b>			
EMAP	112	Calculus	3
EMAP	122	Mechanics II (Particle Dynamics)	3
EMAP	132	Physics II	3
EMAP	142	Engineering Drawing and Projection II	3
IEME	112	Production Engineering	2
		Elective (EMAP) <sup>2</sup>	2
		Elective (General) <sup>1</sup>	1
			-----
			17
<b>Third Semester</b>			
CIVE	211	Structural Mechanics in Civil Engineering	3
CMPE	211	Introduction to Information Technology	3
ELEE	211	Fundamentals of Electric & Electronic Engineering	3
EMAP	211	Differential Equations	3
IEME	221	Introduction to Industrial Engineering & Management	3
MECE	201	Fundamentals of Mechanical Engineering	3
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			18
<b>Fourth Semester</b>			
		Elective (Technical) <sup>3</sup>	12
		Elective (EMAP) <sup>2</sup>	2
		Elective (General) <sup>1</sup>	3
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			17

**Fifth Semester**

ELEE	311	Network Analysis	3
ELEE	311 L	Electric Circuits Lab	1
ELEE	313	Electric and Electronic Measurements	3
ELEE	331	Logic Design	3
ELEE	331 L	Logic Circuits Lab	1
ELEE	341	Electric Machines I	3
EMAP	315	Numerical Methods and Special Functions II	2
		Elective (General) <sup>1</sup>	1
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			17

**Sixth Semester**

ELEE	322	Electronic Circuits II	3
ELEE	322 L	Electronic Circuits Lab	1
ELEE	332	Microprocessors Fundamentals	3
ELEE	352	Electrical Power Engineering I	3
ELEE	352 L	Electric Power and Machine Lab	1
ELEE	362	Solid State Electronics	3
CMNE	382	Signals and Systems	3
		Elective (General) <sup>1</sup>	2
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			19

**Seventh Semester**

CMNE	471	Electromagnetic Waves and Acoustics	3
CMNE	481	Analog Communication Theory and Systems	3
CMNE	483	Digital Signal Processing	3
EMAP	417	Probability Theory and Applications II	2
PWRE	491	Control System I	3
		Elective (General) <sup>1</sup>	2
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			16

**Eighth Semester**

CMNE	432	Microprocessor Interfacing and Applications	2
CMNE	472	High Frequency Transmission	3
CMNE	482	Digital Communication Theory	3
CMNE	472 L	High Frequency Transmission Lab	1
CMNE	482 L	Communications Lab	1
PWRE	442	Electric Machines and Power Systems	2
PWRE	442 L	Electric Machines and Power Systems Lab	1
		Elective (General) <sup>1</sup>	2
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			15

## Ninth Semester

CMNE	598	Senior Project I	3
CMNE	583	Telephony Systems	3
		Elective (Technical) <sup>4</sup>	6
		Elective (General) <sup>1</sup>	2
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			14

## Tenth Semester

CMNE	599	Senior Project II	3
CMNE	584	Communication Networks	3
		Elective (Technical Lab) <sup>5</sup>	2
		Elective (Technical) <sup>6</sup>	3
		Elective (General) <sup>1</sup>	1
			-----
			12

<sup>1</sup> A total of 16 credits is required as General University Requirements: 5 credits are selected from the University Mandatory courses list including: ARAB 001 (2 Cr.), ENGL 001 (2 Cr.), LAWS 001 (1 Cr.), and another 11 credits are selected from the University Elective Courses list.

<sup>2</sup> Selected from these courses: EMAP 152, EMAP 162, EMAP 172.

<sup>3</sup> Courses selected from the 200 level departmental and faculty elective courses.

<sup>4</sup> Selected from 500 level odd numbered departmental and faculty elective courses.

<sup>5</sup> Selected from ELEE 572L, ELEE 582L, ELEE 562L, and ELEE 532L.

<sup>6</sup> Selected from 500 level even numbered departmental and faculty elective courses.

# BACHELOR OF ELECTRIC POWER & CONTROL ENGINEERING

## Curriculum

### (164 Credit Hours)

<b>First Semester</b>			<b>Credit</b>
CHEM	109	Chemistry	2
CMPE	111	Introductory Computer Programming	3
EMAP	111	Algebra and Analytical Geometry	3
EMAP	121	Mechanics I (Statics)	3
EMAP	131	Physics I	3
EMAP	141	Engineering Drawing and Projection I	3
		Elective (General) <sup>1</sup>	2
			-----
			19
<b>Second Semester</b>			
EMAP	112	Calculus	3
EMAP	122	Mechanics II (Particle Dynamics)	3
EMAP	132	Physics II	3
EMAP	142	Engineering Drawing and Projection II	3
IEME	112	Production Engineering	2
		Elective (EMAP) <sup>2</sup>	2
		Elective (General) <sup>1</sup>	1
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			17
<b>Third Semester</b>			
CIVE	211	Structural Mechanics in Civil Engineering	3
CMPE	211	Introduction to Information Technology	3
ELEE	211	Fundamentals of Electric and Electronic Engineering	3
EMAP	211	Differential Equations	3
IEME	221	Introduction to Industrial Engineering and Management	3
MECE	201	Fundamentals of Mechanical Engineering	3
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			18
<b>Fourth Semester</b>			
		Elective (Technical) <sup>3</sup>	12
		Elective (EMAP) <sup>2</sup>	2
		Elective (General) <sup>1</sup>	3
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			17

### **Fifth Semester**

ELEE	311	Network Analysis	3
ELEE	311 L	Electric Circuits Lab	1
ELEE	313	Electric and Electronic Measurements	3
ELEE	331	Logic Design	3
ELEE	331 L	Logic Circuits Lab	1
ELEE	341	Electric Machines I	3
EMAP	315	Numerical Methods and Special Functions II	2
		Elective (General) <sup>1</sup>	1
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			17

### **Sixth Semester**

ELEE	322	Electronic Circuits II	3
ELEE	322 L	Electronic Circuits Lab	1
ELEE	332	Microprocessors Fundamentals	3
ELEE	352	Electrical Power Engineering I	3
ELEE	352 L	Electric Power and Machine Lab	1
ELEE	362	Solid State Electronics	3
PWRE	342	Power Electronics I	3
		Elective (General) <sup>1</sup>	2
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			19

### **Seventh Semester**

CMNE	485	Communication Engineering	2
PWRE	441	Electric Machines II	3
PWRE	441 L	Electrical Machine II Lab	1
PWRE	451	Electrical Power Engineering II	3
PWRE	451 L	Electrical Power Engineering II Lab	1
PWRE	491	Control System I	3
PWRE	491 L	Control System I Lab	1
		Elective (General) <sup>1</sup>	2
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			16

### **Eighth Semester**

PWRE	444	Power Electronics II	3
PWRE	444 L	Power Electronics Lab	1
PWRE	454	Power System Protection I	3
PWRE	454 L	Power System Protection I Lab	1
PWRE	492	Control System II	3
		Elective (Technical) <sup>4</sup>	2
		Elective (General) <sup>1</sup>	2
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			15

## **Ninth Semester**

PWRE	598	Senior Project I	3
PWRE	541	Electrical Drives	3
PWRE	541 L	Electrical Drives Lab	1
PWRE	551	Power System Analysis	3
PWRE	551 L	Power System Analysis Lab	1
		Elective (General) <sup>1</sup>	2
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			13

## **Tenth Semester**

PWRE	599	Senior Project II	3
PWRE	558	High Voltage Engineering	3
PWRE	558 L	High Voltage Engineering Lab	1
PWRE	592	Industrial Automation	2
PWRE	592 L	Industrial Automation Lab	1
		Elective (Technical) <sup>5</sup>	2
		Elective (General) <sup>1</sup>	1
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			13

<sup>1</sup> A total of 16 credits is required as General University Requirements: 5 credits are selected from the University Mandatory courses list including: ARAB 001 (2 Cr.), ENGL 001 (2 Cr.), LAWS 001 (1 Cr.) and another 11 credits are selected from the University Elective Courses list.

<sup>2</sup> Selected from General Engineering courses: EMAP 152, EMAP 162, EMAP 172.

<sup>3</sup> Courses selected from 200 level departmental and faculty elective courses.

<sup>4</sup> Selected from 400 level even numbered departmental and faculty elective courses.

<sup>5</sup> Selected from 500 level even numbered departmental and faculty elective courses

# BACHELOR OF CIVIL ENGINEERING

## Curriculum

### (164 Credit Hours)

<b>First Semester</b>			<b>Credit</b>
CHEM	109	Chemistry	2
CMPE	111	Introductory Computer Programming	3
EMAP	111	Algebra and Analytical Geometry	3
EMAP	121	Mechanics I (Statics)	3
EMAP	131	Physics I	3
EMAP	141	Engineering Drawing and Projection I	3
		Elective (General) <sup>1</sup>	2
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			19
<b>Second Semester</b>			
EMAP	112	Calculus	3
EMAP	122	Mechanics II (Particle Dynamics)	3
EMAP	132	Physics II	3
EMAP	142	Engineering Drawing and Projection II	3
IEME	112	Production Engineering	2
		Elective (EMAP) <sup>2</sup>	2
		Elective (General) <sup>1</sup>	1
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			17
<b>Third Semester</b>			
CIVE	211	Structural Mechanics in Civil Engineering	3
CMPE	211	Introduction to Information Technology	3
ELEE	211	Fundamentals of Electric and Electronic Engineering	3
EMAP	211	Differential Equations	3
IEME	221	Introduction to Industrial Engineering and Management	3
MECE	201	Fundamentals of Mechanical Engineering	3
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			18
<b>Fourth Semester</b>			
CIVE	212	Structural Analysis	3
CIVE	222	Engineering Geology	3
CIVE	242	Engineering Surveying I	3
CIVE	262	Civil Engineering Drawing	3
EMAP	224	Engineering Mechanics for Civil Engineering	2
		Elective (General) <sup>1</sup>	2
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			16

<b>Fifth Semester</b>			
CIVE	311	Structural Analysis II	3
CIVE	315	Soil Mechanics	3
CIVE	321	Engineering Surveying II	3
CIVE	331	Hydraulics I	3
		Elective (General) <sup>1</sup>	4
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			16
<b>Sixth Semester</b>			
CIVE	310	Construction Materials	3
CIVE	312	Structural Analysis III	3
CIVE	332	Hydraulics II	3
CIVE	342	Transportation Planning and Traffic Engineering	3
CIVE	352	Reinforced Concrete Design I	3
		Elective (General) <sup>1</sup>	1
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			16
<b>Seventh Semester</b>			
CIVE	421	Surveying for Construction	1
CIVE	441	Hydrology	3
CIVE	451	Reinforced Concrete Design II	3
CIVE	453	Structural Steel Design I	3
CIVE	455	Foundation Engineering	3
		Elective (Technical) <sup>4</sup>	2
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			15
<b>Eighth Semester</b>			
CIVE	426	Contracts, Quantities and Specifications	2
CIVE	434	Sanitary Engineering	3
CIVE	444	Highway Engineering	3
CIVE	456	Reinforced Concrete Design III	3
		Elective (Technical) <sup>5</sup>	2
		Elective (General) <sup>1</sup>	4
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			17
<b>Ninth Semester</b>			
CIVE	598	Senior Project I	3
CIVE	521	Construction Management	2
CIVE	545	Harbor Engineering and Marine Structures	3
		Elective (Technical) <sup>6</sup>	8
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			16

## Tenth Semester

CIVE	599	Senior Project II	3
CIVE	554	Structural Steel Design II	3
		Elective (Technical) <sup>6</sup>	6
		Elective (General) <sup>1</sup>	2
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			14

<sup>1</sup> A total of 16 credits is required as General University Requirements: 5 credits are selected from the University Mandatory courses list including: ARAB 001 (2 Cr.), ENGL 001 (2 Cr.), LAWS 001 (1 Cr.) and another 11 credits are selected from the University Elective Courses list.

<sup>2</sup> Selected from General Engineering courses: EMAP 152,EMAP 162,EMAP 172.

<sup>4</sup> Recommended to take CIVE 419.

<sup>5</sup> Selected from 400 level departmental and faculty elective courses.

<sup>6</sup> Selected from 500 level departmental and faculty elective courses

# BACHELOR OF MECHANICAL ENGINEERING

## Curriculum

### (164 Credit Hours)

<b>First Semester</b>			<b>Credit</b>
CHEM	109	Chemistry	2
CMPE	111	Introductory Computer Programming	3
EMAP	111	Algebra and Analytical Geometry	3
EMAP	121	Mechanics I (Statics)	3
EMAP	131	Physics I	3
EMAP	141	Engineering Drawing and Projection I	3
		Elective (General) <sup>1</sup>	2
			-----
			19
<b>Second Semester</b>			
EMAP	112	Calculus	3
EMAP	122	Mechanics II (Particle Dynamics)	3
EMAP	132	Physics II	3
EMAP	142	Engineering Drawing and Projection II	3
IEME	112	Production Engineering	2
		Elective (EMAP) <sup>2</sup>	2
		Elective (General) <sup>1</sup>	1
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			17
<b>Third Semester</b>			
CIVE	211	Structural Mechanics in Civil Engineering	3
CMPE	211	Introduction to Information Technology	3
ELEE	211	Fundamentals of Electric and Electronic Engineering	3
EMAP	211	Differential Equations	3
IEME	221	Introduction to Industrial Engineering and Management	3
MECE	201	Fundamentals of Mechanical Engineering	3
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			18
<b>Fourth Semester</b>			
		Elective (Technical) <sup>3</sup>	11
		Elective (EMAP) <sup>2</sup>	3
		Elective (General) <sup>1</sup>	2
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			16

<b>Fifth Semester</b>			
ELEE	301	Electric Machines and Power Engineering	3
MECE	311	Computer-Aided Mechanical Drawing	2
MECE	313	Mechanics of Machinery I	3
MECE	321	Thermodynamics I	3
MECE	331	Fluid Mechanics I	3
		Elective (General) <sup>1</sup>	2
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			16
<b>Sixth Semester</b>			
MECE	312	Mechanical Design	3
MECE	314	Mechanics of Machinery II	3
MECE	322	Thermodynamics II	3
MECE	332	Fluid Mechanics II	3
MECE	342	Fundamentals of Combustion Engineering	3
		Elective (General) <sup>1</sup>	2
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			17
<b>Seventh Semester</b>			
MECE	411	Design of Power Transmission Systems	3
MECE	413	Mechanical Vibrations	3
MECE	421	Heat Transfer	3
MECE	431	Pump Technology	2
MECE	441	Internal Combustion Engines	3
		Elective (General) <sup>1</sup>	2
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			16
<b>Eighth Semester</b>			
MECE	412	Fundamentals of Mechatronics	3
MECE	414	Mechanical Control Systems	3
MECE	422	Refrigeration and Air Conditioning	3
MECE	424	Thermal Equipment Design	2
MECE	442	Gas Dynamics	3
		Elective (General) <sup>1</sup>	2
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			16
<b>Ninth Semester</b>			
MECE	521	Thermal Power Stations	3
MECE	598	Senior Project I	3
		Elective (Technical) <sup>4</sup>	8
		Elective (General) <sup>1</sup>	1
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			15

## Tenth Semester

MECE	599	Senior Project II	3
MECE	532	Hydro-Power Plants	3
		Elective (Technical) <sup>5</sup>	6
		Elective (General) <sup>1</sup>	2
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			14

<sup>1</sup> A total of 16 credits is required as General University Requirements: 5 credits are selected from the University Mandatory courses list including: ARAB 001 (2 Cr.), ENGL 001 (2 Cr.), LAWS 001 (1 Cr.) and another 11 credits are selected from the University Elective Courses list.

<sup>2</sup> Selected from General Engineering courses: EMAP 152,EMAP 162,EMAP 172.

<sup>3</sup> Courses selected from 200 level departmental and faculty elective courses.

<sup>4</sup> Selected from 500 level odd numbered departmental elective courses groups:51X,52X,53X,54X. Student shall not take more than 4 credits per semester from one group.

<sup>5</sup> Selected from 500 level even numbered departmental elective course groups: 51X,52X,53X,54X. Student shall not take more than 4 credits per semester from one group.

# BACHELOR OF COMPUTER ENGINEERING & INFORMATICS

## Curriculum

### (164 Credit Hours)

<b>First Semester</b>			<b>Credit</b>
CHEM	109	Chemistry	2
CMPE	111	Introductory Computer Programming	3
EMAP	111	Algebra and Analytical Geometry	3
EMAP	121	Mechanics I (Statics)	3
EMAP	131	Physics I	3
EMAP	141	Engineering Drawing and Projection I	3
		Elective (General) <sup>1</sup>	2
			-----
			19
<b>Second Semester</b>			
EMAP	112	Calculus	3
EMAP	122	Mechanics II (Particle Dynamics)	3
EMAP	132	Physics II	3
EMAP	142	Engineering Drawing and Projection II	3
IEME	112	Production Engineering	2
		Elective (EMAP) <sup>2</sup>	2
		Elective (General) <sup>1</sup>	1
			-----
			17
<b>Third Semester</b>			
CIVE	211	Structural Mechanics in Civil Engineering	3
CMPE	211	Introduction to Information Technology	3
ELEE	211	Fundamentals of Electric and Electronic Engineering	3
EMAP	211	Differential Equations	3
IEME	221	Introduction to Industrial Engineering and Management	3
MECE	201	Fundamentals of Mechanical Engineering	3
			-----
			18
<b>Fourth Semester</b>			
		Elective (Technical) <sup>3</sup>	11
		Elective (EMAP) <sup>2</sup>	3
		Elective (General) <sup>1</sup>	2
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			16

<b>Fifth Semester</b>			
CMPE	311	Object-Oriented Programming	3
CMPE	321	Digital Systems II	3
CMPE	323	Digital Electronics	3
CMPE	331	Discrete Structures II	2
EMAP	317	Statistical Methods	2
		Elective (General) <sup>1</sup>	2
			-----
			15
<b>Sixth Semester</b>			
CMPE	312	Programming Language Design	3
CMPE	322	Microprocessors	3
CMPE	334	Data Structures II	3
CMPE	352	Transmission & Processing of Digital Signals	3
CMPE	362	Control Systems for Computer Engineers	3
		Elective (General) <sup>1</sup>	1
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			16
<b>Seventh Semester</b>			
CMPE	411	Operating Systems	3
CMPE	431	Computer Algorithms I	3
CMPE	433	Queuing and Modeling	2
CMPE	441	Database Systems I	3
		Elective (Technical) <sup>4</sup>	3
		Elective (General) <sup>1</sup>	2
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			16
<b>Eighth Semester</b>			
CMPE	432	Artificial Intelligence	2
CMPE	452	Computer Networks	3
		Elective (Technical) <sup>5</sup>	9
		Elective (General) <sup>1</sup>	2
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			16
<b>Ninth Semester</b>			
CMPE	598	Senior Project I	3
CMPE	511	Compilers	3
CMPE	521	Computer Organization and Architecture	3
		Elective (Technical) <sup>6</sup>	6
		Elective (General) <sup>1</sup>	2
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			17

## Tenth Semester

CMPE	599	Senior Project II	3
CMPE	532	Computer Graphics	3
		Elective (Technical) <sup>7</sup>	6
		Elective (General) <sup>1</sup>	2
			-----
			14

<sup>1</sup> A total of 16 credits is required as General University Requirements: 5 credits are selected from the University Mandatory courses list including: ARAB 001 (2 Cr.), ENGL 001 (2 Cr.), LAWS 001 (1 Cr.), and another 11 credits are selected from the University Elective Courses list.

<sup>2</sup> Selected from General Engineering courses: EMAP 152, EMAP 162, EMAP 172.

<sup>3</sup> Courses selected from 200 level departmental and faculty elective courses.

<sup>4</sup> Selected from 400 level odd numbered departmental and faculty elective courses.

<sup>5</sup> Selected from 400 level even numbered departmental and faculty elective courses

<sup>6</sup> Selected from 500 level odd numbered departmental and faculty elective courses.

<sup>7</sup> Selected from 500 level even numbered departmental and faculty elective courses

# BACHELOR OF INDUSTRIAL ENGINEERING & MANAGEMENT

## Curriculum

### (164 Credit Hours)

<b>First Semester</b>			<b>Credit</b>
CHEM	109	Chemistry	2
CMPE	111	Introductory Computer Programming	3
EMAP	111	Algebra and Analytical Geometry	3
EMAP	121	Mechanics I (Statics)	3
EMAP	131	Physics I	3
EMAP	141	Engineering Drawing and Projection I	3
		Elective (General) <sup>1</sup>	2
			-----
			19
<b>Second Semester</b>			
EMAP	112	Calculus	3
EMAP	122	Mechanics II (Particle Dynamics)	3
EMAP	132	Physics II	3
EMAP	142	Engineering Drawing and Projection II	3
IEME	112	Production Engineering	2
		Elective (EMAP) <sup>2</sup>	2
		Elective (General) <sup>1</sup>	1
			-----
			17
<b>Third Semester</b>			
CIVE	211	Structural Mechanics in Civil Engineering	3
CMPE	211	Introduction to Information Technology	3
ELEE	211	Fundamentals of Electric and Electronic Engineering	3
EMAP	211	Differential Equations	3
IEME	221	Introduction to Industrial Engineering and Management	3
MECE	201	Fundamentals of Mechanical Engineering	3
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			18
<b>Fourth Semester</b>			
		Elective (Technical) <sup>3</sup>	12
		Elective (EMAP) <sup>2</sup>	3
		Elective (General) <sup>1</sup>	3
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			18

<b>Fifth Semester</b>			
IEME	323	Production and Operation Management I	2
IEME	331	Industrial Measurements and Inspection I	2
IEME	341	Industrial Manufacturing Processes	3
IEME	363	Machine Design	3
IEME	365	Facility Planning and Design	3
		Elective (General) <sup>1</sup>	2
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			15
<b>Sixth Semester</b>			
EMAP	314	Numerical Analysis and Techniques	3
IEME	316	Economic Analysis and Decision Making	2
IEME	324	Production and Operation Management II	2
IEME	342	Statistical Process Control	3
		Elective (Technical) <sup>4</sup>	3
		Elective (General) <sup>1</sup>	2
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			15
<b>Seventh Semester</b>			
IEME	425	Scheduling and Project Management	2
IEME	433	Industrial Measurements and Inspection II	2
IEME	443	Computer Aided Design and Manufacturing	3
IEME	461	System Modeling and Simulation I	3
IEME	473	Environmental Systems and Engineering Safety	3
		Elective (General) <sup>1</sup>	2
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			15
<b>Eighth Semester</b>			
IEME	432	Design of Experiments	3
IEME	446	Maintenance Planning and Techniques	3
IEME	472	Human Factor Engineering	2
		Elective (Technical) <sup>5</sup>	6
		Elective (General) <sup>1</sup>	2
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			16
<b>Ninth Semester</b>			
IEME	598	Senior Project I	3
IEME	527	Computer-Based Management Systems	3
IEME	537	Operations Research II	3
IEME	547	Technology-Based Entrepreneurship	3
IEME	549	Engineering Logistics and Supply Chain	3
		Elective (General) <sup>1</sup>	1
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			16

## Tenth Semester

IEME	599	Senior Project II	3
IEME	526	Quality Engineering Principles and Analysis	3
IEME	574	Reliability Engineering and System Safety	2
IEME	598	Systems Engineering	3
		Elective (Technical) <sup>6</sup>	3
		Elective (General) <sup>1</sup>	1
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			15

<sup>1</sup> A total of 16 credits is required as General University Requirements: 5 credits are selected from the University Mandatory courses list including: ARAB 001 (2 Cr.), ENGL 001 (2 Cr.), LAWS 001 (1 Cr.), and another 11 credits are selected from the University Elective Courses list.

<sup>2</sup> Selected from General Engineering courses: EMAP 152, EMAP 162, EMAP 172.

<sup>3</sup> Courses selected from 200 level departmental and faculty elective courses.

<sup>4</sup> Selected from 300 level even numbered departmental and faculty elective courses.

<sup>5</sup> Selected from 400 level even numbered departmental and faculty elective courses.

<sup>6</sup> Selected from 500 level even numbered departmental and faculty elective courses.

# BACHELOR OF SURVEYING ENGINEERING

## Curriculum

### (164 Credit Hours)

<b>First Semester</b>			<b>Credit</b>
CHEM	101	Chemistry	2
CMPE	111	Introductory Computer Programming	3
EMAP	111	Algebra and Analytical Geometry	3
EMAP	121	Mechanics I (Statics)	3
EMAP	131	Physics I	3
EMAP	141	Engineering Drawing and Projection I	3
		Elective (General) <sup>1</sup>	2
			-----
			19
<b>Second Semester</b>			
EMAP	112	Calculus	3
EMAP	122	Mechanics II (Particle Dynamics)	3
EMAP	132	Physics II	3
EMAP	142	Engineering Drawing and Projection II	3
IEME	112	Production Engineering	2
		Elective (EMAP) <sup>2</sup>	2
		Elective (General) <sup>1</sup>	1
			-----
			17
<b>Third Semester</b>			
CIVE	211	Structural Mechanics in Civil Engineering	3
CMPE	211	Introduction to Information Technology	3
ELEE	211	Fundamentals of Electric and Electronic Engineering	3
EMAP	211	Differential Equations	3
IEME	221	Introduction to Industrial Engineering and Management	3
MECE	201	Fundamentals of Mechanical Engineering	3
			-----
			18
<b>Fourth Semester</b>			
		Elective (Technical) <sup>3</sup>	12
		Elective (EMAP) <sup>2</sup>	3
		Elective (General) <sup>1</sup>	2
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			17

### **Fifth Semester**

SRVE	311	Theory of Measurements and Errors	3
SRVE	313	Plane Surveying II	3
SRVE	315	Topographic Surveying	3
SRVE	317	Computation of Areas and Volumes	3
SRVE	319	Testing and Calibration of Surveying Instruments	2
		Elective (General) <sup>1</sup>	2

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16

### **Sixth Semester**

SRVE	312	Optical and Electromagnetic Distance Measurements	3
SRVE	314	Surveying for Construction	3
SRVE	316	Photogrammetry I	3
SRVE	318	Geodesy I	3
		Elective (General) <sup>1</sup>	2

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14

### **Seventh Semester**

SRVE	411	Introduction To Geospatial Information Systems	3
SRVE	413	Adjustment of Control Networks	3
SRVE	417	Photogrammetry II	3
SRVE	419	Geodesy II	3
		Elective (Technical) <sup>4</sup>	2
		Elective (General) <sup>1</sup>	2

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16

### **Eighth Semester**

SRVE	412	Specifications and Contracts	2
SRVE	414	Surveying Astronomy	3
SRVE	416	Map Projections	3
SRVE	418	Design and Implementation of Geospatial Information Systems	3
		Elective (Technical) <sup>5</sup>	4
		Elective (General) <sup>1</sup>	1

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16

### **Ninth Semester**

SRVE	598	Senior Project I	3
SRVE	513	Computer Programming for Surveying	3
SRVE	515	GPS Surveying	3
SRVE	517	Remote Sensing	3
		Elective (Technical) <sup>6</sup>	2
		Elective (General) <sup>1</sup>	2

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16

## Tenth Semester

SRVE	599	Senior Project II	3
SRVE	514	Collecting Surveying Data with Pen Map	3
SRVE	518	Special Topics in Geospatial Information Systems	3
		Elective (Technical) <sup>7</sup>	4
		Elective (General) <sup>1</sup>	2
			-----
			15

<sup>1</sup> A total of 16 credits is required as General University Requirements: 5 credits are selected from the University Mandatory courses list including: ARAB 001 (2 Cr.), ENGL 001 (2 Cr.), LAWS 001 (1 Cr.), and another 11 credits are selected from the University Elective Courses list.

<sup>2</sup> Selected from General Engineering courses: EMAP 152, EMAP 162, EMAP 172.

<sup>3</sup> Courses selected from 200 level departmental and faculty elective courses.

<sup>4</sup> Selected from 400 level odd numbered departmental and faculty elective courses.

<sup>5</sup> Selected from 400 level even numbered departmental and faculty elective courses.

<sup>6</sup> Selected from 500 level odd numbered departmental and faculty elective courses.

<sup>7</sup> Selected from 500 level even numbered departmental and faculty elective courses.

## **ELECTIVE COURSES:**

### **General Engineering**

EMAP 152-3D- Drawing and Modeling Software (2 Cr.), EMAP 162 Applied Engineering Software (2 Cr.), EMAP 172 Introduction to Global Positioning Systems (2 Cr.), EMAP 212 Applied Engineering Mathematics I (3 Cr.), EMAP 214 Applied Engineering Mathematics II (2 Cr.), EMAP 216 Probability Theory and Applications (3 Cr.), EMAP 220 Numerical Computations (3 Cr.), EMAP 222 Mechanics III (Rigid Body Dynamics) (3 Cr.), EMAP 314 Numerical Analysis and Techniques (3 Cr.).

### **Electrical Engineering (3 Cr. Each):**

ELEE 222 Electronic Circuits I , ELEE 234 Logic Circuit Fundamentals, ELEE 262 Modern Physics, ELEE 272 Electromagnetic Fundamentals , ELEE 301 Electric Machines and Power Engineering.

### **Communication And Electronics Engineering**

CMNE 485 Communication Engineering (2 Cr.), CMNE 521 Digital Integrated Circuits (3 Cr.), CMNE 522 Radio Frequency Communication Circuits (3 Cr.), CMNE 527 Computer Architecture (3 Cr.), CMNE 531 Embedded Systems, CMNE 531 L Embedded Systems Lab (1 Cr.), CMNE 561 VLSI Design (3 Cr.), CMNE 562 L Integrated Circuits Lab (1 Cr.), CMNE 571 Microwave Engineering (3 Cr.), CMNE 572 Antennas for Telecommunication and Remote Sensing (3 Cr.), CMNE 572 L Microwaves and Antennas Lab (1 Cr.), CMNE 584 Communication Networks (3 Cr.), CMNE 584L Communications Circuits Lab (1 Cr.), CMNE 585 Optical Communications (3 Cr.), CMNE 585 Optical Communications (3 Cr.), CMNE 586 Information Theory and Coding (3 Cr.).

### **Electric Power And Control Engineering**

PWRE 442 Electric Machines and Power Systems (2 Cr.), PWRE 442L Electric Machines and Power Systems Lab (1 Cr.), PWRE 446 Generalized Machines Theory (2 Cr.), PWRE 446L Generalized Machine Theory (Lab) (1 Cr.), PWRE 542 Solid State Drives (2 Cr.), PWRE 586 Special Machines (2 Cr.), PWRE 544 Specialized Modes of Machine Operation (2 Cr.), PWRE 588 Advanced Topics in Power Electronics (2 Cr.), PWRE 546 Mechatronics and Robotics (2 Cr.), PWRE 552 Power System Protection II (2 Cr.), PWRE 554 Power System Control and Operation (2 Cr.), PWRE 556 Power System Planning (2 Cr.), PWRE 596 Power Systems Computer-Aided Design (2 Cr.), PWRE 598 Electrical Design in Commercial and Industrial Buildings (2 Cr.), PWRE 594 Digital Control Systems (2 Cr.).

### **Civil Engineering (2 Cr. Each)**

CIVE 201 Theory of Structures for Architects, CIVE 202 Surveying for Architects, CIVE 301 Reinforced Concrete for Architects, CIVE 302 Steel Structure for Architects, CIVE 303 Soil Mechanics and Foundations for Architects, CIVE 411 Earthquake Engineering, CIVE 412 Stability of Structures, CIVE 414 Structural Modeling, CIVE 419 Architectural Planning & Construction Methods, CIVE 425 Environmental Protection Engineering, CIVE 427 Irrigation and Drainage Engineering, CIVE 436 Advanced Transportation Engineering, CIVE 446 Transportation Planning, CIVE 452 Principles of Plumbing, CIVE 483 Hydrographic Surveying, CIVE 504 Tunnel and Mining Surveying, CIVE 511 Advanced Structural Analysis, CIVE 514 Inelastic Analysis & Dynamics of Structures, CIVE 516 Feasibility Study and Marketing, CIVE 517 Remote Sensing, CIVE 523 Photogrammetry & Geodesy, CIVE 524 Water and Wastewater Treatment, CIVE 526 Design with Geosynthetics, CIVE 527 Water and Wastewater Network, CIVE 528 The Use of G P S & G I S, CIVE 531 Railways Engineering, CIVE 536 Hydraulic Structures, CIVE 537 Hydraulic and Hydrologic Modeling, CIVE 544 Airports Engineering, CIVE 548 Coastal Engineering and Shore Protection, CIVE 551 Reinforced Concrete Bridges, CIVE 552 Steel Bridges, CIVE 556 Advanced Reinforced Concrete, CIVE 559 Tall Building Structure, CIVE 560 Pre-stressed Concrete Structure, CIVE 564 Traffic Engineering, CIVE 565 Urban Railways, CIVE 566 Experimental Soil Mechanics, CIVE 567 Retaining Structures, CIVE 568 Materials Technology, CIVE 569 Soil and Site Improvement, CIVE 570 Concrete Technology, CIVE 571 Advanced Mechanics of Materials.

### **Mechanical Engineering**

MECE 212 Mechanical Drawing (3 Cr.), MECE 214 Mechanics of Materials (3 Cr.), MECE 301 HVAC and Sanitation for Architects (2 Cr.), MECE 415 Mechanical Power Stations (2 Cr.), MECE 415L Mechanical Power Stations (Lab) (1 Cr.), MECE 511 Dynamic System Modeling (2 Cr.), MECE 512 Computer Aided Design (2 Cr.), MECE 513 Predictive and Preventive Maintenance (2 Cr.), MECE 514 Friction and Wear of Materials (2 Cr.), MECE 516 Mechatronics System Design (2 Cr.), MECE 522 Operation and Management of Thermal Power Stations (2 Cr.), MECE 523 Mechanical Engineering Measurements (2 Cr.), MECE 524 Water Treatment and Desalination Technology (2 Cr.), MECE 525 Refrigeration and H V A C Applications (2 Cr.), MECE 526 Solar and Renewable Energy (2 Cr.), MECE 533 Hydraulic Circuits (2 Cr.), MECE 534 Hydraulic Equipment (2 Cr.), MECE 535 Fluid System Design (2 Cr.), MECE 536 Pipe-Line Engineering (2 Cr.), MECE 542 Gas Turbines Propulsion (2 Cr.), MECE 543 Diesel Engines (2 Cr.), MECE 544 New Trends in Combustion Engineering (2 Cr.), MECE 545 Automotive Engineering (2 Cr.), MECE 546 Pollution Control Engineering (2 Cr.).

### **Computer Engineering**

CMPE 212 Introductory Web Programming (2 Cr.), CMPE 222 Digital Systems I (3 Cr.), CMPE 232 Data Structures I (3 Cr.), CMPE 234 Discrete Structures I (3 Cr.), CMPE 412 Software Engineering (3 Cr.), CMPE 414 Computer Software Laboratory

(3 Cr.), CMPE 430 Digital Image Processing (3 Cr.), CMPE 434 Information Theory & Coding (3 Cr.), CMPE 435 Theory of Computation (3 Cr.), CMPE 436 Computer Algorithms II (3 Cr.), CMPE 437 Operations Research for Computer Engineers (3 Cr.), CMPE 438 Performance Evaluation (3 Cr.), CMPE 454 Computer Networking Laboratory (3 Cr.), CMPE 462 Digital Modern Control (3 Cr.), CMPE 464 Robotics and P L CS Laboratory (3 Cr.), CMPE 482 Introduction to Computational Biology (3 Cr.), CMPE 514 Web Programming (3 Cr.), CMPE 524 Microprocessor-Based Systems (3 Cr.), CMPE 526 Parallel Processing (3 Cr.), CMPE 533 Neural Networks (3 Cr.), CMPE 535 Computer Vision (3 Cr.), CMPE 537 Cryptography and Information Security (3 Cr.), CMPE 541 Database Systems II (3 Cr.), CMPE 542 Statistical Data Mining (3 Cr.), CMPE 551 Network Architecture and Protocols (3 Cr.), CMPE 552 Network Interconnections (3 Cr.), CMPE 564 Robotics (3 Cr.), CMPE 585 Algorithms in Bioinformatics (3 Cr.).

### **Industrial And Management Engineering**

IEME 202 Technology and Shaping of Metals (2 Cr.), IEME 212 Industrial Economics (3 Cr.), IEME 214 Operation Research for Industrial Applications (3 Cr.), IEME 252 Engineering Materials Technology (3 Cr.), IEME 262 Principle of Engineering Design (3 Cr.), IEME 314 Industrial Packaging (3 Cr.), IEME 318 Statistical Analysis (3 Cr.), IEME 320 Organization Design (3 Cr.), IEME 322 Management Information Systems (3 Cr.), IEME 426 Failure Analysis (3 Cr.), IEME 428 Management of Global Operations (3 Cr.), IEME 438 Plastics Engineering (3 Cr.), IEME 462 system Modeling and Simulation II (3 Cr.), IEME 534 Product Quality and Reliability (3 Cr.), IEME 544 Strategic Manufacturing Planning (3 Cr.), IEME 564 Mechatronics (3 Cr.), IEME 566 Reverse Engineering and Prototyping (3 Cr.), IEME 597 Business Systems Simulation (3 Cr.).

### **Surveying Engineering**

SRVE 212 Optical Principles of Surveying Instruments (3 Cr.), SRVE 242 Plane Surveying I (3 Cr.), SRVE 262 Surveying Drawings (3 Cr.), SRVE 471 Boundary and Public Land Surveys (2 Cr.), SRVE 473 Drawing and Constructions of Maps (2 Cr.), SRVE 482 Gravimetric Geodesy (2 Cr.), SRVE 483 Hydrographic Surveying (2 Cr.), SRVE 484 Precise Application of Surveying (2 Cr.), SRVE 504 Tunnel and Mining Surveying (2 Cr.), SRVE 506 Digital Mapping System (2 Cr.), SRVE 508 Surveying Economics & Surveying Management (2 Cr.), SRVE 510 Digital Terrain Modeling (2 Cr.), SRVE 593 Satellite and Inertial Surveying (2 Cr.), SRVE 595 Computer Mapping & Land Information Management (2 Cr.), SRVE 597 Digital Imaging Processing (2 Cr.).

# POSTGRADUATE PROGRAMS OFFERED DEGREES

The Postgraduate programs offered at the Faculty of Engineering include Master and Doctor of Philosophy (PhD) degrees in the following fields:

- 1- Electrical Engineering (2 specialties) :
  - i- Power System and Control
  - ii- Communication and Electronics
- 2- Civil Engineering (3 specialties):
  - i- Structural and Geotechnical Engineering
  - ii- Public work Engineering
  - iii- Water Resources and Environmental Engineering
- 3- Mechanical Engineering (4 specialties):
  - i- Design and Dynamic Systems
  - ii- Thermal Engineering
  - iii- Fluids Engineering
  - iv- Combustion and Automotive Engineering
- 4- Computer Engineering & Informatics
- 5- Industrial Engineering & Management
- 6- Surveying Engineering

## PROGRAM DESCRIPTION

### MASTER DEGREES

The duration of study to receive a **Master Degree** is 4 semesters (minimum) and the program involves both taught courses and a thesis and requires a total of 36 Credit hours taken as follows:

- Mandatory Courses: 15 Cr.
- Departmental Electives: 15Cr.
- Thesis: 6 Cr.

### PHD DEGREE

The duration of study to receive a **PhD Degree** is 6 semesters (minimum). The program involves both taught courses and a thesis adding up to total of 40 Credit hours taken as follows:

- Departmental Electives: 12 Cr.
- Thesis: 28 Cr.
- Comprehensive Exam.

The PhD program requirements also include the publication of one international journal paper or two international conference papers on topics related to the PhD thesis.

## POSTGRADUATE COURSES

The following course list is applicable to all postgraduate courses available at the faculty. However, there are some additional courses applicable specifically to the PhD level only.

**MASTER DEGREE IN ELECTRICAL ENGINEERING  
"COMMUNICATIONS & ELECTRONICS"  
Curriculum  
(36 Credit Hours)**

		<b>Credit</b>
CMNE 601	Advanced Communication Theory	3
CMNE 602	Propagation of Electromagnetic Waves in Different Media	3
CMNE 603	Advanced Electronic Circuits	3
CMNE 604	Microprocessor-based Systems	3
CMNE 699	Thesis	6
EMAP XXX	Mathematics	3
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		21

\* The remaining 15 credits should be taken as Elective Courses offered by the department (3 Cr. Each):

CMNE 605 Advanced Communication Systems, CMNE 606 Neural Networks, CMNE 607 Special Topics in Digital Signal Processing, CMNE 608 Antenna Engineering, CMNE 609 Microwave Engineering, CMNE 610 Remote Sensing, CMNE 611 Theory Of Guided Optical Waves & Integrated Optics, CMNE 612 Special Topics In Propagation, CMNE 613 Analysis & Design of Digital Integrated Circuits, CMNE 614 Modeling of Semiconductor Devices, CMNE 615 Advanced Analog Integrated Circuits, CMNE 616 Very Large Scale Integrated Circuits (vlsi), CMNE 617 Radio Frequency Communication Circuits, CMNE 618 Special Topics in Electronics, CMNE 619 Advanced Computer Architecture, CMNE 620 Advanced Embedded Systems, ARM Architecture. Introduction to Real Time Operating Systems, CMNE 621 Robotics, CMNE 701 Advanced Special Topics in Communications, CMNE 702 Advanced Special Topics in Digital Signal Processing, CMNE 703 Advanced Special Topics in Propagation, CMNE 704 Advanced Special Topics in Electronics.

**MASTER DEGREE IN ELECTRICAL ENGINEERING**  
**"POWER SYSTEMS & CONTROL"**  
**Curriculum**  
**(36 Credit Hours)**

			<b>Credit</b>
PWRE	601	Advanced Power System Analysis	3
PWRE	602	Advanced Power Electronics	3
PWRE	603	Introduction to Robust Control	3
PWRE	604	DSP Microprocessors	3
PWRE	699	Thesis	6
EMAP	XXX	Mathematics	3
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			21

\* The remaining 15 credits should be taken as elective courses offered by the department (3 Cr. Each):

PWRE 605 Optimal Operation of Power systems, PWRE 606 Fault – Tolerant Power Systems, PWRE 607 Optimal Use of Power Production and Transmission Facilities in Hydro Power System, PWRE 608 Power System Reliability and Security, PWRE 609 Power Market Operations, PWRE 610 Deregulated Power Systems, PWRE 611 Power System Transaction Management, PWRE 612 Power System Staidly and Controls, PWRE 613 Voltage Instability in Power Systems, PWRE 614 Modeling and Simulation of Power System Components, PWRE 615 Power System Design of Alternative Energy Sources, PWRE 616 Computer Relays for Electric Power Systems, PWRE 617 Modern Trends in Power System Protection, PWRE 618 Design of HV/EHV Power Transmission Systems, PWRE 619 High Voltage DC Transmission Systems, PWRE 620 Int. Standards and Tech. Specifications of Electrical Power Equip., PWRE 621 Transients in Power Systems, PWRE 622 Dynamics and Simulation of Electrical Machines, PWRE 623 Advanced Electrical Machines, PWRE 624 Advanced Solid State Drives, PWRE 625 Adjustable Speed Drives, PWRE 626 Advanced Industrial Automation , PWRE 627 Power Active Filter Design, PWRE 628 Digital Control Systems, PWRE 629 Optimal Control Systems, PWRE 630 Adaptive Control Systems, PWRE 631 Intelligent Control Systems, PWRE 632 Robotics, PWRE 633 Nonlinear Control Systems, PWRE 634 Computational Intelligence in Engineering, PWRE 635 Special Topics in Power Systems, PWRE 636 Special Topics in Automatics Control Systems, PWRE 637 Special Topics in Power Electronic, PWRE 638 Special Topics in Electric Machines, PWRE 639 Electrical Power Quality.

# MASTER DEGREE IN CIVIL ENGINEERING

## "Public Works, Structural & Geotechnical Engineering, Water Resources & Environmental Engineering"

### Curriculum (36 Credit Hours)

			<b>Credit</b>
CIVE	601	Transportation Planning & Traffic Engineering	3
CIVE	602	Water Resources Engineering	3
CIVE	603	Advanced Structural Systems	3
CIVE	604	Finite Element Method	3
CIVE	605	Construction Economics and Cost Control	3
CIVE	699	Thesis	6
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			21

\* The remaining 15 credits should be taken as elective courses offered by the Department (3 Cr. Each):

#### **Public Works Engineering**

CIVE 606 Traffic and Transportation Engineering, CIVE 607 Alignment and Geometric Design for Highways and Airports, CIVE 608 Managements of Construction Projects, CIVE 609 Transportation and the Environment, CIVE 610 Railways Engineering, CIVE 611 Transportation Economy, CIVE 612 Pavement Design and Highway Material and Equipments, CIVE 613 – Highway Maintenance, CIVE 614 – Construction Specifications, CIVE 615 – Railway Station and Yards, CIVE 616 Permanent Way Technique, CIVE 617 Environmental Impacts of Railway Systems, CIVE 618 Track Maintenance and Renewal, CIVE 619 Multi – Model Transport Systems, CIVE 620 Urban Railways, CIVE 621 Traffic Engineering, CIVE 622 Transportation Planning, CIVE 623 Transportation Facilities, CIVE 624 Logistics Concepts, CIVE 625 Sustainable Transportation.

#### **Structural and Geotechnical Engineering**

CIVE 626 Advanced Reinforced Concrete Structures, CIVE 627 Advanced Foundations, CIVE 628 Computer Analysis of Structures, CIVE 629 Earthquake Engineering, CIVE 630 Analysis of Tall Buildings, CIVE 631 Elastic – Plastic Analysis of Structures, CIVE 632 Soil Improvement, CIVE 633 Soil Dynamics, CIVE 634 Soil Hydraulics, CIVE 635 Environmental Geotechnics, CIVE 636 Prestressed Concrete Structures, CIVE 637 Concrete Techniques and Repair, CIVE 638 Stability and Plastic Analysis of Structures, CIVE 639 Theory of Plates and Shells, CIVE 640 Construction Management , CIVE 641 Rehabilitation of Structures , CIVE 642 Advanced Steel Structures, CIVE 643 Theory of Elasticity of Concrete Structures, CIVE 644 Numerical Methods for Solving Soil Problems, CIVE 645 Fire Engineering of Structures, CIVE 646 Concrete Technology, CIVE 647 Fatigue of Metallic Materials and Welding Techniques, CIVE 648 Corrosion Theories of Metallic Materials, CIVE 649 Mechanics of Concrete Structures, CIVE 651 Reliability and Safety Analysis, CIVE 652 Inelastic Seismic Performance and Damage Evaluation of Building., CIVE 653 Value Engineering in the Construction Industry, CIVE 654 Construction Aspects and Earth Work in Geotechnical Engineering.

#### **Water Resources and Environmental Engineering**

CIVE 655 Surface and Ground Water Pollution, CIVE 656 Hydraulic and Structural Design of Pipelines and Pipe Networks, CIVE 657 Design and Construction of Pipelines, CIVE 658 Hydrologic and Hydraulic Measurements and Modeling, CIVE 659 River Engineering, CIVE 660 Design of Pumping Stations, CIVE 661 Design of Small Canal Hydraulic Structures, CIVE 662 Design of Small Dams, CIVE 663 Surface Water Hydrology, CIVE 664 Ground Water Hydrology, CIVE 665 Fluid Mechanics, CIVE 666 Finite Element Method in Hydraulics, CIVE 667 Unsteady Flow in Closed Conduits, CIVE 668 Modern Design of Small Irrigation Structures, CIVE 669 Advanced Topics in Hydraulics and Irrigation Engineering, CIVE 670 Sewer Systems, CIVE 671 Storm Water Collection, CIVE 672 Solid State Control, CIVE 673 Coastal and Marine Structures, CIVE 674 Harbor Engineering and Navigation Channels, CIVE 675 Wastewater Collection Systems, CIVE 676 Drinking Water Supply, CIVE 677 Environmental Engineering, CIVE 678 Coastal Engineering (a), CIVE 679 Coastal Engineering (b), CIVE 680 Marine Structure.

**MASTER DEGREE IN MECHANICAL ENGINEERING**  
**Combustion and Automotive Engineering, Design and Dynamic Systems,**  
**Fluids Engineering, Thermal Engineering**  
**Curriculum**  
**(36 Credit Hour)**

		<b>Credit</b>
MECE 601	Condition Monitoring and Diagnosis	3
MECE 602	Advanced Combustion Engines	3
MECE 603	Theory and Design of Hydraulic Machines	3
MECE 604	Power Plants & Renewable Energy	3
MECE 605	Advanced Thermodynamics	3
MECE 699	Thesis	6
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		21

\* The remaining 15 credits should be taken as elective courses offered by the Department (3 Cr. Each):

**Combustion and Automotive Engineering**

MECE 606 Direct Research, MECE 606 Modern Automotive Engineering, MECE 608 Engineering Management of Automotive Service Centers, MECE 609 Fundamentals of Diesel Engineering, MECE 610 Turbomachinery, MECE 611 Combustion, Emissions and Pollution Control, MECE 612 Performance and Maintenance of diesel Engines, MECE 613 Special Topics in Combustion Engineering.

**Design and Dynamic Systems**

MECE 606 Direct Research, MECE 614 Vibration Control, MECE 615 Robot Dynamics, MECE 616 Lubricants and Lubrication Systems, MECE 617 Mechanical Behavior of Composite Materials, MECE 618 Tribology, MECE 619 Fracture Mechanics, MECE 620 Elastohydrodynamics, MECE 621 Nonlinear Vibrations, MECE 622 Modern Control Analysis, MECE 623 Intelligent Control Systems.

**Fluids Engineering**

MECE 606 Direct Research, MECE 624 Design of Pipelines, MECE 625 Hydraulic Power Circuits, MECE 626 Hydraulic and Pneumatic Systems, MECE 627 Theory of Lubrication, MECE 628 Viscous Fluid Flow, MECE 629 Boundary Layer Theory, MECE 630 Multiphase Flow, MECE 631 Special Topics in Fluid Mechanics.

**Thermal Engineering**

MECE 632 Cooling Systems, MECE 633 Air Conditioning Equipment and System, MECE 634 Heating Systems, MECE 635 Heat Exchangers, MECE 636 Advanced Heat Transfer, MECE 637 Water Treatment and Desalination Units, MECE 638 Special Topics in Thermal Engineering.

## MASTER DEGREE IN COMPUTER ENGINEERING & INFORMATICS

### Curriculum

(36 Credit Hours)

			Credit
CMPE	601	Distributed Operating Systems	3
CMPE	602	Advanced Computer Architecture	3
CMPE	603	Advanced Algorithms	3
CMPE	604	Network Interconnections	3
CMPE	605	Fuzzy Sets, Logic, and Applications.	3
CMPE	699	Thesis	6
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			21

\* The remaining 15 credits should be taken as elective courses offered by the Department (3 Cr. Each):

CMPE 606 Randomized Algorithms, CMPE 607 Advanced Microprocessor – Based Systems, CMPE 608 Advanced Topics in Computer Graphics, CMPE 609 Neural Networks, CMPE 610 On-line Algorithms, CMPE 611 Nontraditional Database Systems, CMPE 612 Data – Mining, CMPE 613 Data Warehousing, CMPE 614 Security Protocols, CMPE 615 Advanced Computer Control and Robotics, CMPE 616 Modern Trends in Computer Engineering I, CMPE 617 Modern Trends in Computer Engineering, II.

## MASTER DEGREE IN INDUSTRIAL ENGINEERING & MANAGEMENT

### Curriculum

(36 Credit Hours)

			Credit
IEME	601	Advanced Operations Research	3
IEME	602	Advanced Production and Operations Management	3
IEME	603	Decision Models and Analysis	3
IEME	604	Feasibility Studies	3
IEME	605	Total Quality Management and six sigma	3
IEME	699	Thesis	6
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			21

\*The remaining 15 credits should be taken as elective courses offered by the Department (3 Cr. Each):

IEME 606 Safety Engineering and Reliability, IEME 607 Maintenance Planning and Management, IEME 608 Modeling and Simulation, IEME 609 Process Improvement Engineering, IEME 610 Supply Chain and Logistics, IEME 611 Technology Management, IEME 612 Research Methodology, Presentation and Communications Skills, IEME 613 Engineering Economics, IEME 614 Advanced Topics in IE, IEME 615 Case Studies and IE Applications.

**MASTER DEGREE IN SURVEYING ENGINEERING**  
**Curriculum**  
**(36 Credit Hours)**

			<b>Credit</b>
SRVE	601	Adjustment of Horizontal & Vertical Networks	3
SRVE	602	Higher Geodesy I	3
SRVE	603	Map Projections I	3
SRVE	604	Precise Surveying Works	3
SRVE	605	Surveying By Global Positioning System GPS	3
SRVE	699	Thesis	6
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			21

\* The remaining 15 credits should be taken as elective courses offered by the department (3 Cr. Each):

SRVE 606 Higher Geodesy (II), SRVE 607 Global Positioning System (GPS), SRVE 608 Management of Surveying Projects, SRVE 609 Adjustment of Observations, SRVE 610 Global Geophysics and Geodynamics, SRVE 611 Internal Surveying and INS / GPS Integrations, SRVE 612 Geometric Reference Systems, SRVE 613 Advanced Topics in Analytical and Digital Photogrammetry, SRVE 614 MAP Projections (II), SRVE 615 Hydrographic Surveying, SRVE 616 Digital Terrain Modeling, SRVE 617 Remote Sensing, SRVE 618 High Precision Surveys, SRVE 619 Advanced Physical Geodesy, SRVE 620 Navstar GPS, Theory and Applications.

**PhD IN ELECTRICAL ENGINEERING**  
**"Communications & Electronics"**  
**Curriculum**  
**(40 Credit Hours)**

			<b>Credit</b>
CMNE	799	Thesis	28
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			28

\* The remaining 12 credits should be taken as elective courses offered by the department (3 Cr. Each):

CMNE 701 Advanced Special Topics in Communications, CMNE 702 Advanced Special Topics in Digital Signal Processing, CMNE 703 Advanced Special Topics in Propagation, CMNE 704 Advanced Special Topics in Electronics.

**PhD IN ELECTRICAL ENGINEERING**  
**"Power Systems & Control"**  
**Curriculum**  
**(40 Credit Hours)**

	<b>Credit</b>
PWRE 799 Thesis	28
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	28

\* The remaining 12 credits should be taken as elective courses offered by the department (2 Cr. Each):  
 PWRE 701 Advanced Special Topics in Power Systems, PWRE 702 Advanced Special Topics in Automatic Control, Systems, PWRE 703 Advanced Special Topics in Power Electronics, PWRE 704 Advanced Special Topics in Electric Machines.

**PhD IN CIVIL ENGINEERING**  
**"Public Works, Structural & Geotechnical Engineering, Water Resources & Environmental Engineering"**  
**Curriculum**  
**(40 Credit Hours)**

	<b>Credit</b>
CIVE 799 Thesis	28
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	28

\* The remaining 12 credits should be taken as elective courses offered by the department (3 Cr. Each):

**Public Works Engineering**

CIVE 701 Transport Modeling, CIVE 702 Tunnel Engineering, CIVE 703 Advanced Railway Control Systems, CIVE 704 Underground Rail Transport Systems, CIVE 705 Railway Simulation, CIVE 706 Railway Planning For High Speed Systems, CIVE 707 Traffic Theory, CIVE 708 Intelligent Traffic Systems ITS., CIVE 709 Transportation Logistics, CIVE 710 Evaluation of Transport Projects, CIVE 711 Air Transport Planning, CIVE 712 Magnetic Train Technology.

**Structural and Geotechnical Engineering**

CIVE 713 Nonlinear Analysis of Structure, CIVE 714 Analysis of Composite Design, CIVE 715 Analysis of Space and non Conventional Structures, CIVE 716 Advanced Soil Mechanics, CIVE 717 Numerical Modeling of Concrete Structures, CIVE 718 Dynamic and Seismic Analysis of Structures, CIVE 719 Behavior and Stability of Metal Structures, CIVE 720 Advanced Finite Element Method, CIVE 721 Mathematical Programming (a), CIVE 722 Mathematical Programming (b), CIVE 723 Vibration Control, CIVE 724 Conditions of Contracts for Works of Civil Eng. ONSTR (FIDIC).

**Water Resources and Environment**

CIVE 725 Water Logging and Drainage Systems, CIVE 726 Environmental Impact of Irrigation and Drainage Projects, CIVE 727 Wave Hydraulics and Coastal Engineering, CIVE 728 Water Purification Engineering, CIVE 729 Wastewater Reuse and Waste Recycle, CIVE 730 Industrial Wastewater Treatment, CIVE 731 Surface Water Pollution Control, CIVE 732 Economics of Water and Wastewater Projects.

**PhD IN MECHANICAL ENGINEERING**  
**Combustion and Automotive Engineering, Design and Dynamic Systems,**  
**Fluids Engineering, Thermal Engineering**  
**Curriculum**  
**(40 Credit Hours)**

	<b>Credit</b>
MECE 799 Thesis	28
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	28

\* The remaining 12 credits should be taken as elective courses offered by the department (3 Cr. Each):

**Combustion and Automotive Engineering**

MECE 701 Thermodynamics of Combustion, MECE 702 Heterogeneous Combustion, MECE 703 Advanced Gas Dynamics, MECE 704 Applications of Unsteady Flow in Combustion, MECE 705 Combustion Kinetics and Flames, MECE 706 Special Topics in Combustion Engineering.

**Design and Dynamic Systems**

MECE 707 Theory of Elasticity, MECE 708 Theory of Plates and Shells, MECE 709 Theory of Plasticity, MECE 710 Viscoelasticity, MECE 711 Theory of Elastic Stability, MECE 712 Advanced Dynamics, MECE 713 Noise and Vibration Control, MECE 714 Nonlinear Control.

**Fluids Engineering**

MECE 715 Computational Fluid Mechanics, MECE 716 Turbulent Flow, MECE 717 Flow Transients, MECE 718 Non – Newtonian Fluid Mechanics, MECE 720 Aerodynamics, MECE 721 Special Topics in Fluid Mechanics.

**Thermal Engineering**

MECE 722 Advanced Engineering in Thermodynamics, MECE 723 Heat and Mass Transfer, MECE 724 Two – Phase Flow Heat Transfer, MECE 725 Humidification and Drying, MECE 726 Numerical Methods in Transport Phenomena, MECE 727 Special Topics in Thermal Engineering.

**PhD IN COMPUTER ENGINEERING & INFORMATICS**  
**Curriculum**  
**(40 Credit Hours)**

	<b>Credit</b>
CMPE 799 Thesis	28
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	28

\* The remaining 12 credits should be taken as elective courses offered by the department (3 Cr. Each):

CMPE 701 Structure and Design of Programming Languages, CMPE 702 Parallel Computing, CMNE 703 Special Topics in Artificial Intelligence, CMPE 704 Advanced Database Systems, CMNE 705 Image Understanding, CMNE 706 Computational Geometry.

**PhD IN INDUSTRIAL ENGINEERING & MANAGEMENT**  
**Curriculum**  
**(40 Credit Hours)**

	<b>Credit</b>
IEME 799 Thesis	28
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	28

\* The remaining 12 credits should be taken as elective courses offered by the department (3 Cr. Each);

IEME 701 Organizational Behavior, IEME 702 Transportation and Supply Chain System, IEME 703 Human – Machine Systems, IEME 704 Human Decision Making, IEME 705 Productivity Analysis, IEME 706 Economic Decision Analysis, IEME 707 Computational Statistics, IEME 708 Discrete Optimization, IEME 709 Nonlinear Optimization, IEME 710 Stochastic Processes, IEME 711 Financial Data Analysis, IEME 712 Reliability Engineering, IEME 713 Special Topics, IEME 714 Special Topics in OR. , IEME 715 Topics in Manufacturing, IEME 716 Topics in Optimization.

**PhD IN SURVEYING ENGINEERING**  
**Curriculum**  
**(40 Credit Hours)**

	<b>Credit</b>
SRVE 799 Thesis	28
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	28

\* The remaining 12 credits should be taken as elective courses offered by the department (3 Cr. Each):

SRVE 701 Advanced Estimation Methods and Analysis, SRVE 702 Atmospheric Effects on satellite Navigation Systems, SRVE 703 Digital Stereo Image Processing, SRVE 704 Advanced Spatial Information Systems, SRVE 705 Satellite Altimetry and Application, SRVE 706 Advanced Topics in Photogrammetry, SRVE 707 Advanced Remote Sensing.