Arab Academy for Science, Technology & Maritime Transport

College of Engineering & Technology

Information Directory

All inquiries and correspondence concerning the following areas should be addressed to:

Academic Offices

Dean's Office

College of Engineering and Technology, Arab Academy for Science and Technology,
P.O. Box 1029, Abu Qir Campus,
Alexandria, Egypt.
Tel: +203-562-1785 +203-562-2366 Ext. (1311)
Fax: +203-562-2915

Academic Departments

Architectural Engineering & Environment Design	+203-562-2366 Ext. (1416)	+203-562-0751
Basic and Applied Science	+203-562-2366 Ext. (1248)	+203-562-2578
Computer Engineering & Computer Science	+203-562-2366 Ext. (1221)	+203-562-0751
Construction & Building Engineering	+203-562-2366 Ext. (1143)	+203-561-0755
Electrical & Control Engineering	+203-562-2366 Ext. (1444)	+203-562-2586
Electronics & Communications Engineering	+203-562-2366 Ext. (1200)	+203-562-1477
Industrial & Management Engineering	+203-562-2366 Ext. (1258)	+203-561-0755
Marine Engineering	+203-562-2366 Ext. (1238)	+203-562-2586
Mechanical Engineering	+203-562-2366 Ext. (1246)	+203-562-2586

Admissions and Registration

Arab Academy for Science and Technology,
P.O. Box 1029, Abu Qir Campus,
Alexandria, Egypt.
Tel: +203-561-1814

Cairo Bank

Arab Academy for Science and Technology,
P.O. Box 1029, Abu Qir Campus,
Alexandria, Egypt.
Tel: +203-562-2572

Clinic

Arab Academy for Science and Technology,
P.O. Box 1029, Abu Qir Campus,
Alexandria, Egypt.
Tel: +203-562-1586

Director of Transport Affairs

Arab Academy for Science and Technology,
P.O. Box 1029, Abu Qir Campus,
Alexandria, Egypt.
Tel: +203-556-1497 +203-556-5429

Library

Arab Academy for Science and Technology,
P.O. Box 1029, Abu Qir Campus,
Alexandria, Egypt.
Tel: +203-562-2366(432)

Student Dorms

Arab Academy for Science and Technology,
P.O. Box 1029, Abu Qir Campus,
Alexandria, Egypt.
Tel: +203-562-2100

Further directory assistance for other offices is available through the main switchboard at +203-562-2366 or +203-562-2388.
The Academy's web site address is: www.aastmt.org

President's Word

The world is witnessing a new era that reflects all the massive changes and developments caused by technological advancement in all aspects of science. We believe that for the Arab World to obtain power and glory, it has to resort to scientific and technological development. The Academy plays a major national role in raising generations of youths who can deal with the outside world using modern tools of technology. Such role encourages youths to comprehend and master sciences of the future which in all will enhance their creativity.

Since its existence, the Academy was determined to assure its Arab identity. In doing so, it always took the lead in taking up new science and technology fields to achieve the goals set in its grounds for Quality and Productivity studies, research and services, Computer literacy, Multimodal Transportation and Logistics, participation in training on Crisis and Disaster management, in addition to implementing the latest techniques in using Multimedia to serve educational, training and research processes. The Academy also pioneered in connecting the Arab world with Developed Countries in the field of Informatics, establishing the rules for the International Olympiad in Informatics, and Robotics.

As we are on the threshold of a new era, the Academy - being a house of expertise and a successful example of mutual Arab co-operation - takes on a new distinguished role of development on he Arab countries and using the latest techniques to implement those requirements , which will lead the Arab youths to a powerful position through discipline, morals, technology, and harmless knowledge.

We thank God Almighty for the success and grace He granted us. We pray that the Almighty upholds the Arab nation and guide its youths to always support the Arab World.

Dr. Ismail Abdel Gafar Ismail Farag
President, AASTMT

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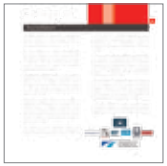





















College Message – Current Status and Future Prospectus

AASTMT has realized the importance of educational innovation and development, since the early days of its establishment in 1972.

The College of Engineering and Technology, at AASTMT, was established in 1990. Currently, the College of Engineering and Technology offers Bachelor's and Master's degrees in the areas of architectural engineering and environmental design, computer engineering, construction and buildings engineering, electrical and control engineering, electronics and communications engineering, industrial and management engineering, marine engineering, and mechanical engineering.

All programs offered by the College are acknowledged by the Supreme Council of Egyptian Universities (SCU) and fully accredited from the British Professional Institutes (IMechE), (IMarEST), (IET), (ICE), (IStructE), and (IHT), beside the accreditation from the Royal Institute of British Architects (RIBA) parts 1 and 2 for the architectural engineering program. Also all college programs, except Architecture & Environmental Design, are accredited by the Engineering Accreditation Commission of ABET.

AASTMT college of Engineering and Technology has got the certificate of the National Authority for Quality Assurance and Accreditation in Education (NAQAAE) in 2014 where this certificate valid for 5 years.

The core objective of the college is achieving Excellency in all provided educational services, throughout the effective implementation of continuous improvement concept, as well as the success in obtaining and renewal of all local and international accreditations.

Number of qualified and competent faculty members have increased drastically during the last five years resulting in huge developments in research activities whether to obtain research funds from local and international entities or to publish in the highly ranked and prominent scientific journals. Also, higher admission requirements combined with a competitive system of scholarships have been applied to attract high quality students. Furthermore, continuous development of educational resources, lab facilities, and campus infrastructure has been a constant activity in the College to maintain delivery of its quality services to students and faculty members.

As a step forward towards the enhancement of the relationship between the industrial and academic communities, the Industrial Advisory Committee was holding meetings on a semi-annual basis. These meetings discuss the opportunities of students' practical training, market needs in the college's graduates and finally the industrial problems that may be treated in the research projects.

In the future, the COE is strategically targeting to efficiently integrate all of our facilities, and resources to prepare young generations for the requirements of the knowledge based societies and to proactively provide competitive, intellectual and market divan academic programs, research, and community services and pledges strong collaboration between our Faulty, staff members, students, researchers, alumni and industrial and business leaders.

Prof. Amr Ali Hassan
Dean, College of Engineering and Technology

College of Engineering Vision/Mission Statements

Vision

Our Vision is to excel as one of the best engineering colleges locally and regionally and to maintain internationally recognized programs with an advanced academic rank. We also envision to provide the highest quality educational programs, research, and community services and to play a leading role in, all our engineering activities, as a foremost engineering school in the Arab world.

Mission

Our mission is to efficiently integrate all of our facilities, and resources to prepare young generations for the requirements of the knowledge based societies and to proactively provide competitive, intellectual, and market-driven academic programs, research, and community services and pledges strong collaboration between our faculty, staff members, students, researchers, alumni, and industrial and business leaders. Further to maintain and develop long term and lasting partnerships with Arab institutions, and internationally acknowledged bodies.

Introduction

The roots of the College of Engineering and Technology extend back to the date of the establishment of the Academy in 1972, when the Marine Engineering Department started to offer a two-year program of basic studies for engineering cadets, as well as upgrading courses for marine engineers. The Department of Academic Studies was also established to conduct courses in Mathematics, Physics, Chemistry and English Language.

In October 1975, the Radio and Electronics Department was established to offer a two-year program leading to the competency certificate of second-class program radio officer.

In 1977, following the adoption of the Credit Hour system for all undergraduate studies, the year of 1978 witnessed the beginning of the Bachelor of Engineering (B. Eng.) program plans in two major areas: Marine Engineering and Electronic Engineering. In 1984, both degrees were acknowledged by the Supreme Council of Egyptian Universities to be equivalent to similar degrees offered by the Egyptian Universities.

In 1987, the Radio and Electronic Department was renamed as the Electronics and Computer Department to reflect the recent technological trends towards computerization and information technology. Renaming this department, however, was accompanied by major changes in curriculum design and course contents.

In November 1990, the formal decree to establish the College of Engineering and Technology was issued. The preliminary structure comprised the four departments of Electronics, Marine Engineering, Electrical and Control Engineering, Basic and Applied sciences.
In 1994, it was decided to introduce two more fields of study namely; Construction and Building Engineering and Industrial and Management Engineering. In 1997, the Department of Architectural Engineering and Environmental Design was also established.

In September 1998, the College of Engineering Cairo Branch started its first Intake. The expansion that led to the establishment of the Cairo campus was consistent with the mission of the The Arab Academy for Science and Technology and Maritime Transport to serve the whole region. Campuses have separate Deans and Heads of Departments but are run under the same umbrella. The campuses follow the same syllabus, and coordination between branches allows sharing strategies and decisions. This special relation allows automatic acceptance of students in either campuses and a transparent transfer of credits and hours between campuses. Students are free to attend terms in Alexandria or Cairo.

The College of Engineering and Technology, at Port Said, was established in 2013 to serve the Sues Canal region .It overlooks the Mediterranean Sea, which gives students a special and unique college life. The college offers Bachelor's degrees in the areas of architectural engineering and environmental design, and construction and buildings engineering, that lasts for 5 academic years (a minimum of 10 semesters). The college adopts an innovative approach to engineering education. Instead of just learning the theory of engineering from a text book or a lecture, we are turning engineering education on its head to ensure that our graduates master needed workplace skills. The campus in Port Said is affiliated to Alexandria campus; all campuses share the same syllabi, strategies and decisions which ensures excellency in all provided educational services. This special relation allows automatic acceptance of students in other campuses and a transparent transfer of credits and hours between campuses. Moreover, Students are allowed to attend terms in other campuses.

Recently, through its current eight departments, the College of Engineering and Technology offers eight Bachelor of Science programs (B. Sc.) that take a minimum of 10 semesters (5 academic years) to complete.

Accreditation

The Arab Academy for Science and Technology and Maritime Transport is a fully accredited member of both the Association of Arab Universities and the International Association Universities.

The Arab Academy for Science and Technology and Maritime Transport has been awarded the ISO 9001:2000 certificate for its educational processes in September 1999, after following formal quality assurance procedures to maintain the educational quality level received by students and renewed on 2002, and 2008.

Undergraduate Programs offered by the College of Engineering and Technology are accredited by the Supreme Council of Egyptian Universities (SCU) according to the decree number 135 dated on August 27, 1996 and renewed according to the decrees number 3 dated on February 5, 2002, number 118 dated on July 10, 2007, number 36 dated February 24, 2011, and number 284 dated on December 10, 2012. Postgraduate Programs offered by the College of Engineering and Technology are accredited by the Supreme Council of Egyptian Universities (SCU) according to the decree number 30 dated on April 28, 2001 and renewed according to the decrees number 70 and 79 dated on June 19, 2006, number 97 dated on July 24, 2006, number 164 dated on September 8, 2009, number 224 dated October 17, 2010, number 84 dated December 26, 2013, and numbers 105, 106, and 107 dated April 22, 2014.

The Institute of Marine Engineering, Science and Technology (IMarEST) accredited the undergraduate program of Marine Engineering on March, 13, 2007. The Institute of Mechanical Engineers (IMechE) accredited the undergraduate program of Mechanical Engineering and the undergraduate program of Industrial and Management Engineering on November, 22, 2005. The Institution of Electrical Engineers (IEE) now named the Institution of Engineering and Technology (IET) accredited the undergraduate program of Computer Engineering, the undergraduate program of Electrical and Control Engineering, and the undergraduate program of Electronics and Communications Engineering on April, 27, 2005. The Joint Board of Moderators JBM: The Institution of Civil Engineers ICE, the Institution of Structural Engineers (IStructE) accredited the undergraduate program of Construction and Building Engineering and recognized by the Institution of Highways and Transportation IHT on December, 14, 2005.

Accreditation

The Royal Institute of British Architects (RIBA) validated the program of undergraduate Architectural Engineering and Environmental Design effective from 2005/6, and renewed on October 2014 for 5 years.
The Engineering Accreditation Commission of ABET accredited all engineering programs delivered on the AbuKir campus and Cairo campus (except for the program of Architectural Engineering and Environmental Design).

National Authority for Quality Assurance and Accreditation of education (NAQAAE) accredited the undergraduate and postgraduate programs dated on March 10, 2014 for 5 years.

The College of Engineering and Technology has many international agreements and programs with highly noticeable universities that support our students and faculty members. These programs extend from Lincoln University, Northumbria University, and Staffordshire University in UK; UTM University in Malaysia; Fatih University in Turkey; to University of Central Florida, and University of Missouri and Tennessee Tech University in USA; and to University of Waterloo, Carleton University, and Concordia University in Canada.

The College of Engineering and Technology also has protocols regarding graduate studies with national universities including Alexandria University, Ain Shams University, Cairo University, and Helwan University.

Academic Programs

The College of Engineering and Technology in The Arab Academy for Science, Technology and Maritime Transport offers Bachelor of Science degrees as well as Master of Science in the following fields:

- Architectural Engineering and Environmental Design
  (Alexandria, Cairo, PortSaid and Aswan)
- Computer Engineering.
  (Alexandria, Cairo and Lattekia – Syria)
- Construction and Building Engineering.
  (Alexandria, Cairo, PortSaid and Aswan)
- Electrical and Control Engineering.
  (Alexandria and Cairo)
- Electronics and Communications Engineering.
  (Alexandria, Cairo and Aswan)
- Industrial and Management Engineering.
  (Alexandria)
- Marine Engineering.
  (Alexandria)
- Mechanical Engineering.
  (Alexandria and Cairo)

These programs are accredited by the supreme Council of Egyptian Universities (SCU) according to the decree number 135 dated on August 27, 1996 and renewed according to the decrees number 3 dated on February, 5, 2002 and number 118 dated on July10, 2007.

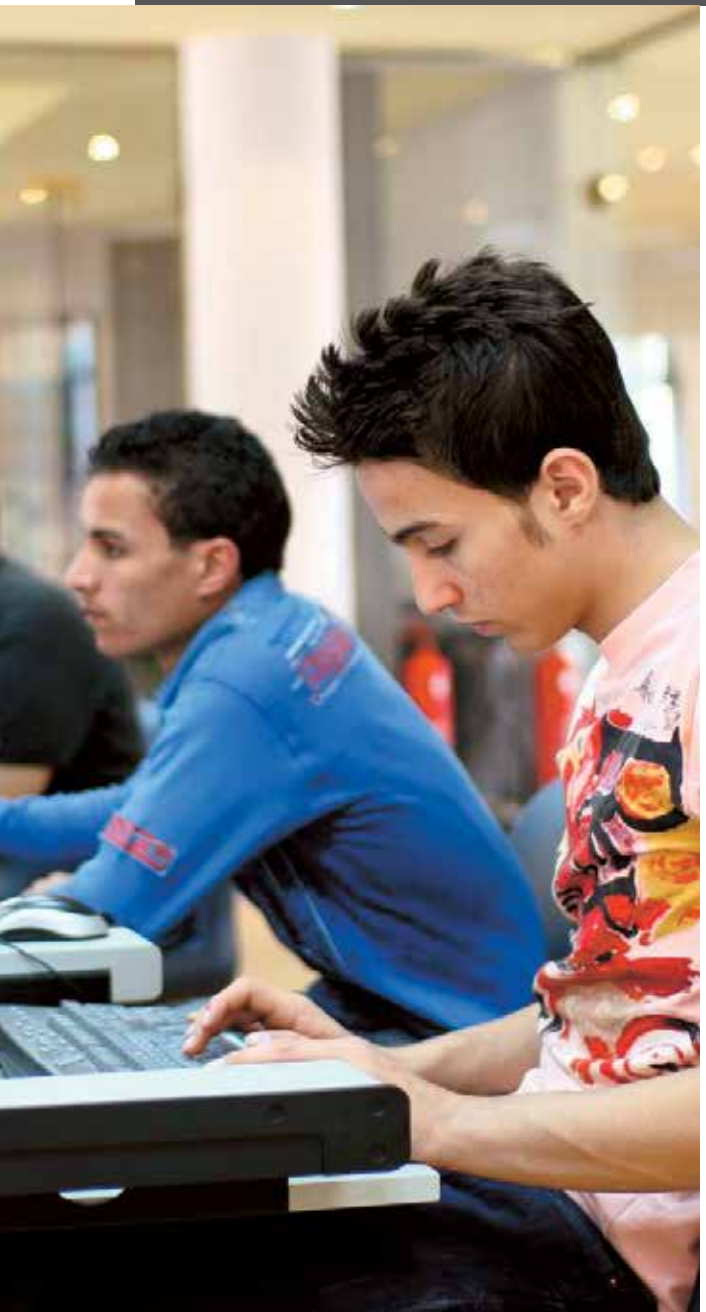
The programs are in the areas of:

- Marine Engineering.
- Mechanical Engineering.
- Electronics and Communications Engineering.
- Computer Engineering.
- Electrical and Control Engineering.
- Construction and Buildings Engineering.
- Industrial and Management Engineering.
- Architectural Engineering and Environmental Design.

The college maintains sound relationships with a number of universities in USA, UK, Canada and Egypt for joint supervision of undergraduate and postgraduate studies and research work. Agreements with University of Nottingham (UK), Carlton University (Canada) are based on major activities such as: the twinning of programs of study, as jointly taught Masters Program, programs of research leading to PhD degree and regular visits by academic staff.

The College of Engineering and Technology maintains an array of laboratories, workshops and computing facilities to secure the practical aspects and hands-on experience of the technology education in many areas. These areas include diesel and steam power plants, automation, measurements, heat transfer, hydraulics, electric machines, electric marine installation auxiliaries, radar,electronics,telecommunications,microprocessors, microcomputers, computer applications, marine pollution, surveying, construction materials, metrology, computer integrated manufacturing, electronic design automation, antennas and microwaves, work analysis, internal combustion engines, and refrigeration and air conditioning.

Academic Regulations



Students Rights and Responsibilities

Each individual student is responsible for his/her behaviour and is expected to maintain standards of academic honesty and personal integrity. Students must ensure safety, health, fairness, and the proper use of available resources in their undertakings. Students share the responsibility, with faculty for creating an environment that supports academic honesty and principles of professionalism.

Proper relationship between faculty and student are fundamental to the college's function, and this must be built on mutual respect and understanding together with shared dedication to the education process.
The College strongly believes that each student is worthy of trust and that each student has the right to live in an academic environment that is free of injustice caused by dishonesty.

While students have an obligation to assist their fellow students in meeting the common goals of their education, students have an equal obligation to maintain the highest standards of personal integrity.

Student Discipline

Until a degree is issued, students remain subject to AASTMT Code of Practice for Student Discipline that is clearly defined in the implemented quality management procedures in the College.

Students must be familiar with this code of practice by reading it carefully and asking questions about anything that is unclear. Students are ultimately responsible for meeting the requirements for their degrees, responsible for their behaviour, and are expected to maintain personal integrity.

Attendance, Absence and Withdrawals

Regular attendance in all classes is required. Students are expected to arrive on time and remain in class for the entire period scheduled. The responsibility for work missed due to any type of absence rests with the student. Attendance is mandatory

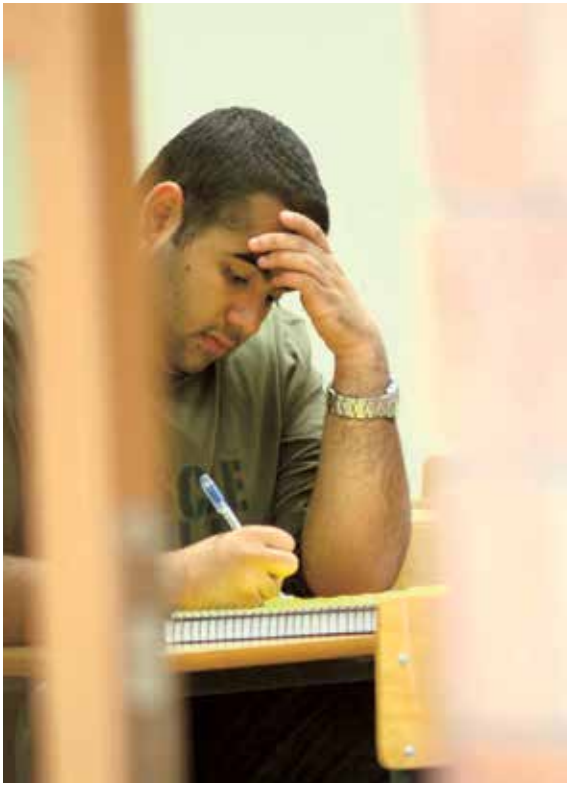
Students are expected to attend every class session. Each instructor will maintain current records and will, upon request, furnish an accurate report of any student's attendance pattern to the Registration Office. Attendance is checked from the first class meeting; therefore, late registrants will have some absences when they first meet a class.

When students are absent, for any reason, they are still responsible for the content of the missed lecture and for any assignments. If the absence causes the student to miss a major examination: that examination may be made up if the instructor is convinced that the absence was justified. A student's attendance record is a legitimate part of the criteria, which the instructor may use in assigning a grade for the courses. It is the responsibility of students to be aware of the attendance policies for their classes.

After the student has missed over 15% of class, the student will be asked to withdraw from the course and a grade of "W" will be entered. In case of illness or other forcing circumstances, absence may reach 20% without forcing withdrawal.

Students withdrawing from study during a semester must fill out a withdrawal permit; have it properly executed by the Registrar in order to leave a clear record. A student completing this process before the beginning of the final examination period will have a "W" record on the permanent record.

A student who withdraws without following this required procedure will be awarded an "F". Students cannot officially withdraw from study after the last day of classes prior to final examinations or while under disciplinary investigation.



Academic Advisor

Students are personally responsible for completing all requirements established for their degree by the College / Department. It is the student's responsibility to know the requirements for the appropriate degree program.

Faculty advisors will assist students in preparing schedules, completing degree plans, and generally will counsel students on academic matters, but advisors may not assume responsibility for the student's academic progress and ultimate success or failure in a given program of study.

Any substitution, waiver, or exemption for any established requirement or academic standard may be accomplished only with the approval of the department Head and the College Dean.

Graduation Requirements

To be qualified for Bachelor of Science the candidate must:

- Complete 180 credit hours of approved work
- Earn a cumulative grade point average of at least 2.00
- Complete practical training.

Assessment & Grading System

The College of Engineering and Technology adopts a continuous assessment system. Marks are distributed along the semester as follows:

- 30% of the grade is declared after the 7th week of class.
- Another 20% after the 12th week of class and 10% is awarded based on the student attendance, participation and assignments submission.
- The final exam is worth 40% of the grade.

Students can check their grades through the website using their assigned registration number and pin code. The letters A, B, C, D, F, I, and W are used as follows:

- A, B, and C, are passing grades.
- D is conditional passing grade, which is not counted as passing grades unless the student achieves the proper accumulative Grade Point Average for these registered credit hours. If he fails to do so, he shall have to repeat the courses with grade D to raise his GPA.

This is to be arranged with his Academic Advisor.

- If a student fails to attend the final exam without excuse, his final Exam's mark shall be zero.

A student's grade point average (GPA) is computed by dividing the total number of grade points accumulated by the total number of semester hours attempted

General Grade

General Grade is set according to the following accumulative Grade Point Averages:

Satisfactory	GPA 2.0 < 2.6	60% - less to 65%
Good	GPA 2.6 < 3.0	65% - less to 75%
Very Good	GPA 3.0 < 3.6	75% - less to 90%
Excellent	GPA 3.6 to 4	90% and above

Course Grade

Course grades are set according to the following scheme:

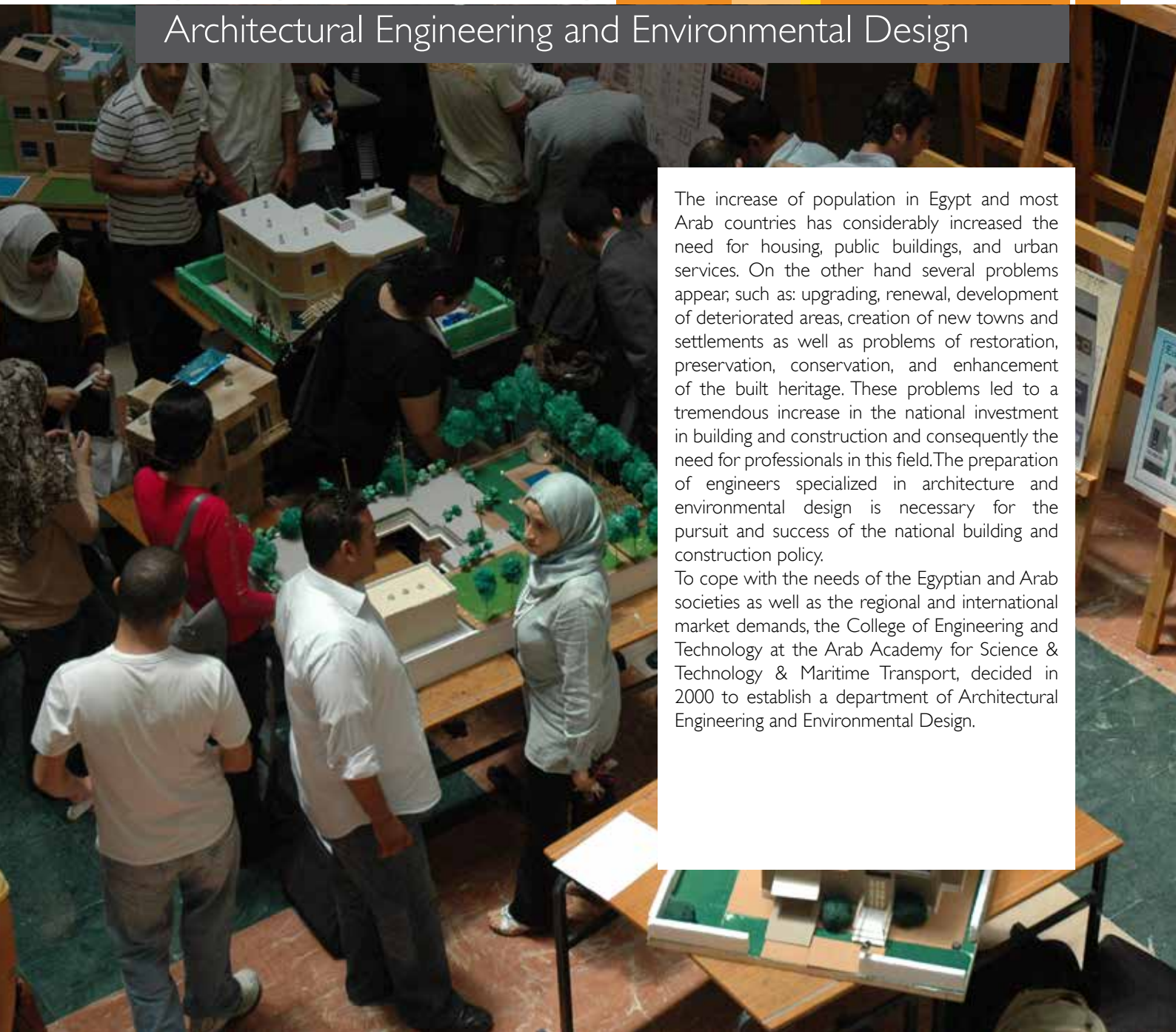
Evaluation Sign	Evaluation Points	Percentages (%)
A+	12/3 = 4	From 95 to 100
A	11.5/3 =3.83	From 90 to less than 95
A-	11/3 =3.66	From 85 to less than 90
B+	10/3 =3.33	From 80 to less than 85
B	9/3 =3.00	From 75 to less than 80
B-	8/3 =2.66	From 70 to less than 75
C+	7/3 =2.33	From 65 to less than 70
C	6/3 = 2.00	From 60 to less than 65
C-	5/3 =1.66	From 55 to less than 60
D	3/3 =1.00	From 50 to less than 55
F	Zero	Less than 50

- I In Complete
- W Withdrawn
- U Un Graded
- AU Audit
- TR Transferred
- P Pass
- F Fail

Academic Probation

Students are placed on academic probation if their accumulative the GPA is less than 2.00 at the end of any semester on the credits hours attempted at the Academy.

Architectural Engineering and Environmental Design



The increase of population in Egypt and most Arab countries has considerably increased the need for housing, public buildings, and urban services. On the other hand several problems appear, such as: upgrading, renewal, development of deteriorated areas, creation of new towns and settlements as well as problems of restoration, preservation, conservation, and enhancement of the built heritage. These problems led to a tremendous increase in the national investment in building and construction and consequently the need for professionals in this field. The preparation of engineers specialized in architecture and environmental design is necessary for the pursuit and success of the national building and construction policy.

To cope with the needs of the Egyptian and Arab societies as well as the regional and international market demands, the College of Engineering and Technology at the Arab Academy for Science & Technology & Maritime Transport, decided in 2000 to establish a department of Architectural Engineering and Environmental Design.

The main aims of the program include:

- Introducing students to the theoretical and scientific bases.
- Enabling students to acquire professional competency which meets future needs and job opportunities.
- Preparing graduates capable of imagination, creative thinking, problem solving and critical thinking.
- Helping the architect to understand the relationship between people and buildings, and between buildings and their environment.

A set of goals are adopted by the department such as:

- Prepare graduates specialized in architectural engineering and environmental design.
- Enable students to organize livable environments on all levels.
- Prepare the students to deal with modern tools & technologies.
- Encourage graduates to undertake activities related to research, futuristic approaches, and development

Everything related to the built environment, belongs to the domain of the architects. They are front - runners in the challenge to create a new world in the Twenty First Century.

public enterprises, consulting firms, governmental or local authorities, etc., whether in Arab or foreign countries. The graduates live up to the standards and requirements of the GAT Agreement such that they can compete on the highest levels.

Architects are qualified to work as Architectural designers and can gain further qualifications to become planners, landscape architects or conservation specialists. They can also work in the field of contracting, execution, tender preparation & evaluation, and/or the field of research & studies, feasibility studies and project management as well as maintenance & restoration of buildings.

Some architects prefer to work independently or to be partners or employees in small firms. Generally young architects work for different kinds of employers in their early years. Once they have gained enough experience, many set up in their own practice.

Academic Program Sheet – Architectural Design Branch

Compulsory Courses			
Year 1			
Semester 1		**Semester 2**	
BA 113	Physics 1	BA 114	Physics 2
BA 123	Mathematics 1	BA 141	Engineering Mechanics 1
CC 111	Introduction to computer	CC 112	Structured Programming
ME151	Eng. Drawing & Descriptive Geometry	BA 118	Chemistry
AR 111	Visual Studies (1)	AR 114	Visual Studies (2) Theory of Colours
AR 130	Hist. of Arch. & Technology	AR 131	Hist. & Theory of Architecture (1)
LH XXX	Semester 1 Electives	LH XXX	Semester 2 Electives
Year 2			
Semester 3		**Semester 4**	
AR 210	Architectural Drawing	CB 240	Theory of Structures
AR 215	Visual Studies (3) Shade & Persp.	AR 211	Architectural Design (1)
AR 232	Hist. & Theory of Architecture (2)	AR 233	Hist. & Theory of Architecture (3)
AR 251	Building Technology (1)	AR 252	Building Technology (2)
AR 283	Computer Aided Drafting	AR 284	3D Modelling
AR XXX	Semester 3 Electives	AR XXX	Semester 4 Electives
Year 3			
Semester 5		**Semester 6**	
CB 350	Building Mat. & Testing	CB 351	Reinf. Con. & Metallic Struc.
CB 370	Surveying	AR 313	Architectural Design (3)
AR 312	Architectural Design (2)	AR 335	Hist. & Theory of Architecture (5)
AR 334	Hist. & Theory of Architecture (4)	AR 354	Building Technology (4)
AR 353	Building Technology (3)	AR 362	Environmental Studies (1)
AR XXX	Semester 5 Electives	AR XXX	Semester 6 Electives

Year 4			
Semester 7		**Semester 8**	
CB 460	Soil Mech. & Foundations	CB 410	Quant. Surv. & Cost Estim.
AR 414	Architectural Design (4)	AR 415	Architectural Design (5)
AR 441	Int. to City & Regional Planning	AR 416	Interior Design (1)
AR 455	Execution Design (1)	AR 442	Introduction to Urban Design
AR 464	Environmental Studies (2)	AR 456	Execution Design (2)
AR XXX	Semester 7 Electives	AR XXX	Semester 8 Electives
Year 5 (Architectural Design Branch)			
Semester 9		**Semester 10**	
AR 500	Research & Programming	CB 510	Project Management & Sched.
AR 516	Architectural Design (6)	AR 501	Arch. Design Graduation Project
AR 543	Intro. to Site Planning & Housing	AR 541	Professional Practice & Law
AR 544	Landscape Architecture	AR XXX	Semester 10 Electives
AR 557	Execution Design (3)		
AR XXX	Semester 9 Electives		
Year 5 (Interior Design Branch)			
Semester 9		**Semester 10**	
AR 500	Research & Programming	CB 510	Project Management & Sched.
AR 512	Interior Design (2)	AR 501	Interior Design Graduation Project
AR 543	Intro. to Site Planning & Housing	AR 541	Professional Practice & Law
AR 544	Landscape Architecture	AR XXX	Semester 10 Electives
AR 553	Interior Details		
AR XXX	Semester 9 Electives		

College Electives			
Semester 1		**Semester 2**	
LH 131	ESP 1	LH 132	ESP 2
LH 133	Langue Française 1	LH 134	Langue Française 2

Department Electives			
Semester 3		**Semester 4**	
AR 222	Presentation Techniques	AR 224	Workshop & Arch. Models
AR 223	Arch. of Egypt Time & Place	AR 225	Introduction to Painting
AR 226	Creativity & Innovation	AR 227	Int. to Arch. Photography
Semester 5		**Semester 6**	
AR 324	Introduction to Sculpture	AR 323	Music & Civilization
AR 325	Rendering & Animation	AR 326	Comp. Graphic Design
AR 327	Interior Design Principles	AR 328	Furniture Design
		AR 321	Documentation of Hist. Buildings
Semester 7		**Semester 8**	
AR 421	Architectural Criticism	AR 422	Medit. City Urb. & Arch. Hist.
AR 424	Functional Req. in Interior Env.	AR 423	Topics in Sustainability
AR 426	Comp. App. In Architecture: BIM1	AR 425	Int. Environmental Systems
AR 427	Introduction to Web Design	AR 428	Comp. App. In Architecture: BIM2
Semester 9		**Semester 10**	
AR 521	Comparative Urbanism	AR 523	Hist. Preservation & Conservation
AR 522	Design with Light	AR 524	EIA in Urban Planning
AR 526	Vernacular Architecture	AR 527	Conceptual Interiors
AR 529	Comp. App. In U.P.G.I.S.	AR 528	Finishing Materials

Graduation Requirements

College Requirements					
A total of 26 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 22 Cr. Hr. of the following compulsory courses					
BA	1	BA 113	Physics (1)	3	None
	2	BA 114	Physics (2)	3	BA 113
	2	BA 118	Chemistry	2	None
	1	BA 123	Mathematics (1)	3	None
	2	BA 141	Engineering Mechanics (1)	3	None
CC	1	CC 111	Introduction to computer	3	None
	2	CC 112	Structured Programming	3	CC 111
ME	1	ME 151	Eng. Drawing and Descriptive Geometry	2	None

College Electives At least four credit hours (4 cr. hr.) from the following list of the college electives					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
NE	1	LH 131	ESP(1)	2	None
	2	LH 132	ESP (2)	2	LH 131
	1	LH 133	Langue Française (1)	2	None
	2	LH 134	Langue Française (2)	2	LH 133

Department Requirements

A total of 154 credit hours are required by the department, which are distributed as follows:

- 138 credit hours of compulsory courses.
- A minimum of 16 credit hours of department restricted electives.

The required compulsory and restricted elective courses are listed in the following table.

College Requirements					
A total of 26 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 138 Cr. Hr. of the following compulsory courses					
AR	1	AR 111	Visual Studies 1	3	None
	1	AR 130	Hist. of Arch. & Technology	2	None
	2	AR 114	Visual Studies 2 Theory of Colors	3	None
	2	AR 131	Hist. & Theory of Architecture (1)	2	None
	3	AR 210	Architectural Drawing	4	ME 151
	3	AR 215	Visual Studies 3 Shade & Perspective	3	ME 151
	3	AR 232	Hist. & Theory of Arch. (2)	3	None
	3	AR 251	Building Technology (1)	3	None
	3	AR 283	Computer Aided Drafting	3	ME 151
	4	AR 211	Architectural Design (1)	4	AR210/AR114
	4	AR 233	Hist. & Theory of Architecture (3)	3	None
	4	AR 252	Building Technology (2)	3	AR 251
	4	AR 284	3D Modeling	3	AR 215/AR283
	5	AR 312	Architectural Design (2)	4	AR 211/ AR 215
	5	AR 334	Hist. & Theory of Architecture (4)	3	AR 131
	5	AR 353	Building Technology (3)	3	AR 252
	6	AR 313	Architectural Design (3)	4	AR 312
	6	AR 335	Hist. & Theory of Architecture (5)	3	AR 334
	6	AR 354	Building Technology (4)	3	AR 353

College Requirements					
A total of 26 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 138 Cr. Hr. of the following compulsory courses					
AR	6	AR 362	Environmental Studies (1)	3	None
	7	AR 414	Architectural Design (4)	4	AR 313
	7	AR 441	Int. to City & Regional Planning	3	None
	7	AR 455	Execution Design (1)	3	AR 354
	7	AR 464	Environmental Studies (2)	3	AR 362
	8	AR 415	Architectural Design (5)	4	AR 414
	8	AR 416	Interior Design (1)	3	AR 312
	8	AR 442	Introduction to Urban Design	3	AR 441
	8	AR 444	Introduction to Manage., Practice & Law	3	AR 455
	8	AR 456	Execution Design (2)	3	AR 455/AR 464
	9	AR 516	Architectural Design (6)	4	AR 415
	9	AR 543	Introduction to Site Planning & Housing	3	AR 442
	9	AR 544	Landscape Architecture	3	None
	9	AR 557	Execution Design (3)	3	AR 456
	9	AR 500	Research & Programming	3	None
	9	AR 553	Interior Details	3	AR 456
	9	AR 512	Interior Design (2)	4	AR 416/ AR 415
	10	AR 501	Architectural Design Graduation Project	12	AR 516/ AR 500
	10	AR 501	Interior Design Graduation Project	12	AR 512/ AR 500
	10	AR 541	Professional Practice & Law	2	AR 444

College Requirements					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
CB	4	CB 240	Theory of Structures	3	BA 141
	5	CB 350	Building Materials & Testing	3	CB 240
	6	CB 351	Reinf. Concrete & Metallic Structures	3	CB 350
	5	CB 370	Surveying	3	BA 123
	8	CB 410	Quant. Surv. Cost Estimation	3	CB 351
	7	CB 460	Soil Mechanics & Foundations	3	CB 351
	10	CB 510	Project Management & Scheduling	2	AR 444
Department Restricted Electives At least eight courses (16 Cr. Hr.) from the following list of the college electives					
AR	3	AR 222	Presentation Techniques	2	None
	3	AR 223	Arch. Of Egypt Time & Place	2	None
	3	AR 226	Creativity & Innovation	2	None
	4	AR 224	Workshop & Arch. Models	2	None
	4	AR 225	Introduction to Painting	2	None
	4	AR 227	Introduction to Arch. Photography	2	None
	5	AR 324	Introduction to Sculpture	2	None
	5	AR 325	Rendering & Animation	2	AR 215/AR 284
	5	AR 327	Interior Design Principles	2	None
	6	AR 323	Music & Civilization	2	None
	6	AR 326	Comp. Graphic Design	2	AR 283
	6	AR 328	Furniture Design	2	None
	7	AR 421	Architectural Criticism	2	None
	7	AR 424	Functional Req. in Interior Env.	2	None

College Requirements					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
AR	7	AR 426	Comp. App. In Architecture: BIM 1	2	AR 283
	7	AR 427	Introduction to Web Design	2	AR 326
	8	AR 422	Med. City Urban & Arch. History	2	None
	8	AR 423	Topics in Sustainability	2	None
	8	AR 425	Int. Environmental Systems	2	None
	8	AR 428	Comp. App. In Architecture: BIM 2	2	AR 426
	9	AR 521	Comparative Urbanism	2	None
	9	AR 522	Design with Light	2	AR 114
	9	AR 526	Vernacular Architecture	2	AR 334
	9	AR 529	Comp. App. In U.P.G.I.S.	2	AR 283/AR 441
	10	AR 523	Hist. Preservation & Conservation	2	None
	10	AR 524	EIA in Urban Planning	2	AR 441
	10	AR 527	Conceptual Interiors	2	None
	10	AR 528	Finishing Materials	2	None

Course Summary Description

IM 400AR – Practical Training

Cr.0. Prerequisite: None.

This course is a non-credit course and is a college graduation requirement. Students are asked to undertake a minimum of four weeks of practical training in off-campus sites recommended by the college and the department in order to pass this course. Students are required to submit a recognition letter from the site where they received their training, besides a report and a presentation. Course is a Pass/ Fail one.

AR 111 – Visual Studies 1

Cr.3. Prerequisite: None

Introduction: techniques of graphic representation in pencil, pen and ink, and charcoal. Composition and design; definition. Elements of composition. Visual properties of form; Form and space: definition, organization; Basic principles of architecture, proportion and scale. Ordering principles. Introduction to photography, with an emphasis on methods, and techniques for general and architectural photography.

AR 112 – Visual Studies 2: Theory of Colours

Cr.3. Prerequisite: None

The factors of visual perception and vision system. The nature of colours and the optical system. Colour properties: hue, value and saturation. The theory of colours organization (Faber, Munsell and Chevreul organization). Principles of colour schemes; chromatic harmony, Monochromatic harmony, Triadic harmony and complementary harmony. Colours and architectural spaces (Internal and External spaces).

AR 130 – History of Architecture & Technology

Cr.2. Prerequisite: None

Introduction to art as a human activity. The study begins with the first traces of prehistoric buildings and settlements in the Ancient World and covers Egypt: The Archaic Period, The Old Kingdom, The Empire and The Late Period until the Arab conquest. Mesopotamia: Summer, Akkad, Babylon, Assyria and Persia until the Arab conquest.

AR 131 – History & Theory of Architecture 1

Cr.2. Prerequisite: None

A survey of the Classical Civilization focusing on the architecture, art and formation of cities in the Greek and Roman period. Aegean period, (Minoan, Mycenaean). Greek, (Archaic, Classical) and Hellenistic periods. Etruscan and Roman periods.

AR 210 – Architectural Drawing

Cr.4. Prerequisite: ME 151

The principal task of the architect is to design buildings which accommodate human activity. Drawing is its most expressive form. The course introduces the student to basic drawing skills and techniques. Fundamentals of architectural drawing; conventions of graphic representation, drawing as an important means to architecture, orthographic projection, architectural composition through abstract shapes and forms, study of architectural orders, architectural space, plan, section, elevation, sectional perspective, other graphic means. The techniques; line drawings, tone drawings, humanizing the drawing (figures, trees, plants, and furniture), efficiency in drawing, lettering. (The course is based on studio exercises and includes lectures.)

AR 211 – Architectural Design 1

Cr.4. Prerequisite: AR 210 & AR 210

Introduction to the fundamentals of architectural design through the design process, definition, analysis, concepts, development and presentation. Building form in relation to program human activity, scale and furniture as means of creating space. Space analysis. Training includes simple projects focusing on the functional relations and the use of space. Studio problems in architectural design at an elementary level of a small residential or a single use building and a primary educational building.

AR 213 – Visual Studies 3: Shade and Perspective

Cr.3. Prerequisite: ME 151

This course is intended to teach the principles of architectural representation and develop the student's perceptive skills. Student should acquire an ability to communicate simple forms graphically by transforming visual information into a two-dimensional image with shade and shadow. The course examines the language of architectural form and deals with the techniques of analyzing and representing it by different means of rendering.

Topics include: (a) Shade and Shadow: Fundamentals; shade of points, lines, planes, volumes. Exercises on shade and shadow of different architectural elements; arches, stairs, curves, etc…

(b) Perspective: Fundamentals of perspective; plane of image, position of the observer, cone of vision, angles of vision, vanishing points (one point, two points), Architectural perspective. Shade and shadow in perspective. (The course includes lectures, problem solving and exercises.)

AR 222 – Presentation Techniques

Cr.2. Prerequisite: None

The course is a journey through various manual presentation techniques. The course is based on advanced architectural presentation techniques, the observation of color, materials, relationship between architectural elements and its environment. Trial is encouraged through studio sessions, evaluations and group discussions.

AR 223 – Architecture of Egypt: Time & Place

Cr.2. Prerequisite: None

This summer course introduces students to the architecture of Egypt, covering keystone buildings and sites ranging from antiquity to the 21st century. The course depends mainly on site excursions. Accompanied by lecturers throughout the course, students are encouraged to sketch, take photographs and have on-site arguments and discussions. The course also includes visits to museums and exhibitions, as well as a number of meetings with guest lecturers, conservation architects and design professionals. Finally a studio work is held on the light of the lessons learned throughout the trip. Each student is required to prepare and submit a portfolio that comprises his/her sketches and photographs. Attendance on excursions is mandatory.

AR 224 – Workshops & Architectural Models

Cr.2. Prerequisite: None

Fundamentals of architectural models (definition, analysis, concepts, development and presentation). Students are trained to build abstract and architectural forms by using different materials: Wood, paper, plaster ….etc.

AR 225 – Introduction to Painting

Cr.2. Prerequisite: None

This course gives the student a technical experiment in the art of painting through training on different methods & techniques. The course aims to develop students creative sense through the colour expression of form, space, light, shadow & different textures. In order to realize this, the student has to be acquainted with instruments, tools, different materials & how to use them, then trained on painting methods of coloured pencils, pastel, tempera & oil painting through still – life inside the classroom of painting, in addition of some sketches & photographic references – prepared under our supervision. The course introduces the students to the art of painting through experimenting with different methods.

AR 226 – Creativity & Innovation

Cr.2. Prerequisite: None

Creativity (meaning, components, importance), Characteristics of Creative persons, Creative thinking. Logical thinking and lateral thinking, Creative thinking and innovative ideas, Creative thinking problem solving, energizing creative power, creative thinking strategies, Implementing.

AR 227 – Int. to Architectural Photography

Cr.2. Prerequisite: None

Introduction to the course - Introduction to Camera Types (Manual and Digital) - Photographic Accessories and Techniques - Photographic Composition - Dealing with Light - Architectural Photography - Special Photographic Effects - Introduction to Computer Photo Editing Software Programs - The course will end with a photographic Project.

AR 232 – History & Theory of Architecture 2

Cr.3. Prerequisite: None

(a) History: The study includes the various phases of the Christian Era; Early Christian, Coptic, Byzantine, Carolingian, Romanesque and Gothic.

(b) Theory: Fundamentals of Architectural Design, Building Components, Walls, Floors, Roofs, Ceiling, Circulation, Entrances and Approaches.

AR 233 – History & Theory of Architecture 3

Cr.3. Prerequisite: None

(a) History: The course examines the formation and development of architectural, artistic, and urban traditions of the Islamic World. The study includes the ideas and cultures that shaped the architectural character. The course includes; Early Islamic, Abbassid period, Egypt, Mesopotamia, Persia, The Mongol period, Syria, Spain, The Seljuks of Rum, The Ottoman Turks. Emphasis is placed upon the study of Islamic Architecture in Cairo. Study of selected examples of religious, civic and residential Islamic Architecture in chronological order.

(b) Theory: Introduction to architectural design. Buildings and location. Design process and methodology. Design Approaches, Types of design process, Character and environment, Principles of house design. Types of Educational Buildings, nurses and schools. The course includes formal lectures and seminars.

AR 251 – Building Technology 1

Cr.3. Prerequisite: None

The course introduces students to the principles and fundamentals of building construction. Topics include the basic concepts of structural systems and foundations according to building loads and soil characteristics. In addition, the course presents the basic units of wall construction systems and clarifies the different methods of building insulation.

AR 252 – Building Technology 2

Cr.3. Prerequisite: AR 251

The course deals with the basic elements of buildings (Walls, Roofs and Floors). Topics include the use of different materials (Reinforced concrete, Wood and Steel) for both construction and finishing of these elements. In addition, the course clarifies the relation between the used materials and the related adequate construction system or systems.

AR 283 – Computer Aided Drafting

Cr.3. Prerequisite: CC 112 & ME 151

Introduction to Auto CAD , The First menu and how to configure to adapt the PC Auto CAD screen, Function keys and group of order (commands), Mouse, Commands (Line, Circles, Erase, Trim, Extended, Offset), Selection of objects in Auto CAD, Selection of point by the tools and by keyboard, Commands (Copy, Move, Zoom, Pan, Snap),Commands (Chprop, Ltscale, Polygon, Arc, Break), Isometric (3D), Commands (Miror, Array, Rotate, Scale, Strech), Commands (Block, Insert, Wblok), Dim, Layer, Hatch, Text .

AR 284 – 3D Modelling

Cr.3. Prerequisite: AR 112 & AR 283

This course introduces students to the world of 3D modelling. It is a new way of thinking since it enables the student to view his/her design from many different angles. The course will illustrate 3D modelling techniques of the dominant software package currently in the market – namely AutoCAD. Starting with the basics and going through the process of building a visual model, this course will cover the main concepts of 3D modelling – concepts that are universally valid in many other packages. The course meets once a week for up to four hours of lectures, discussions, and studio sessions held in the computer lab. AutoCAD version 14 will be the main package discussed in this course.

AR 312 – Architectural Design 2

Cr.4. Prerequisite: AR 211

The Design 2 program aims to introduce the students to the Local built Env. & the traditional architecture as well as increasing their awareness of the essences and details of such a discipline. As it concentrates on analyzing the existing features of the traditional architecture and interacting with it on site through group work. Site analysis is crucial to achieve such a goal- cultural awareness. In this stage 20% of the program time is for environmental and site analysis. In the 2nd stage 20%of the program is for program analysis. In the 3rd stage 60% of the time is oriented to designing the architectural project on an individual basis.

AR 313 – Architectural Design 3

Cr.4. Prerequisite: AR 312

Continuation of design with projects at an intermediate level focusing on the ways in which the nature of structural systems methods of construction and building materials affect and inform architectural design. Students must be able to select building materials with knowledge of their characteristics and performance to satisfy the requirements of building programs as an integral part of the design.

AR 323 – Music & Civilization

Cr.2. Prerequisite: None

This course is a tour through the world of music. Students begin by studying the elements of music (melody, harmony, rhythm, timbre, texture and forum, etc.) and build a comprehensive vocabulary with which to understand and evaluate musical expression. After this introduction, seven historical periods of music are presented: Medieval, Renaissance, Baroque, Classical, Romantic, Modern and Post - modern. Students learn to match composers of various periods with particular styles and characteristics. Each composer is presented within the context of his era relating it to the civilization of the same era. CDs & tapes illustrate the forms & styles characteristic of periods and composers.

AR 324 – Introduction to Sculpture

Cr.2. Prerequisite: None

The course introduces the students to the fundamentals of art in three-dimensional form. Terminology, shape, volume, light, texture, colour and value. Materials: clay, plaster, wood, stone, metal...etc. Techniques, tools selection, proper usage, and finishing. Sculptural methods; Additive, subtractive, substitutive, manipulative...etc. Studio work includes production of sculptures both figurative and abstract in different materials; Contemporary movements in sculpture are examined through slide lectures and visits to exhibitions.

AR 325 – Rendering & Animation

Cr.3. Prerequisite: AR 215 & AR 284

This course introduces students to the world of 3D Rendering and Animation. It is a step forwards toward computer animated dynamic presentations—a tool that is widely used in the architecture practice. The course covers the development of rendered still images as well as animated field/frame-accurate recording. Autodesk's 3D Studio Family is the basic software packages handled through the course. However, all universal concepts will also be covered in this course including human vision, camera angles, perspective correction, and finally, scene composition. The course meets once a week for up to four hours of lectures, discussions, and studio sessions held in the computer lab. 3D Studio Max version 2.5 will be the main package discussed in this course.

AR 326 – Computer Graphics Design

Cr.2. Prerequisite: AR 325

This course introduces students to the world of total automation in architecture. It teaches them ways to integrate many computer packages together. This Integration would cover all professional needs and reduce errors. It would also reduce the total time needed to complete a project. The course also emphasizes computer-programming tools relevant to architecture. Tools that would ease difficult and time-consuming tasks faced by architects in their daily work.

AR 327 – Interior Design Principals

Cr.2. Prerequisite: None

Space is the essential element in interior design. Space gives life to the architecture which houses it. This course is a visual study of the nature of an interior settings fundamental element which make up our interior environments, and Characteristics of each element. Emphasis is placed on basic design principals and how design relationships determine the functional, structural, and aesthetic qualities of interior spaces. Study of the design process.

AR 328 – Furniture Design

Cr.2. Prerequisite: None

IThis course is an Introduction to the concepts, function, materials and techniques of furniture. Review of historical background and design theory development two and three-dimensional forms of a basic furniture concepts or design.

AR 334 – History & Theory of Architecture 4

Cr.3. Prerequisite: AR 131

(a) History: The Early Renaissance, the High and Late Renaissance, the Baroque and Rococo are covered. The developments of the nineteenth century which lead to the various architectural movements, innovation in materials (iron and glass) are carefully traced through eclecticism and classical revival.

(b) Theory: Architectural movements and structure systems. Structure systems (Types, Materials and conceptions). Study of Form-active system, Vector – active system, Bulk-active system, Surface-active system and Vertical-structure system. Design criteria of educational buildings (types, location and design principles). Design criteria of hotels (types, location and design principles).

AR 335 – History & Theory of Architecture 5

Cr.3. Prerequisite: AR 334

(a) History: Architectural movements and pioneers. The essential characteristics of "MODERNISM" from the styles of 19th century to the end of 20th century. Changed vocabulary and new structure systems.

(b) Theory: The concept of Architectural character within the scope of environmental design. Study and analysis of cultural, Health and Transportation buildings and facilities.

AR 353 – Building Technology 3

Cr.3. Prerequisite: AR 252

The course deals with the main complementary elements (Openings and stairs) through different materials of construction, finishing and accessories. The connections between these elements and the basic elements, studied through the prerequisite course, are stressed. In addition, the course clarifies the different design considerations and architectural treatments of building joints.

AR 354 – Building Technology 4

Cr.3. Prerequisite: AR 353 & CB 370

The course furnishes a wide range of finishing materials for both external envelope and internal spaces of buildings. Facing, cladding and curtain walls for external walls like suspended ceilings, Light partitions and internal wall treatments of internal spaces are the main topics of this course. These different topics are studied through both conventional and advanced materials and method of construction. In addition the course deals with some important architectural details of fixed furniture and landscape elements.

AR 362 – Environmental Studies 1

Cr.3. Prerequisite: None

Theories of environmental design. Development of various methods, tools, and techniques available for environmental designs. Natural Elements (air, sun and water) are examined as they interact with human needs within buildings or building complexes. Thermal control, lighting, acoustic, elimination of wastes, circulation of air. Methods of utilizing solar energy to provide heating, cooling, hot water and electricity for buildings and related techniques for reducing energy consumption. Conservation of natural resources. (The course includes lectures, research and laboratory tests.)

AR 411 – Architectural Design & Urban Landscape

Cr.3. Prerequisite: None

This course introduces the fundamentals of architectural design and landscape architecture for none architects students. It familiarizes students with the design process, the analysis of form and function, and the development of an architectural project. The course focuses on the role of the architect and urban planner in organizing space and time to fulfil different human needs and activities. It directs students on how to deal with different design problems through systematic design processes, and how to take into consideration different physical, cultural, and temporal factors. The course is offering to students in the Construction and Building Engineering Department Only.

AR 414 – Architectural Design 4

Cr.4. Prerequisite: AR 313

Continuation of design with more complex projects, considering form, proportions, with particular emphasis on environmental design architectural character. Architectural design as a creative operation to solve functional problems of buildings or a complex of buildings. Problem analysis, goals, results, evaluation of propositions.

AR 415 – Architectural Design 5

Cr.4. Prerequisite: AR 414

Continuation of design with projects of increasing complexity and form, Integration of existing historical buildings, their conservation or re-use. Architectural design as a creative operation to solve functional problems of buildings. Collection of information, analysis studies. The integration of structure, mechanical systems, using intermediate and large space structures. Consideration is given to the relation between internal and external space. Study of interior design; activity analysis, furniture and lighting. (Studio work including lectures, projects, interior and exterior perspectives.) Design projects such as community and hotel buildings.

AR 416 – Interior Design 1
Cr.3. Prerequisite: AR 312
Emphasis is placed on basic design principles through graphic representation techniques. Interior space, interior design, design vocabulary, interior environmental systems. Studio projects cover commercial and residential interiors. The course stresses the planning and construction of interior space and the coordination of furnishing and accessories. Problem solving studio involves the understanding and application of colour, fabrics, lighting, interior materials, paints, floor coverings, wall coverings, ceilings, lighting.

AR 421 – Architectural Criticism
Cr.2. Prerequisite: None
Architectural Criticism introduces principles, methods and criteria of making judgments & evaluation of architectural work. Different conceptions, ideas and directions of critics & criticism schools are presented. Studies of a comparative nature enhance skills of analysis, description, interpretation and assessment of architectural work to be criticized.

AR 422 – A Mediterranean City: Urban & Architectural History
Cr.2. Prerequisite: None
Study of the development of a Mediterranean City as a case study. The spatial organization and its changing character through time. Geographical, historical, social, political and cultural factors as determining the shaping of the city. Texture and architectural development. Relationship between economic growth and urban development. Selected readings, lectures and visits to historic Sites are included.

AR 423 – Topics in Sustainability
Cr.2. Prerequisite: None
The course reviews concepts and theories of sustainability and how the term has developed and embraced change and shift in policies and global commitment. Students are encouraged to think of developing principles and consider the design process with sustainable principles at the forefront. Innovative ideas and international examples are explored.

AR 424 – Functional Requirements in Interior Environment
Cr.2. Prerequisite: None
This course is Methods for Design of the interior spaces. The purpose of interior design is the functional improvement, aesthetic enrichment, and psychological enhancement of interior spaces. The purpose of this course is to study of the relationship between users' activity, furnishing requirements and design.

AR 425 – Interior Environmental Systems
Cr.2. Prerequisite: None
The course is focusing on macro and micro considerations of the whole building design process and highlights the state-of-the-art, and major innovations in building technologies for structure, enclosure and material systems, hybrid systems, flexible infrastructures of mechanical, lighting, connectivity and control systems. The course will explore real world relationships, opportunities, and conflicts of the performance mandates, and the integration of building systems necessary to achieve total building performance. The course will also re-evaluate and update the basic design, construction, and building systems integration methods that have constrained the building industry throughout its history.

AR 426 – Computer Application in Architecture: BIM 1

Cr.2. Prerequisite: AR 283

Building Information Modeling applications in architecture are expected to be form of architectural presentations used in the future. This course provides hands on experience to students seeking the use of advanced applications and techniques to produce and enhance building ideas and concepts. The student will develop their skills and apply new skills in computer applications regarding Building Information Modeling (BIM), which is the process of generating and managing building data during its life cycle. Typically, the student will study how to apply computer software of BIM such as Autodesk Revit Architecture, which uses three-dimensional, real-time, dynamic building modeling software to increase productivity in building design and construction. The student will work with the process that produces the BIM, which encompasses building geometry, spatial relationships, geographic information, and quantities and properties of building components.

AR 427 – Introduction to Web Design

Cr.2. Prerequisite: AR 326

Students should have by now some experience in working with computer applications like Auto Cad, 3D Studio Max, Photo Shop or other packages. This class will develop this experience into new dimensions; form still Images to a movie production for the final presentation. Students will develop their skills and apply new skills in multimedia production. They will study how to design their production, story boarding, creating and moving characters, film editing, sound design, special effects and final output to CD or Video Tape. Students will work with different multimedia packages and study how to put them all together.

AR 428 – Computer Applications in Architecture

Cr.2. Prerequisite: AR 283

This course introduces students to the world of total automation in architecture. It teaches them ways to integrate many computer packages together. This Integration would cover all professional needs and reduce errors. It would also reduce the total time needed to complete a project. The course also emphasizes computer-programming tools relevant to architecture. Tools that would ease difficult and time-consuming tasks faced by architects in their daily work.

AR 441 – Introduction to City and Regional Planning

Cr.3. Prerequisite: None

The course deals with the different concepts and principles of city planning. It furnishes a wide background in the field of planning and its related physical social and economic influencing factors. The course first defines the general concepts of planning, and then it briefly illustrates the history of city planning of different civilizations. The course also presents an outline of prototypical planning problems and solutions in different areas of planning.

AR 442 – Introduction to Urban Design

Cr.3. Prerequisite: AR 441

The course is designed to provide overviews of the design of urban areas through an understanding of the different theories, principles, processes and procedures of urban design. Specific applications in a variety of functional categories are examined such as housing, central business districts and other activity centres are examined.

AR 444 – Introduction to Management, Practice and Law

Cr.3. Prerequisite: AR 445

The course consists of four main parts covering its overall aims. Part one, of three weeks duration, is introductory to the main characteristics of building project management: its phases, participants and documents of the design phase in particular. Part two, of three weeks duration, discusses the specification writing of different building items with concentration on architectural aspects of a building. Part three, of four weeks duration, concentrates on Quantity surveying, price breakdown and the cost estimate of different building items. For three weeks duration, part four concludes the course with introduction to building permits, cost estimate and tender evaluation. This course prepares students to further detailed courses of professional practice and building regulations.

AR 455 – Execution Design 1

Cr.3. Prerequisite: AR 354

The course introduces the student the fundamentals of execution design drawings based upon the wide range of vocabulary taught through the previous courses of building technology. Topics include the different basic execution instructions and the way of organizing them to form easy readable complete execution documents. These documents are presented in the form of plans, sections, elevations, schedules, types and details of different elements of building. This experience is applied on a simple given project.

AR 501 – Architectural Design Graduation Project

Cr.12. Prerequisite: AR 516 & AR 500

The student proceeds to design the project of his choice. The program and location has been prepared in the previous semester. This comprehensive architectural project is the culmination of the student's architectural education. The student must present new concepts and imaginative solutions based on real problems taking into consideration the environmental, social, cultural and structural systems. The project is presented in a series of drawings, perspectives, models, etc.

AR 501– Interior Design Graduation Project

Cr.12. Prerequisite: AR 500 & AR 512

The student proceeds to design the project of his choice. This comprehensive interior design project is the accumulation of the student's education. The student must present new concepts and imaginative solutions based on real problems. The project is presented in a series of drawings, perspectives and models.

AR 521 – Comparative Urbanism

Cr.4. Prerequisite: None

A growth of interest in urbanism stems from the need to find a new way of looking at the human habitat and resolving how humans create urban places. Students in this course will be introduced to concepts and meanings of urbanism from a variety of perspectives to enhance their understanding and encourage an active exploration and analysis of urbanism in an era of unprecedented urban change fueled by accelerated urban growth, climate change and the proliferation of information technology.

AR 516 – Architectural Design 6

Cr.4. Prerequisite: AR 415

Studies of architectural project related to realistic problems with the integration of structure, mechanical systems, environmental aspects and application of construction laws. Students learn how to analyze and then synthesize the various issues of space and form with special emphasis on environmental requirements and landscaping. (Studio work includes lectures, perspectives and workshop models.)

AR 521 – Research & Programming

Cr.2. Prerequisite: None

This course is an introduction to basic principles and fundamentals of research & programming methodology. Program development and research methods in architectural design, urban design and related disciplines are investigated. Emphasis is placed on information gathering techniques relevant to the theory and practice of environmental design. Skills of technical and creative writing as well as conducting AR

AR 522 – Design with Light

Cr.2. Prerequisite: AR 114

Elements of light are the base of interior design. Light has 3 different branches that are summarized in function, physiology and phycology. These are the essentials of design in an interior space. Function is the study of sources, fitting, methods and defining the levels of light and it's intensity for every job throughout the calculations of light (lumen methods). Physiology defines its effects on the human through the motion and activity inside a space. Phycology defines light as

the main element to achieve form and space through the relation with materials and colors.

AR 523 – Historical Preservation and Conservation

Cr.2. Prerequisite: None

Introduction to historic preservation in an architectural context with concentration on building materials properties and technologies of conservation and restoration. Review of preservation and conservation as social attitudes. Emphasis will be given to historic preservation within the general context of the built environment. Contemporary methods and process of historic preservation considering technical, economic and aesthetic problems of assessing, restoring and adapting historical buildings for alternatives occupancies.

AR 524 – Environmental Impact Assessment in Urban Planning

Cr.2. Prerequisite: AR 441

This course introduces the environmental dimension as an integral part of urban planning. Environmental measures are to be taken to minimize adverse effects of urbanization prior planning for a new development. Environmental Impact Assessment (EIA) establishes a sound environmental tool to identify, predict, evaluate and present mitigation measures for key impacts of a development.

AR 526 – Vernacular Architecture

Cr.2. Prerequisite: AR 334

This course will provide an introduction to the field of vernacular architecture, research in different countries, describing and defining basic building types, focusing on interpretive concerns such as how to read a building, the social functions of architecture and the hidden intentions in the built form.

Also demonstrating how material, culture can be analyzed to provide a broader, richer account of the human past ,while reaching out for cross cultural comparisons. The course will concentrate on African and Arabian countries vernacular architecture with particular intention to regional formation.

AR 527 – Conceptual Interiors

Cr.2. Prerequisite: None

This course offers an introduction to the map of design process, Problem solving as it applies to interior architecture and design. The student will learn concept finding and concept visualization through quick sketches and study models, Exploration of design alternatives and source of design inspiration will be studied. Students will study the relationship between concept as stimulus and visual equivalent to determine their appropriate use.

AR 528 – Finishing Materials

Cr.2. Prerequisite: None

An introduction to interior materials, finishes and textile products used in interior design. Course topics will include interior and building materials, criteria for selecting finish materials, flooring materials, wall coverings, window treatments, furniture construction, and upholstery; and selection of these appropriate interior materials and finishes.

AR 529 – Computer Applications in Urban Planning (G.I.S.)

Cr.2. Prerequisite: AR 283 & AR 441

This course is addressed to students who have no previous experience with computer-based geographic information handling but who need to learn GIS and desktop mapping technology. It introduces the fundamental concepts and structure of Geographic Information Systems, in the context of other related disciplines such as cartography, remote sensing and urban planning. It covers basic GIS concepts such as map characteristics and projects, spatial data models, relational databases, and spatial analysis. It explores sources of data, data quality and database management. This course approaches GIS from an interdisciplinary perspective, including data, examples, and problems. Implementation and management of GIS projects I the field of urban and regional planning are emphasized.

AR 541– Professional Practice & Law

Cr.2. Prerequisite: AR 444

This course is meant to inform the student of all the parties, duties and responsibilities they will face in the professional world. Students begin by studying the different models of professional relationships between involved parties in the profession. Then, they learn the profession rights and duties of the architect in his relationship with project owner as well as the project contractor.

AR 543 – Introduction to Site Planning & Housing

Cr.3. Prerequisite: AR 442

The course is divided into two seven-week segments. The site planning segment will explore various techniques of site analysis to determine size and form of development in a given area with due consideration to geological, topographical, hydrological, environmental, aesthetic and legal aspects. The Housing segment will consider the design and development of housing sites with due consideration to different types of housing, user needs and the way in which housing is related to and dependent on a larger community social, economic and land use context.

AR 544 – Landscape Architecture

Cr.3. Prerequisite: None

Fundamentals of interior landscape architecture. Students are introduced to the study of interior spaces as they relate to and complement building designs. Theoretical and historical background of landscape design, space analysis, and plant materials. Landscape elements and classification. Plant life, microclimate: elements and methods of landscape design. Study of aesthetic and functional values. Typical projects might include interior gardens, plaza, Play ground, memorials and other small spaces.

AR 553 – Interior Details

Cr.3. Prerequisite: AR 456

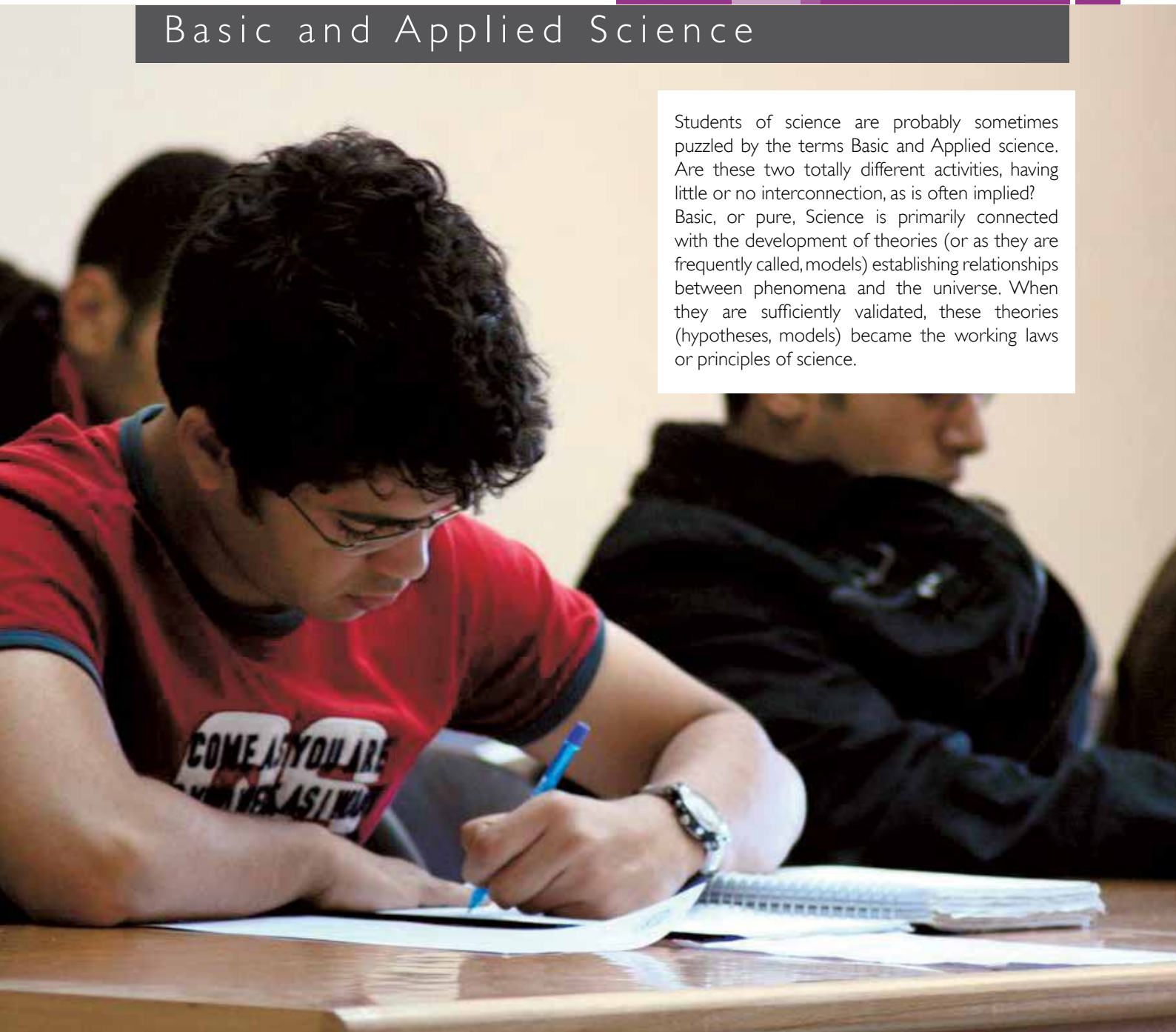
This course is an introduction to the concepts of function & materials & interior design and techniques in their relationship of building design and association with walls or structural system to create integrated design internally and externally.

AR 557 – Execution Design 3

Cr.3. Prerequisite: AR 456 & CB 410

The course deals with mastering execution documents for sophisticated projects including specific functional elements. This is achieved with application on student's design project from the previous semester. Concentration on special architectural details, of specific element/elements of the project, is stressed. In addition, the course realises the coordination process between the different technical systems, included in the project, on one hand, and the different execution documents and drawings, on the other.

Basic and Applied Science



Students of science are probably sometimes puzzled by the terms Basic and Applied science. Are these two totally different activities, having little or no interconnection, as is often implied?
Basic, or pure, Science is primarily connected with the development of theories (or as they are frequently called, models) establishing relationships between phenomena and the universe. When they are sufficiently validated, these theories (hypotheses, models) became the working laws or principles of science.

Applied science, on the other hand, is directly connected with the application of the working laws of pure science to the practical affairs of life. In order to increase man's control over his environment thus leading to the development of new techniques, processes and machines, such activities as investigating the strength and uses of materials, extending the findings of pure mathematics to improve the sampling procedures used in agriculture or the potentialities of atomic energy. All are examples of the work the applied scientist or technologist achieve.

It is evident that many branches of purely theoretical or experiment work. Thus the study of radio activity began as a piece of basic research, but its results are now applied in a great number ways, for instance the study of metal fatigue. Conversely, working in applied science and technology frequently acts as a direct stimulus to the development of pure or basic science.

It seems, then two branches of science are mutually dependent and interacting, and that the so-called division between the basic and the applied scientist is real.

Basic and Applied Science includes five major disciplines: Mathematics, Physics, Chemistry, Mechanics and Humanities which are the base of all work done in the engineering departments.

The objectives of the Basic and Applied Sciences department include:

- Forming a base for specialized studies in all educational programs.
- Offering advanced and applied courses for B. Eng., B. Tech and upgrading studies all Colleges.

Course Summary Description

IM 400BA – Practical Training
Cr.0. Prerequisite: None.
This course is a non-credit course and is a college graduation requirement. Students are asked to undertake a minimum of four weeks of practical training in off-campus sites recommended by the college and the department in order to pass this course. Students are required to submit a recognition letter from the site where they received their training, besides a report and a presentation. Course is a Pass/ Fail one.

BA 123 – Mathematics 1: Differentiation
Cr.3. Prerequisite: None
Basic rules of Differentiation – Trigonometric functions and their derivatives – Inverse trigonometric functions and their derivatives – Logarithmic function and its derivative. Logarithmic function and its derivative – Derivatives of hyperbolic and inverse hyperbolic functions – Parametric differentiation, Implicit differentiation – Limits and L'Hospital rule –Partial Differentiation – Taylor's and Maclaurin's expansions – Curve sketching: Critical, maximum, minimum and inflection points – Curve sketching (rational functions) and physical application (velocity and acceleration) – Conic sections : Parabola, Ellipse and Hyperbola.

BA 124 – Mathematics 2: Integration
Cr.3. Prerequisite: BA 123
Integration by parts – Integration of rational functions – Integration of Trigonometric powers –Integration by trigonometric substitution – Integration of quadratic forms and the Reduction formulas – Areas and Volumes – Length of the curve – Average of a function – Numerical integration – Matrix Algebra – Eigenvalues and Eigenvectors – Cayley - Hamilton theorem.

BA 223 – Mathematics 3
Cr.3. Prerequisite: BA 124
First order ordinary differential equations. Second order ordinary differential equations with constant coefficients: methods of undetermined coefficients and variation of parameters. Second order ordinary differential equations with variable coefficients: Euler's equation. Laplace transform: first and second shift theorems, transform of differentiation and integration, unite step function and convolution theorem. Inverse Laplace transform. Application of Laplace transform: solving differential and integral equations. Fourier series of functions of period 2P, Fourier series for even and odd functions, half range expansions and for harmonic functions.

BA 224 – Mathematics 4
Cr.3. Prerequisite: BA 223
Vectors in 2D and 3D Space – Vector Algebra – Vector and scalar functions –Vector differential calculus –Vector integral calculus – Theorems, physical interpretation of the integrals theorems – Complex algebra – Complex functions – Complex differentiation – Complex integration – Poles and zeros of analytical functions – Residue theorem, and application to real integrals.

BA 323 – Mathematics 5
Cr.3. Prerequisite: BA 224
Solving ODE using power series methods - Gama functions - Beta functions - Bessel functions - Legendre's Polynomials - Partial D.E., Method of separation of variables - Heat equation - Wave equation - Conformal Mapping : complex functions as mapping -Linear Factional mapping– Schwarz – Christoffel mapping.

BA 325 – Mathematics 6

Cr.3. Prerequisite: BA 124

Sample spaces and events, probability theorems - conditional probability and independence - Total probability and Bayes Theorem. – discrete probability distribution – continuous probability distribution – Mathematical Expectation, moments, variance and mean – special discrete distributions : Bernoulli, Binomial, Negative Binomial, Geometric, and Poisson – special continuous distributions: Uniform, exponential and Normal - discrete joint probability distributions: marginal distributions, conditional distributions, covariance , correlation coefficient - Continuous joint probability distributions: marginal distributions, conditional distributions, covariance , correlation coefficient - Random process: classification, strict stationary, second orders stationary, wide sense stationary, independence, Ergodic, auto-correlation, cross-correlation.

BA 326 – Mathematics 6 Probability and Statistics

Cr.3. Prerequisite: BA 124

Descriptive statistics - Sample spaces and events, probability theorems - conditional probability and independence - Total probability and Bayes Theorem. – Enumeration methods - discrete probability distribution – continuous probability distribution – Mathematical Expectation, moments, variance and mean – special discrete distributions : Bernoulli, Binomial, Negative Binomial, Geometric, and Poisson – special continuous distributions: Uniform, exponential and Normal - discrete joint probability distributions: marginal distributions, conditional distributions, covariance , correlation coefficient - Continuous joint probability distributions: marginal distributions, conditional distributions, covariance , correlation coefficient.

BA 327 – Mathematics 6 Statistics and Numerical methods

Cr.3. Prerequisite: BA 124

Descriptive statistics - Sample spaces and events, probability theorems - conditional probability and independence - Total probability and Bayes Theorem – Discrete probability distribution – Continuous probability distribution – Mathematical Expectation, moments, variance and mean - Numerical methods: Introduction, solution of equations, Interpolation.

BA 329 – Mathematics 5 Probability and Statistics

Cr.3. Prerequisite: BA 124

Descriptive statistics - Sample spaces and events, probability theorems - conditional probability and independence - Total probability and Bayes Theorem. – Discrete probability distribution – Continuous probability distribution – Mathematical Expectation, moments, variance and mean – special discrete distributions : Bernoulli, Binomial, Negative Binomial, Geometric, and Poisson – special continuous distributions: Uniform, exponential and Normal - discrete joint probability distributions: marginal distributions, conditional distributions, covariance , correlation coefficient - Continuous joint probability distributions: marginal distributions, conditional distributions, covariance , correlation coefficient.

BA 113 – Physics 1 Electricity-Magnetism-Optics

Cr.3. Prerequisite: None

Electrostatics -Coulomb's law- Electric field – Motion of charged particles in a uniform electric field – Electric flux and Gauss law – Electric Potential energy and electric potential – Capacitors(parallel plate capacitors, energy stored) – Capacitors in series and parallel – Electric current – Ohm's law – resistivity – Power in the circuits – Resistors in series and parallel – Kirchhoff's rules – R.C circuit – Magnetism (Force on a charge in magnetic field) Force on a current – carrying conductor in magnetic field. Biotsavart law and its application – Amper's law and its applications – Electromagnetic Induction –Magnetic flux –Faraday's law- Mutual Induction – Self Induction – Interference of light – Young's double slit experiment – Polarization of light waves.

BA 114 – Physics 2 Heat & Sound

Cr.3. Prerequisite: BA 113

Heat and work – The states of the working fluid – Reversibility and Reversible work – The first law of thermodynamics – The non-flow energy equation – The working fluid; Liquid, vapour and gas – Properties of steam – The use of steam tables. The Perfect Gas & its properties – Reversible non-flow processes: Constant volume, constant pressure, constant temperature (isothermal), adiabatic and polytrophic process for steam and perfect gas – The second law of thermodynamics – The heat engine – Entropy – The T-S diagram a: For vapour; for perfect gas – Static and dynamic properties of fluids. Kinematics of fluid flow. Equation of continuity – The steady-flow energy equation) – Bernoulli's equation – Heat Transfer – Conduction, Convection and radiation; the composite wall and the electrical analogy; Heat flow through a cylinder and a sphere.

BA 118 – Chemistry

Cr.3. Prerequisite: None

Introduction – Electrochemical Reactions, Electro chemical cells, Introduction, Electrochemical Reactions, Electro chemical cells, Electrochemical Series, Polarization, Passivity, Definition of Corrosion, Metals and Corrosive Environments, Forms of corrosion, uniform, Galvanic and D.A.C., Pitting corrosion , S.C.C and I.G.C., Atmospheric Corrosion Erosion Corrosion, Coating protection and Inhibitors, Cathodic Protection, Classification of Fuel, Properties of liquid fuel, Combustion of fuel, Purpose of Lubrication, Classification of Lubricants, Properties of Lubricating Oils, choice of Lubricant, Additives, Introduction to Impurities in Water, Purification and Treatment of Water.

BA 141 – Engineering Mechanics 1 Statics

Cr.3. Prerequisite: None

Introduction to mechanics: general principles. Force system: rectangular components of a force, parallelogram law. Equilibrium of a particle: springs and cables. Force system resultant: moment of a force, transbility of a force, free body diagram. Equilibrium of a rigid body: condition of rigid body equilibrium, equation of equilibrium, two and three force member. Structural analysis: simple trusses, the method of joint, zero force members, method of sections, frames and machines. Friction. Moment of inertia.

BA 142 – Engineering Mechanics 2 Dynamics

Cr.3. Prerequisite: BA 141

Kinematics of particles: rectilinear kinematics, general curvilinear motion, motion of projectile. Kinetics of a particle: Newton's laws of motion, equations of motion. Work and energy of a particle: principle of work and energy, work and energy for a system of particles. Motion of a rigid body: translational and rotational motion. General plane motion. Relative motion analysis: relative motion analysis using rotating axis. Kinetics of a rigid body: rotation about a fixed axis: translation, general plane motion.

NE 264 – Scientific Thinking

Cr.3. Prerequisite: None

Introduction about Nature of Scientific Thinking &Thinking Patterns Development; Meaning & Construction of Science + Scientific Values & attitudes; Science, non-science & other-than science +Science, Engineering & Technology; Properties of science; Mental operations used in science and Scientific Guessing; Types of deductions and Representation; Research methods in natural sciences, definitions; Experiments, Observations, Scientific postulates and their conditions; Verification of scientific postulates; General methods of problems solving; Creative and critical Thinking; Fluency types; Flexibility, Originality and Basics of Brain Storming.

NE 465 – Aesthetic Education & Art Appreciation

Cr.3. Prerequisite: None

Introduction to fine Arts – Art in our lives – The Basic Meaning of Art- Design elements: Shape and Form – Design elements: Space – Design elements: Texture and pattern – Design elements: Color – Color theory – The Principles of Design: Balance – Emphasis- Contrast –Repetition – The Principles of Design : Proximity – Proportion- Harmony – Unity & Variety – Ethics of engineering

NE 466 – Environmental Science & Technology

Cr.3. Prerequisite: None

Environmental sciences and engineering and definitions of Physical, chemical, biological, and social environments and environmental studies – Ecology and ecological system, formations, functions and limiting factors, energy transfer and materials cycling in ecosystem – Population and population growth and resources depletion and pollution – Air pollution sources, types and control, smoke, fogs and smog phenomena – Greenhouse gases and impacts on the environment – Climate changes and sea level rise and management – Acid rains and its effects on soil, water and biological systems- Tropospheric and stratospheric ozone sources, roles and effects in the environment – Sustainable developments and preventive technology – Green technology and sustainable communities – pollution types, sources and treatments – Radiation Green and radioactivity and health hazards and radiation protection – Waste sources, types and management – Environmental auditing, impacts assessment and methodology- Risk types , sources, characterization and management – Environmental management

NE 467 – Management of Energy Resources

Cr.3. Prerequisite: None

Energy for sustainable development; Metal and corrosive Environments; Strategic components of sustainable energy; Renewable energy technologies; Energy audit process and maintenance management; Lighting; Power factor correction; Control system and computers; Combustion processes and the use of industrial wastes; Heating, ventilating and air conditioning (HVAC).

English Cources

LH131 ESP I

The course aims at enhancing students' four language skills, improving their general and technical lexical repertoire and enabling them to communicate their ideas effectively. The course is designed to train learners to follow the principles and stages of the writing process and write well-structured, unified and coherent academic paragraphs. The course also aims at promoting students' listening and speaking skills by training them on listening for gist, specific information and note-taking. In addition, the course focuses on helping students use relevant grammatical structures.

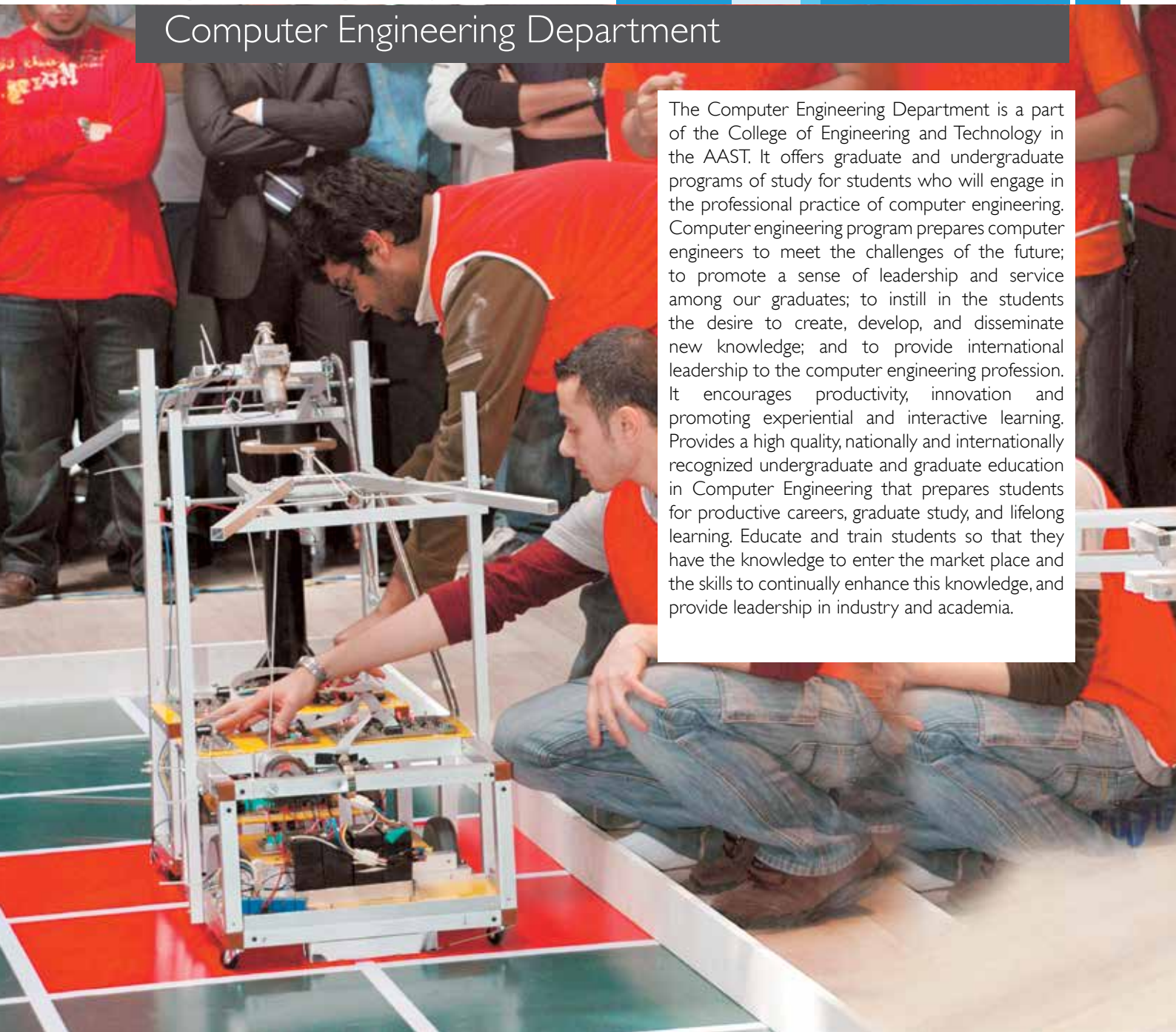
LH132 ESP II

The course aims at enabling students to decode technical discourse in English with ease and precision. The course is designed to provide students with the required knowledge, skills and attitude to express themselves orally using general and technical English meaningfully and accurately. Students are trained on skimming and scanning relevant technical texts and on listening for gist and specific information. In addition, the writing component of the course focuses on making students produce academic essays and employment correspondence effectively and summarize technical texts. By the end of the course, students will be able to take part in an interview.

LH231 Technical Report Writing

The course aims at enhancing students' writing skills in order to write various types of technical reports (background, process, lab and feasibility) following international standards in the report format, citing quotations and documenting sources. Students are also trained on using dictionaries to know the different meanings of a word / phrase / expression and to differentiate between synonyms. The course focuses on summarizing and paraphrasing relevant technical text. It also includes a component on oral presentations of reports.

Computer Engineering Department



The Computer Engineering Department is a part of the College of Engineering and Technology in the AAST. It offers graduate and undergraduate programs of study for students who will engage in the professional practice of computer engineering. Computer engineering program prepares computer engineers to meet the challenges of the future; to promote a sense of leadership and service among our graduates; to instill in the students the desire to create, develop, and disseminate new knowledge; and to provide international leadership to the computer engineering profession. It encourages productivity, innovation and promoting experiential and interactive learning. Provides a high quality, nationally and internationally recognized undergraduate and graduate education in Computer Engineering that prepares students for productive careers, graduate study, and lifelong learning. Educate and train students so that they have the knowledge to enter the market place and the skills to continually enhance this knowledge, and provide leadership in industry and academia.

In this specialization, the student will learn to:

- Write computer programs and software packages for various applications.
- Design web-based systems and web programming
- Design digital systems.
- Design Mobile applications
- Design Robotic systems
- Design special and general-purpose processors.
- Design communications' protocols for the Internet.
- Design systems for data acquisition.
- Design Microcontroller-based applications.
- Design Embedded systems and smart platforms

The responsibilities of the graduate of the Computer Engineering program encompass:

- Specifying the most suitable computer equipment for certain functions.
- Designing and implementation of software packages for various computer and inter-network applications.
- Designing and implementing Web-based systems for different applications.
- Designing and implementation Mobile Applications for various mobile platforms
- Working in the area of embedded systems
- Designing and implementing database and information systems in market place applications
- Offering opinion and consultation in the field, supervising computer installations and operations, planning their sites and environment.
- Working in the area of networking, data communication and security systems.
- Designing and implementing special purpose processors and interface cards.
- Ability to design and conduct experiments, as well as to analyze and interpret data.
- Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Ability to function on multidisciplinary teams
- Understanding of professional and ethical responsibility.
- Ability to communicate effectively the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- Recognition of the need for, and an ability to engage in lifelong learning.
- Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Clearly defined career objectives, and be able to market themselves via an effective, professional resume and behavior-based interview techniques.

This Program is accredited by the Engineering Accreditation Commission of ABET.
http://www.abet .org

The program educational objectives and student outcomes are listed in the (CET) site.

The Program Educational Objectives (PEO's):

After graduation, students of the Computer Engineering Program will achieve the following:

- **(PEO1)** Demonstrate technical expertise, critical thinking behavior and problem solving skills for a successful career in both industry and academia.
- **(PEO2)** Acquire leadership and communication skills needed to work effectively and professionally as part of a team.
- **(PEO3)**Full understanding of the technology influence on the society and the related ethical issues to make pragmatic decisions regarding their personal and professional responsibilities.
- **(PEO4)** Demonstrate intellectual curiosity and learn new skills independently for self-development in a dynamic environment.

The graduates of computer engineering will have the following skills:

- The ability of developing advanced software and hardware systems.
- The ability to make significant contributions to Computer Engineering through the research, design and development of a wide range of embedded systems and system-on-chip applications.
- To function effectively as a team member and/or leader in multidisciplinary and multicultural environments.
- Practice computer engineering using the highest standards of ethical and professional responsibility.
- Understand professional and ethical responsibilities.
- Pursue lifelong learning through such activities as professional training and membership in professional societies and to be able to adapt to new engineering tools.
- The ability to demonstrate a commitment to teamwork while working with others of diverse interdisciplinary backgrounds.
- The ability to demonstrate leadership and initiative to ethically advance professional and organizational goals, facilitate the achievements of others, and obtain substantive results.

The department's graduates can find jobs in various fields of applications

Hardware-oriented applications

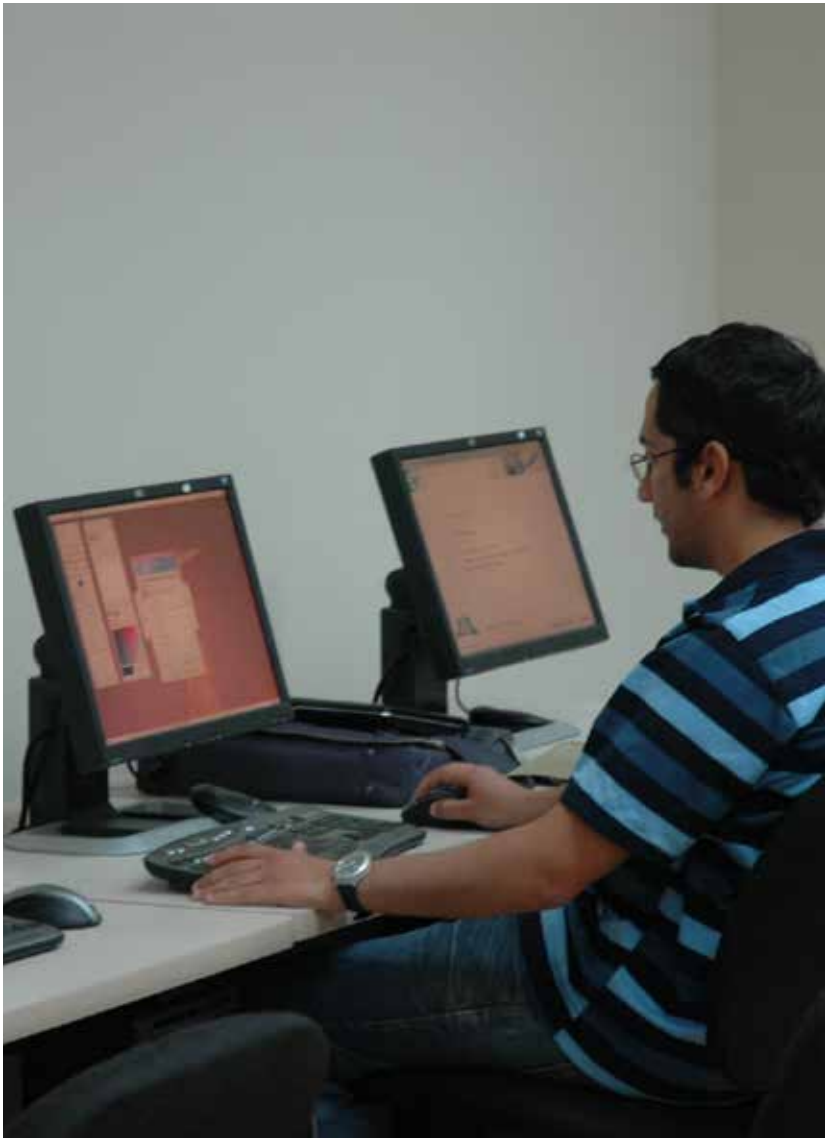
- Design and Implementation of Interface/control cards
- Special-purpose processor design and implementation using FPGA and ASIC
- Realization of embedded systems used in control applications
- Robotic systems
- Data Acquisition Systems
- Computer-based digital control
- Computer-based security systems

Software-based applications

- Analysis, design and implementation of Web-based Applications
- Smart electronic systems
- Analysis, design and implementation of Data Base systems
- Intelligent Systems analysis and design
- Applications of Artificial Neural Networks
- Analysis and design of Local Area Networks
- Internet-based applications and web programming
- Microcontroller programming
- Digital signal processing and biomedical applications
- Data Security

Networking-oriented applications

- Data communication and Internet protocols
- Wired and wireless communication
- Advanced network applications
- Network Security



Academic Program Sheet

Year 1			
Semester 1		**Semester 2**	
BA 113	Physics 1	BA 114	Physics 2
BA 123	Mathematics 1	BA 118	Chemistry
BA 141	Engineering Mechanics 1	BA 124	Mathematics 2
CC 111	Introduction to computer	BA 142	Engineering Mechanics 2
IM 111	Industrial Relations	CC 112	Structured Programming
LH 131	English for Special Purposes 1	IM 112	Manufacturing Technology
ME151	Eng. Drawing & Descriptive Geometry	LH 132	English for Special Purposes 2
Year 2			
Semester 3		**Semester 4**	
BA 223	Mathematics III	BA 224	Mathematics IV
CC 213	Programming Applications	CC 215	Data Structure
CC 218	Discrete Mathematics	CC 216	Digital Logic Design
EE 231	Electrical Circuits I	EC 218	Measurements & Instrumentations
LH 231	Technical Report Writing	EC 238	Electronics I
NE XXX	1 College elective course	EE 232	Electrical Circuits II
Year 3			
Semester 5		**Semester 6**	
BA 323	Mathematics V	BA 326	Mathematics VI
CC 317	Digital Systems Design	CC 311	Computer Architecture
CC 319	Advanced Programming	CC 316	Object-Oriented Programming
EE 328	Electrical Power & Machines	CC 331	Data and Computer Communications
EC 339	Electronics II	CC 341	Digital Electronics
EC 320	Communications Theory	NE 364	Engineering Economy

Year 4			
Semester 7		**Semester 8**	
CC 410	Systems Programming	CC 415	Data Acquisition Systems
CC 413	Numerical Analysis	CC 416	Computer Graphics
CC 414	Database Systems	CC 418	Operating Systems
CC 421	Microprocessors Systems	CC XXX	Department Restricted Elective
CC XXX	Department Restricted Elective	CC 431	Computer Networks
EE 418	Automatic Control Systems	IM 400CC	Practical Training
		IM 423	Operations Research
Year 5			
Semester 9		**Semester 10**	
CC 501	Project I	CC 503	Project II
CC 511	Artificial Intelligence	CC 513	Computing Systems
CC 531	Advanced Networks	CC XXX	Department Restricted Elective
CC XXX	Department Restricted Elective	CC XXX	Department Restricted Elective
CC XXX	Department Restricted Elective	IM 535	International Operations Mgt.
NE XXX	1 College elective course		

College Electives	
NE 264	Scientific Thinking
NE 465	Aesthetic Education and Art Appreciation
NE 466	Environmental Science and Technology

Department Restricted Electives			
Semester 9		**Semester 10**	
CC 412	Computing Algorithms	CC 521	Microcomputer Based Design
CC 417	Assembly Language	CC 523	Computer Design & Performance Evaluation
CC 515	Intro. to Software Engineering	CC 524	Neural Networks
CC 516	Pattern Recognition	CC 525	Intelligent Robotics
CC 517	Modelling & Simulation	CC 527	Computer Aided Design
CC 518	Data Security	CC 528	Computer Systems Performance Analysis
CC 529	Distributed and parallel systems	CC 540	Computer Systems Engineering
CC533	Internetwork Programming	CC 550	Selected Topics in Computing
CC 535	Internetwork Security	CC552	Web Engineering
CC 537	Computer Forensics	CC553	Mobile Applications
CC 539	Selected Topics in Networks		

Graduation Requirements

College Requirements					
A total of 66 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 23 Courses (60 Cr. Hr.) of the following compulsory courses					
BA	1	BA113	Physics (1)	3	None
	2	BA114	Physics (2)	3	BA 113
	2	BA118	Chemistry	2	None
	1	BA123	Mathematics (1)	3	None
	2	BA124	Mathematics (2)	3	BA 123
	1	BA141	Engineering Mechanics (1)	3	None
	2	BA142	Engineering Mechanics (2)	3	BA 141
	3	BA223	Mathematics (3)	3	BA 124
	4	BA224	Mathematics (4)	3	BA 223
	5	BA323	Mathematics (5)	3	BA224
	6	BA326	Mathematics (6)	3	BA224
CC	1	CC111	Introduction to Computers	3	None
	2	CC112	Structured Programming	3	CC 111
IM	1	IM111	Industrial Relations	2	None
	2	IM112	Manufacturing Technology	2	None
	8	IM400CC	Practical Training	0	90 Cr. Hr.
	8	IM423	Operations Research	3	90 Cr. Hr.
	10	IM535	International Operations Management	3	108 Cr. Hr.

College Requirements					
A total of 66 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 23 Courses (60 Cr. Hr.) of the following compulsory courses					
LH	1	LH131	English for Special Purposes (1)	2	None
	2	LH132	English for Special Purposes (2)	2	LH 131
	3	LH231	Technical Report Writing	3	LH 132
ME	1	ME151	Eng. Drawing and Descriptive Geometry	2	None
NE	6	NE 364	Engineering Economy	3	54 Cr. Hr.

College Non Engineering Electives					
Two courses (6 Cr. Hr.) from the following list of the college electives					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
NE	3	NE 264	Scientific Thinking	3	None
	3	NE 465	Aesthetic Education and Art Appreciation	3	None
	3	NE 466	Environmental Science and Technology	3	None

Department Requirements

A total of 114 credit hours are required by the department, which are distributed as follows:

- 96 credit hours of compulsory courses.
- A minimum of 18 credit hours of department restricted electives.

The required compulsory and restricted elective courses are listed in the following table.

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 31 Courses (96 Cr. Hr.) of the following compulsory courses					
CC	3	CC213	Programming Applications	3	CC 112
	3	CC218	Discrete mathematics	3	CC 111
	4	CC215	Data Structure	3	CC 213
	4	CC216	Digital Logic Design	3	CC 111
	5	CC317	Digital Systems Design	3	CC 216
	5	CC319	Advanced Programming	3	CC 215
	6	CC311	Computer Architecture	3	CC 317
	6	CC316	Object-Oriented Programming	3	CC 319
	6	CC341	Digital Electronics	3	EC 238
	6	CC331	Data and Computer Communications	3	EC 320
	7	CC410	Systems Programming	3	CC 319
	7	CC421	Microprocessors Systems	3	CC 311
	7	CC413	Numerical Analysis	3	(CC 112 or CC114) and BA 224
	7	CC414	Database Systems	3	CC 319
	8	CC415	Data Acquisition System	3	CC 421
	8	CC416	Computer Graphics	3	CC 319
	8	CC418	Operating Systems	3	CC 410
	8	CC431	Computer Networks	3	CC 331

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 31 Courses (96 Cr. Hr.) of the following compulsory courses					
CC	9	CC501	Project I	3	GPA 2.0 and Senior Standing (Cr. Hrs. 138)
	9	CC511	Artificial Intelligence	3	CC 218 and CC 319
	9	CC531	Advanced Networks	3	CC 431
	10	CC503	Project II	6	CC 501
	10	CC513	Computing Systems	3	CC 418 and CC 421
EC	4	EC238	Electronics I	3	EE 231
	4	EC218	Measurements & Instrumentation	3	EE 231
	5	EC320	Communications Theory	3	BA 224 and EE 231
	5	EC339	Electronics II	3	EC 238
EE	3	EE231	Electrical Circuits I	3	BA124
	4	EE232	Electrical Circuits II	3	EE 231
	5	EE328	Electrical Power & Machines	3	EE 232
	7	EE418	Automatic Control Systems	3	EE328 , BA323

Department Restricted Electives

6 courses (18 Cr. Hr.) from the following list of the college electives

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
CC	7 – 10	CC 412	Computing Algorithms	3	CC 319
	7 – 10	CC 417	Assembly Language	3	CC 421
	7 – 10	CC 515	Introduction to Software Engineering	3	CC 319 and CC414
	7 – 10	CC 516	Pattern Recognition	3	CC 416
	7 – 10	CC 517	Modelling & Simulation	3	CC 319 and BA 326
	7 – 10	CC 518	Data Security	3	CC 319
	7 – 10	CC 521	Microcomputer Based Design	3	CC 415
	7 – 10	CC 523	Computer Design and Performance Eval.	3	CC311
	7 – 10	CC 524	Neural Networks	3	BA 323 and CC112.
	7 – 10	CC 525	Intelligent Robotics	3	CC 319 and EE 418
	7 – 10	CC 527	Computer Aided Design	3	(CC 311 and CC 341) or CC 312
	7 – 10	CC 528	Computer Systems Performance Analysis	3	Senior Standing (Cr. Hrs. 138)
	7 – 10	CC 529	Distributed and parallel systems	3	CC418 and CC 431
	7 – 10	CC 533	Internetwork Programming	3	CC 431
	7 – 10	CC 535	Internetwork Security	3	CC 431
	7 – 10	CC 537	Computer Forensics	3	Cr. Hrs. 138
	7 – 10	CC 539	Selected Topics in Networks	3	CC 531
	7 – 10	CC 540	Computer Systems Engineering	3	Cr. Hrs. 138
	7 – 10	CC 550	Selected topics in Computing	3	CC 311 and Cr. Hrs. 138
	7 – 10	CC552	Web Engineering	3	CC213
	7 – 10	CC553	Mobile Applications	3	CC414 and CC316

Course Summary Description

IM 400CC – Practical Training

Cr.0. Prerequisite: None.

This course is a non-credit course and is a college graduation requirement. Students are asked to undertake a minimum of four weeks of practical training in off-campus sites recommended by the college and the department in order to pass this course. Students are required to submit a recognition letter from the site where they received their training, besides a report and a presentation. Course is a Pass/ Fail one.

CC 111 – Introduction to Computers

Cr.3. Prerequisite: None

This course provides an introduction to computers and computing .Topics of interest include the impact of computers on society, ethical issues, and hardware /software applications, including internet applications, system unit, storage and input/output devices, numbering systems, system and application software, presentation skills, program development, programming languages, and flow charts, Visual Basic, web page design using HTML, and communications and networks.

CC 112 – Structured Programming

Cr.3. Prerequisite: CC 111

An introduction to C-language Programming is provided in this course, Variable/Constant definitions, Basic Programmes, Sequential Programming, Conditional Programming, Looping and repetitions, Functions, Arrays.

CC 114– Introduction to programming

Cr.3. Prerequisite: CC 111

Introduction to Programming and Problem Solving-Variables- Memory Concepts-Assignment Statements-Arithmetic Operations-Logical Operations-Conditional Statements-Selection Control Structures-Multiple-Selection Statement-Loops-One-Dimensional Arrays-Two-Dimensional Arrays-Control events in windows applications-Functions and Procedures

CC 213 – Programming Applications

Cr.3. Prerequisite: CC 112

An advanced C-language Programming is provided in this course: two dimensional arrays, strings, pointers, recursion, structures, bitwise-operators, input-output interfacing, graphics, mouse interfacing as well as text and binary files are covered in details. Projects are required from students to increase their skills in C programming..

CC 215 – Data Structures

Cr.3. Prerequisite: CC 213

Difference between static data type and dynamic data types - the concept of pointers & dynamic memory allocation - programming practice using dynamic structures.

CC 216 – Digital Logic Design

Cr.3. Prerequisite: CC 111

The course introduce the concepts of number systems - binary arithmetic and codes - logic gates - Boolean algebra and logic simplifications - Design and realization of combinational circuits - Functions of combinational circuits logic- Sequential Logic (Flip-Flops, latches, synchronous /Asynchronous counter designs) . Finally, design analysis and realization of counters and shift registers are covered.

CC 218 – Discrete Mathematics

Cr.3. Prerequisite: CC 111

The logic of statements - logical form and equivalence - logic implementation – arguments – predicates - number theory - counting methods – function – relation - methods of proof

CC 217 – Digital Fundamental

Cr.3. Prerequisite: CC 111

Review Number systems. Boolean algebra and logic simplifications. Design and realization of combinational circuits, Functions of combinational circuits' logic. Computer – aided engineering.

CC 243 – Introduction to Computer Organization

Cr.3. Prerequisite: CC 216

Computer interconnection structures; computer components, computer function interconnection structures, and bus interconnection. Internal and external memory: computer memory system overview, semiconductors main memory, cache memory, magnetic tape, and optical memory. Input / Output: I/O modules, programmed I/O interrupt-driven I/O, direct memory Access. Operating system: Operating systems overview, scheduling, and memory management. The central processing unit: Computer Arithmetic, characteristics and functions of instruction sets, addressing modes, processor organization, the instruction cycle, instruction pipelining. Control unit Micro- operation, hardware implementation, Control Functions.

CC 311 – Computer Architecture

Cr.3. Prerequisite: CC 317

Basic Computer Organization - Arithmetic Logic Unit - High Speed Arithmetic – The MIPS Architecture – Performance Evaluation Techniques - The Memory Element - Memory Organization - Computer Input/ Output Organization – The Hardwired Control Unit - Microprogramming and typical Computer Architectures – CISC and RISC Paradigms.

CC 312 – Computer Organization

Cr.3. Prerequisite: CC 216

Computer interconnection structures - computer components - computer function interconnection structures - bus interconnection. - Internal and external memory - computer memory system overview - semiconductors main memory - cache memory - magnetic tape - optical memory - Input / Output - I/O modules - programmed I/O - interrupt-driven I/O - direct memory Access - Operating system - Operating systems overview – scheduling - memory management - The central processing unit - Computer Arithmetic - characteristics and functions of instruction sets - addressing modes - processor organization - the instruction cycle - instruction pipelining - Control unit Micro-operation - hardware implementation - Control Functions.

CC 316 – Object-Oriented Programming

Cr.3. Prerequisite: CC 319

Object-Oriented Modelling and development: classes – objects – inheritance – GUI interfaces – applets – multithreading – networking.

CC 317 – Digital System Design

Cr.3. Prerequisite: CC 216

Introduction to digital design, combinational digital design and realization using: decoders, encoders, buffer, multiplexers, comparators, adders, and ALU, sequential design and realization using: latches, flip-flops, counters, and shift registers, memories, CPLD, and FPGA. Synchronous analysis and design using algorithmic state machines ASM, Digital design practice, CAD using FPGA and CPLD.

CC 319 – Advanced Programming

Cr.3. Prerequisite: CC 215

C# language constructs data types – input/ output & control statements – modularity – arrays – strings – files – classes and objects – Inheritance – Polymorphism – Interfaces.

CC 331 – Data and Computer Communications

Cr.3. Prerequisite: EC 320

The goal of the course is to provide a background and context for the concept of computer networks. The broad range of topics that are encompassed in the field of data and computer communications is introduced, and the fundamental concepts of protocols and protocol architectures are examined. Also the course deals with the fundamental concepts of signal, medium, and encoding. Also deals with other aspects of data communications: reliability and efficiency. Error detection and correction in case of errors during transmission will be covered. A variety of multiplexing techniques can be used to provide for efficient use of the medium. Transmission media is discussed included guided and unguided media. Signal encoding techniques are discussed. Data link control protocols are studied.

CC 341 – Digital Electronics
Cr.3. Prerequisite: EC 238
Overview of electric and electronic circuit analysis. Linear wave shaping with simple low pass and high pass filters. Non-linear wave shaping with diodes and transistor switching. Analysis and design of basic logic gates with bi-junction and MOS technologies. Analysis and design of astable, monostable and bistable mutivibrators. Logic families performance characteristics.

CC 410 – Systems Programming
Cr.3. Prerequisite: CC 319
Introduction to system programming, machine architecture, machine language, assembly language, two pass assemblers, one pass assemblers, macro facilities, conditional macros, macro processors, loaders, linkers, introduction to formal languages, compilers and interpreters.

CC 411 – Introduction to Microprocessor
Cr.3. Prerequisite: CC 312 or CC216
Numbering and coding Systems – Internal Organization of Computers–Reduced Instruction Set computer (RISC) architecture Vs Complex Instruction Set computer (CISC) architecture - Evolution from 8080 to 80486. Pipelining- 8086 Registers- Program Segments- Logical Address-Physical Address- Little Endian Convention- Stack- Flag Register- Addressing Modes- Control transfer Instructions- Data Types and Data Definition-Arithmetic and Logic instructions and Programs- 8088 Microprocessor-8284 and 8288 supporting chips- Local bus Vs System Bus-DMA- Memory Capacity-Memory Organization-ROM(PROM-EPROM-EEPROM –Flash memory-Mask ROM) -RAM (SRAM, DRAM, NV-RAM)- Memory Address Decoding- 8088 I/O Instructions- 8255 PPI Chip

CC 412 – Computing Algorithms
Cr.3. Prerequisite: CC 319
Analyze the asymptotic performance of algorithms - demonstrate a familiarity with major algorithms and data structures - synthesize efficient algorithms in common engineering design situations

CC 413 – Numerical Analysis
Cr.3. Prerequisite: (CC 112 or CC 114) and BA 224
Introduction to numerical methods and their applications - Solving Equations, error analysis, solving system of linear algebraic equations, Optimization, integration, Interpolation and Least square error and regression.

CC 414 – Database Systems
Cr.3. Prerequisite: CC 319
Relational Database analysis – design - normalization and implementation - implementation skills using Oracle developer - Concurrent transactions – XML data management.

CC 415 – Data Acquisition Systems
Cr.3. Prerequisite: CC421
Data Acquisition, Definitions & Applications, Data Acquisition channel structure components, Sensors and Transducers: Types, applications, structural classifications, Signal conditioning, Amplifications reshaping, and filtration, Data conversion, principles, devices and limitations, Introduction to data Analysis and elementary control, Case studies, Student Projects.

CC 416 – Computer Graphics

Cr.3. Prerequisite: CC 319

History and survey of graphics applications – Overview of graphics systems and input-output devices – Drawing Algorithms for points, lines, circles and area filling. Introduction to spline representation and application . Two-dimensional transformation . Windowing and clipping. Interactive input methods – introduction to three-dimensional graphics. Introduction to computer graphics pipeline and graphical processing unit. Programming with Open GL.

CC 417 – Assembly Language

Cr.3. Prerequisite: CC 421

In this course, students gain knowledge in PC hardware, and in using assembly language, including what needed to write, link and execute a program written in assembly language. The course will also introduce the Intel family of computers, its associated components, and how the operating system controls these components. The formal logic machine,, instruction addressing and execution, computer memory, basics of assembly language, linking and running a program will be addressed. In addition, the course enables students to analyze and implement many practical problems with Assembly language. The course includes a project that teaches students how to deal with various topics in the course.

CC 418 – Operating Systems

Cr.3. Prerequisite: CC 410

Introduction to modern operating systems - the concepts, structure, design principles, implementation issues, and mechanisms of operating systems.

CC 421 – Microprocessor Systems

Cr.3. Prerequisite: CC 311

Numbering and coding Systems – Internal Organization of Computers–Reduced Instruction Set computer (RISC) architecture Vs Complex Instruction Set computer (CISC) architecture - Evolution from 8080 to 80486. Pipelining- 8086 Registers- Program Segments- Logical Address-Physical Address- Little Endian Convention- Stack- Flag Register- Addressing Modes- Control transfer Instructions- Data Types and Data Definition-Arithmetic and Logic instructions and Programs- 8088 Microprocessor-8284 and 8288 supporting chips- Local bus Vs System Bus-DMA- Memory Capacity-Memory Organization-ROM(PROM-EPROM-EEPROM –Flash memory-Mask ROM) -RAM (SRAM, DRAM, NV-RAM)- Memory Address Decoding- 8088 I/O Instructions- 8255 PPI Chip

CC 431 – Computer Networks

Cr.3. Prerequisite: CC 331

Introduction – Computer Networks and the Internet Networking protocol layers OSI and TCP/IP- Application Layer Principles of net applications, web and HTTP, FTP, electronic mail, DNS and Peer to Peer applications. Transport layer, Multiplexing and demultiplexing, Connectionless Transport and UDP – reliable data transfer and connection oriented transport TCP, congestion control. Network layer forwarding and routing, IP protocol, routing algorithms, Broadcast and Multicast routing. Data Link layer, introduction and services, error detection and correction techniques, Multiple access protocols and Link layer addressing, Ethernet and PPP.

CC 442 – Digital Design & Introduction to Microprocessor

Cr.3. Prerequisite: CC 112 or CC114

The course serves as an introduction to basic digital operations and digital circuits. Topics included are number systems, logic gates, Boolean algebra, combinational logic, flip flops, registers, memories, and an introduction to microprocessors. . It demonstrates concepts through the design of a variety of logic circuits such as adders, comparators, decoders, encoders, Multiplexers, Demultiplexers, counters, registers, and microprocessors.

CC 501 – Senior Project1

Cr.3. Prerequisite: Senior Standing – Completion of 138 Credit Hours and a GPA of at least 2.00.

Application-oriented project aiming to show competence in major academic area. An independent research project is conducted under the guidance of a faculty member. Topics will depend on student's and supervisor's interest. The research should contribute to the advancement of knowledge in the field chosen. Written report and formal presentation are required.

CC 503 – Project II

Cr.6. Prerequisite: CC 501

Application-oriented project aiming to show competence in major academic area. An independent research project is conducted under the guidance of a faculty member. Topics will depend on student's and supervisor's interest. The research should contribute to the advancement of knowledge in the field chosen. Written report and formal presentation are required.

CC 511 – Artificial Intelligence

Cr.3. Prerequisite: CC 218 and CC319

History and Goals – Representation and search – Knowledge based systems – Logic (Propositional and Predicate) as a representation language – Problem Solving Strategies, Game playing Trees (MinMax, alpha-beta pruning), Iterative improvement search, Generic algorithms, Introduction to Perceptron Neural networks & feed forward networks, First order logic, Propositional logic and Expert systems.

CC 512 – Computer Networks I

Cr.3. Prerequisite: CC 319 & EC 323

Introduction: reasons; applications; structure; architecture; OSI model; standards

System components: modems & switches; routers; gateways, System operation Access protocols: circuit-switched; packet-switched; broadcast, Data link control protocols, Digital transmission, Computer networks design considerations: line delay; response time; throughput; allocation of channels; Computing power and other considerations.

CC 513 – Computing Systems

Cr.3. Prerequisite: CC 418 – CC 421

High performance computing, ILP, RISC architecture, Memory hierarchy, Pipelining, Vector processing, Array processing, Massively parallel processors, Multiprocessor architecture, Data flow computers. Different Parallel computing models, Shared and Distributed Memory Systems, Analyse the use of virtual and cache memory and evaluate their effects on computer systems.

CC 514 – Computer Networks II

Cr.3. Prerequisite: CC 512

The course emphasizes topics of fundamental importance concerning the technology and architecture of LANs. It highlights various LAN protocols and standards and discusses LANs, internetworking and interoperability. Students measure LAN performance and study LAN realizations using the available networking facilities.

CC 515 – Introduction to Software Engineering

Cr.3. Prerequisite: CC 319 and CC414

Introduction to software engineering disciplines with emphasis on software life cycle - project management – verification - validation and testing of software.

CC 516 –Pattern Recognition

Cr.3. Prerequisite: CC 416

Smoothing operations - edge detection algorithms - the connected component methodology - shape detection and morphological operations - statistical decision - other paradigms in pattern recognition include hierarchical and partitional clustering - feed-forward and feed-backward neural networks.

CC 517 – Modelling and simulation

Cr.3. Prerequisite: CC319 and BA326

Review of Probability,random variables and distributions - random Processes - discrete and continuous markov Processes - queuing systems - stochastic petri nets - computer generation of random numbers - simulation of an M/M/1 queuing system.

CC 518 – Computer Security

Cr.3. Prerequisite: CC 319

This course provides an introduction to the fundamental principles of cryptography and its applications on the network security domain. The course covers a broad variety of important security topics, such as cryptography, authentication, network vulnerabilities and attacks, network intrusion detection and tools to defend against network attacks. The course introduces also the applications of discrete mathematics and number theory in the design of modern cryptographic algorithms.

CC 521 – Micro-Computer Based Design

Cr.3. Prerequisite: CC 415

Need for micro based systems, Design cycle for micro based system, Different platforms for embedded systems, FPGAs as a platform for micro based systems, Comparing between microprocessors and micro-controllers. I/O interfacing, Programming of micro controllers embedded systems, Hardware / software portioning and Integration

CC 523 – Computer Design and Performance Evaluation

Cr.3. Prerequisite: CC 311

Comparison between the two major design methodologies based on ISA (Instruction Set Architecture) and ASA (Application Specific Architecture). The course covers the topics of queuing theory and Markov processes as a tool for computer system performance evaluation. Moreover, the students are introduced to operational analysis techniques regarding performance of computer systems.

CC 524 – Neural Networks

Cr.3. Prerequisite: CC 112 and BA 323

Introduction to basic concepts of neural networks. The basic neuron. The multiplayer perception. Artificial neural networks: applications, learning, and architecture. Competitive neural networks. Kohonen self-organizing networks. Adaptive reasoning theory (ART). Hop field neural networks. Neural networks implementation. Neural networks applications. Introduction to MATLAB environment. Single perception, Multiplayer perception, Competitive networks, Kohonen networks, ART networks, And Hop field networks using MATLAB.

CC 525 – Intelligent Robotics

Cr.3. Prerequisite: CC 319 and EE 418

Introduction, History, Applications, Object rotation, General transformations, Forward Kinematics, Inverse kinematics, Static's, Forward Dynamics, Inverse Dynamics, trajectory generation, Control, Applications and practical Considerations.

CC 527 – Computer Aided Design

Cr.3. Prerequisite: (CC 311 and CC 341) or CC 312

To introduce fundamental algorithms and techniques for computer aided integrated circuit design. It covers aspects of design flow, physical design, logic optimization, timing analysis and verification, synthesis for testability

CC 528 – Computer Systems Performance Analysis

Cr.3. Prerequisite: Senior Standing credits 138

The purpose of this course is to introduce the student to the principles and techniques of performance measurement in the analysis of computer systems. Such techniques are used to detect bottlenecks, measure the efficiency of computer systems and applications

CC 529 – Distributed and Parallel Systems

Cr.3. Prerequisite: CC 431 and CC418

This course studies the fundamental aspects of distributed systems and applications. Early foundations and recent developments in distributed systems will be investigated. Both client-server and peer-to-peer application designs will be discussed. Other topics include sockets, reliability, replication, group membership protocols, clock synchronization, and logical timestamps.

CC 531– Advanced Networks

Cr.3. Prerequisite: CC 431

This course covers a set of advanced topics in computer networks. The focus is on principles, architectures and protocols used in Switched Local Area Networks, Wireless, Mobile ad hoc NETworks, and multimedia networks. Topics include: LAN Multiple Access Protocols, Link Layer Error Detection and Correction Techniques, Link Layer Addressing and switches- ARP-CDMA-WiFi: architecture, CSMA/CA-Frame Format-Mobility Management: addressing and Routing-Mobile IP-Multimedia Networking Applications,-VoIP-RTP-SIP-QoS- Diffserv.

CC 533– Internetwork Programming

Cr.3. Prerequisite: CC 431

In this course, students explore internet implementation as a network of embedded computing systems, internetworking skills for design and implementation of hardware and embedded software internet products.

CC 535– Internetwork Security

Cr.3. Prerequisite: CC 431

Hacking and the Law, Network Mapping, Vulnerability Assessment, Network Mapping tools, Vulnerability Scanners, Sniffing, Defenses, Denial of Service Techniques using address spoofing, Man-in-the-middle, Defenses, Stack-Based Buffer Overflow Attacks and Password Attacks and Cracker tools, Web Attacks, RootKits, Trojans and Backdoors, Intrusion Detection tools, Writing new intrusion detection signatures, HoneyNets, Forensics.

CC537 - Computer Forensics

Cr.3. Prerequisite: Senior Standing credits 138

Conducting a computer forensics investigation- Examining the layout of a network- Finding hidden data- Capturing images- Identifying, collecting, and preserving computer evidence- Understanding encryption and examining encrypted files- Documenting the case- Evaluating common computer forensic tools- Presenting and analysing computer evidence.

CC539 - Selected Topics in Networks

Cr.3. Prerequisite: CC531

Selected Topics in Networks - Wireless Networking -Mobile Networks – Sensor Networks – Content-Based Networking – Autonomic Networks - Network Optimization.

CC540 - Computer Systems Engineering

Cr.3. Prerequisite: Senior Standing credits 138

The course objective is to integrate key topics from algorithms, computer architecture, operating systems, compilers, and software engineering, in one unified framework. This will be done constructively, by building a general-purpose computer system from the ground up. In the process, many ideas and techniques used in the design of modern hardware and software systems are explored, and major trade-offs and future trends are discussed. Throughout the course, the student gains many cross-section views of the computing field, from the bare bone details of switching circuits to the high level abstraction of object-based software design.

CC 550– Selected Topics in Computing

Cr.3. Prerequisite: CC 311 and credits 138

Fundamental concepts and issues related to the design and analysis of advanced computing which includes multithreaded, parallel, and distributed computing. This course introduces a discussion of programming techniques, applications, implementations, and performance issues. In addition, selected topics from the following list will also be covered: load balancing, task scheduling, fault-tolerance, coordination & agreement, distributed objects & remote invocation, and distributed transactions & concurrency control. It also gives an introduction to real-time systems, reconfigurable computing, and some advanced topics.

CC 552– Web Engineering

Cr.3. Prerequisite: CC213

Provides an introduction to the discipline of Web Engineering. This course aims to introduce the methods and techniques used in Web-based system development. This course draws upon previous programming and computing experience to develop practical web development and maintenance skills. The course teaches the students the Object Oriented techniques, Design, Analysis using HTML, CSS, Java Script, PHP, MYSQL, ASP.NET, and Ajax. This course is intended for students with knowledge of both Internet communication concepts and an introductory programming knowledge.

CC 553– Mobile Applications

Cr.3. Prerequisite: CC 414 and CC316

This course introduces MOBILE APPLICATION DEVELOPMENT to students who are already familiar with java Programming language and database systems. Advanced features of MOBILE APPLICATION DEVELOPMENT will be introduced through applications. Among those advanced features: Building Graphical User Interface (GUI), Access mobile resources (Camera, Sensors, Bluetooth), processing Multimedia resources (Video and Audio processing), Location tracking and map allocation, Android storage options and data management (database connectivity using SQLite), and Animations applications.

The course also covers mobile application fundamentals, application components, intents, application anatomy compression between multiple mobile operating system and define android architecture and its platform.

This Program is accredited by the Engineering Accreditation Commission of ABET.

http://www.abet .org

The program educational objectives and student outcomes are listed in the (CET) site.

Construction and Building Engineering

The Construction and Building engineering program at the AASTMT provides the necessary technical skills that are consistent with the accreditation standards and national needs in many fields. Such fields are mathematics, basic science, engineering science, engineering design, humanities and social sciences. Moreover, the program provides critical learning for a broad foundation in structures, environmental engineering, geotechnical, materials, water resources, construction management, construction engineering, and transportation. Considerable emphasis is placed on group-based, open-ended design projects to provide students with the necessary skills needed for creative teamwork and to prepare them professionally for diverse employment opportunities. Preparation for professional practice and graduate studies is accomplished through careful selection of professional and technical electives. Students are motivated to keep abreast of current technical developments, improve communication skills, use computer tools, be aware of project constraints, and maintain high standards of ethics and professionalism.

The mission of the Construction and Building Engineering Program is to provide students and the construction industry with the highest level of technical preparation, professional development and leadership skills for successful careers in construction engineering and provides a high-quality education based on a well-balanced curriculum.

Graduates of the Construction and Building Engineering degree program design and manage construction processes that create living and working environments such as office buildings, industrial buildings, airports, housing, roads, bridges, utilities, water resources and coastal engineering projects. Graduates fill positions in construction companies, engineering consulting firms, government agencies, and large construction corporations. The positions usually involve the planning, design, and management of the construction process, or the coordination, inspection, and management of design, contracts, or facilities for a business.

When you ask top managers in construction and engineering firms why they selected this career, you can hear the excitement of the construction industry in their responses. Some say they like to conceive an idea and then engineer and manage it through to reality. Others say that they like the combination of computerized planning, process design, cost engineering, and scheduling with the gratification of seeing a job well done.

Graduates of this degree program enjoy a wide range of opportunities to apply their technical knowledge with tremendous variety of day-to-day work. Some choose design, planning, or financial management positions working in an office environment, while others prefer direct field operations.

Following are some of the job opportunities that can be pursued by the program graduates:

- Field engineer: implements and coordinates engineered construction processes.
- Design engineer: develop conceptual and detailed designs for many construction projects such as office buildings, industrial buildings, airports, housing, roads, bridges, hydraulic structures, coastal structures, utilities, and dams.
- Surveying engineer: perform surveying activities for all types of construction projects
- Cost Estimator: develops itemized costs and budgets for design and construction based upon knowledge and pre-design of operations, materials, and resources requirements.
- Scheduling engineer: designs and monitors the time plans and sequence of construction operations.
- Quality control engineer: ensures that the items of the construction project conform to specifications and standards.
- Project controls engineer: reviews the cost and time performance of the project during construction.
- Contract administrator: reviews the project's contracts and reviews.
- Project engineer: designs all or part of the project construction process, and coordinates construction engineering to accomplish the overall objectives of the facility design team.

- Project manager: oversees all aspects of a project, coordinates subcontractors, and represents the primary contact to the client as well as to the company's leaders.
- Chief engineer, designer, estimator, project controls, contract administration, and project manager: oversees operations in designated areas related to multiple projects.
- Division head or vice president, president, chief executive officer: manages overall company operations.

The main aim of the program is to prepare individuals for a professional career in construction engineering and management and for life-long learning by providing graduates with the necessary technical skills, personal skills and knowledge in construction and building engineering.

Graduates of the Construction and Building Engineering program are expected to be able to:

- Be successfully employed in a construction engineering field.
- Apply mathematics and engineering fundamentals with proficiency to solve complex construction problems.
- Utilize personal, communication, and leadership skills and be able to work effectively in a team.
- Be able to success in professional career as well as graduate studies through continuing education.
- Conduct themselves with high standards of ethics, regards to public safety and sustainability issues.

Academic Program Sheet

Year 1			
Semester 1		**Semester 2**	
BA 113	Physics 1	BA 114	Physics 2
BA 123	Mathematics 1	BA 118	Chemistry
BA 141	Engineering Mechanics 1	BA 124	Mathematics 2
CC 111	Introduction to computers	BA 142	Engineering Mechanics 2
IM 111	Industrial Relations	CC 114	Introduction to Programming
LH 131	English for Special Purposes 1	IM 112	Manufacturing Technology
ME 151	Eng. Drawing & Descriptive Geometry	LH 132	English for Special Purposes 2
Year 2			
Semester 3		**Semester 4**	
CB 221	Construction Engineering Drawings	BA 224	Mathematics 4
CB 241	Structural Analysis 1	EE 218	Measurements & Instrumentation
CB 251	Testing of Materials	CB 242	Strength of Materials
EE 238	Electrical Engineering Fundamentals	CB 271	Construction Surveying 1
BA 223	Mathematics 3	CB 281	Hydraulics for Civil Engineers
LH 231	Technical Report Writing	NE XXX	Non Engineering Elective 1
Year 3			
Semester 5		**Semester 6**	
BA 329	Probability & Statistics	CB 311	Introduction to Construction Management
CB 382	Water Resources Engineering	CB 354	Design of Reinforced Concrete Structures 1
CB 343	Structural Analysis 2	CB 362	Soil Mechanics
CB 352	Construction Materials	CB 313	Quality Control in Construction
CB 361	Engineering Geology	CB 312	System Analysis for Construction Engineers
ME255	Computer Aided Drafting (CAD)	CB 322	Building Construction

Year 4			
Semester 7		**Semester 8**	
CB 472	Transportation and Traffic Engineering	CB 431	Technical Installations in Buildings
CB 455	Design of Reinforced Concrete Structures 2	CB 463	Design and Construction of Earth Structures & Foundation
CB 483	Irrigation & Drainage	CB 474	Highway Design and Construction
AR 411	Architectural Design & Urban Landscape	CB 444	Design of Metallic Structures
CC 413	Numerical Analysis	CB 415	Quantity Surveying, Cost Estimating & Specifications
NE XXX	Non Engineering Elective 2	CB 485	Design & Construction of Coastal Structures
		IM 400 CB	Practical Training
Year 5			
Semester 9		**Semester 10**	
CB 514	Construction Contracts and Law	CB 524	Methods & Equipment for Construction 2
CB 523	Methods & Equipment for Construction 1	CB 533	Environmental Control & Energy in Buildings
CB 516	Construction Project Management 1	CB 519	Construction Project Management 2
CB 532	Environmental & Sanitary Engineering	CB 503	Project 2
CB 501	Project 1	CB 5XX	Department Restricted Elective
CB 5XX	Department Restricted Elective		

College Electives			
Non-Engineering Elective 1		**Non-Engineering Elective 2**	
NE 266	Creativity and Innovation	NE 465	Aesthetics Edu. & Art Appreciation
NE 264	Scientific Thinking	IM 531E	Human Resource Management
IM 539	International Business Management	NE 466	Environmental Science and Technology

Department Restricted Electives			
CB 545	Structural Dynamics	CB 546	Special topics in Steel & Composite Structures
CB 556	Concrete Technology	CB 558	Special topics in Reinforced Concrete Structures
CB 573	Construction Surveying 2	CB 575	Special Topics in Transportation Engineering
CB 584	Special Topics in Hydraulic and Coastal Structures	CB 525	Special Topics in Construction Engineering
CB 518	Financial Management and Accounting in Const.	CB 534	Special Topics in Environmental Engineering
CB 564	Special Topics in Geotechnical Engineering	CB 557	Inspection, Maintenance and Repair of Structures
CB 576	Special Topics in Railway Engineering		

Graduation Requirements

College Requirements					
A total of 60 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 54 Cr. Hr. of the following compulsory courses					
BA	1	BA 113	Physics (1)	3	None
	2	BA 114	Physics (2)	3	BA 113
	2	BA 118	Chemistry	2	None
	1	BA 123	Mathematics (1)	3	None
	2	BA 124	Mathematics (2)	3	BA 123
	3	BA 223	Mathematics (3)	3	BA 124
	4	BA 224	Mathematics (4)	3	BA 223
	5	BA 329	Probability & Statistics	3	BA 224
	1	BA 141	Engineering Mechanics (1)	3	None
	2	BA 142	Engineering Mechanics (2)	3	BA 141
CC	1	CC 111	Introduction to Computer	2	None
	2	CC 114	Introduction to Programming	3	CC 111
	7	CC 413	Numerical Analysis	3	CC 114 & BA 224
IM	1	IM 111	Industrial Relations	2	None
	2	IM 112	Manufacturing Technology	2	None
	8	IM 400 CB	Practical Training	0	None

College Requirements					
A total of 60 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 54 Cr. Hr. of the following compulsory courses					
ME	1	ME 151	Eng. Drawing and Descriptive Geometry	3	None
LH	1	LH 131	English for Special Purposes (1)	2	None
	2	LH 132	English for Special Purposes (2)	2	LH 131
	3	LH 231	Technical Report Writing	3	LH 132
EE	3	EE 238	Electrical Engineering Fundamentals	3	BA 124
	4	EE 218	Measurements & Instrumentation	3	EE 238

College Electives					
At least six credit hours (6 cr. hr.) from the following list of the college electives					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 54 Cr. Hr. of the following compulsory courses					
NE	4	NE 264	Scientific Thinking	3	None
	4	NE 266	Creativity and innovation	3	None
	7	NE 466	Environmental Science and Technology	3	None
	7	NE 465	Aesthetic Education and Art Appreciation	3	None
IM	4	IM 539	International Business Management	3	None
	7	IM 531E	Human Resource Management	3	126 Cr. Hr.

Department Requirements

A total of 120 credit hours are required by the department, which are distributed as follows:

- 114 credit hours of compulsory courses.
- A minimum of 6 credit hours of department electives

The required compulsory and restricted elective courses are listed in the following table.

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 114 Cr. Hr. of the following compulsory courses					
CB	6	CB 311	Introduction to Construction Management	3	BA 224
	6	CB 312	System Analysis for Construction Engineers	3	BA 329
	6	CB 313	Quality Control in Construction	3	BA 329
	8	CB 415	Quantity Surveying, Cost Estimating & Specifications	3	CB 322 & CB 354
	9	CB 514	Construction Contracts and Law	3	CB 311 & CB 415
	9	CB 516	Construction Project Management 1	3	CB 311 & CB 322
	10	CB 519	Construction Project Management 2	3	CB 415 & CB 516
	3	CB 221	Construction Engineering Drawings	3	ME 151
	6	CB 322	Building Construction	3	CB 221
	9	CB 523	Methods & Equipment for Construction 1	3	CB 322
	10	CB 524	Methods & Equipment for Construction 2	3	CB 523
	8	CB 431	Technical Installations in Buildings	3	CB 322
	9	CB 532	Environmental & Sanitary Engineering	3	CB 382
	10	CB 533	Environmental Control & Energy in Buildings	3	CB 431
	3	CB 241	Structural Analysis 1	3	BA 141
	4	CB 242	Strength of Materials	3	CB 241 & CB 251

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 114 Cr. Hr. of the following compulsory courses					
CB	5	CB 343	Structural Analysis 2	3	CB 242
	8	CB 444	Design of Metallic Structures	3	CB 343
	3	CB 251	Testing of Materials	3	None
	5	CB 352	Construction Materials	3	CB 251
	6	CB 354	Design of Reinforced Concrete Structures 1	3	CB 343
	7	CB 455	Design of Reinforced Concrete Structures 2	3	CB 354
	5	CB 361	Engineering Geology	3	None
	6	CB 362	Soil Mechanics	3	CB 361
	8	CB 463	Design & Const. of Earth Structures & Foundation	3	CB 362 & CB354
	4	CB 271	Construction Surveying 1	3	BA 124
	7	CB 472	Transportation Engineering	3	CB 271
	8	CB 474	Highway Design and Construction	3	CB 472
	4	CB 281	Hydraulics for Civil Engineers	3	BA 114
	5	CB 382	Water Resources Engineering	3	CB 281
	7	CB 483	Irrigation & Drainage	3	CB 382
	9	CB 485	Design & Construction of Coastal Structures	3	CB 281
	9	CB 501	Project 1	3	138 Cr. Hr.
	10	CB 503	Project 2	6	CB 501
AR	7	AR 411	Architectural Design & Urban Landscape	3	CB 221
CC	7	CC 413	Numerical Analysis	3	CC 114 & BA 224
IM	8	IM 400 CB	Practical Training	0	None
ME	5	ME 255	Computer Aided Drafting (CAD)	3	CB 221

Department Restricted Electives					
At least two courses (6 Cr. Hr.) from the following list of the college electives					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
CB	9 – 10	CB 518	Financial Management & Accounting in const.	3	CB 516
	9 – 10	CB 525	Special Topics in Construction Engineering	3	CB 523
	9 – 10	CB 534	Special Topics in Environmental Engineering	3	CB 532
	9 – 10	CB 545	Structural Dynamics	3	CB 343
	9 – 10	CB 557	Inspection, Maintenance. & Repair of Structures	3	CB 444 or CB 455
	9 – 10	CB 546	Special topics in Steel & Composite structures	3	CB 444
	9 – 10	CB 556	Concrete Technology	3	CB 352
	9 – 10	CB 558	Special topics in Reinforced Concrete Structures	3	CB 455
	9 – 10	CB 564	Special Topics in Geotechnical Engineering	3	CB 463
	9 – 10	CB 573	Construction Surveying 2	3	CB 271
	9 - 10	CB 575	Special Topics in Transportation Engineering	3	CB 474
	9 – 10	CB 576	Special Topics in Railway Engineering	3	CB 472
	9 – 10	CB 584	Special Topics in Hydraulic & Coastal Structures	3	CB 483

Course Summary Description

IM 400CB – Practical Training

Cr.0. Prerequisite: None.

This course is a non-credit course and is a college graduation requirement. Students are asked to undertake a minimum of four weeks of practical training in off-campus sites recommended by the college and the department in order to pass this course. Students are required to submit a recognition letter from the site where they received their training, besides a report and a presentation. Course is a Pass/ Fail one.

CB 221 – Construction Engineering Drawings

Cr.3. Cr.3. Prerequisite: ME 151

Introduction to construction engineering as related to the overall types of Engineering projects - A brief review of the construction industry; site layout, erection of steel and concrete structures - Drawings to demonstrate the concepts of various types of civil engineering and construction projects which include: residential and industrial buildings, water resources projects, urban transportation systems, coastal development projects, and environmental protection projects - Design and construction drawings which include architectural systems, structural systems, mechanical and electrical installation. Field strips and analysis of local construction projects.

CB 241 – Structural Analysis 1
Cr.3. Prerequisite: BA 141
Definition of a structure, its support conditions and its various structural forms in addition to various loading conditions that a structure must support. Study the stability and determinacy of structures. Calculation of reaction forces. Basic concepts of structural analysis. Calculation of the internal forces (normal forces, shear forces and bending moments) and its distribution on statically determinate beams, frames and arches. Member forces in trusses. Influence lines and its use to calculate the maximum response functions in structures.

CB 242 – Strength of Materials
Cr.3. Prerequisite: CB 241 & CB 251
Properties of Areas, normal stresses, axial stress, thermal stress and bending stresses. Shear stresses: Direct shear stress, transverse loading and torsional stresses, Principal stresses and strains, elastic deflection of beams, and buckling of columns.

CB 251 – Testing of Materials
Cr.3. Prerequisite: None
Codes and specifications, classification of engineering materials, the Architecture of solids, mechanical properties of engineering materials, and testing materials machinery. Axial static tension: stress- strain relationship. Static compression: test, static bending, static torsion, mechanical properties and testing, hardness of metals, dislocations and strengthening mechanism in metals, fracture, impact testing, fatigue and Creep.

CB 271 – Construction Surveying 1
Cr.3. Prerequisite: BA 124
Standards ; Unit calibration ; Measurement of distance; Linear surveying technique ; Bearing calculation and measurement ; Compass Traversing ; Rectangular coordinates calculation ; Application of practical surveying problems ; Measurement of horizontal and vertical angles ;Theodolite Traversing ; Profile levelling; Contouring ; Computation of earthwork ; Layout of construction engineering projects .

CB 281 – Hydraulics for Civil Engineers
Cr.3. Prerequisite: BA 114
Properties of fluids and continuum flow, hydrostatics, hydrodynamic applications, flow kinematic properties and forces, flow conservation equations, continuity equation, momentum principle, energy equations, flow measurements, flow in closed/open conduits, flow in pipeline systems; pipes in series, pipes in parallel, pipeline network and pump stations, features of hydraulic analyses for the design of civil engineering projects in rivers, lakes and coastal zone.

CB 311 – Introduction to Construction Management
Cr.3. Prerequisites: BA 224
The nature of the construction industry, participants of the construction project, management functions, organizational structures, time value of money and interest, cash flow diagram and equivalence, measures of worth, comparison of alternatives, feasibility studies, and application of economic analysis principles to the construction industry.

CB 312 – Systems Analysis for Construction Engineers
Cr.3. Prerequisite: BA 329
Introduction to the mathematical models. The formulation of linear programming models. Solving of linear programming models using the graphical solution method. The transportation and assignment problems. Decision making under uncertainty. Economic considerations for resource allocation, minimum cost model. Sensitivity analysis, changes in unit costs and changes in resource constraints.

CB 322 – Building Construction
Cr.3. Prerequisite: CB 221
The course covers topics in the area of building construction in view of both aspects; construction engineering and architectural engineering. The subjects related to the construction engineering are site and temporary works, substructure, and superstructure. The subjects related to the architectural engineering are architectural drawings, brick works, insulation, stairs, building openings, services, and finishing materials.

CB 343 – Structural Analysis 2
Cr.3. Prerequisite: CB 242
Introduction to statically indeterminate structures. Methods of structural analysis of statically indeterminate structures. Method of consistent deformations.
Method of three-moment equation for continuous beams. Virtual work method. Slope-deflection method. Moment distribution method. Stiffness method. Computer validations.

CB 352 – Construction Materials
Cr.3. Prerequisite: CB 251
Terminology and basic geology of construction materials physical properties: Weight - Volume relationship, sieve analysis, graduation curves, and classification. Engineering properties: Strength and deformation characteristics, aggregates in construction, hydraulic cements, properties of cement Paste, Portland cement concrete: Basic ingredients, basic constituent, proportioning of concrete mixtures. Concrete strength and behaviour, concrete durability, admixtures in concrete, masonry, asphalt concrete: proportions, mix procedures and engineering properties.

CB 354 – Design of Reinforced Concrete Structures 1
Cr.3. Prerequisite: CB 343
Introduction and material properties. Elastic Method: Analysis and design of beams considering flexure. Limit slate Design Method: Analysis and Design of beams considering flexure and shear. Development length and anchorage. Design of one- way and two-way solid slabs. Analysis and design of short columns.

CB 361 – Engineering Geology
Cr.3. Prerequisite: None
Earth composition. Major types of rocks and deposits. Clay minerals. Weathering conditions. Principles of structural geology. Subsurface exploration: techniques and tests. Influence of geological origin on composition and structure of soils. Index properties. Soil description and engineering classification. Permeability and capillarity.

CB 382 – Water Resources Engineering
Cr.3. Prerequisite: CB 281

Watershed hydrology and hydraulic measurements; Principles of hydrologic modelling for surface water; Introduction to ground water engineering. Design of erodible and non-erodible channels open channels; Flow characterization of lakes & reservoirs and its design engineering; Design and construction aspects of water resources structures; Dams and ancillary water supply structures; Flood-damage mitigation and stormwater control structures; Planning of water resources projects and introduction to water resources management. Field visits to water resources projects and laboratory facilities.

CB 313 - Quality Control in Construction
Cr.3. Prerequisites: BA 329

Introduction to quality - Quality improvement techniques - Control charts for variables - In addition, the evaluation of strength test results of concrete, variation and analysis is presented - Quality assurance -Quality systems - ISO 9000 series - Total quality management.

CB 514 - Construction Contracts and Law
Cr.3. Prerequisites: CB311 & CB415

Principles and basics of construction contracting, Types of construction contracts, selection of construction contracts, contracts documents, and project delivery systems, introduction to building and construction law, Legal aspects associated with construction projects, claims and change orders, Alternative Dispute Resolution.

CB 415 – Quantity Surveying, Cost Estimating & Specifications
Cr.3. Prerequisites: CB 322 & CB 354

Quantity surveying. Introduction to cost estimating in construction. Direct and indirect costs. Markups and profits. Construction bidding. Construction specification writing, types and uses.

CB 516 – Construction Project Management 1
Cr.3. Prerequisites: CB 311 & CB322

Network Diagramming Methods. Advanced activity relationships. Bar Charts and Calendars. Work Breakdown Structures (WBS). Activity duration estimation. Project scheduling process. Resource management techniques: resource loading; resource planning & control; resource levelling; and resource allocation. Project cash flow analysis and improvement. Project progress measurement and schedule updating. Project control and Earned Value Analysis. Types of construction schedules and practical scheduling issues.

CB 444 – Design of Metallic Structures
Cr.3. Prerequisite: CB 343

Introduction to metallic structures. Structural proprieties and allowable stresses of steels, Fields of applications of steels, loads, planning & bracing of steel structures.

Design of axially loaded tension and compression steel members, design of steel beams and beam-columns, design of steelwork connections, steel frames, steel bridges, construction of steel structures.

CB 455 – Design of Reinforced Concrete Structures 2
Cr.3. Prerequisite: CB 354
Analysis and design of sections subjected to torsion, design of stairs, design of eccentric sections, analysis and design of slender columns, design of frames, design of flat slabs and hollow blocks, design of water tanks, Introduction to Pre-stressed concrete.

CB 362 - Soil Mechanics
Cr.3. Prerequisites: CB 361
Seepage - Effective stress - Vertical stresses - Consolidation and settlement - Shear strength - Slope stability - Lateral earth pressure - Compaction - Bearing capacity. Experimental determination of soil properties - Grain size distribution - Atterberg limits -Density and Compaction – Permeability - Shear strength – Consolidation - Bearing Capacity - In Situ Testing and Sampling. Soil report writing.

CB 463 – Design and Construction of Earth Structures and Foundations
Cr.3. Prerequisites: CB 362 & CB354
Types of foundation and selection criteria. Design of shallow and deep foundations. Construction and practical considerations. Pile-load test. Retaining structures. Sheet-pile walls. Diaphragm walls.

CB 472 – Transportation and Traffic Engineering
Cr.3. Prerequisite: CB 271
Transportation systems; Individual vehicle motion; Transportation networks; Vehicle flow; Time – Space diagrams; Fundamental flow relationships; Transportation planning; Trip generation; Trip distribution; Modal choice; Network assignments; Network equilibrium; Classification of Highways; Geometric design; Horizontal alignment; Vertical alignment; intersections, interchanges, structural design of highway.

CB 483 – Irrigation and Drainage
Cr.3. Prerequisite: CB 382
Application of the hydraulic & hydrologic principles to the design and construction of irrigation and drainage systems: Crop water requirements and hydrologic determination of the design flow; traditional and modern irrigation methods and systems; Types of drainage systems; hydraulics of surface drainage-ground water interface; Irrigation and drainage system design and structures.

CB 518 – Financial Management and Accounting in Construction
Cr.3. Prerequisites: CB 516
Principles of financial management and accounting. Financial statements' compilation and analysis, projecting cash flow, project financing, budgeting, cost control, introduction to cost accounting and risk-return relationship.

CB 519 – Construction Project Management 2
Cr.3. Prerequisites: CB 415 & CB 516
Feasibility studies and economic evaluation of public projects. Value Engineering. Building Information Modeling (BIM). Probabilistic Scheduling (Pert). Cost-Time relation and schedule compression. Line of Balance. Delay Analysis Methods. Health & safety management systems. Risk Management. Sustainable construction. Advanced topics in construction project management.

CB 523 – Methods and Equipment for Construction 1

Cr.3. Prerequisite: CB 322

Design and construction of formwork systems; horizontal formwork, and vertical formwork. Concrete technology; mixing and batching concrete, transporting concrete, and placing and compacting concrete. Design and construction of dewatering systems; open sumps system, WellPoint system, and deep wells system. Design and construction of shoring systems; continuous piles system, secant piles system, and diaphragm walls system. Cranes; derrick cranes, mobile cranes, and tower cranes.

CB 524 – Methods and Equipment for Construction 2

Cr.3. Prerequisite: CB 523

Engineering fundamentals of moving earth. Tractors and related equipment; tractors, bulldozers, clearing land, and ripping rock. Scrapers. Excavating equipment; draglines, clamshells, hydraulic excavators, loaders, and trenching machines. Trucks and wagons. Belt conveyor systems. Piles and pile-driving equipment. The production of crushed stone aggregate.

CB 525 – Special Topics in Construction Engineering

Cr.3. Prerequisite: CB 523

Construction of multi-storey buildings; Shoring and reshoring operations. Assessment of formwork removal times. Advanced formwork systems. Slip form technique. Lift slab system. Tilt-up construction. Up-down construction technique. Precast concrete technology. Bridge construction systems; Cast-in-place system, cantilever carriage method, and flying shuttering. Tunnel construction. Compressed air. Blasting rock.

CB 431 - Technical Installations in Buildings

Cr.3. Prerequisites: CB 322

Thermal Comfort – Heating - Ventilation & Air Conditioning (HVAC) - Central heating & cooling systems - Distribution Media - Delivery devices - Heat and Moisture transfer in buildings – Lighting - On-site power generation - Normal electrical systems - Special systems - Water supply & Drainage systems - Types of fixtures - Private sewerage systems - Fire protection systems - Architectural acoustics.

CB 532 - Environmental & Sanitary Engineering

Cr.3. Prerequisites: CB 382

Sources of pollution- water quality management, waste-water treatment, industrial wastes, types and disposal, solid waste management, collection and disposal, hazardous wastes.

CB 533 – Environmental Control and Energy in Buildings

Cr.3. Prerequisites: CB 431

Energy expenditure in construction stages; Comparison of building material on a production energy basis; Energy demands of a building; Renewable energy and Sustainable development; Thermal load of building spaces; Effect of building envelop; Energy conscious building design; Description of some methods of energy conservation & waste-energy recovery; Alternative building demands; Environmental safety & public health considerations.

CB 534 – Special Topics in Environmental Engineering

Cr.3. Prerequisite: CB 532

Ecological perspective, water cycle, ecosystems, environmental regulation and legislation, Origin of environmental impact assessment, Sources of pollution, Air pollution and indoor air quality, Water quality management, Industrial wastes, Solid waste management, collection and disposal, Marine pollution, Noise pollution, Traffic noise prediction, Contribution of civil engineer in environmental control.

CB 545 – Structural Dynamics

Cr.3. Prerequisite: CB 343

Structural vibrations, Earthquake response of structures, Design criteria for seismic resistant structures, Seismic response of tall buildings, Response spectra.

CB 546 – Special Topics in Steel /Composite Structures

Cr.3. Prerequisite: CB 444

Design load for steel bridges according to the Egyptian code requirements, Design of steel structural elements of bridges. Construction methods for steel bridges. Design of composite structural elements, columns beams and beam- columns. Design of and Constructions of structural elements made of cold-formed steel sections.

CB 556 – Concrete Technology
Cr.3. Prerequisite: CB 352

Concrete workability and consistency. Concrete manufacturing. Mixing, transporting and casting of concrete. Properties of hardened concrete. Compacting and curing of concrete. Expansion joints. Concrete admixtures. Concrete durability. Design of concrete mixtures. Evaluation of concrete strength. Ready mix concrete. Hot weather concrete curing.

CB 557 – Inspection, Maintenance, and Repair of structures
Cr.3. Prerequisite: CB 444 & CB 455

Overview of maintenance, Causes and agents of deterioration, Diagnosis and investigation techniques, Diagnosis and investigation techniques, Foundations repair, concrete defects, Repair of concrete structure, Site visit for a repair project, other materials investigation and repair.

CB 558 – Special Topics in Reinforced Concrete Structures
Cr.3. Prerequisite: CB 455

The design of concrete structures for special tasks - These structures include bridges, halls, and storage structures - The design of contemporary R.C. bridges is achieved through learning the theory and basics behind restressed concrete and the design of pre-stressed bridges - In addition, the design of halls in buildings or factories is applied through the design of saw-tooth (north light) structures, shell roof structures, and arched frame structures - Moreover, the design of special structures for storage such as elevated circular tanks, ground tanks, and silos are covered in the course.

CB 564 – Special Topics in Geotechnical Engineering
Cr.3. Prerequisite: CB 463

Foundations on problematic soils. Ground modification. Soil Improvement. Mat foundation. Unsaturated soil; stress, shear strength, water flow. Geoenvironmental fundamentals. Fate and transport of contaminants in the subsurface. Treatment and disposal methods of waste. Land disposal. Site remediation and subsurface characterization. Containment.

CB 573 – Construction Surveying 2
Cr.3. Prerequisite: CB 271

Types of traverses, closed, open, link, traverse nets and application, theodolite application, automatic laser level, longitudinal and grid levelling precise levelling , mass diagram and hard distance, total stating and application, setting out construction projects, geographic information system, global positioning system, construction surveying software.

CB 474 - Highway Design and Construction
Cr.3. Prerequisites: CB 472

Highway classification & process of location selections; Horizontal Alignment and details of geometric design; Vertical alignment and details of geometric design; Principles of traffic flow; Highway level of service (LOS); Capacity of highway segments ; multi-lane and two lanes ;At grade intersection , types , Channelization; Intersection Control and traffic Signal Design ; Interchanges, types, principles of design examples ; Soil engineering for highway design ; Bituminous Material; traffic load transformation , Equivalent Single Axle load Concept (ESAL) ; Design of flexible Pavements , AASHTO method of design , BCBR method of design; Highway construction ; Highway Maintenance.

CB 576 - Special Topics in Railway Engineering

Cr.3. Prerequisites: CB 472

Railway dynamics, Tractive effort and resistances, Acceleration and braking ; Railway Alignment, Longitudinal and cross sections,Vertical and horizontal curve design ; Structural design of track, Jointed and welded rail design, Sleeper and ballast design ;Turnouts and switches, Switch, Crossover, Diamond crossing, Scissor crossover, slip, Double junction ; Stations and yards, Passenger and freight stations, Locomotive and stabling yard, Sorting and marshalling yards ; Signalling ; Train traffic management, Automatic block system (ABS), Centralized traffic control (CTC), Automatic control system (ATC) ; Railway capacity ; Railway cost, Price and subsidy ; Railway renewal and maintenance management.

CB 575 – Special Topics in Transportation Engineering

Cr.3. Prerequisite: CB 574

Airport classification & site selection; Wind data analysis; Airport Configuration and main components; Determination of runway basic length & corrections; Aircraft characteristics components of airport system; Overall airport site; Classifications of Airport supporting soil; Design of Airport flexible pavements; Design of Airport Rigid Pavements; Airport lighting; Aircraft refuelling, electrical power, navigation marking; Airport safe surfaces; Airport Air traffic, Control System; Instrument landing System, Railway engineering,railway system, Railway alignment, track elements, Cross section, Platform, length, switching, signalling, Transportation Management System, Transportation Software.

CB 584 – Special Topics in Hydraulic & Coastal Structures

Cr.3. Prerequisite: CB 483

Overview of environmental design parameters related to ambient water, soil and air; Design criteria and construction aspects of major river and estuary structures which include lined open channel, river training, bridge piers, flow control structures, submerged tunnel and storm surge barriers; Design criteria and construction methods of some selected coastal structures are presented which embrace pile-supported structures, bulkheads & quay walls, breakwaters and submarine pipelines.

CB 485 - Design and Construction of Coastal Structures

Cr.3. Prerequisites: CB 281

Ocean environment; wind, tides, wave mechanics - Coastal processes; surf-zone dynamics & coastal sediment transport - Wave & current forces on coastal structures - Port planning and technology - Functional design of coastal structures - Construction aspects of major coastal structures - breakwaters, seawalls, docking facilities, ocean outfalls and submarine pipelines - Field visits to local coastal protection projects.

CB 501 - Project 1

Cr.3. Prerequisites: 138 Cr. Hr.

Selection of Project discipline - Assignment of Project discipline - Lecture in advanced topics - Term Project - Group presentation.

CB 503 - Project 2

Cr.6. Prerequisites: CB 501

Evaluation of students will follow college requirements - Action plan preparation - Project preparation, Final review - Project binding - Project submittal

Construction and Building Engineering (CB) Offered to Other Departments

CB 240 - Theory of Structures

Cr.3. Prerequisites: BA141

Basic concept of structural analysis, types of structures, loads, supports and reactions. Free-body diagram - Equations of equilibrium - Analysis of statically determinate structures, internal force diagrams in beams, frames and trusses - Properties of areas - Normal stress distribution - Shear stress distribution - Elastic deflections of structure.

CB 350 - Building Materials & Testing

Cr.3. Prerequisites: CB 240

Introduction to elastic load-deformation behaviour of materials - Stress-strain relations of building materials - Aggregates physical properties - Aggregates in Construction - Cement and its types and properties - Properties of cement paste - Portland Cement Concrete: Basic ingredients - fresh concrete properties – Proportioning - Properties and strength of concrete mixtures - Lime and Gypsum – timber – Masonry -Glass and Plastics - Insulating Materials.

CB 351 - Reinforced Concrete and Metallic Structures

Cr.3. Prerequisites: CB 350

Planning and selection of R.C. structural systems - Planning and selection of steel structural systems - Analysis and design of R.C sections - Design of R.C. one-way slabs - Design of R.C. two- way slabs -Design of R.C. beams - Design of R.C. columns - General arrangement and bracing of steel structures- Design of steel beams - Design of steel tension members - Design of steel compression members- Design of steel columns and supports - Steel bolted connections -Steel welded connections - Selection of construction material and main systems of structures.

CB 370 - Surveying

Cr.3. Prerequisites: BA 124

Standards - Unit calibration - Measurement of distance - Linear surveying technique - Bearing calculation and measurement - Compass Traversing - Rectangular coordinates calculation -Application of practical surveying problems - Measurement of horizontal and vertical angles -Theodolite Traversing - Profile levelling - Contouring - Computation of earthwork - Layout of construction engineering projects.

CB 460 - Soil Mechanics and Foundations

Cr.3. Prerequisites: CB 351

Soil formation and identification - Physical and mechanical properties of soils - Soil description and classification - Exploration, sampling and in situ soil measurements - Soil report - Bearing capacity of soils - Shallow and deep foundations - Improving site soils for foundation use - Earth slopes and retaining structures - Seepage and dewatering - Impact of geotechnical considerations on architectural design and landscaping.

CB 510 - Project Management & Scheduling

Cr.3. Prerequisites: AR 444

Introduction to construction management - relationship and responsibilities of project participants - project life cycle and management functions - Introduction to the principles of time analysis and scheduling practices in the project planning and control process - including network planning - CPM scheduling - resource levelling - cash flow analysis - project life cycle - design construction interface - computer program applications. The course is organized around a series of exercises geared to simulate the management of the various stages of an architectural project.

Graduate Catalog and the site www.aast.edu

This Program is accredited by the Engineering Accreditation Commission of ABET.

http://www.abet .org

The program educational objectives and student outcomes are listed in the (CET) site.

Electrical and Control Engineering

The first objective is to contribute effectively in presenting and/or solving technical problems in their careers to become successful electrical and control engineers.

The second objective is to cope with technological changes and work in different societies through engaging appropriately in a teamwork ethical environment and as required by the profession

The third objective is to Lead successful professional careers or pursue admission in graduate programs.

The fourth objective is to be effective communicators, team players and productive individuals.

An Overview

Electrical and Control Engineering is an important field of engineering dealing with the study of operation, design and control of power systems, drives and control systems. By covering a range of topics such as power, electronics, control systems and signal processing specific objectives can be achieved.

It is well known that the degree of development of a nation is measured by its per capital consumption of electrical energy i.e. electrical energy utilization. The generation of electricity, its transmission and distribution are thus of primary concern of all developing and rapidly industrializing countries. It is estimated that almost 80% of generated power is used to drive motors, machines, electrical drives and power electronics

The Role of Electrical and Control Engineers

With electrification projects forging ahead in developing countries and peak demand forecast doubling every ten years, there is a pressing need for expert generation, transmission and distribution engineers. Also under study by Arab and African countries are projects for the formation of super grids linking all nations from Iraq in the east to Morocco in the west and from North Africa across the continent to South Africa across with eventual interconnection with Europe.The scope of electrical power engineering is thus very wide indeed and power engineers are required to be knowledgeable in both conventional and frontline topics.

Automatic control systems are not only responsible for the modern way of life; they have indeed revolutionized all aspects of both civil and military life. Its industrial applications have speeded up the production and improved the quality of a very large number of manufactured goods. In power systems the wide use of automatic control systems has added to the reliability, stability and economy of generation, transmission and distribution systems.

Career Opportunities for Electrical and Control Engineers

Quick survey of engineering job vacancies at the daily newspapers reveals that Electrical and Control Engineering would collect almost 35% of the total engineering opportunities available. In fact Electrical and Control Engineering department's main objectives are to introduce a qualified engineer to serve in the field of:

- Generation, transmission, distribution and utilization of electrical power for public and private sectors to secure both continuous and emergency demands.
- Electrical power feeding for civil, military, marine and aviation utilities.
- Electrical works in construction engineering.
- Renewable stand-alone generation systems for isolated communities.
- Automated industrial systems where computer controlled systems are applied such as paper industry, steel production and fabrication industries, chemicals, petrochemicals & medicine production industries, spinning & weaving, food production industries… etc.
- Traction and lifting utilities.
- Electrical drives for all aspects of industry.
- Robotics

Academic Program Sheet

Year 1			
Semester 1		**Semester 2**	
LH 131	English for Special Purposes (1)	LH 132	English for Special Purposes (2)
BA 123	Mathematics (1)	BA 124	Mathematics (2)
BA 113	Physics (1)	BA 114	Physics (2)
CC 111	Introduction to Computers	CC 112	Structured Programming
ME 151	Eng. Drawing & Projection	IM 112	Manufacturing Technology
BA 141	Engineering Mechanics (1)	BA 142	Engineering Mechanics (2)
IM 111	Industrial Relations	BA 118	Chemistry
Year 2			
Semester 3		**Semester 4**	
LH 231	Technical Report Writing	BA 224	Mathematics (4)
CC 216	Digital Logic Design	EE 331	Electrical and Magnetic Fields (1)
BA 223	Mathematics (3)	EE 232	Electrical Circuits (2)
ME 274	Material Science	EC 238	Electronics (1)
CC 213	Programming Applications	EE 211	Electrical Measurements & Instrumentation (1)
EE 231	Electrical Circuits (1)	NE 264	Scientific Thinking
Year 3			
Semester 5		**Semester 6**	
BA 323	Mathematics (5)	BA 327	Statistics & Numerical Methods
EC 339	Electronics II	EE 311	Fundamentals of Control Engineering
EE 312	Electrical Measurements & Inst. (2)	EE 333	Electrical and Magnetic Fields (2)
EE 321	Electrical Machines (1)	EE 322	Electrical Machines (2)
EE 341	Introduction to Power Engineering	EE 342	Power Systems (1)
EE 332	Network Analysis	EE 421	Power Electronics (1)

Year 4			
Semester 7		**Semester 8**	
CC 411	Intro. to Microprocessors	ME 425	Power Plant Technology
EE 422	Electrical Machines (3)	NE 364	Engineering Economy
EE 423	Power Electronics (2)	EE 412	Control Systems (2)
EE 411	Control Systems (1)	EE 413	Microprocessor Based Process Control
EE 441	Power Systems (2)	EE 424	Electrical Drives (1)
ME 234	Thermo-fluids	EE 442	Power Systems Protection (1)
		IM 400EE	Practical Training
Year 5			
Semester 9		**Semester 10**	
EE501	Project (1)	EE503	Project (2)
EE XXX	Department Restricted Elective Group A	EE XXX	Department Restricted Elective Group A/B
EE XXX	Department Restricted Elective Group A	EE XXX	Department Restricted Elective Group A/B
EE XXX	Department Restricted Elective Group B	EE XXX	Department Restricted Elective Group A/B
EE XXX	Department Restricted Elective Group B	IM\NE XXX	Department Restricted Elective Group C
IM\NE XXX	Department Restricted Elective Group C		

Department Restricted Electives			
Group A: Automatic Control		**Group B: Electrical Power & Machines**	
EE 511	Discrete Control Systems	EE 521	Special Electrical Machines
EE 512	Automated Industrial Systems 1	EE 522	Electrical Drives 2
EE 513	Control Applications in Power Engineering	EE 523	Fundamentals of Renewable Energy
EE 514	Robotics	EE 541	Power System Protection 2
EE 515	Computer Control of Dynamic Systems	EE 542	Electrical Power Stations
EE 516	Modern Control Systems	EE 543	Electrical Power Distribution
EE 517	Optimal & Adaptive Control	EE 544	Power Systems 3
EE 518	Automated Industrial Systems 2	EE 545	High Voltage Engineering
EE 519	Industrial Communication Networks	EE 546	Electrical Engineering Material
		EE 547	Utilization of Electrical Energy
		EE 548	Electromechanical Systems for Commercial Installation
Group C: Free Elective Courses			
IM 423	Operation Research		
IM 535	International Operations Management		
NE 467	Management of Energy Resources		

Graduation Requirements

College Requirements					
A total of 51 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses Compulsory Courses A total of 51 Cr. Hr. of the following compulsory courses					
BA	1	BA 113	Physics (1)	3	None
	2	BA 114	Physics (2)	3	BA 113
	2	BA 118	Chemistry	2	None
	1	BA 123	Mathematics (1)	3	None
	2	BA 124	Mathematics (2)	3	BA 123
	3	BA 223	Mathematics (3)	3	BA 124
	4	BA 224	Mathematics (4)	3	BA 223
	1	BA 141	Engineering Mechanics (1)	3	None
	2	BA 142	Engineering Mechanics (2)	3	BA 141
	8	IM 400EE	Practical Training	-	None
CC	1	CC 111	Introduction to computer	3	None
	2	CC 112	Structured Programming	3	CC 111
IM	1	IM 111	Industrial Relations	2	None
	2	IM 112	Manufacturing Technology	2	None
LH	1	LH 131	English for Special Purposes (1)	2	None
	2	LH 132	English for Special Purposes (2)	2	LH 131
	3	LH 231	Technical Report Writing	3	LH 132
ME	1	ME 151	Eng. Drawing and Projection	2	None
NE	4	NE 264	Scientific Thinking	3	None
	8	NE 364	Engineering Economy	3	54 Cr. Hr.

Department Requirements

A total of 129 credit hours are required by the department, which are distributed as follows:

- 102 credit hours of compulsory courses.
- A minimum of 27 credit hours of department restricted electives that are selected from the three main course groups :as follows
  - Seven courses equivalent to 21credits from Group A & Group B.
  - Two courses equivalent to 6 credits from Group C.

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 31 Courses (102 Cr. Hr.) of the following compulsory courses					
BA	5	BA 323	Mathematics (5)	3	BA 224
	6	BA 327	Statistics & Numerical Methods	3	None
CC	3	CC 213	Programming Applications	3	CC 112
	3	CC 216	Digital Logic Design	3	CC 111
	7	CC 411	Intro. to Microprocessors	3	CC 216 & EE211 or CC312
EC	4	EC 238	Electronics I	3	EE 231
	5	EC 339	Electronics II	3	EC 238
EE	3	EE 231	Electrical Circuits (1)	3	BA 124
	4	EE 232	Electrical Circuits (2)	3	EE 231
	4	EE 211	Electrical Meas. & Instrumentation (1)	3	EE 231
	4	EE 331	Electrical and Magnetic Fields (1)	3	BA 223 & EE231
	5	EE 312	Electrical Meas. & Instrumentation (2)	3	EE 211
	5	EE 321	Electrical Machines (1)	3	EE 232
	5	EE 341	Introduction to Power Engineering	3	EE 232
	5	EE 332	Network Analysis	3	EE 232
	6	EE 311	Fundamentals of Control Engineering	3	BA 224
	6	EE 333	Electrical and Magnetic Fields (2)	3	EE 331
	6	EE 322	Electrical Machines (2)	3	EE 321

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 34 Courses (96 Cr. Hr.) of the following compulsory courses					
EE	6	EE 342	Power Systems (1)	3	EE 341
	6	EE 323	Power Electronics (1)	3	EC 339
	7	EE 422	Electrical Machines (3)	3	EE 322
	7	EE 423	Power electronics (2)	3	EE 421
	7	EE 411	Control Systems (1)	3	EE 311
	7	EE 441	Power Systems (2)	3	EE 342
	8	EE 412	Control Systems (2)	3	EE 411
	8	EE 413	Microprocessor Based Process Control	3	CC 411
	8	EE 424	Electrical Drives (1)	3	EE 422 & EE423
	8	EE 442	Power Systems Protection (1)	3	EE 441
	9	EE 501	Project (1)	3	S.S.*
	10	EE 503	Project (2)	6	EE 501
ME	3	ME 274	Materials Science	3	BA 114 & BA 142
	8	ME 520	Power Plant Technology	3	ME 234 or ME 333
	7	ME 439	Thermo-fluids	3	None
	8	ME 520	Thermal Plant Technology	3	ME 439

Department Restricted Electives

At least nine courses (27 Cr. Hr.) from the following list of the college electives

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Group A	9-10	EE 511	Discrete Control Systems	3	EE 412
	9-10	EE 512	Automated Industrial Systems (1)	3	EE 411& EE 419
	9-10	EE 513	Control Applications in Power Eng.	3	EE 412
	9-10	EE 514	Robotics	3	CC 411 & EE 412 or EE 419
	9-10	EE 515	Computer Control of Dynamic Systems	3	EE 411 or EE 418
	9-10	EE 516	Modern Control Systems	3	EE 412 or EE 419
	9-10	EE 517	Optimal & Adaptive Control	3	EE 412
	9-10	EE 518	Automated Industrial Systems (2)	3	EE 412
	9-10	EE 519	Industrial Communication Networks	3	EE 512
Group B	9-10	EE 521	Special Electrical Machines	3	EE 422
	9-10	EE 522	Electrical Drives (2)	3	EE 424
	9-10	EE 523	Fundamentals of Renewable Energy	3	EE 424
	9-10	EE 541	Power System Protection (2)	3	EE 442
	9-10	EE 542	Electrical Power Stations	3	EE 442
	9-10	EE 543	Electrical Power Distribution	3	EE 442
	9-10	EE 544	Power Systems (3)	3	EE 441
	9-10	EE 545	High Voltage Engineering	3	EE 442
	9-10	EE 546	Electrical Engineering Material	3	EE 442
	9-10	EE 547	Utilization of Electrical Energy	3	EE 442
	9-10	EE 548	Electromechanical Systems for Commercial Installation	3	EE 442

Department Restricted Electives

At least nine courses (27 Cr. Hr.) from the following list of the college electives

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Group C	9-10	IM 423	Operation Research	3	90 Cr Hrs
	9-10	IM 535	International Operations Management	3	108 Cr Hrs
	9-10	NE 467	Management of Energy Resources	3	None

Course Summary Description

IM 400 EE – Practical Training

Cr.0. Prerequisite: None.

This course is a non-credit course and is a college graduation requirement. Students are asked to undertake a minimum of four weeks of practical training in off-campus sites recommended by the college and the department in order to pass this course. Students are required to submit a recognition letter from the site where they received their training, besides a report and a presentation. Course is a Pass/ Fail one.

EE 211 – Electrical Measurements & Instrumentation (1)

Cr.3. Prerequisite: EE 231

Accuracy of measurement and error analysis. Absolute and secondary instruments and indicating instrument. Moving coil and moving iron instruments. Dynamometer type instruments. Induction type instruments. Wattmeter for Measuring of power and power factor. Bridges (DC). Bridges (AC). Current and potential transformers. Oscilloscopes.

EE 218 – Instrumentation and Measurements

Cr.3. Prerequisite: EE238

Introduction to feedback control (1) - Introduction to feedback control (2)- Physical Measurements - Introduction to feedback systems - Liquid level instruments - Liquid flow instruments – PH + Viscosity - Displacement + velocity measurements - Force and torque measurements - Data analysis - Error detectors/comparators - Electric/pneumatic transducers - Amplifier – Actuation.

EE 231 – Electrical Circuits (1)

Cr.3. Prerequisite: BA 124

Basic DC circuit elements, series and parallel networks Ohm's law and 1st & 2nd kirchoff' laws .Nodal analysis .Mesh analysis. Basic network theorems; "source transformation, super position, Thevenin's theorem and Norton's theorem, Maximum power transfer". Alternating current fundamentals and a-c generation. R.M.S value and average value, form factor and crest factor. Phasor concept. Relation between current and voltage in resistors, capacitors and inductor, Response of R-L and R-C circuits. Sinusoidal response of series R.L.C circuit. Series resonance.

EE 232 – Electrical Circuits (2)

Cr.3. Prerequisite: EE 231

AC series circuit and series response revision, parallel circuit and Δ to Y-simplification. Source transformation, superposition, the node voltage method and the mesh current method. Thevenin theorem. Complex power and maximum power calculations. Three phase voltage sources. Analysis of the balanced wye – wye circuit. Analysis of the wye delta & delta wye circuit and delta delta circuit. Complex power calculation in three phase. Unbalanced and four wire three phase loads. Unbalanced Y loads with neutral (wire disconnected) or having Zo. Inductances and capacitors, series-parallel combinations. The natural response for R-L circuit. The natural response of R-C circuit. General solution of step response of R-L and R-C circuit. Sequential switching.

EE 236 – Electrical Engineering (1)

Cr.3. Prerequisite: BA 124

Basic DC circuit elements - Ohm's law and Kirchhoff's laws. - Resistances connection and circuit analysis - Magnetic fields, Field strength, flux density, magnetic force - Magnetic circuits- Alternating currents, waves, effective, mean values - RL, RC circuits - power calculation - Analysis of AC Networks - Analysis of AC Networks - Three phase circuits and power Instrumentation and feedback system - Pressure measurement - Level and flow measurements - Temperature measurement - Displacement and velocity measurements.

EE 238 – Electrical Engineering Fundamentals

Cr.3. Prerequisite: BA 124

Introduction to Basic Circuit: Resistance, Voltage, Current and Ohm's law - Resistance in series and Kirchhoff's voltage law, Potential divider - Resistance in parallel and Kirchhoff's current law, current divider.- Nodal Analysis - Mesh analysis - Source Transformations, superposition. - Alternating current, waves, effective and mean values - .Analysis of RL and RC circuits. - Analysis of series RLC circuits. Resonance in series circuits.AC power - Analysis of three-phase circuit - Analysis of three-phase circuits and Measurement of power and power factor in three-phase systems. - Laws of magnetic fields, Field strength flux density, permeability, M.M.F and relations - .Magnetic circuits - .Lifting Power of electromagnets & applications.

EE 311 – Fundamentals of Control Engineering

Cr.3. Prerequisite: BA 224

General revision of laplace transforms, test input signals-open loop systems and closed loop systems – Transfer function and basic system properties-Block diagram reduction techniques- Signal flow graph reduction techniques-Time response of 1st and 2nd order systems-Modeling of some physical, electrical ,mechanical and thermal systems –Sensitivity of feedback control systems- Error analysis ,system types and error constants- concept of stability analysis , Routh –Hurwitz, relative stability- Concept and effect of poles and zeros – Analysis & simple electromechanical systems- Proportional Integral Derivative controller-System response to P, PI and PID – Controller tuning technique (Open loop- Closed loop)- Root locus method.

EE312 – Electrical Measurements & Instruments

Cr.3 Prerequisite: EE 211

Displacement, Velocity ,pressure, temperature sensors-Level , flow torque and other sensors – Signal conditioning –Data acquisition and conversion – Fundamentals of digital voltmeters-Digital voltmeters-Digital multimeters -Accuracy of digital voltmeters

EE 321 – Electrical Machines (1)

Cr.3. Prerequisite: EE 232

Definition of the magnetic terms, magnetic materials and the B-H curve. Magnetic circuits principles. Electromechanical Energy Conversion Principles. Force and torque equations in magnetic circuits. Construction of a DC machine. EMF and torque equations in dc machines. Armature windings and commutator design. Armature reaction and compensation techniques. Self excitation of dc generators. External characteristics of dc generators. Kinds of losses and efficiency of dc machine. Torque and speed characteristics of dc motor. Speed control of dc motor. Starting of dc motors. DC Motor electrical braking technique.

EE 322 – Electrical Machines (2)

Cr.3. Prerequisite: EE 321

Single phase transformer, Construction, principle of operation. No load conditions, leakage reactance and equivalent circuit, voltage regulation, losses and efficiency, impedance. Auto transformer. Principle of three phase machines, Construction of 3-phase stator, and general layout of three phase two pole full and short pitched winding, distribution and pitch factor. MMF of one-phase and three-phase windings. Synchronous and rotor speed theory of action of three phase induction motor. Three phase induction motors power flow, EMF and equivalent circuit. Torque speed characteristics and starting. Effect of slip and stator voltage on the performance.

EE 326 – Electrical Engineering(2)

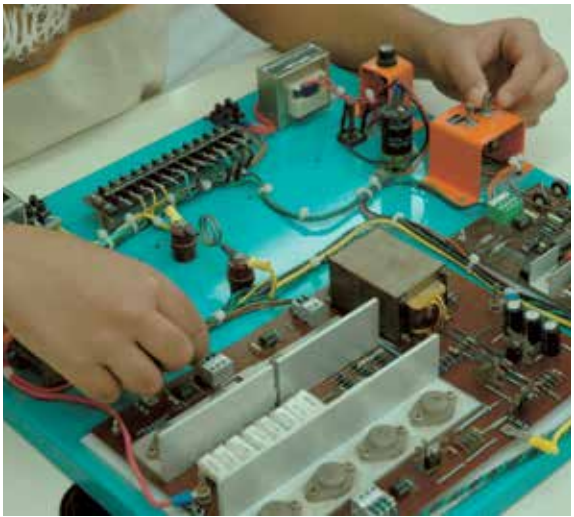
Cr.3. Prerequisite: EE 232 or EE 238

Moving coil instruments – Moving iron instruments – Dynamometer type instruments – Induction type instruments – Wattmeters and methods of measuring power , power factor – DC machines (Generator / motor) – Transformers – Induction motors - Synchronous machines (generator / motor) – Special type motors – Introduction to Control Systems – Open loop and closed loop system characteristics – Control system components – transient performance of control systems – Proportional integral and derivative control and tuning.

EE 328 – Electrical Power and Machines

Cr.3. Prerequisite: EE 232 or EE 238

Review on electric circuits & Magnetic circuits - The law of motor and generator action -.DC Motors - DC Generator - Core Loss and transformer basics - Transformer model and regulation - Transformer ratings and testing.AC rotating field.3-phase induction motor - Synchronous machines - Single phase and small motors - Electric power system - Plant distribution system - Protective devices and distribution of electricity in buildings - System protection & PF correction.



EE 329 – Electrical Machines

Cr.3. Prerequisite: EE 238 & BA 223

Review on electric circuits - Magnetic circuits - DC Machines (1): DC machines Construction –Applications –Theory of operation - .DC Machines (2): Dc machines equivalent circuit – excitation – Voltage control – DC Machines (3): DC motors starting – characteristics - DC Machines (4): DC motors performance and speed control.7th Week Exam + Transformers (1): Construction – applications - Transformers (2) Theory – equivalent circuits – tests - Transformers (3): Voltage regulation – efficiency - Three phase induction motors (1): Construction – applications - Three phase induction motors (2): Rotating magnetic field theory of operation - equivalent circuit.12th Week Exam + Three phase induction motors (3): Characteristics – performance – starting - Synchronous Machine (1): Construction – Applications – equivalent circuit - Synchronous Machine (2): Synchronous alternator: Theory of operation – characteristics– synchronization - Synchronous Machine (3): Synchronous motor.

EE 331 – Electric & Magnetic Fields (1)

Cr.3. Prerequisite: BA 224

Vector analysis and coordinate systems. Coulomb's law and Electric field intensity. Electric flux density, Gauss's law and Divergence theorem. Energy and potential (Electrostatics). Conductors, Dielectrics, and capacitance. Poisson's and La Place's equations.

EE 332 – Network Analysis

Cr.3. Prerequisite: BA 224 & EE 232

Introducing the topic and illustrating its importance for elec. Eng. Complex frequency method for different input forms. Laplace transform and relation between current and voltage for resistance, capacitance and inductance. Laplace transform and electric circuit sources. The impulse function in circuit analysis. Laplace transform and the concept of transfer function. The concept of magnetic coupling. Analysis of magnetic coupled circuits. Linear transformers. Ideal transformers. Two – port networks and its different equation forms. Evaluation of its parameter. Analysis of terminated two-port circuits. Interconnected two – port networks. Revision and a set of solved examples.

EE 333 – Electric and Magnetic Fields (2)

Cr.3. Prerequisite: EE 331

The steady magnetic field. Analogy between steady magnetic field and Electro static field. Magnetic forces. Magnetic Materials and Inductance. Time varying fields. Maxwell's four equations. The uniform plane wave.

EE 341 – Introduction to Power Engineering

Cr.3. Prerequisite: EE 232

Elements of power system. Operating voltage choice. Parameters of overhead trans. Lines (R, L&C). Representation of O.H.T.L. (Short T.L.). Representation of O.H.T.L. (Medium T.L.). Representation of O.H.T.L. (Long T.L.). Voltage regulation. Corona phenomenon and its calculations. Mechanical design (Sag calculations, at the same level). Mechanical design (Sag calculations at different levels). Mechanical design (Insulators), types of poles & towers. Underground cables (Construction, types). Underground cables (Electric field & insulation measurements).

EE 342 – Power Systems (1)

Cr.3. Prerequisite: EE 341

Single line diagram of power system. The per unit system. Bus admittance matrix. Bus impedance matrix. Power flow equations. Gauss- Seidel power flow solution. Newton Raphson power flow solution. Synchronous generator for power control. Tap changing transformers. Non linear function optimization. Economic dispatch neglecting losses and no generator limits. Economic dispatch neglecting losses and including generator limits. Economic dispatch including losses.

EE 411– Control Systems (1)

Cr.3. Prerequisite: EE 311

Root Locus Revision and Concept of Compensation in Time Domain-Lead Compensation in Time Domain -Lag Compensation and lead-lag Compensator in Time Domain-Theory of P-I-D Controllers-Tuning of P-I-D Controllers-Frequency response analysis & Bode diagrams-Concept of Nyquist Stability Criterion-Polar plots-Relative Stability in Nyquist plot-Lead Compensation using Frequency Domain(Applied on Ship Steering Control)-Lag Compensation using Frequency Domain(Applied on Ship Steering Control)-Modeling of linear systems-Phase variable and State Space Representation for Continuous System-State space using canonical-Presentation of projects

EE 412 – Control Systems (2)

Cr.3. Prerequisite: EE 411

Revision on State Space Representation for Continuous Systems-Applied on DC motor position control-State Space Solution and Properties of Transition Matrix-System Controllability & Observability-Eigen values, stability and state feedback -Pole placement in state feedback and System Observers-Difference equation and modeling of discrete system- Z-transform and its properties-Z-transform and its properties-Error Analysis of Discrete Control Systems-Root locus of Discrete Control Systems-State Space representation in Discrete systems(Applied on DC motor position control)- Properties of Transition Matrix in Discrete systems-System Controllability & System Observability in Discrete systems-State Feedback Control System in Discrete systems-Presentation of projects

EE 413 – Microprocessor-Based Process Control

Cr.3. Prerequisite: CC 411

Types of Process Control Strategy- Type of Signal and Signal Conditioning- Analogue and digital Signal Conditioning - Discrete State Process Control-A/D and D/A Conversion – Digital Control System Fundamentals - Data Acquisition Systems-Characteristics of Control System - Microprocessor and Microcontroller as digital control- Microcontroller Principles and Configurations - Microcontroller Programming- Special Instructions of Microcontrollers-Embedded system Applications.

EE 416 – Microcontroller Applications

Cr.3. Prerequisite: CC 442

Introduction to Microcontrollers and Architectures with a review of various types available in the market C-language programming overview - AVR Microcontroller basic structure. - AVR Microcontroller basic programming principles - AVR Microcontroller programming - Timers and Counters, PWM. -Analogue interfacing of AVR Microcontrollers - Serial interfacing standards using RS-232 principles of the PC - Serial Interfacing of the AVR Microcontroller - Serial Interface of AVR – Embedded system Applications.

EE 418 – Automatic Control Systems

Cr.3. Prerequisite: EE 218

Introduction to control system - Differential equation of physical systems - Block diagram models using MATLAB - Signal flow graph models using MATLAB - Test input signals - Performance of 1st and 2nd order system - Effect of 3rd pole and a zero on the 2nd order system + 7Th week exam - Stability concept – Routh - Hurwitz stability criterion - Root locus techniques - Approach to System Design - Advantages of Feedback - Analog PID Controller - Lead Compensator Design + 12Th week exam - Lag Compensator Design - Lead – Lag Compensator and PID Tuning - Case Study

EE 419 – Modern control Engineering

Cr.3. Prerequisite: EE 418

Frequency response, polar plot-Bode plot - Frequency response Bode plot- Nyquist - .Frequency response Applications using Matlab tool box - Lead compensation by frequency response - Lag compensation by frequency response - Introduction to state-space - Methods of state space representation - Solution of state equation - Controllability – observability - State variable feedback -Introduction to digital control systems - The z- transform - Time response of digital systems Stability analysis for digital systems - Case Studies and Applications(Two level tank system, motor speed control)

EE 421 – Power Electronics (1)

Cr.3. Prerequisite: EC 339

Basics and characteristics of power electronic devices, thyristors gating circuits, commutation techniques. Single phase and three phase converters (Controlled and uncontrolled).

EE 422 – Electrical Machines (3)

Cr.3. Prerequisite: EE 322

Principle of synchronous machines, construction and EMF - equivalent circuit, phasor diagram for motor generator, power equation, electrical load diagram and V-curves, parallel operation, starting and synchronization, voltage regulation, effect of saliency, three phase transformer, polarity and standard terminal marking. Three phase connections, open delta connection, three windings transformer-tap changer and phase conversion (3 phase/2phase and 3phase/6phase), parallel operation, current transformer.

EE 423 – Power Electronics (2)

Cr.3. Prerequisite: EE 421

MOSFET Power Transistor, Chopper principles and classification, the buck and the boost regulator, the buck and the cuk regulator, single phase AC voltage controllers principles, three phase full wave AC voltage controllers, Three phase full wave AC voltage controllers, Cycloconverters, principles and performance of PWM inverters, three phase inverters, other kinds of inverters, applications.

EE 424 – Electrical Drives (1)

Cr.3. Prerequisite: EE 422 and EE423

DC Drives; single phase separately excited dc motors drives, three phase drive, dual converter, reversible drives, armature current reversal, field current reversal, closed-load/control, chopper drives, principles of: power control, regenerative brake control rheostat brake control, two/four quadrant chopper drives and multiphase choppers. AC drives; induction motor drive, stator voltage and frequency control, current control, voltage, current and frequency control, closed-loop control, synchronous motor drive with closed-loop control.

EE 441 – Power Systems (2)

Cr.3. Prerequisite: EE 342

Transients in R-L Series Circuits. Internal voltage of loaded machines under faults conditions. Fault calculation using Z bus.The selection of circuit breakers. The symmetrical components of unbalanced phasors. Power in terms of symmetrical components. Sequence circuits of **U** & **D** impedance. Unsymmetrical faults on power systems and single line to ground faults. Line to line faults and double line to ground faults.The stability problem. Rotor dynamics and swing equation. The power equation and synchronizing power coefficients. Equal-area criterion of stability. Step-by-step solution of the swing curve. Factors affecting transient stability.

EE 442 – Power Systems Protection (1)

Cr.3. Prerequisite: EE 441

Zones of protection and general principles of protection. Types of relays and construction of over current relays. Directional relays. Earth fault protection. Differential protection. Protection of transformers. Protection of motors. Protection of generators. Protection of line and distance protection. Circuit breakers and Fuses. Instrument transformers.

EE 448 – Electrical Power

Cr.3. Prerequisite: EE 329

Elements of Power System - Comparison of different transmission systems - Direct current Distribution - AC Distribution - Mechanical Design of O.H.T.L - Resistance and inductance of O.H.T.L - Capacitance of O.H.T.L - Representation of O.H.T.L - Underground cables - Symmetrical faults - Power system protection concepts - Protection of feeders and motors

EE 449 – Electrical Power in Ships

Cr.3. Prerequisite: EE 329

Elements of Power Systems - DC Radial Distributors with Concentrated Loads - Uniformly Loaded distributors - D.C. Three Wire Distributor - DC Ring Distributor - AC Radial Distributors - AC Ring Distributor - Cables - Per-unit system - Symmetrical faults - Protection elements - Protection of power system components

EE 501 – Project (1) & EE503 Project (2)

Cr. 3+6. Prerequisite: Senior Standing

The final year project extends over two semesters. Topics will depend on student's and supervisor's interest. They include data acquisition and interpretation, computer models and simulation and/or design and experimentation. Students are required to give a seminar to discuss the project results and submit a final report.

EE 511 – Discrete Control Systems

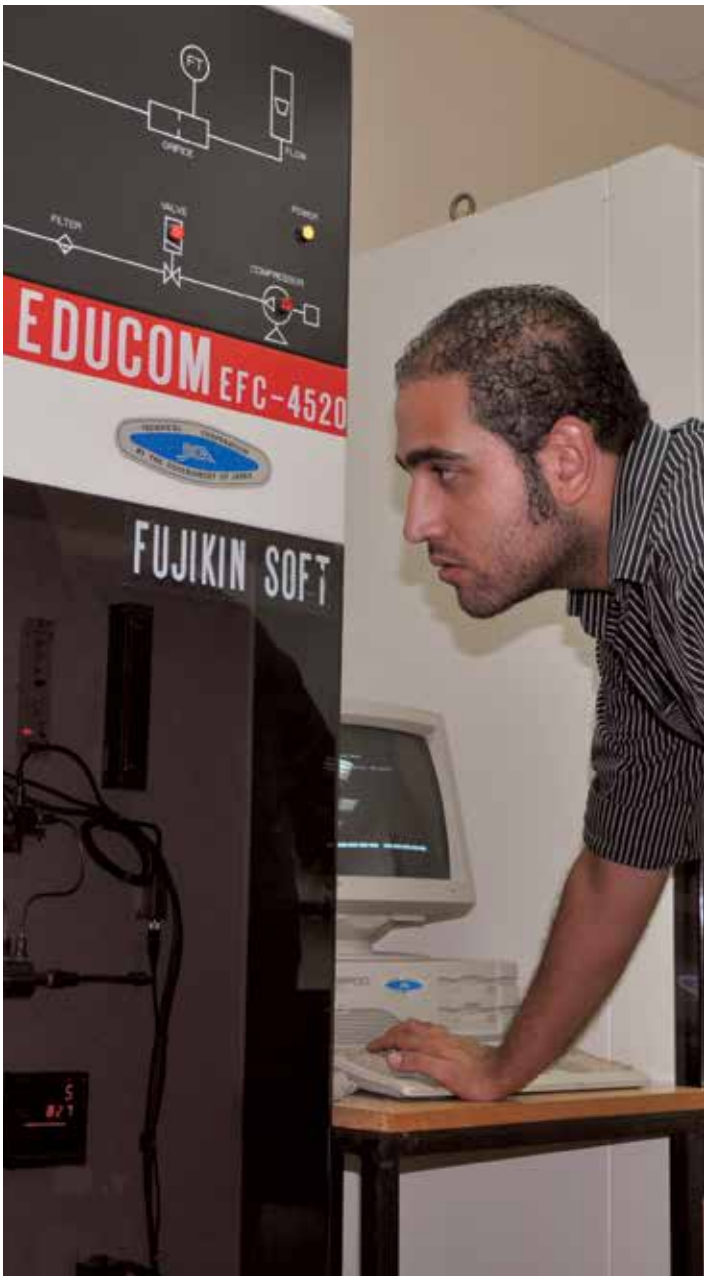
Cr.3. Prerequisite: EE 412

Z-transform and its properties. Pulse transfer function. Linear difference equation. Signal analysis and dynamic response. Analysis of sampled data systems. Block diagram and closed loop transfer function of discrete data systems. Stability analysis of discrete data systems. Root locus in the z-plane. Frequency response method. Design of discrete data systems using compensating networks, State-space.

EE 512 – Automated Industrial Systems (1)

Cr.3. Prerequisite: EE 411 or EE418

Automation hierarchical levels and components. Detecting sensors and actuating elements, relay logic and their applications. Introduction to PLC.S. Types of PLCs and construction . Hardware configuration and descriptions. Programming and testing basic functions. Programming and testing advanced functions. Industrial Applications using PLCs



EE 513 – Control Applications in Power Engineering

Cr.3. Prerequisite: EE 412

Control problems in electrical power system. An introduction to Modelling of turbines and synchronous machine using state space approach. Linearized simulation on model in the s-domain of one machine connected to infinite-bus system. Dynamic performing of the controlled one machine / infinite - bus system Excitation control problem : definition and control configuration of classical and modern systems. Transfer function model excitation system Excitation system compensation (power system stabilizer). Effect excitation system on generator steady – state stability limit and dynamic stabilization. Generation control problem: definition and element modelling. Power factor-control of isolated system using PID controller. Power factor-control of two-area system.

EE 514 – Robotics

Cr.3. Prerequisite: CC 411 and EE 412

What is a robot's components / Classification and Applications Kinematics for manipulators, joints, links and gripper. Coordinate frames and transformation. Determination of coordinate frames – Orientation of end – effector. Inverse solution to Kinematics equations Calculation of inverse transformation between coordinates an inverse solution Kinematic solution Generalized velocity and torque relations. Velocity and acceleration in fixed and rotating coordinates Jacobean matrix /rotational and transnational acceleration Dynamic models of manipulators State variable representation for robot dynamic models Motion control and controller design for gross & fine motion of robot manipulators. Design specifications based on second - order linear system Controller design (using optimum control) for robot manipulators and discussion survey on sensors and actuators

EE 515 – Computer Control of Dynamic Systems

Cr.3. Prerequisite: EE 411

Review state-space description of discrete time systems. Solution of discrete time state equations. Derivation of transfer function from state-space model. Controllability and observability of discrete time systems. Realization theory. Minimal representation digital redesign of continuous time controllers. Digital implementation of the PID controller. Pole assignment of discrete systems. Implementation of state observers for the use with state feedback control.

EE 516 – Modern Control Systems

Cr.3. Prerequisite: EE 412 or EE418

Further state-space analysis: Linear systems with multiple eignvalues, Non linear state-space representation, Linearization, Jacobian matrices, Decomposition of system into controllable and uncontrollable parts, Deadbeat response-pole assignment with state and with output feedback. Use of observer. Introduction to advanced control topics: optimal control. Adaptive control systems. System identification of dynamic systems, least squares, Theory and implementation for system estimation.

EE 517 – Optimal and Adaptive Control

Cr.3. Prerequisite: EE 412

Review of modern approach of control system. Calculus of extremes and single stage decision constrained extremes and lag range multipliers. Variational calculus and Euler-Lagrange Eq. Mathematical Modelling of optimization problem. The maximum principle. The Hamiltonian – Jacobi theory. Linear regulator problems. Minimum time problem. The discrete maximum principle discrete linear quadratic problem. Adaptive control systems. Model reference adaptive control. Self-tuning adaptive control systems. Stability , problem in adaptive control systems

EE 518 – Automated Industrial Systems (2)
Cr.3. Prerequisite: EE 512
Building blocks of automation. Automatic production and assembly. Additional topics regarding programmable logic controllers (PLC's). Analogue signals processing. Integral blocks. Communications capabilities: Data interchange, local area network (LAN), communication protocols, Different communications. Industrial application examples.

EE 521 – Special Electrical Machines
Cr.3. Prerequisite: EE 422
Two phase induction motor. Single phase induction motor, Starting of single phase induction motor, Single phase commutator series motor, Energy convention in doubly salient machines, Three phase conventional reluctance machines Salient pole, synchronous reluctance machine , Stepper motor operation principles. Permanent magnet stepper motor, Variable reluctance stepper motors, Switched reluctance motors, linear induction motors, Induction generators, Permanent magnet DC motor, Brushless DC motors.

EE 522 – Electric Drives (2)
Cr.3. Prerequisite: EE 424
Elements of electric drive systems. Matching between motor and loads characteristics. Concept of travelling time and drive dynamics. Drive control techniques. Drive applications. Introduction to matrix analysis of electric machine. D-Q modelling of electric machines. Speed control of DC motors based on D-Q model. Vector control of 3 phase induction motor. Speed control of variable reluctance motor based on generalized torque matrix representation. Introduction to design of electric machines. Material selection and factors affecting the machine design. Design of single phase transformer. Design of three phase transformer. Design of DC machines.

EE 541 – Power Systems Protection (2)
Cr.3. Prerequisite: EE 442
Introduction: static/ digital vs. electromechanical relays. Relaying practices. Components, detectors and applications. Hardware of digital relay. Mathematical background for digital protection. Digital O.C. relay. Digital distance relay. Digital protection of rotating machines. Digital protection of transformers. Digital bus bar protection. Integration of protection and control in substations. Travelling wave based protection. Recent topics in digital protection.

EE 542 – Electrical Power Stations
Cr.3. Prerequisite: EE 441
Introduction to power stations. Loads and load curves. Power plant economies - Tariffs and power factor improvements. Selection of plants. Types of power stations: Gas turbines, thermal, hydro, steam and nuclear power stations. Hydrothermal coordination. Parallel operation of alternators. Major electrical equipments in power plants. System inter connections. New energy sources.

EE 543 – Electrical Power Distribution
Cr.3. Prerequisite: EE 441
Distribution systems – Distribution substation service areas. Distribution configurations. Primaries design. Secondary design. Voltage profiles and regulators. O.H.T.L. and equipment's - types of power transformers, types of regulators. Underground distribution lines and switchgear – design of distribution substation, design of service area Capacitors and reactive power compensation - Methods of improving P.F. - sizing and locating of P.F. VARS. Motor control centres. Distribution substation operation.

EE 544 – Power Systems (3)

Cr.3. Prerequisite: EE 441

The concept of reliability. Components reliability-reliable and non-reliable systems. State-space method and system reliability calculations. Load forecasting and load classifications. New approach used in load forecasting. Economic dispatch of thermal units. Methods of solution of dispatching problem. Unit commitment problem. SCADA systems. Harmonics and its disadvantages. Design of harmonics filters.

EE 545 – High Voltage Engineering

Cr.3. Prerequisite: EE 441

Generation of D. C. high voltage. Generation of A. C. high voltage. Generation of impulse voltage and currents. Measurements of high voltages. Sources of transient in power system. Travelling waves. Lattice diagram. Gaseous, liquid and solid Insulations study. Surge arresters. High voltage circuit breakers. Gas insulated switcher (GIS). Insulation coordination. Testing and HVDC studies.

EE 546 – Electrical Engineering Materials

Cr.3. Prerequisite: EE 442

Electric materials classification. Dielectrics Macroscopic & Microscopic approaches. Types of polarization – frequency response – complex permittivity. Dielectric losses and their measurements. Dielectric Breakdown. Applications of Dielectrics. Magnetic materials: Macroscopic & Microscopic approaches. Hysteresis – Magnetostriction –. Applications. Superconductivity and superconductors. Polymers and their characteristics. Ceramics and their characteristics. Optical fibres and their properties. Corrosion and cathodic protection of metals.

EE 547 – Utilization of Electrical Energy

Cr.3. Prerequisite: EE 441

Illumination; properties of light, inverse sq. Law and cosine law. Types of lamps and their characteristics. Road lighting. Elec. Heating and welding. Dielectric heating, induction heating, arc induction & resistance furnaces. Traction and Lifts. Standby power systems. Electrical Safety Engineering.

EE 548 – Electromechanical Systems for Commercial Installations

Cr.3. Prerequisite: EE 442

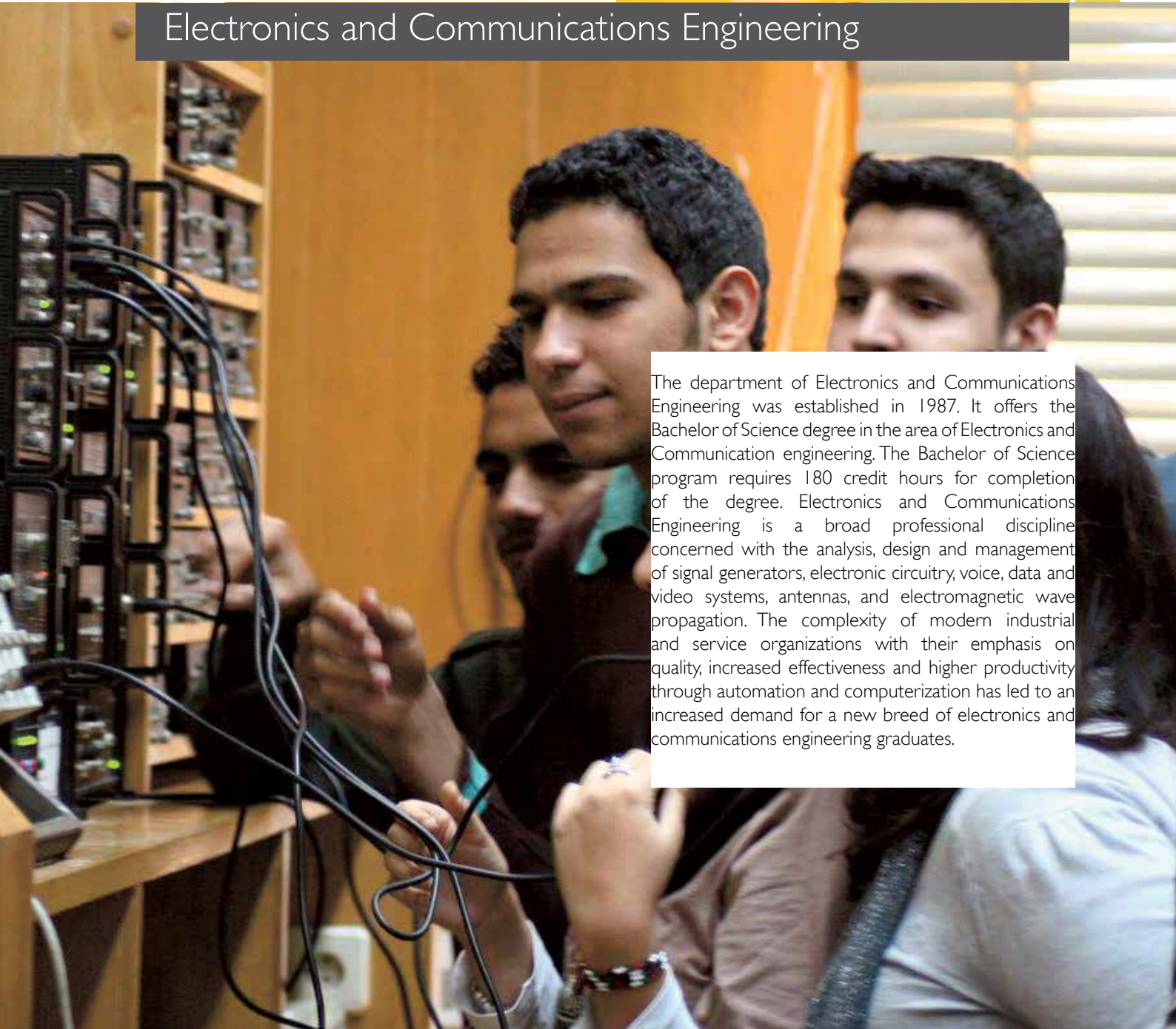
Determination of loads & Load Characteristics. Design of Industrial and Commercial Distribution Systems. Factors affecting selection of circuit arrangements, Systems, Equipment and Facilities required to satisfy functional requirements, System protection Equipment and coordination. Wiring systems: Cables and bus ways, Controllers and motor control centres. Power factor improvement. Emergency and standby power systems. Effects of special loads; Electric arc furnaces, converters, motors. Lighting, Heating and Air-conditioning. Lifts and escalators. Grounding. Electrical safety : Fire alarm systems. Codes and Standards. Energy management.

This Program is accredited by the Engineering Accreditation Commission of ABET.

http://www.abet .org

The program educational objectives and student outcomes are listed in the (CET) site.

Electronics and Communications Engineering



The department of Electronics and Communications Engineering was established in 1987. It offers the Bachelor of Science degree in the area of Electronics and Communication engineering. The Bachelor of Science program requires 180 credit hours for completion of the degree. Electronics and Communications Engineering is a broad professional discipline concerned with the analysis, design and management of signal generators, electronic circuitry, voice, data and video systems, antennas, and electromagnetic wave propagation. The complexity of modern industrial and service organizations with their emphasis on quality, increased effectiveness and higher productivity through automation and computerization has led to an increased demand for a new breed of electronics and communications engineering graduates.

The Electronics and Communication Engineering department program is oriented towards several objectives:

- Fundamental knowledge in mathematics, physical sciences, and electrical engineering.
- The opportunity to specialize in specific areas of interest or career aspiration.
- Intensive training in problem solving, laboratory skills, and design skills.
- A well-rounded education that includes communication skills, the ability to function well on a team, an appreciation for ethical behavior, and the ability to engage in lifelong learning.
- This education is meant to prepare our students to thrive and to lead. It also prepares them to achieve our two Program Educational Objectives (PEOs):
- Successful Careers: Graduates of the program will have successful technical or professional careers.
- Lifelong Learning: Graduates of the program will continue to learn and to adapt in a world of constantly evolving technology.

Several goals are targeted by the department that includes:

- Impart to students advanced technical and engineering knowledge.
- Prepare electronic and communication engineers who are capable of making a positive contribution to their communities.
- Satisfy the growing need of the national industries (both governmental and private).
- Enable graduates to rapidly assimilate the rapid technological advancements.

Quick survey of engineering job vacancies at the daily newspaper reveals that Electronics and Communications Engineering would collect almost 40% of the total engineering opportunities available.

In fact the Electronics and Communications Engineering department main objectives are to introduce a qualified engineer to serve in the field of:

- Wireless Communications.
- Biomedical Engineering.
- Analogue and Digital Signal Processing based systems
- Automated industrial systems where computer controlled systems are used.
- Mobile Communication Systems.
- Microcontrollers and Embedded Systems.
- Antennas and Wave Propagation Applications.

Academic Program Sheet

Year 1			
Semester 1		**Semester 2**	
LH131	ESP (1)	LH 132	ESP (2)
BA123	Mathematics(1)	BA124	Mathematics(2)
BA113	Physics (1)	BA114	Physics (2)
CC111	Introduction to Computer	CC112	Structured Programming
BA118	Chemistry	IM111	Industrial Relations
BA141	Engineering Mechanics (1)	BA142	Engineering Mechanics (2)
IM112	Manufacturing Technology	ME151	Engineering Drawing & Projection
Year 2			
Semester 3		**Semester 4**	
LH231	Technical Report Writing	BA224	Mathematics (4)
BA223	Mathematics (3)	NE264	Scientific Thinking
EC210	Solid State Electronics	EC233	Electronic Devices (1)
CC213	Programming Applications	EC217	Measurements & Instrumentation
NE465	Aesthetic Edu & Art Appreciation	CC111	Digital Logic Design
EE231	Electrical Circuits (1)	EE232	Electrical Circuits (2)
Year 3			
Semester 5		**Semester 6**	
BA323	Mathematics (5)	EC341	Electromagnetics
EC334	Analog and Digital-Circuit Analysis	EC333	Electronic Amplifiers
EC328	Electrical Power & Machines	BA325	Mathematics (6)
CC312	Computer Organization	EC322M	Introduction to Communication Systems
EC332	Electronic Devices (2)	CC413	Numerical Analysis
EC321M	Signals and Systems	EC311	Electronic Materials

Year 4			
Semester 7		**Semester 8**	
EC432	Microelectronic Circuits	EC434	Analog Signal Processing
EC421M	Statistical Communication Theory	EC422	Introduction to Digital Communications
EC442	Electromagnetic Wave Propagation	EC443	Electromagnetic Transmitting Media
CC411	Introduction to Microprocessors	NE364	Engineering Economy
IM423	Operation Research	EE419	Modern Control Engineering
EE418	Automatic Control Systems	EC410	Electronic Measurements
		IM400EC	Practical Training
Year 5			
Semester 9		**Semester 10**	
EC523M	Advanced Communication Systems	EC546	Microwave Technology
EC544	Antennas Engineering	EC533	Digital Signal Processing
EC501	Project (1)	EC503	Project (2)
ECXXX	Elective Course	ECXXX	Elective Course
ECXXX	Elective Course	ECXXX	Elective Course
ECXXX	Elective Course		

Graduation Requirements

College Requirements					
A total of 60 credit hours are required by the college as per the following table					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses					
BA	1	BA113	Physics (1)	3	None
	2	BA114	Physics (2)	3	BA113
	1	BA118	Chemistry	2	None
	1	BA123	Mathematics (1)	3	None
	2	BA124	Mathematics (2)	3	BA123
	1	BA141	Engineering Mechanics (1)	3	None
	2	BA142	Engineering Mechanics (2)	3	BA141
	3	BA223	Mathematics (3)	3	BA124
	4	BA224	Mathematics (4)	3	BA223
CC	1	CC111	Introduction to Computer	3	None
	2	CC112	Structured Programming	3	CC111
EE	3	EE231	Electrical Circuits 1	3	BA124
	4	EE232	Electrical Circuits 2	3	EE231
IM	2	IM111	Industrial Relations	2	None
	1	IM112	Manufacturing Technology	2	None
LH	1	LH129	English for Special Purposes (0)	0	None
	1	LH131	English for Special Purposes (1)	2	None
	2	LH132	English for Special Purposes (2)	2	LH 131
	3	LH231	Technical Report Writing	3	LH 132
ME	2	ME151	Engineering Drawing & Projection	2	None
NE	4	NE264	Scientific Thinking	3	54 Cr. Hr.
	3	NE465	Aesthetic Education& Art Appreciation	3	None
	8	NE364	Engineering Economy	3	54 Cr. Hr.

Department Requirements

A total of 120 credit hours are required by the department, which are distributed as follows:

- 33 credit hours of compulsory courses from other departments.
- 72 credit hours of compulsory EC courses.
- 15 credit hours of elective courses.

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses from other departments A total of 30 Cr. Hr. of the following compulsory courses from other departments					
BA	5	BA 323	Mathematics(5)	3	BA224
	6	BA325	Mathematics(6)	3	BA224
CC	3	CC213	Programming Applications	3	CC112
	4	CC216	Digital Logic Design	3	CC111
	5	CC312	Computer Organization	3	CC216
	6	CC413	Numerical Analysis	3	BA224 & CC112
	7	CC411	Introduction to Microprocessors	3	CC312
EE	6	EE328	Electrical Power & Machines	3	EE232
	7	EE418	Automatic Control Systems	3	EE328 & BA323
	8	EE419	Modern Control Engineering	3	EE418
IM	7	IM423	Operations Research	3	90 Cr. Hr.

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory EC Courses A total of 75 Cr. Hr. of the following compulsory EC courses					
Group 1	3	EC210	Solid State Electronics	3	BA114&BA118
	4	EC217	Measurements & Instrumentation	3	EE231
	6	EC311	Electronic Materials	3	EC210
	8	EC410	Electronic Measurements	3	EC432
Group 2	5	EC321M	Signals and Systems	3	BA224 &EE231
	6	EC322M	Introduction to Communication Systems	3	EC321M
	7	EC421M	Statistical Communication Theory	3	EC322M &BA325
	8	EC422	Introduction to Digital Communications	3	EC421M
	10	EC523M	Advanced Communication Systems	3	EC422
Group 3	4	EC233	Electronic Devices 1	3	EC210
	5	EC332	Electronic Devices 2	3	EC233 &EE232
	6	EC333	Electronic Amplifiers	3	EC332
	5	EC334	Analog & Digital Circuit Analysis	3	EE232& EC233
	7	EC432	Microelectronic Circuits	3	EC333
	8	EC434	Analog Signal Processing	3	EC432
	9	EC533	Digital Signal Processing	3	EC434

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Group 4	6	EC341	Electromagnetics	3	BA114 &BA224
	7	EC442	Electromagnetic Wave Propagation	3	EC341
	8	EC443	Electromagnetic Transmitting Media	3	EC442
	9	EC544	Antennas Engineering	3	EC443
	10	EC546	Microwave Technology	3	EC443
Project	9	EC501	Senior Project 1	3	135 Cr. Hr.
	10	EC503	Senior Project 2	6	EC501
IM	8	IM400EC	Practical Training	0	None

Group 1: Solid State Electronics Courses
Group 2: Communications Courses
Group 3: Electronics Courses
Group 4: Electromagnetics and Antennas Courses

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Department Electives A total of 15 Cr. Hr. of the following elective courses					
Group 1	9 – 10	EC530	Micro-Electromechanical Systems (MEMS)	3	EC434
	9 – 10	EC535	Digital VLSI Design	3	EC432 &CC216
	9 – 10	EC536	VLSI Fabrication& Testing	3	EC432
	9 – 10	EC537	Biomedical Electronics	3	EC434
	9 – 10	EC538	Selected Topics in Electronics	3	EC434
	9 – 10	EC560	Modern Electronic Circuits	3	EC434
Group 2	9 – 10	EC539	Opto Electronics	3	EC233
	9 – 10	EC520	Satellite Communications	3	EC422
	9 – 10	EC521	Communication Networks	3	EC422
	9 – 10	EC522	Acoustics	3	EC341
	9 – 10	EC525	Information Theory & Coding	3	EC422
	9 – 10	EC526	Mobile Communications	3	EC422
	9 – 10	EC527	Applied Telecommunications Systems	3	EC322M
	9 – 10	EC528	Data Communication	3	EC422
	9 – 10	EC529	Modern Wireless Communications	3	EC422
	9 – 10	EC550	Selected Topics in Communications	3	EC422
	9 – 10	EC551	Telecommunication Systems Engineering	3	EC422
	9 – 10	EC524	Optical Communications	3	EC422
Group 3	9 – 10	EC545	Advanced Antennas Systems	3	EC443

College Electives					
CC	9 – 10	CC524	Neural Networks	3	BA323 &CC112
EE	9 – 10	EE512	Automated Industrial Systems (1)	3	EE419
IM	9 – 10	IM535	International Operations Management	3	108 Cr. Hr.
EE	9 – 10	EE514	Robotics	3	EE419

Group 1: Electronics Courses
Group 2: Communications Courses
Group 3: Electromagnetics and Antennas Courses

Course Summary Description

IM 400EC – Practical Training

Cr.0. Prerequisite: None

This course is a non-credit course and is a college graduation requirement. Students are asked to undertake a minimum of four weeks of practical training in off-campus sites recommended by the college and the department in order to pass this course. Students are required to submit a recognition letter from the site where they received their training, besides a report and a presentation. Course is a Pass/ Fail one.

EC 210 – Solid State Electronics

Cr.3. Prerequisite: BA 114& BA118

Elementary materials science concepts: Atomic structure, Bonding and types of solids, the crystalline state. Lattice vibrations. The Hall Effect and hall devices. Quantum mechanics: photons, particles and waves, the electron as a wave, infinite potential well, Heisenberg's uncertainty principle, Tunneling phenomenon (potential barrier). The band theory of solids: E-K diagram, energy bands diagram, Electrons and holes, effective mass Semiconductors: Intrinsic semiconductors, Extrinsic semiconductors (n-type doping, p-type doping, compensation doping), Electron and holes Concentrations, Fermi energy level position, Conductivity of a semiconductor, Diffusion and conduction currents equations. Definitions for dielectric and magnetic materials and superconductivity.

EC 217 – Measurements & Instrumentation

Cr.3. Prerequisite: EE 231

Measurements of errors, Accuracy, Precision, Resolution, Sensitivity. Statistical analysis (Mean, Deviation, Standard Deviation, and Variance). Units and standards of measurement. Electromechanical indicating instruments. Analog Instruments (DC Ammeter (Ayrton Shunt), DC Voltmeter, Ohmmeter (Series type, Shunt Type), AC- Instruments with Rectifiers (full wave and half wave rectifiers), Bridge measurements (AC Bridges(Maxwell bridge, Wien bridge, Schering bridge), DC Bridges(Wheatstone bridge)), Digital instruments for measuring basic parameters, True RMS voltmeters, Q-meter, Oscilloscope techniques.

EC 218 – Instrumentation and Measurement (Computer Eng. Program) *

Cr.3. Prerequisite: EE 231

Measurements of errors, Accuracy, Precision, Resolution, Sensitivity. Statistical analysis (Mean, Deviation, Standard Deviation, and Variance). Units and standards of measurement. Electromechanical indicating instruments. Analog Instruments (DC Ammeter (Ayrton Shunt), DC Voltmeter, Ohmmeter (Series type, Shunt Type), AC- Instruments with Rectifiers (full wave and half wave rectifiers), Bridge measurements (AC Bridges(Maxwell bridge, Wien bridge, Schering bridge), DC Bridges(Wheatstone bridge)), Digital instruments for measuring basic parameters, True RMS voltmeters, Q-meter, Oscilloscope techniques.

EC 311 – Electronic Materials

Cr.3. Prerequisite: EC 210

Free electron model, Electric conductivity, and Dielectric properties: Microscopic electric field Dielectric constant and polarizability, local electric field at an atom. Magnetic materials and Ferro electric Crystals. Diamagnetism and Para-magnetism, Ferromagnetic order. Anti-Ferromagnetic order. Ferromagnetic domains, superconductivity. Destruction of superconductivity by magnetic fields, Meissner effect.

EC 410 – Electronic Measurements

Cr.3. Prerequisite: EC 432

Ac signal sources, Oscillators, Selection of an Oscillator, Barkhausen criteria. Audio frequency oscillator (Wien bridge oscillator, Phase shift oscillator), Radio frequency oscillator (Colpitts oscillator, Hartley oscillators), Crystal oscillator. Signal Generator, Sweep frequency generator, Pulse and Square wave generator, Function Generator, Attenuators. Harmonic analysis, Frequency spectrum of waveform, Harmonic distortion. Harmonic Analyzing Instruments, Harmonic distortion analyzer. Wave analyzer, spectrum analyzer. Transducers, classification of transducers, Selecting of Transducer, Strain gauge transducer, Displacement Transducer, Capacitive Transducer, Inductive Transducers, Piezoelectric Transducer, Temperature Transducers, Photoelectric Transducers. Data acquisition system, Signal-conditioning circuit. Digital to Analog and Analog to Digital converters. Data acquisition system and computerized control.

EC 320 – Communication Theory (Computer Engineering Program) *

Cr.3. Prerequisite: BA 224 – EE 231

Introduction to communication theory. Review of Fourier series and Fourier transform as a mathematical tool for spectral analysis. Concept of power and energy spectral densities and correlation between waveforms. Transmission through linear filters and channels. Hilbert transform and Amplitude Modulation techniques.

EC 321M – Signals and Systems

Cr.3. Prerequisite: BA 224 – EE 231

Introduction to communication theory. Fourier transform as a mathematical tool for spectral analysis. Sampling Theory, Convolution of continuous and discrete signals, Correlation, Concept of power and energy spectral densities and correlation between waveforms. Transmission through linear filters and channels. Hilbert transform and Positive pre-envelope and complex envelope. Response of LPF and BPF to signals.

EC 322M – Introduction to Communication Systems

Cr.3. Prerequisite: EC 321M

Base band communication of Analog signals. FDM Concepts. Amplitude modulation, mathematical description and spectral characteristics offullcarrier AM, DSB-SC, SSB-SC, and VSB. Multiplexing techniques (QAM and FDM). Angle modulation (FM and PM); generation and detection of CW modulation. Sampling theory and its practical aspects. PAM, Time Division multiplexing, TDM-PAM, PWM, and PPM generation and detection. Cross talk and channel bandwidth requirements, Baseband Digital Modulation: Pulse Coding modulation (PCM), DPCM and Delta Modulation (DM), Prediction

EC 421M – Statistical Communication Theory

Cr.3. Prerequisite: BA325, EC 322M

Review of probabilities, R.V., characteristic function, joint R.V., correlation, independence - Random processes: Stationarity, Ergodicity with applications to line codes - AWGN channels and band-pass noise - AM/ FM with the presence of noise - Noise effect on analog pulse modulation - Noise effect on PCM.

EC 422 – Introduction to Digital Communications

Cr.3. Prerequisite: EC 421M

Bandpass data transmission - Gram Schmidt orthogonalization procedure, Geometric representation of signals in signal space - Noise effect in signal space, Decision regions and related probability of error - binary modulation techniques (CB-ASK, CB-FSK, CB-PSK) – M-ary ASK M-ary FSK –M-ary PSK-Optimum FSK, MSK, Non-Coherent Detection, NC-FSK – DPSK.

EC 523M – Advanced Communication Systems

Cr.3. Prerequisite: EC 422

Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA). OFDM, OFDMA- Examples of FDMA, TDMA, and CDMA systems, and their applications. Source and channel coding. Channel Capacity.

EC 520 – Satellite Communications **

Cr.3. Prerequisite: EC 422

Orbits and Earth Coverage: Orbital parameters-circular and elliptical orbits-GEO, MEO, LEO. Link budget, atmospheric Losses- frequency bands. Satellite construction (Payload and Platform)- Radio system technology (Antennas, Mobile satellite communication systems, Direct satellite broadcasting and VSAT).

EC 521 – Communication Networks **

Cr.3. Prerequisite: EC 422

Orbits and Earth Coverage: Orbital parameters-circular and elliptical orbits-GEO, MEO, LEO. Link Basic Concepts of a Network - Physical Layer - Internet Protocol and Subnetting - Network address translation protocol and IPv6 - Routing algorithms - Routing standards - Local Area Network topologies - Wireless LANs - Networking and Internetworking Devices - VOIP - Transport Layer - New trends in networking.

EC 522 – Acoustics **

Cr.3. Prerequisite: EC 341

Acoustic wave and velocity of sound - The one-dimensional wave equation - Impedance of mediums - Three-dimensional wave equation and spherical wave - Sound intensity and power - Energy density and levels - Multiple sources and loudness - Environmental acoustics - Equivalent sound pressure level and assessment of noise - Analogy between acoustical and electrical circuits - Transducers and sensitivity of MICs and loudspeakers - Hi-fi system and introduction of underwater acoustics - Velocity profiles and SONAR.

EC 525 – Information Theory & Coding **

Cr.3. Prerequisite: EC 422

Review of probability theory - Concept of information theory and coding - Average information & Entropy – Mutual information - Channel capacity - Bandwidth and S/N of a channel - Source Coding - Channel Coding Theorem - Turbo Codes - Iterative decoding - Performance of different coded modulation in AWGN channels.

EC 526 – Mobile Communications **
Cr.3. Prerequisite: EC422
Difference between conventional mobile and cellular mobile - Overview on different cellular generations - Cellular radio design principles - Concept of frequency reuse/cellular block diagram - Co channel interference/adjacent channel interference - Multipath propagation - Speech coding in GSM - Channel coding and interleaving in GSM - GSM mobile station block diagram - Multiple access techniques - Control channels in GSM - Location updating\ security management.

EC 527 – Applied Telecommunication Systems **
Cr.3. Prerequisite: EC322M
Introduction to radar system - Classification and principles of the radar system - The radar equation – Probability of detection - The digital radar, terminals, transmission and switching. Analog and Digital telephone networks.

EC 528 – Data Communication **
Cr.3. Prerequisite: EC422
This course covers the fundamental issues impacting all data networks and reviews virtually most of the important new standard and technological development, offering especially Comprehensive coverage of the physical layer and packet switching techniques

EC 529 – Modern Wireless Communications **
Cr.3. Prerequisite: EC422
Radio Wave Propagation - SC-FDM and their applications - Cellular systems – speech coding - Equalization & Diversity – MRC – RAKE Receiver – Channel coding: block codes, convolutional codes, and turbo codes.

EC 550 – Selected Topics in Communications **
Cr.3. Prerequisite: EC422
Characteristics of Multipath Fading Channels –SC-FDMA systems – MC-CDMA systems - Digital Audio Broadcasting - Terrestrial Digital Video Broadcasting - Bluetooth: Basic concepts-Protocol Architecture -Encryption &Security -Link Management -Logical link control -Ultra Wideband: Basic properties of UWB signals and systems -Generation of UWB -UWB channel modeling - UWB Communications - Modulation methods for UWB -UWB Transmitter -UWB Receiver.

EC 551 – Telecommunication Systems Engineering **
Cr.3. Prerequisite: EC422
Principles,Technologies, system architectures, standards of GSM, GPRS, UMTS, WLAN, 802.16 and WiMAX - QoS in telecommunication systems - Internet Telephony - Resource allocation and management - Sensor networks.

EC 524 – Optical Communications **
Cr.3. Prerequisite: EC422
Historical development - Optical Fiber Waveguide - Electromagnetic theory for optical propagation – Normalized frequency of the optical fiber - Linearly polarized modes in optical fibers - Transmission Characteristics in Optical Fibers - Dispersion modified single-mode optical fibers - Fiber Fabrication – Fiber Cable Design – Fiber Connection - Optical Sources – Laser - Wavelength Converter – Optical Amplifiers - Light Detectors - Optical Transmitter and Receiver - Optical fiber systems - Optical Fiber Communication Systems.

EC553 – Media & Entertainment Eng. **
Cr.3. Prerequisite: EC322M
Stereophonic broadcasting systems - TV scanning and broadcasting - Detailed block diagram of a TV transmitter and receiver - Color TV fundamentals - NTSC,PAL, and SECAM systems - Digital TV - HDTV and Satellite TV - Audio recording analog and digital - Compact disc and CD player - Reflection and ray tracing theory - Acoustical treatment and studio design

EC134 – Fundamentals of Electricity and Electronics (Computer Science Program) *
Cr.3. Prerequisite: BA113
This course introduces the basic concepts of electricity and electronics concepts. This is useful in understanding the operations of robotics. The topics of interest include the basics of electricity and electrical circuit's components. It covers also the basic DC and AC circuits' analysis, power and resonance, and transformers. The electronic topics include semiconductors diodes and transistors. The course covers practical and applications of the studied topics in the operations of amplifiers and oscillators.

EC233 – Electronic Devices (1)
Cr.3. Prerequisite: EC210
P-N junction diode, current components, junction capacitance, junction diode as a circuit element, special types of P-N junctions. P-N junction diodes, current components, junction capacitance, junction diode as a circuit element.

EC238– Electronics I (Computer Eng. Program + Electrical & control Eng. Program) *
Cr.3. Prerequisite: EE231
Semiconductors - p-n junction - diode current components - junction capacitance – Si and Ge junction diodes - special p-n junctions - bipolar junction transistor - BJT as a switch- Regions of operation: Cut-off, saturation, reverse- and forward active regions - field effect transistor: structure, operation – I-V characteristics - large and small analysis - MOSFET as a switch.

EC331 – Electronics (Mechatronics Eng. Program) *
Cr.3. Prerequisite: EE328
P-N junction diode. Special P-N junctions- bipolar junction and field effect transistors- Transistor amplifiers. Cascaded amplifiers. Voltage and power amplifiers. Silicon Controlled Rectifiers (SCR).

EC332– Electronic Devices (2)
Cr.3. Prerequisite: EE232 – EC233
Operation of BJT - DC Analysis - BJT Base Width Modulation - AC Analysis of BJT - Common Emitter, Collector, and Base Amplifiers - BJT as a Switch - Operation of JFET - DC and AC Analysis - MOS-Structure - Operation of MOSFET - Depletion/ Enhancement Mode MOSFETs - DC Analysis of MOSFET - Channel Length Modulation - Body Effect - MOSFET Capacitances - AC Analysis of MOSFET - Common Source, Drain, and Gate Amplifiers - MOSFETs Amplifiers using Active Loads - Shockley, DIAC, SCR,TRIAC, UJT, and PUT Circuits.

EC333– Electronic Amplifiers

Cr.3. Prerequisite: EC332

Revision on Single Stage BJT Amplifiers - Cascode - MOSFET Common Source, Source Follower and Common Gate Amplifier – MOSFET Cascode and Folded Cascode Amplifier - Frequency Response of MOSFET Circuits - Feedback Amplifiers - Feedback Topologies - Stability - Ring Oscillator and LC Oscillators - Voltage Controlled Oscillators - Power Amplifier - Tuned Amplifiers.

EC334– Analog & Digital Circuits Analysis

Cr.3. Prerequisite: EE232, EC233

Review of basic circuit theorems - Two-Port Networks - The transfer function -Phase and Time Responses - Bode Plot - Phase and Group Delays - Computer-Aided Analysis Packages - Integrated Digital Logic Families, Definitions (Propagation Delay, Fan-in, Fan-out) - RTL, DTL, TTL Logic Families - Analysis of TTL gates - ECL Family and Examples - CMOS Digital Circuits and Logic Families Comparison.

EC339– Electronics II (Computer Eng. Program + Electrical & control Eng. Program) *

Cr.3. Prerequisite: EC238

Electronic amplifier theory, power amplifiers, transistor switching, RC filters, Differential amplifiers, Operational amplifiers filters and Oscillators.

EC432– Microelectronic Circuits

Cr.3. Prerequisite: EC333

Differential Amplifiers - Current Mirrors - Noise in Electronic Circuits - Operational Amplifiers - Phase Locked Loops - Switched Capacitor Circuits - IC Fabrication Steps.

EC434– Analog Signal Processing
Cr.3. Prerequisite: EC432
Linear and nonlinear wave shaping, sinusoidal and relaxation oscillators, sweep generator, analog filters.

EC533– Digital Signal Processing
Cr.3. Prerequisite: EC434
ADC's and DAC's, DFT, FFT and DCT, the Z-transform, discrete time transfer function, realization topologies, FIR filter design using windowing, Optimal method, frequency sampling method, least p-th norm method using MATLAB. IIR filter design, stability, bilinear transform, least p-th norm method using MATLAB. Applications of DSP e.g. Data compression Data acquisition systems….etc.

EC534– Analog and Digital Signal Processing (Mechatronics Eng. Program) *
Cr.3. Prerequisite: EC339
Simple analog wave shaping circuits, Sinusoidal and square wave generators. Design of RC active filters, ADC's and DAC's. Discrete transforms. Digital filter design.

EC530– Micro – Electromechanical Systems)MEMS(**
Cr.3. Prerequisite: EC434
MEMS technology, revolution and advantages of MEMS technology. Description of the MEMS applications, and its fabrication techniques. Studying the nature of piezoelectricity and piezoresistivity. Description of the microsensors, microactuators, different system issues and the scaling effect. Finally describing the Microassembly and an overview on Microrobotics.

EC535 – Digital VLSI Design **
Cr.3. Prerequisite: EC432 – CC216
Design of VLSI digital circuits, Stick diagrams, design rules, CAD system, speed and power considerations, floor planning, layout techniques

EC536 – VLSI Fabrication & Testing **
Cr.3. Prerequisite: EC432
Choice of technology, different fabrication processes of VLSI integrated circuits: crystal growth, thermal oxidation, chemical etching, diffusion and ion implantation, epitaxy and chemical-vapor deposition, metallization, and process integration. Testing techniques. Design for testability.

EC537 – Biomedical Electronics **
Cr.3. Prerequisite: EC434
Biomedical instrumentation, basics of biomedical engineering, biological phenomena, bio-potential amplifiers, electronic pacemaker circuits.

EC538 – Selected Topics in Electronics **
Cr.3. Prerequisite: EC434
Selection from modern topics in electronics.

EC539 – Opto Electronics **
Cr.3. Prerequisite: EC233
Introduction to the most significant devices employed in all-optical communications and networks. Introducing and identifying all-optical switching, routing and networking. Light production and the processes that occur during light propagation. Optical sources: light emitting diodes (LEDs) and lasers. Optical detectors: photoconductors, photodiodes and phototransistors. Photonic devices that can employ different functions within the network or link: gratings and optical

amplifiers. Fiber Bragg Gratings (FBGs): Construction, types, characteristics and applications. In-line amplifiers: Erbium doped fiber amplifier (EDFA), and waveguide amplifiers: semiconductor optical amplifier (SOA) comparisons, operations, characteristics and applications.

EC560 – Modern Electronic Circuits **

Cr.3. Prerequisite: EC434

A course that integrates electronic courses with communication courses to give students the overall picture of different communications systems. This includes the design, analysis, testing and troubleshooting methods to be carried in these systems.

EC341 – Electromagnetics

Cr.3. Prerequisite: BA114 – BA224

Review of vector analysis, electromagnetic fields: Coulombs law, electric field and flux density, Gauss's law, electric potential, conductors and semi – conductors, dielectric and capacitance, polarization, magnetic field and flux density, BiotSavart law, Ampere's law, magnetic potential. Maxwell's equations, and magnetization vectors, analogy between electrostatics and magnetostatic, boundary conditions.

EC442 – Electromagnetic Wave Propagation

Cr.3. Prerequisite: EC341

Wave equation, Uniform plan waves, Wave propagation in free space, perfect dielectric, lossy and good conductors, skin effect, surface impedance. Normal incidence, reflection coefficient and standing wave pattern. Input impedance, Oblique incidence reflection coefficients for horizontal and parallel polarization Brewster angle, and types of polarization. Fundamental parameters of antennas, Linear wire antenna (infinitesimal, small, finite length dipole, and half-wavelength dipole). Ground wave propagation. Troposphere propagation. Ionosphere wave propagation.

EC443 – Electromagnetic Transmitting Media

Cr.3. Prerequisite: EC442

Transmission Lines: Types, parameters, equations, voltage and currents, matched and mismatched lines, Use smith chart; single, double, and triple stub matching, quarter wave length transformers, Baluns. Multiple reflection of EM waves between infinite parallel plates, rectangular waveguides. TE and TM modes. Cutoff frequency and propagation parameters. Power transmitted, wall losses, and dielectric losses. Circular waveguides, TE and TM modes. Cutoff frequency and propagation parameters. Power transmitted, wall losses, and dielectric losses. Cavity resonators, modes quality factor, effect of dielectric loss. Circular cavity.

EC544 – Antennas Engineering

Cr.3. Prerequisite: EC443

Linear array theory: uniform linear arrays (broadside, Electronic scanning and Endfire). Non-uniform linear arrays (binomial, chebyscheff), planar arrays. Circular arrays. Aperture on conducting & non-conducting planes. Horn antennas. E-sectoral, H-sectoral, and pyramidal horns, parabolic reflectors (surface geometry, feeders). Loop antennas. Traveling wave antennas. Rhombic antenna.

EC546 – Microwave Technology

Cr.3. Prerequisite: EC443

Comprehensive knowledge of microwave hardware. This includes passive and active components. The study extends to the design and analysis of all generating and amplifying devices and Microwave Mixers. Investigating the Microwave Integrated Circuits and Introducing the Nanotechnology, Top Down and Bottom up Technologies and Carbon Nanotube Transistors. Also exploring the different measuring techniques used at such frequency range as well as the related measuring techniques, Microwave Network, and Spectrum Analysis.

EC545 – Advanced Antennas Systems **

Cr.3. Prerequisite: EC443

Rectangular Microstrip antenna (definition, analysis, design, radiation pattern, directivity). Circular Microstrip antenna (definition, analysis, design, radiation pattern, directivity). Wideband Antenna (analysis of Spiral Antenna, Conical Antenna, Cylindrical Antenna). Helical Antenna (analysis, design, radiation pattern, directivity). Inverted F Antenna (analysis, design, radiation pattern, directivity). Log Periodic Antenna (analysis, design, radiation pattern, directivity). Analysis of Lens Antenna. Introduction to Smart Antenna.

* Courses for other departments

** Elective Course

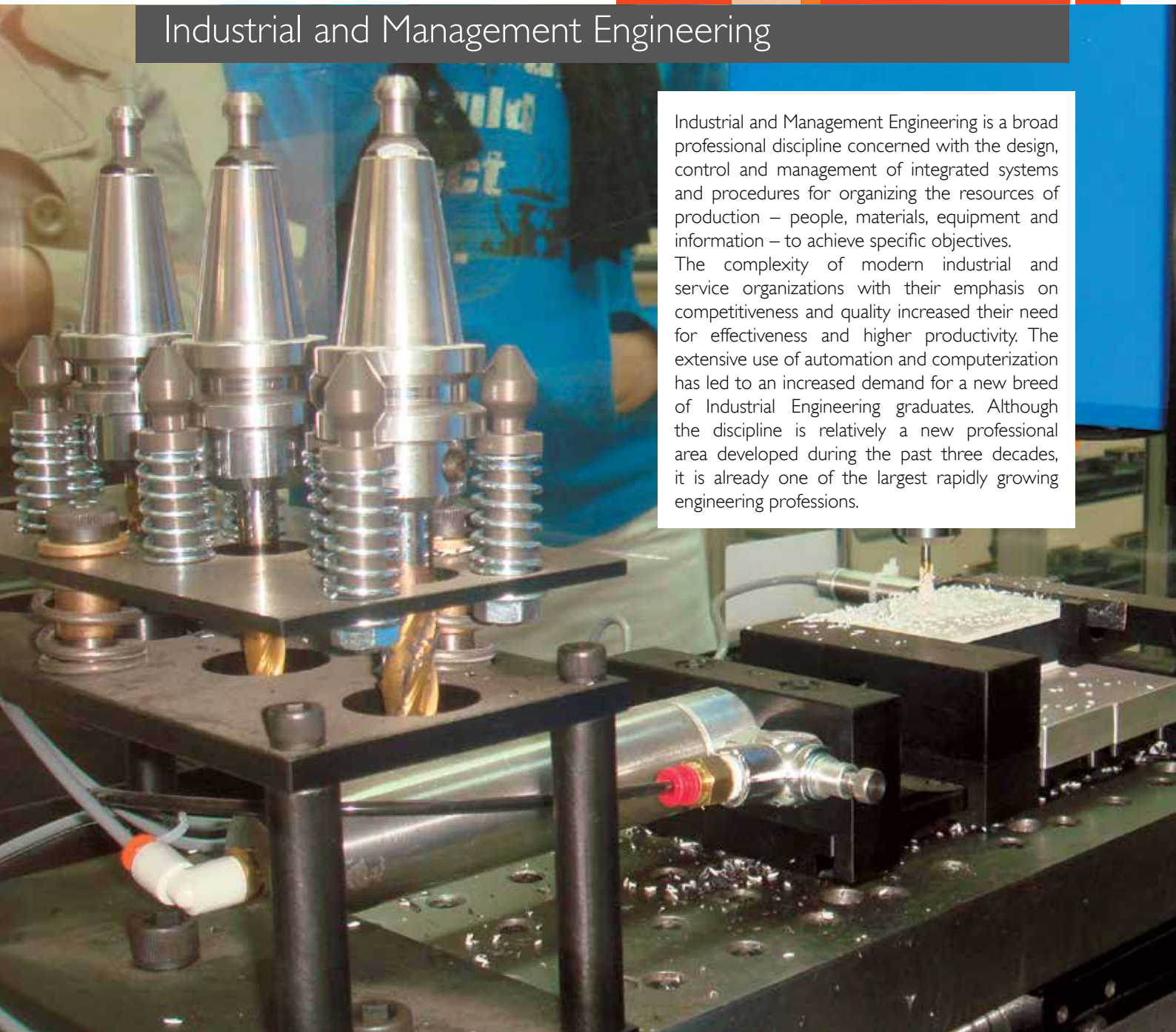
Graduate catalog and the site www.aast.edu

This Program is accredited by the Engineering Accreditation Commission of ABET.

http://www.abet .org

The program educational objectives and student outcomes are listed in the (CET) site.

Industrial and Management Engineering



Industrial and Management Engineering is a broad professional discipline concerned with the design, control and management of integrated systems and procedures for organizing the resources of production – people, materials, equipment and information – to achieve specific objectives.

The complexity of modern industrial and service organizations with their emphasis on competitiveness and quality increased their need for effectiveness and higher productivity. The extensive use of automation and computerization has led to an increased demand for a new breed of Industrial Engineering graduates. Although the discipline is relatively a new professional area developed during the past three decades, it is already one of the largest rapidly growing engineering professions.

Industrial Engineers (IE's) are those who understand the design, operation, inspection, management and use of systems and the integration of those functions. According to the Institute of Industrial Engineers (IIE), IE's combine the abilities of engineers and managers. They draw upon the knowledge of mathematics, physical and technical engineering sciences combined with management behavioural sciences to function as problem solvers, innovators, designers, coordinators, and system integrators. Industrial Engineers practice in all phases of manufacturing industries, service industries and government agencies. They design and coordinate components of plant facilities, man-machine systems, material handling systems, information systems, computer-controlled systems, and inventory systems. In addition, they analyze costs and economic feasibility, human abilities and needs, jobs and work measurement, and mathematical models of systems. The background, experience and training of Industrial Engineers give them wide acquaintance with industrial problems.

Industrial Engineering programs of study prepare graduates for careers in all phases of industrial, manufacturing and service firms. They qualify them to perform different managerial and technical functions that require scientific and engineering background. By combining the study of science, mathematics, engineering fundamentals, design, management and quality principles, the programs provide a unique background and a sound basis for life-long career development in engineering practice, research, or management.

Recent developments such as wide spread industrial interest in systems approach, information systems, advanced materials, manufacturing processes, global firms, supply chain, and quality systems have made the Industrial Engineer's entrance into management even more likely. They are trained to have familiarity with qualitative and quantitative methods interaction and control. At present, the demand for Industrial Engineers exceeds supply assuring job opportunities expected to expand rapidly in the future.

Career opportunities for Industrial Engineers cover a whole spectrum of industrial systems and service systems. Industrial systems include ,but are not limited to : Automotive, Aerospace, Apparel, Basic metals, Beverages, Building materials, Chemicals, Computers, Appliances, Electronics, Equipment, Fabricated metals, Food processing, Glass, Ceramics, Heavy machinery, Paper, Petroleum refining, Pharmaceuticals, Plastics, Power utilities, Publishing, Textiles, Tire and rubber, Wood and furniture. Service Systems include, but are not limited to : Banking, Education, Communications, Financial services, Government, Health and medical, Hotel, Information, Insurance, Repair and maintenance, Restaurant, Retail trade, Transportation, Wholesale trade, Transportation, and Warehousing.

The Industrial and Management Engineering program at the Arab Academy for Science and Technology and Maritime Transport (AASTMT) was established in 1994 to prepare graduates for careers in various areas. The program enables them to perform technical and managerial functions that require sound basis for life-long career development in engineering practice, research and management.

The program has been carefully designed and continuously updated according to the national and international academic reference standards of industrial and management engineering and is fully recognized by the Egyptian Supreme Council of Universities (SCU), and accredited by both the National Authority for Quality Assurance and Accreditation of Education (NAQAAE) and by the Engineering Accreditation Commission of (ABET).
http://www.abet .org

Program Educational Objectives

The educational objectives of the Industrial and Management Engineering B.Sc. program are to produce and qualify graduates who will be able to:

PEO1: Provide leadership to develop and lead productive teams and serve as mentor to junior co-workers.
PEO2: Apply professional managerial skills by leading teams or work groups and/or to assume managerial positions.
PEO3: Exemplify their knowledge by delivering professional oral/written communication and by making use of modern computer software tools.
PEO4: Apply gained knowledge and skillset to further serve the society and continue upholding the highest ethical standards in conducting themselves.
PEO5: Succeed in obtaining professional employment and/or admission to and successfully completing a graduate education program.

Academic Program Sheet

Year 1			
Semester 1		**Semester 2**	
BA 113	Physics I	BA 114	Physics II
BA 123	Mathematics I	ME151	Eng. Drawing & Projection
BA 141	Engineering Mechanics I	BA 124	Mathematics II
CC 111	Introduction to computer	BA 142	Engineering Mechanics II
IM 111	Industrial Relations	CC 114	Introduction to Programming
LH 131	ESP I	IM 112	Manufacturing Technology
BA 118	Chemistry	LH 132	ESP II
Year 2			
Semester 3		**Semester 4**	
BA 223	Mathematics III	BA 224	Mathematics IV
IM 221	Introduction to Industrial Engineering	EE 236	Electrical Engineering I
LH 231	Technical Report Writing	IM 213	Material Removal Processes
ME 252	Mechanical Eng. Drawing	ME 231	Thermodynamics
ME 274	Materials Science	ME 241	Experimental Methods
NE 264	Scientific Thinking	ME 277	Strength of materials
Year 3			
Semester 5		**Semester 6**	
EE 326	Electrical Engineering II	IM 315	Materials Technology
IM 314	Material Forming Processes	IM 316	Advanced Manufacturing Systems
IM 341	Engineering Statistics	IM 342	Statistical Analysis
ME 355	Theory of Machines	ME 454	Machine Design
ME 361	Fluid Mechanics	NE 365	Accounting and Finance
NE 364	Engineering Economy	NE 465	Aesthetic Edu. & Art Appreciation

Year 4			
Semester 7		**Semester 8**	
ME 455	Computer Aided Design	IM 400IM	Practical Training
IM 422	Work Design and Measurements	IM 417	Failure Analysis
IM 423	Operations Research	IM 424	Production Planning and Control
IM 432	Operations Management	IM 425	Management Science
IM 433	Industrial Data Systems Management	IM 426	Industrial Facilities Planning
IM 443	Quality Engineering	IM 434	Engineering Project Management
		IM 444	Reliability Engineering
Year 5			
Semester 9		**Semester 10**	
IM 501	Senior Project I	IM 502	Senior Project II
IM XXXE	Department Restricted Elective	IM 535	International Operations Management
IM XXXE	Department Restricted Elective	IM XXXE	Department Restricted Elective
IM XXXE	Department Restricted Elective	IM XXXE	Department Restricted Elective
IM XXXE	Department Restricted Elective	IM XXXE	Department Restricted Elective
IM XXXE	Department Restricted Elective		

Department Restricted Electives			
Group 1: Materials and Manufacturing Engineering		**Group 2: Industrial Engineering**	
IM 511E	Engineering Metrology	IM 521E	Discrete Event System Simulation
IM 512E	Integrated Manufacturing Systems	IM 522E	Industrial Systems Simulation
IM 513E	Advanced Joining Processes	IM 523E	Human Factors Engineering and Design
IM 514E	Polymers, Ceramics and Composite Materials	IM 524E	Industrial Safety
IM 515E	Selection of Engineering Materials	IM 525E	Industrial Material Handling Systems
IM 516E	Engineering Solid Mechanics	IM 526E	Factory Physics
IM 517E	Smart Materials and Applications in Industrial Systems	IM 527E	Social Network Analysis
Group 3: Management Engineering		**Group 4: Quality and Design Engineering**	
IM 531E	Human Resource Management	IM 541E	Product Design and Development
IM 532E	Industrial Distribution Systems	IM 542E	Reverse Engineering
IM 533E	Supply Chain Management	IM 543E	Design of Experiments
IM 534E	Maintenance Management	IM 544E	Quality Assurance Systems
IM 535E	Marketing Management	IM 545E	Total Quality in Industrial Management
IM 536E	Engineering Cost Analysis	IM 546E	Machinery Condition Monitoring
IM 537E	Introduction to Entrepreneurship	IM 547E	Introduction to Six Sigma

Graduation Requirements

College Requirements					
A total of 60 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 60 Cr. Hr. of the following compulsory courses					
BA	1	BA 113	Physics I	3	None
	2	BA 114	Physics II	3	BA 113
	1	BA 118	Chemistry	2	None
	1	BA 123	Mathematics I	3	None
	2	BA 124	Mathematics II	3	BA 123
	3	BA 223	Mathematics III	3	BA 124
	4	BA 224	Mathematics IV	3	BA 223
	1	BA 141	Engineering Mechanics I	3	None
	2	BA 142	Engineering Mechanics II	3	BA 141
CC	1	CC111	Introduction to Computer	3	None
	2	CC114	Introduction to Programming	3	CC 111
IM	1	IM 111	Industrial Relations	2	None
	2	IM 112	Manufacturing Technology	2	None
	8	IM 400IM	Practical Training	0	None
	10	IM 535	International Operations Management	3	108 Credit Hours
ME	2	ME151	Eng. Drawing & Projection	2	None

College Requirements					
A total of 60 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 60 Cr. Hr. of the following compulsory courses					
LH	1	LH 131	ESP I	2	None
	2	LH 132	ESP II	2	LH 131
	3	LH 231	Technical Report Writing	3	LH 132
NE	3	NE 264	Scientific Thinking	3	None
	5	NE 364	Engineering Economy	3	54 Credit Hours
	6	NE 365	Accounting and Finance	3	NE 364
	6	NE 465	Aesthetic Edu. & Art Appreciation	3	None

Department Requirements

A total of 120 credit hours are required by the department, which are distributed as follows:

- 96 credit hours of compulsory courses.
- A minimum of 24 credit hours of department restricted electives that are selected from the four main course groups as follows:
  - Three courses equivalent to 9 credits from the main area of interest (minor).
  - Three courses, one from each of the remaining groups, equivalent to 9 credits.
  - Two courses from any group equivalent to 6 credits (free electives).

The required compulsory and restricted elective courses are listed in the following table.

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 96 Cr. Hr. of the following compulsory courses					
IM	4	IM 213	Material Removal Processes	3	IM 112
	5	IM 314	Material Forming Processes	3	IM 213, ME 277
	6	IM 315	Materials Technology	3	ME 277
	6	IM 316	Advanced Manufacturing Systems	3	IM 314
	8	IM 417	Failure Analysis	3	IM 315
	3	IM 221	Introduction to Industrial Engineering	3	None
	7	IM 422	Work Design and Measurements	3	90 Credit Hours
	7	IM 423	Operations Research	3	90 Credit Hours
	8	IM 424	Production Planning and Control	3	IM 432
	8	IM 425	Management Science	3	IM 423
	8	IM 426	Industrial Facilities Planning	3	IM 423
	7	IM 432	Operations Management	3	90 Credit Hours
	7	IM 433	Industrial Data Systems Management	3	90 Credit Hours

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 96 Cr. Hr. of the following compulsory courses					
IM	8	IM 434	Engineering Project Management	3	IM 423
	5	IM 341	Engineering Statistics	3	BA 224
	6	IM 342	Statistical Analysis	3	IM 341
	7	IM 443	Quality Engineering	3	IM 342
	8	IM 444	Reliability Engineering	3	IM 443
	9	IM 501	Senior Project I	3	S.S.*
	10	IM 502	Senior Project II	6	IM 501
ME	3	ME 274	Materials Science	3	BA 114, BA 142
	3	ME 252	Mechanical engineering Drawing	3	ME 151
	4	ME 277	Strength of Materials	3	ME 274
	4	ME 231	Thermodynamics	3	BA 114
	4	ME 241	Experimental Methods	3	54 Credit Hours
	5	ME 355	Theory of Machines	3	BA 142
	5	ME 361	Fluid Mechanics	3	BA 124
	6	ME 454	Machine Design	3	ME 252
	7	ME 455	Computer Aided design	3	ME 454
EE	4	EE 236	Electrical Engineering I	3	BA 124
	5	EE 326	Electrical Engineering II	3	EE 236

* Senior standing (completion of 135 Hours and GPA of at least 2.00)

Department Restricted Electives

At least nine courses (24 Cr. Hr.) from the following list of the college electives

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Group 1	9 – 10	IM 511E	Engineering Meteorology	3	126 Credit Hours
	9 – 10	IM 512E	Integrated Manufacturing Systems	3	126 Credit Hours
	9 – 10	IM 513E	Advanced Joining Processes	3	IM 417
	9 – 10	IM 514E	Polymers, Ceramics & Composite Materials	3	IM 417
	9 – 10	IM 515E	Selection of Engineering Materials	3	126 Credit Hours
	9 – 10	IM 516E	Engineering Solid Mechanics	3	IM 417
	9 – 10	IM 517E	Smart Materials and Applications in Industrial Systems	3	126 Credit Hours
Group 2	9 – 10	IM 521E	Discrete Event System Simulation	3	IM 423
	9 – 10	IM 522E	Industrial Systems Simulation	3	IM 521E
	9 – 10	IM 523E	Human Factors Engineering and Design	3	IM 422
	9 – 10	IM 524E	Industrial Safety	3	126 Credit Hours
	9 – 10	IM 525E	Industrial Material Handling Systems	3	IM 426
	9 – 10	IM 526E	Factory Physics	3	IM 424
	9 – 10	IM 527E	Social Network Analysis	3	126 Credit Hours

Department Restricted Electives

At least nine courses (24 Cr. Hr.) from the following list of the college electives

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Group 3	9 – 10	IM 531E	Human Resource Management	3	126 Credit Hours
	9 – 10	IM 532E	Industrial Distribution Systems	3	IM 432
	9 – 10	IM 533E	Supply Chain Management	3	IM 432
	9 – 10	IM 534E	Maintenance Management	3	IM 432
	9 – 10	IM 535E	Marketing Management	3	IM 432
	9 – 10	IM 536E	Engineering Cost Analysis	3	126 Credit Hours
	9 – 10	IM 537E	Introduction to Entrepreneurship	3	126 Credit Hours
Group 4	9 – 10	IM 541E	Product Design and Development	3	126 Credit Hours
	9 – 10	IM 542E	Reverse Engineering	3	126 Credit Hours
	9 – 10	IM 543E	Design of Experiments	3	126 Credit Hours
	9 – 10	IM 544E	Quality Assurance Systems	3	IM 443
	9 – 10	IM 545E	Total Quality in Industrial Management	3	IM 443
	9 – 10	IM 546E	Machinery Condition Monitoring	3	126 Credit Hours
	9 – 10	IM 547E	Introduction to Six Sigma	3	126 Credit Hours

*IM517E, IM527E, IM537E, and IM547E are planned for offering during the academic year 2016/2017.

Where the four main course groups are:

- Group 1: Materials and Manufacturing Engineering.
- Group 2: Industrial Engineering.
- Group 3: Management Engineering.
- Group 4: Quality and Design Engineering.

Course Summary Description

IM 400IM – Practical Training

Cr.0. Prerequisite: None.

This course is a non-credit course and is a college graduation requirement. Students are asked to undertake a minimum of four weeks of practical training in off-campus sites recommended by the college and the department in order to pass this course. Students are required to submit a recognition letter from the site where they received their training, besides a report and a presentation. Course is a Pass/ Fail one.

IM 501 – Senior Project I

Cr.3. Prerequisite: Senior Standing – Completion of 138 Credit Hours and a GPA of at least 2.00.

Application-oriented project shows competence in major academic area, where an independent research project is conducted under the guidance of a faculty member in the Department of Industrial and Management Engineering. The research should contribute to the advancement of knowledge in the field. Written report and formal presentation are required.

IM 502 – Senior Project II

Cr.6. Prerequisite: IM 501

Application-oriented project to show competence in major academic area. Where, an independent research project is conducted under the guidance of a faculty member in the Department of Industrial and Management Engineering. The research should contribute to the advancement of knowledge in the field. Written report and formal presentation are required.

IM 111 – Industrial Relations

Cr.2. Prerequisite: None

This course identifies the different types of industries, production techniques, management and organization structure, the different types of hazards and dangers and how to prevent them. Also it clarifies the meaning of production planning and control and cost calculations.

IM 112 – Manufacturing Technology

Cr.2. Prerequisite: None

The course provides an introduction to engineering materials and their properties, production of common metals. It covers types of manufacturing, basic manufacturing processes such as casting, metal forming, welding and machining. An overview of some advanced manufacturing processes is also included. In addition, it introduces measurement standards, instruments, deviations and methods.

IM 212 – Manufacturing Processes

Cr.3. Prerequisite: IM 112

This course is tailored for departments other than the department of industrial and management engineering and it covers the following topics: Chip type machining processes, cutting tools, work holding devices, mechanics of chip formation, and analytical study of machining processes. It also includes tool wear, process accuracy and product surface finish, precision measurements and metrology, and an overview of non-conventional machining processes.

IM 213 – Material Removal Processes

Cr.3. Prerequisite: IM 112

The course covers a variety of topics including: Chip type machining processes, cutting tools, tool wear, turning processes, drilling, broaching, and abrasive machining. It also includes the mechanics of chip formation, analytical study of machining processes, work piece holding devices, and thread and gear manufacturing. Furthermore, it gives an overview of non-traditional machining processes, process accuracy and product surface finish, precision measurements and metrology.

IM 314 – Material Forming Processes

Cr.3. Prerequisite: IM 213, ME 277

The course introduces the concept of plastic deformation and Mechanical behaviour of materials.This includes stress, strain and different bulk deformation processes; including forging and forgeability, rolling, extrusion, rod & wire drawing. It also covers sheet metal forming and formability, deep drawing, shearing processes; blanking & piercing, and welding processes.

IM 315 – Materials Technology
Cr.3. Prerequisite: ME 277
The course covers the classification of engineering materials, material selection for manufacturing, casting processes and solidification, fluid flow, melting practice and casting alloys, continuous casting of steel and die casting, die design. It also includes polymers, processing of polymers, processing of reinforced plastics, metal powders production and compaction, ceramics properties and forming processes.

IM 316 – Advanced Manufacturing Systems
Cr.3. Prerequisite: IM 314
Reflecting manufacturers' growing need to integrate computers into their production processes, this course covers the machining fundamentals, as well as Computer Numerical Control (CNC) programming and operation. It covers the operation of Computer Numerical Control machine tools with a focus on word address (G and M code) programming for the industry standard Fanuc controllers.

IM 417 – Failure Analysis
Cr.3. Prerequisite: IM 315
The course covers different techniques for failure analysis including modes for mechanical failure, residual stresses, brittle and ductile fractures, fatigue fracture, wear, corrosion, elevated-temperature failures. It also introduces the different techniques of non-destructive testing.

IM 511E – Engineering Meteorology
Cr.3. Prerequisite: 126 Credit Hours
The course covers the following topics: dimensional engineering meteorology, dimensional tolerance, error propagation and tolerance accumulation, screw thread measurements and inspection, geometrical tolerance, and verification of geometrical features.

IM 512E – Integrated Manufacturing Systems
Cr.3. Prerequisite: 126 Credit Hours
This course covers the technology associated with computer integrated manufacturing (CIM). Conventional manufacturing technologies are introduced, followed by computer automation and CIM. The course includes computer-aided design (CAD), product data management (PDM), computer-aided engineering (CAE), and integrated manufacturing systems.

IM 513E – Advanced Joining Processes
Cr.3. Prerequisite: IM 417
This is an advanced course that covers the different joining processes; reaction of various materials to welding, brazing and soldering; distortion; process and material selection and structural engineering considerations.

IM 514E – Polymers, Ceramics and Composite Materials
Cr.3. Prerequisite: IM 417
This course covers the structure-property relationships as well as the mechanical and thermo-mechanical characteristics of the different types of polymeric, ceramic and composite materials. In addition, it introduces the students to the different properties and industrial applications of these classes of materials.

IM 515E – Selection of Engineering Materials

Cr.3. Prerequisite: 126 Credit Hours

The course helps students develop problem-solving abilities for materials evaluation and selection, materials processes selection, failure analysis, and materials testing. The course includes the study of the basics for material selection in the design of engineering systems; materials design parameters, and classes of materials. A set of case studies in material's selections are given throughout the course to develop the materials selection knowledge and skills of the students.

IM 516E – Engineering Solid Mechanics

Cr.3. Prerequisite: IM 417

This course presents solid modelling not just as a communication tool, but as an integral part of the design process. To this end the course explores design intent, the use of solid models in engineering analysis, and introduces techniques from manufacturing such as mould design and sheet metal patterning. The course includes the study of the basis for solid mechanics in the design of machine and product elements. A set of case studies are given throughout the course to develop the part design modelling knowledge and skills of the students.

IM 517E – Smart Materials and Applications in Industrial Systems

Cr.3. Prerequisite: 126 hours

The course covers the different types of smart materials, their properties and fields of applications in industrial systems. Different types of smart materials are studied such as shape memory alloys, piezoelectric materials, magnetorheological fluids and semiconductor smart systems. . In addition, it introduces the students to the processing techniques and degradation mechanisms of different types of smart materials.

IM 221 – Introduction to Industrial Engineering

Cr.3. Prerequisite: None

The course provides an introduction to the fundamentals of Industrial Engineering; concepts, analysis, and design. It covers applications of the principles and problems in operations research, systems analysis, manufacturing processes, human factors, facility design, process selection, production processes, quality and operation management.

IM 422 – Work Design and Measurements

Cr.3. Prerequisite: 90 Credit Hours

The course introduces the students to the concept of improvement of productivity through designing and developing various work centres. It covers the detailed restudying of work centres to find better ways to produce the products and/or improve their quality, study of basic techniques required to establish an allowed time standard to perform a given task. It also includes performance rating and measurement of work content of prescribed methods with considerations for allowance for fatigue and personal unavoidable delays.

IM 423 – Operations Research
Cr.3. Prerequisite: 90 Credit Hours.
The course provides the basic concepts and fundamentals of management science, problems addressed by operations research, and problem formulations in linear programs. It includes the graphical solution of linear programs, simplex method, transportation model, assignment model, network planning, and critical path and PERT methods.

IM 424 – Production Planning and Control
Cr.3. Prerequisite: IM 432
The course covers topics related to materials management; purchasing and inventory acquisition, inventory control; including safety stocks and service levels. It also includes material and capacity requirements planning, scheduling and controlling production activities, analysis of manufacturing, service and project operations. Furthermore, it covers quality assurance, maintenance and cost control, and strategy for future production operations.

IM 425 – Management Science
Cr.3. Prerequisite: IM 423
This course is designed to provide a revision of operations research for continuity, queuing theory and its applications. It includes also decision analysis, dynamic programming and its applications, and Markovian decision analysis.

IM 426 – Industrial Facilities Planning
Cr.3. Prerequisite: IM 423
The course provides the students with an introduction to types of facilities, steps in facilities design, layout planning tools and techniques, applications in manufacturing and non-manufacturing areas.

IM 521E – Discrete Event System Simulation
Cr.3. Prerequisite: IM 423
This course provides a basic treatment of discrete-event simulation, including the proper collection and analysis of data, the use of analytic techniques, verification and validation of models, and designing simulation experiments. Furthermore, it presents the application of simulation in manufacturing and material handling systems, and service industries.

IM 522E – Industrial Systems Simulation
Cr.3. Prerequisite: IM 521E
As a continuation to the IM 521E course, this course starts with an introduction to simulation concepts, and progresses through an overview of the Arena software, basic model development, input analysis, additional modelling constructs, output analysis, and advanced modelling. Furthermore, the course includes chapters on integrating Arena simulation models with other applications, specialized statistical issues, continuous simulation, and conducting a successful simulation study.

IM 523E – Human Factors Engineering and Design (Ergonomics)

Cr.3. Prerequisite: IM 422

The course covers topics related to the human characteristics (capabilities, limitations, motivations and desires) in order to adapt a human made environment to the people involved. It highlights that this knowledge may affect complex technical systems workstations, or the tools used at work.

IM 524E – Industrial Safety

Cr.3. Prerequisite: 126 Credit Hours

The course covers accident causes, losses, and investigative techniques. It includes the role of human, task/machine, and environment in accident prevention. It introduces safety standards, codes, and laws. It also covers product liability, design, evaluation, and management of safety organizations and programs. The topics of hazard recognition, analysis, control and risk assessment, systems safety and related techniques are also included.

IM 525E – Industrial Material Handling Systems

Cr.3. Prerequisite: IM 426

The course provides a broad understanding of materials handling engineering from a system design and application engineering point of view. It covers the topics of instruction in the engineering principles, design criteria, operating parameters, performance requirements, equipment resources, and applications of engineering practices involved in the planning, design, and operation of materials handling systems for manufacturing, physical distribution, and government operations. A materials handling system design project is a required part of the course.

IM 526E – Factory Physics

Cr.3. Prerequisite: IM 424

This course provides students' with deep and generic insights for understanding, evaluating, and improving the performance of production lines. The course covers different topics including: advanced inventory management and control techniques, advanced materials requirements planning, basic dynamics of production lines, the different variability sources in a production line, the corrupting influence of variability, evaluating the performance of production lines, and the effect of batching on production lines' performance.

IM 527E – Social Network Analysis

Cr.3. Prerequisite: 126 Credit Hours

This course will discuss how social networks concepts, theories, and visual-analytic methods that are being used to map, measure, understand and design a wide range of phenomena such as social networking sites (e.g., Facebook, MySpace), recommender systems (e.g., Amazon, NetFlix, Pandora), trust and reputation systems (e.g., eBay, Epinions, Slashdot), search engines (e.g., Google, Technorati), P2P file-sharing (e.g., BitTorrent; Joost), user-generated content (e.g., Flickr, Wikipedia, Yelp), social bookmarking (e.g., del.icio.us, digg, reddit) and virtual worlds (e.g., Second Life, EverQuest 2, World of Warcraft).

IM 432 – Operations Management

Cr.3. Prerequisite: 90 Credit Hours

The course introduces the production, operations and productivity concepts. It covers production, operation decision making, systems design, capacity and investment, facility location and layout, and planning for goods and services. It also includes the concept of process planning and selection, forecasting demand, aggregate demand, aggregate planning and master scheduling.

IM 433 – Industrial Data Systems Management

Cr.3. Prerequisite: 90 Credit Hours

The course provides an introduction to Management Information Systems (MIS). It explains the importance of information systems to management, and includes: hardware, software, input/output devices, file and database, communication, decision support systems and expert systems, and MIS planning and development.

IM 434 – Engineering Project Management

Cr.3. Prerequisite: IM423

An introduction to project management including project selection within a general strategic orientation, organizing the project and the project management team, scope management, project planning and scheduling, probabilistic scheduling, budgeting and cost estimating, resource allocation and levelling, project time acceleration, project monitoring and control, and project integration management.

IM 535 – International Operations Management

Cr.3. Prerequisite: 108 Credit Hours.

The course introduces the students to the concepts of international business environment, international trade and direct foreign investments, foreign exchange, and economic cooperation.

IM 531E – Human Resource Management

Cr.3. Prerequisite: 126 Credit Hours.

The course covers topics related to: Managers and their personnel concepts, personnel administration and resource policies, organizational planning and management development, managing and working in a changing world. It also includes the concepts of motivation and team work, recruitment and selection, training and appraisal, worker participation in production problems, wages, incentives and services.

IM 532E – Industrial Distribution Systems

Cr.3. Prerequisite: IM 432

The course covers the concepts of design and analysis of distribution systems of people, processes and technology. The focus is on distribution, warehousing, and material handling. Other topics include the role of the warehouse in the extended enterprise, warehouse planning, process design, layout, equipment selection, workforce and workplace issues, and financial performance measures.

IM 533E – Supply Chain Management
Cr.3. Prerequisite: IM 432
This course covers the major issues in supply chain management, including: definition of a supply chain; role of inventory; advanced production-inventory models; supply contracts; bullwhip effect and information sharing; vendor-managed inventories and other distribution strategies; third-party logistics providers; managing product variety; information technology and supply chain management; international issues.

IM 534E – Maintenance Management
Cr.3. Prerequisite: IM 432
The course introduces the concepts of maintenance and the industrial organization, acquisition policy and maintenance life, cycle costs, maintenance strategy as a business centred approach. It also covers topics of reliability of plant components and systems, determining the life plan and schedule, controlling plant reliability, reliability centred maintenance, and enterprise asset management.

IM 535E – Marketing Management
Cr.3. Prerequisite: IM 432
The course introduces the students to the concepts of evaluation of markets and marketing, the marketing environment, demand and market study, the buyer behaviour; consumer and organizational markets. It also covers the topics of the marketing mix, marketing information system, the development of new products and services, the product life cycle, pricing and promotional distribution systems, and development and marketing plan.

IM 536E – Engineering Cost Analysis
Cr.3. Prerequisite: 126 Credit Hours
This course provides the latest principles and techniques for the evaluation of engineering design, with an emphasis on analysis and estimation of costs. It analyzes labour, material, accounting, and forecasting; then the theme of estimating is developed, with a study of methods, operations, and products.

IM 537E – Introduction to Entrepreneurship
Cr.3. Prerequisite: 126 Credit Hours
The course provides an introduction to the principles of Entrepreneurship. It introduces the essential elements of building one's own business, from brainstorming ideas and assessing opportunities to pitching a business idea. It explains entrepreneurial thinking with attention to entrepreneurial mind-set, entrepreneurial motivations, and entrepreneurial behaviours.

IM 341 – Engineering Statistics
Cr.3. Prerequisite: BA 224
The course introduces the students to statistical sciences, descriptive statistics and inferential statistics, methods of graphical presentation of data, histogram, box plot, position parameters, mean, median, and quartiles, dispersion parameters, and variance. It covers also the fundamentals of probability, probability distributions for discrete and continuous variables, and sampling distributions.

IM 342 – Statistical Analysis
Cr.3. Prerequisite: IM 341
The course provides a revision of engineering statistics, sampling distributions, point estimators, confidence interval estimations. It covers the testing of hypothesis, linear regression, multiple regression, and analysis of variance.

IM 443 – Quality Engineering

Cr.3. Prerequisite: IM 342

The course introduces the principles and concepts of statistical quality control, quality improvement tools, control charts for variables, control charts for attributes, choice between attribute and variable control charts, process capability measures. It also covers the types of attribute acceptance sampling plans, characteristics of acceptance sampling plans, producer consumers' relationships, performance of acceptance sampling plans, economics of acceptance sampling plans. The standard attribute acceptance sampling plans applications and limitation, the quality in design, reliability, product life and process design are included.

IM 444 – Reliability Engineering

Cr.3. Prerequisite: IM 443

The course covers principles of reliability, failure rate and its relation to reliability, probability distribution of the time to failure, exponential and weibull distributions, reliability of systems, series and parallel systems, stand by redundancy, systems mean time to failure, mean residual life, reliability in design. It also includes failure mode effect analysis, failure tree analysis, reliability testing and analysis, and warranty problems.

IM 541E – Product Design and Development
Cr.3. Prerequisite: 126 Credit Hours
This course examines the product design and development process. Topics include: organization and management issues associated with the product development process; the identification of customer needs and the translation of these needs into product performance specifications; methodologies for the generation and selection of concepts; developing the product architecture with emphasis on creating interfaces, prototyping and design for manufacturing.

IM 542E – Reverse Engineering
Cr.3. Prerequisite: 126 Credit Hours.
The course provides an introduction to product development with reverse engineering concept, product development tools, definition of customer needs, product architectures. It also covers product metrics, design for manufactures and assembly, design for environment, and several case studies.

IM 543E – Design of Experiments
Cr.3. Prerequisite: 126 Credit Hours
The course includes a revision of models for statistical analysis, the objectives of design of experiments, single factor designs, several factors designs, 2k factorial design, fractional factorial design, orthogonal array and Taguchi methods, and robust design.

IM 544E – Quality Assurance Systems
Cr.3. Prerequisite: IM 443
The course covers the quality management and quality assurance vocabulary, the development of quality assurance standards; complaint, myths and advantages of quality assurance certification. It includes the structure of quality assurance standards, the procedure of implementation of quality assurance standards, certification and accreditation bodies, clauses of quality assurance standards, selection of appropriate quality management standards, quality management, and quality systems guidelines. It also covers the structure of quality manual, internal and external auditing, auditor qualification, reporting the audit, and the standards strongly related to quality assurance standard.

IM 545E– Total Quality in Industrial Management
Cr.3. Prerequisite: IM 443
This course introduces the history and evolution of quality, definition of quality, basic concept of total quality management, philosophies of leading sags of quality Deming, Juran, Ichikawa, Crosby, Taguchi, ChigoChingo. It also covers the characteristics of quality distribution parameters, the relationships between quality parameters, some statistical process control tools, and quality cost.

IM 546E – Machinery Condition Monitoring
Cr.3. Prerequisite: 126 Credit Hours
The course covers maintenance types, maintenance philosophy, the role of vibration in Machinery Condition Monitoring (MCM), damage in machines, vibrational techniques, and vibration analysis. It also covers unbalance detection, bent shaft, misalignment, mechanical looseness, bearing faults, gear faults, pump cavitations, and electrical motor faults.

IM 547E– Introduction to Six Sigma

Cr.3. Prerequisite: 126 Credit Hours

This course introduces and examines Six Sigma concepts and theory of quality control in manufacturing and service operations, analysis of product design and process capability, and statistical process control. Students will develop a broad understanding of Six Sigma principles and practice, and acquire knowledge about such initiatives in manufacturing and service operations.

NE 364 – Engineering Economy

Cr.3. Prerequisite: 54 Credit Hours

A study of basic concepts emphasizing analysis of aggregate economy. Examination of the processes of price determination and calculation of optimum demand for maximum profit. Basic principles of money-time relationship. Methods of investment assessment and fundamental techniques of comparison of investment opportunities. Theories of depreciation of physical facilities and study of cost recovery systems.

NE 365 – Accounting and Finance

Cr.3. Prerequisite: NE 364

This course introduces accounting; the language of business, users and use of accounting information in economic decision. In addition, this course will focus on recording, measuring and reporting business transactions in different types of organizations.

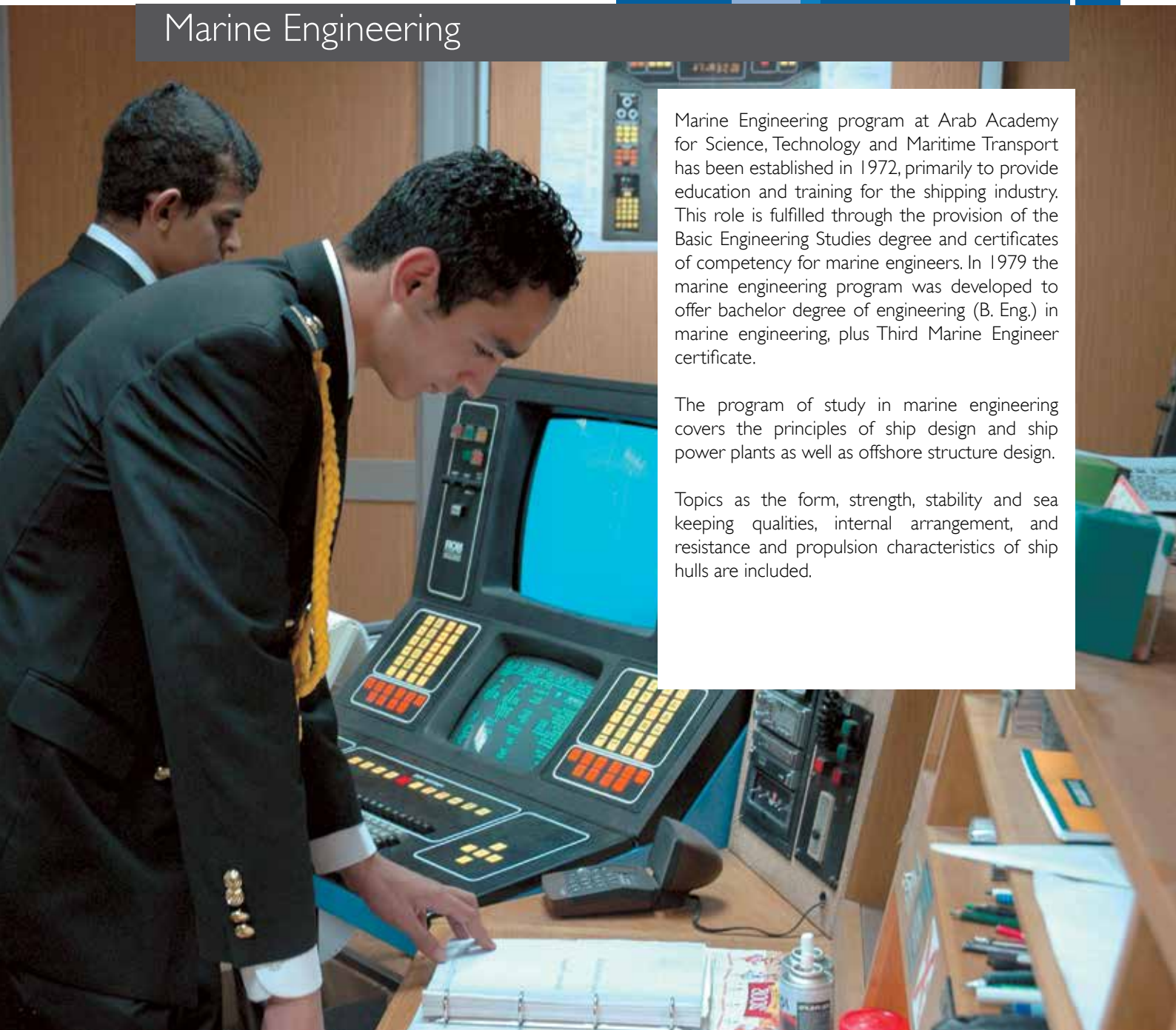
For further information please consult the graduate catalog and the site *www.aast.edu*

This Program is accredited by the Engineering Accreditation Commission of ABET.

http://www.abet .org

The program educational objectives and student outcomes are listed in the (CET) site.

Marine Engineering



Marine Engineering program at Arab Academy for Science, Technology and Maritime Transport has been established in 1972, primarily to provide education and training for the shipping industry. This role is fulfilled through the provision of the Basic Engineering Studies degree and certificates of competency for marine engineers. In 1979 the marine engineering program was developed to offer bachelor degree of engineering (B. Eng.) in marine engineering, plus Third Marine Engineer certificate.

The program of study in marine engineering covers the principles of ship design and ship power plants as well as offshore structure design.

Topics as the form, strength, stability and sea keeping qualities, internal arrangement, and resistance and propulsion characteristics of ship hulls are included.

In addition to the marine engineering, the department offers specialization in offshore engineering.

Marine Engineering program at Arab Academy for Science, Technology and Maritime Transport prepares well qualified marine engineers who play a significant role in shipping industry and marine business. Their responsibility will be the provision of management, design, selection to do installation, operation and maintenance of the engineering systems and associate equipment encountered in the shipping sector as well as marine industry.

Since the design of Marine systems encompasses many Engineering fields, graduates of this department are called to handle diverse professional responsibilities. Therefore, the program includes the fundamentals of physical science and mathematics as well as a broad range of engineering aspects that are environmentally friendly. To provide the appropriate educational breadth, in many courses such as the humanities and social sciences are elected and accommodated.

The undergraduate program is arranged to give the students a broad knowledge in engineering mechanics through basic courses in the areas of structural mechanics, hydrodynamics, marine power systems, and marine dynamics.

The program has been planned to satisfy the requirements of the Supreme Council of Universities in Egypt (SCU) and Accredited by the Engineering Accreditation Commission of ABET.
http://www.abet .org

Program Educational Objectives

"Skills, abilities and attributes a Marine Engineer possesses as a result of his combined engineering education and 3-5 years of industrial experience"

- Graduates will succeed in engineering positions within marine, and offshore industry and in national, regional, and, international levels.
- Graduates will succeed in the pursuit of advanced degrees in marine engineering or related fields.
- Graduates will distinguish themselves in breadth of perspective and ability to solve complex problems.
- Graduates will be prepared to communicate and work effectively on team-based engineering projects.
- Graduates will be effective communicators and team members, with many assuming leadership roles.

Academic Program Sheet

Year 1			
Semester 1		**Semester 2**	
LH131	ESP (1)	LH132	ESP (2)
BA123	Mathematics (1)	BA124	Mathematics (2)
BA113	Physics (1)	BA114	Physics (2)
CC111	Introduction to Computer	CC 114	Introduction to Programming
ME151	Eng. Drawing & Descriptive Geometry	IM112	Manufacturing Technology
BA141	Eng. Mechanics (1)	BA142	Engineering Mechanics (2)
MT 112	Marine Safety	BA118	Chemistry
P 101	Physical Education (1)	P 102	Physical Education (2)
D 101	Leadership (1)	D 102	Leadership (2)
Year 2			
Semester 3		**Semester 4**	
LH 231	Technical Report Writing	BA 224	Mathematics (4)
BA 223	Mathematics (3)	EE 218	Instrumentation & Measurements
ME 252	Mechanical Engineering Drawing	IM 212	Manufacturing Process (1)
ME 231	Thermodynamics	MM 221	Marine Diesel Engine (1)
EE 238	Electrical Eng. Fundamentals	MM 241	Naval Arch. & Ship Construction
ME 274	Material Science	MM 211	Marine Engineering (1)
P 203	Physical Education (3)	P 204	Physical Education (4)
D 203	Leadership (3)	D 204	Leadership (4)

Year 3			
Semester 5		**Semester 6**	
MM 322	Marine Diesel Engines (2)	ME 355	Theory of Machines
MM 312	Marine Engineering (2)	ME 276	Stress Analysis
MM 342	Naval Arch. & Ship Construction (2)	MM 346	Marine Hydrodynamics 1
EE 320	Marine Electrical Engineering	MM 317	Marine & offshore Simulation
EE 310	Marine Control Systems	EE 329	Electrical Machines
MM 313	Watch Keeping Duties	NM 291 or	Maritime Law or Environmental Science & Technology
N 310	Nautical Technology	NE 466	Maritime Law
N 370	Marine Safety		Environmental science & technology
P 305	Physical Education (5)		
D 305	Leadership (5)		
Year 4			
Semester 7		**Semester 8**	
MM 415	Marine Engineering 3	IM 400	Practical Training
ME 454	Machine Design	ME 434	Refrigeration & Air Conditioning
ME 431	Heat Transfer	ME 423	Steam Plant Engineering
MM 447	Marine Hydrodynamics 2	ME 455	Computer Aided Design
EE 418	Automatic Control Systems	MM 429	Electrical Ship design
CC 442	Digital Electronics & Microprocessors	MM 471	Intro. to Offshore Engineering
		MM 423	Marine Diesel Engines 3
Year 5			
Semester 9		**Semester 10**	
MM 543	Ship Design	MM 526	Maintenance Planning for Marine Units
IM 423	Operations Research	MM 544	Shipyard Technology
MM 501	Project (1)	MM 503	Project (2)
MMXXX	Department Restricted Elective	MMXXX	Department Restricted Elective
MMXXX	Department Restricted Elective	MMXXX	Department Restricted Elective
MMXXX	Department Restricted Elective		

Department Restricted Electives			
Group A		**Group B**	
MM 524	Marine Diesel Engines 4	MM 573	Oil & Gas Production Technology
MM 516	Marine Engineering 4	MM 571	Design & Const. of Offshore Structures
ME 458	Mechanical Vibrations	MM 572	Drilling Technology
MM 545	Ship Resistance and Powering	MM 570	Underwater Technology
MM 528	Ship Propulsion Systems	MM 575	Offshore Engineering
ME 525	Turbo-machinery	MM 574	Port Equipment Engineering

Graduation Requirements

Candidates for bachelor degree of engineering (B. Eng.) in Maine Engineering plus Third Marine Engineer Certificate, must complete the professional degree program which consists of five years study (10 semesters, 180 Cr Hrs). The program of study comprises the following instructional and training phases:

PHASE - I

A phase of study at the Academy on internal residence. Consists of four semesters with a minimum duration of two years.

PHASE - II

A guided sea-training period on board the training ship of the Academy (AIDA IV), for duration of four months; equivalent to a six months period of practical sea training. The guided sea training is carried out under the supervision, guidance and evaluation of the Marine Engineering Department in coordination with the Sea Training Department.

PHASE - III

A phase of study at the department on external residence basis for five semesters. Minimum duration of two and half years.

Completion of the study of phase - I, together with a guided sea-training period onboard the training ship of the Academy, qualifies the student to appear before a Board of Examiners of Engineers for written and oral exanimations for the award of a certificate of competency as Engineer Watch keeper (Third Marine Engineer).

At the beginning of the 9th term, students decide on one of the two offered areas:

- Marine Engineering
- Offshore Engineering

In the final year, students form design teams and work on engineering application projects. Professors from universities and professional engineers from the marine industry are invited to evaluate and assess the final students' project report.

College Requirements					
A total of 52 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses					
BA	1	BA 113	Physics (1)	3	None
	1	BA 118	Chemistry	2	None
	1	BA 123	Mathematics (1)	3	None
	1	BA 141	Engineering Mechanics (1)	3	None
	2	BA 114	Physics (2)	3	BA 113
	2	BA 124	Mathematics (2)	3	BA 123
	2	BA 142	Engineering Mechanics (2)	3	BA 141
	3	BA 223	Mathematics (3)	3	BA 124
	4	BA 224	Mathematics (4)	3	BA 223
CC	1	CC 111	Introduction to Computer	3	None
	2	CC 114	Introduction to Programming	3	CC 111
	2	IM 112	Manufacturing Technology	2	None
LH	1	LH 131	ESP I	2	None
	2	LH 132	ESP II	2	LH 131
	3	LH 231	ESP III	3	LH 132
ME	2	ME 151	Eng. Drawing & Projection	2	None

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 52 Cr. Hr. of the following compulsory courses					
	1	MT 112	Marine Safety	2	None
	1	P 101	Physical Education 1	0.5	None
	2	P 102	Physical Education 2	0.5	P 101
	3	P 203	Physical Education 3	0.5	P 102
	4	P 204	Physical Education 4	0.5	P 203
	5	P 305	Physical Education 5	0.5	P 204
	1	D 101	Leadership 1	0.5	None
	2	D 102	Leadership 2	0.5	P 101
	3	D 203	Leadership 3	0.5	P 102
	4	D 204	Leadership 4	0.5	P 203
	5	D 305	Leadership 5	0.5	P 204
	5	N 370	Marine Safety	1	None
	5	N 310	Nautical Technology	1	None

Department Requirements

A total of 128 credit hours are required by the department, which are distributed as follows:

- 113 credit hours of compulsory courses.
- A minimum of 15 credit hours of department restricted electives that are selected from the two main course groups as follows:
  - Four courses equivalent to 12 credit hours from the main area of interest.
  - One course, from the other group, equivalent to 3 credits.

The required compulsory and restricted elective courses are listed in the following table.

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 113 Cr. Hr. of the following compulsory courses					
CC	7	CC 442	Digital Design and Intro. to Microprocessor	3	CC 114
EE	3	EE 238	Electrical Eng. Fundamentals	3	BA 124
	4	EE 218	Instrumentation & Measurements	3	EE 238
	5	EE 310	Marine Control Systems	2	EE 218
	5	EE 320	Marine Electrical Engineering	1	EE 238
	6	EE 329	Electrical Machines	3	EE 238
	7	EE 418	Automatic Control Engineering	3	EE 329
IM	4	IM 212	Manufacturing Processes	3	IM 112
	9	IM 423	Operation Research	3	90 Cr.Hr.
ME	3	ME 231	Thermodynamics	3	BA 114
	3	ME 252	Mechanical Engineering Drawing	3	ME151
	3	ME 274	Materials Science	3	BA 114 & BA 142
	6	ME 276	Stress Analysis	3	ME 274
	6	ME 355	Theory of Machines	3	BA 142
	7	ME 431	Heat Transfer	3	ME 231
	7	ME 454	Machine Design	3	ME 276 & ME 252
	8	ME 423	Steam Plant Engineering	3	ME 431

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 113 Cr. Hr. of the following compulsory courses					
ME	8	ME 434	Refrigeration & Air Conditioning	3	ME 431
	8	ME 455	Computer Aided Design	3	ME 454
MM	4	MM 211	Marine Engineering (1)	3	None
	4	MM 221	Marine Diesel Engine (1)	3	ME 231
	4	MM 241	Naval Arch. & Ship Construction (1)	3	None
	5	MM 312	Marine Engineering (2)	2	MM 211
	5	MM 313	Watch Keeping Duties	2	None
	5	MM 322	Marine Diesel Engines (2)	2	MM 221
	5	MM 342	Naval Arch. & Ship Construction (2)	2	MM 241
	6	MM 317	Marine & offshore simulation	3	76 Cr. Hr.
	6	MM346	Marine Hydrodynamic 1	3	MM 241
	6	NM 291	Maritime Law OR	3	None
		NE 466	Environmental science & technology	3	None
	7	MM 415	Marine Engineering (3)	3	MM 312 or MM221
	7	MM 447	Marine Hydrodynamic 2	3	MM 346
	8	MM 423	Marine Diesel Engines (3)	3	MM 322
	8	MM 429	Electrical Ship design	3	EE329
	8	MM 471	Intro. to Offshore Engineering	3	76 Cr. Hr.
	9	MM 501	Senior Project 1	3	135 Cr. Hr.
	9	MM 543	Ship Design	3	MM 241& ME 276
	10	MM 503	Senior Project 2	6	MM 501
	10	MM526	Maintenance Planning for Marine units	3	126 Cr.Hr.
	10	MM 544	Shipyard technology	3	MM 543

Department Restricted Electives

At least five courses (15 Cr. Hr.) from the following list of the college electives from the following main course groups:

- Group A: Marine Engineering
- Group B: Offshore Engineering

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Group A	9 – 10	ME 458	Mechanical Vibrations	3	ME 355
	9 – 10	ME 565	Turbomachinery	3	MM 447
	9 – 10	MM 524	Marine Diesel Engines 4	3	MM423
	9 – 10	MM 516	Marine Engineering 4	3	MM415
	9 – 10	MM 528	Ship Propulsion Systems	3	MM 447& MM 241
	9 – 10	MM 545	Ship Resistance and Powering	3	MM 447& MM 241
Group B	9 – 10	MM 570	Underwater Technology	3	MM 471
	9 – 10	MM 571	Design & Construction of Offshore Structures	3	MM 471
	9 – 10	MM 572	Drilling Technology	3	MM 471
	9 – 10	MM 573	Oil & Gas Production Technology	3	MM 471
	9 – 10	MM 574	Port Equipment Engineering	3	MM471
	9 – 10	MM 575	Offshore Engineering	3	MM 471

Course Summary Description

IM 400MM – Practical Training

Cr.0. Prerequisite: None.

This course is a non-credit course and is a college graduation requirement. Students are asked to undertake a minimum of four weeks of practical training in off-campus sites recommended by the college and the department in order to pass this course. Students are required to submit a recognition letter from the site where they received their training, besides a report and a presentation. Course is a Pass/ Fail one.

MM 211 – Marine Engineering 1

Cr.3. Prerequisite: None

Introduces construction engineering as related to the Introduction to marine engineering, types of marine power plants, introduction to marine auxiliary engines transmission of power through propulsion systems, thrust bearing, shafting, shaft bearing, stern tube, propeller, different types of pumps, displacement and retordynamic, construction, performance, characteristics, heat exchangers, central cooling systems.

MM 312 – Marine Engineering 2

Cr. 2. Prerequisite: MM 211

Pumping systems, cooling systems, ballast system, bilge system, piping fitting, types of valves, deck machinery, watch keeping duties. Introduction to steering gear.

MM 313 – Watch Keeping Duties

Cr. 2. Prerequisite: MM 211

Watch keeping arrangements and procedures, keeping a safe engine watch, keeping a watch in port, keeping an effective engine watch in port under normal circumstances, keeping a safe engine watch at sea going, watch keeping routine duties, engine room log book data steps to prepare for manoeuvring, procedures taken in an emergency case in the engine room.

MM 415 – Marine Engineering III

Cr. 3. Prerequisite: MM221

Steering gear, bow thruster, stabilizer, fresh water generator, fire detection and prevention, fire fighting equipment and safety in engine room, prevention of pollution, regulation, equipment and sewage systems. Fuels, specification, combustion, treatment of oils filtering, purification, clarification, etc…

MM 516 – Marine Engineering IV

Cr. 3. Prerequisite: MM 415

The course deals with the main topics of fuel & oil handling on board ships, fuel oil purification, steering gear, refrigeration system operation and fault finding, air condition and different techniques, fire fighting equipments and ship survey.

MM 221 – Marine Diesel Engines 1

Cr. 3. Prerequisite: ME 231

Classification of internal combustion engines, construction details, systems of marine diesel engines, super-charging, marine fuels and fuel injection systems, combustion and diesel knocking, engine preparation and starting, engine performance and heat balance analysis and calculation. Operation and trouble shooting. Hands-on laboratory work is an integral part of this course.

MM 322 – Marine Diesel Engines 2

Cr. 2. Prerequisite: MM 221

The training machinery installations, main and auxiliary engines preparations, starting, condition monitoring and stopping procedures, actual systems of training ship, cooling, lubrication, fuel and starting systems of main propulsion plant, main diesel engine propulsion system evaluation using the diesel engine combustion performance analyzer, engine trouble shooting study and analysis, marine machinery maintenance.

MM 423 – Marine Diesel Engines 3

Cr. 3. Prerequisite: MM322

Review of marine diesel engines constructional features, kinematics and dynamics of crankshaft mechanisms, combustion chamber analysis and design, fixed and moving parts analysis and design. Design of diesel engine cooling and fuel injection systems. Moreover the exhaust system analysis and design will be introduced.

MM 429 – Electric Ship Design

Cr. 3. Prerequisite: EE 329

Review of marine engineering physical principles, propulsion and electric power, energy conversion, power plant concept, overview of main ship machinery, main prime movers, thrust producing devices, propellers, propeller engine matching, electrical components, electric motors, AC generators, power electronics and converters, example of electric propulsion drives, principle of All Electric Ships, applications.

MM 524 – Marine Diesel Engines 4

Cr. 3. Prerequisite: MM 423

Importance of marine diesel engines including Duel Fuel Engines as a source of energy production, approaches of reducing the specific fuel consumption of a marine diesel engine, improving engine thermal efficiency. Fuel oil and injection systems for better engine performances improving the total diesel propulsion plant efficiency, energy utilization on board ships, engine rating and practical operation of propulsion machinery, exhaust emission and control, condition monitoring and fault diagnosis expert system of a marine diesel engine.

MM 528 – Ship Propulsion Systems

Cr. 3. Prerequisite: MM 447+ MM 241

The principals of steam turbine, gas turbine, diesel, diesel electric and combined marine power systems including power cycles, operating characteristics, and limitations. Engine-Hull-propeller matching and propulsion power transmission. Principals of electric power generation, electric load analysis, costing in marine power plant. Decision making for selection of propulsion systems and their components.

MM 241 – Naval Architecture and Ship Construction 1

Cr. 3. Prerequisite: None

The course deals with the main topics of naval architecture (e.g., ship's term, principal dimensions, form coefficients, calculations of areas and volumes, centre of gravity and buoyancy, initial stability, trim, resistance and powering) and ship construction (e.g., ship's types, systems of framing, welding, material, classification societies, etc…).

MM 342 – Naval Architecture and ship construction 2

Cr. 2. Prerequisite: MM 241

Merchant ship types principle dimensions, ship stresses, framing system, ship structural items, typical mid ship sections longitudinal and transverse members, types of rudders, docking of ship, inspection and maintenance work of all under water fittings, different surveys required by the rules of classification societies.

MM 543 – Ship Design

Cr. 3. Prerequisite: MM 241+ ME 276

The course deals with topic related to the design process of a ship (e. g. Hydrostatic data, stability, determination of main dimensions, ship strength).

MM 544 – Shipyard Technology

Cr. 3. Prerequisite: MM 543

The course deals with all topics related to shipyards technology (e. g. shipyard layout, site selection, different workshops, welding technology, quality control, management.)

MM 545 – Ship Resistance and Powering

Cr. 3. Prerequisite: MM447+MM241

The course deals with the main topics of ship resistance and powering. How to calculate the resistance for a particular ship and the selection of power and propeller.

MM 471 – Introduction to Offshore Engineering

Cr. 3. Prerequisite: 76 Cr. Hr.

Principles of oceanography, geological properties of the ocean floor. Offshore prospecting. Winds, waves, tides and currents – history and development of offshore industry – types of offshore structures and vehicles, their performance, capabilities and limitations – fixed structures, compliant structures, mobile structures, semi-submersibles, support and supply vessels, sub-sea systems – oil and gas drilling & production technologies – safety aspects of offshore installations.

MM 570 – Underwater Technology

Cr. 3. Prerequisite: MM 471

Survey of undersea activities in oceanography and offshore engineering – the tools of underwater operations, decompression chambers, diving apparatus, submarines, robotics and remotely operated vehicles – design criteria and applications – corrosion and cathodic protection – underwater inspection, maintenance and repair operations.

MM 571 – Design and Construction of Offshore Structures

Cr. 3. Prerequisite: MM 471

Wave theories, wave loading and offshore structures, Morison equation, wave slamming, current forces – wind forces on offshore structures – wave spectra and random loading – structural design of the jacket structure, stresses in cylindrical members and joints – design of topside structures – construction materials, steel structures, concrete structures – fabrication of the jacket and topside structures – transportation, launching, lifting and upending operations – pilling and installation operations – certifications and regulations.

MM 572 – Drilling Technology

Cr. 3. Prerequisite: MM 471

Drilling objectives – physical and mechanical properties of rocks – drilling methods, drilling equipment, main and auxiliary drilling tools, drilling bits, drilling string, bit-rotation mechanisms – Mud engineering, drilling fluids, directional drilling, drilling practices – casing and cementing operations – drilling complications – drilling economics.

MM 573 – Oil and Gas Production Technology

Cr. 3. Prerequisite: MM 471

Physical properties of oil and gas – well completions, bottom hole completion techniques, well productivity – types of production systems, fixed plate forms, floating production, sub-sea systems – offshore pipelines – process plant, general layout and design, produced fluid systems, gas injection systems, separation facilities, oil and gas transfer, oil and gas flow metering, oily water processing – maintenance and safety aspects.

MM 574 – Port Equipment Engineering

Cr. 3. Prerequisite: MM 471

Port and harbour facilities, marine terminals, construction shipyards, repair docks – general design considerations, design criteria, site selection and layout, facility type requirements, environmental conditions, material selection – operational and environmental loads – berthing loads and fender system design – Mooring loads and design principles – fixed structures, structure types and configurations, selection of optimum structure types, design features – Floating structures, types and applications, structural design, mooring system design. Inspection, maintenance and repair operations.

MM 575 – Offshore Engineering

Cr. 3. Prerequisite: MM 471

Fundamental properties of reservoir rocks, porosities, permeability, fluid distribution in reservoirs, mechanical properties of rocks - Fundamental properties of reservoir fluids, composition of petroleum fluids, properties of the liquid and gaseous states – reservoir performance – performance prediction – Gas and water injection – Enhanced recovery methods – Basic concepts of well testing – Reservoir simulation.

MM 317- Marine and Offshore Simulation

Prerequisite (76 Cr. Hr.) / Credit 3 hrs.

Introduction to geometric main dimensions of ship hull form and platform rigs, drawing and fairing of ship lines, lines plans for different ship types, different types of bows and stern, ship form, space allocations and general arrangements GA, Midship section, shell expansion drawing, aerofoils and their marine applications, airfoil drawing, applications to rudders and ducts, propeller geometry, propeller drawings, introduction to engine room simulator, simulation of main engines, ship auxiliary system, simulation of electric power plants.

MM 346 - Marine Hydrodynamics 1

Cr. 3. Prerequisite MM241

Fluid properties, system, extensive and intensive properties, fluid statics, pressure variation with elevation, fluid forces on plane and curved surfaces, fluids in motion , velocity and flow rate, Fluid Kinematics –acceleration-, basic control volume approach. Continuity equation, differential form of continuity equation, rotation and vorticity, stream function, velocity potential.

MM 447 - Marine Hydrodynamics 2

Cr. 3. Prerequisite MM346

Review of flow kinematics, stream function and velocity potential, irrotational flow, basic flows, uniform, source/sink, vortex, doublet, laplace equation, law of superposition, examples of combined flows, lifting and non lifting flows, Kutta -jakouski equation, aerofoils, pressure variation in flowing fluids, Euler equation, Bernoulli equation, , momentum equation, application of momentum equation, energy equation, surface resistance, flow in pipes, marine applications to internal and external flows.

MM 526 - Maintenance Planning for Marine Units

Cr. 3. Prerequisite 126 Cr. Hr.

Introduction to Maintenance, Ship's Data & Documentation, Rules & Regulations for Ships, Maintenance Planning Aspects, Predictive Maintenance Techniques, Scheduled Maintenance for Machinery & Equipment, Spare Parts & Inventories, Automated Maintenance Systems, Reliability & Redundancy, Case study.

NM 291- Maritime Law (code to be changed to MM starting 2016/2017)

Cr. 3. Prerequisite 90 Cr. Hr.

Introduction in maritime law, Main international maritime organizations, Flag state, coastal state, port state, Ship marks, Classification societies, International conventions, (SOLAS 1974), Conventions, Maritime Labor conventions., (STCW 95), Marine accidents, (MARPOL 73/78) Ship's certificates and documents.

This Program is accredited by the Engineering Accreditation Commission of ABET.

http://www.abet .org

The program educational objectives and student outcomes are listed in the (CET) site.

Mechanical Engineering

Mechanical Engineers play a major role in energy utilization and conservation, in solar energy, design and selection, management, operation and maintenance of both conventional and non-conventional power plants. The department provides various specialties such as heating, air conditioning and refrigeration, transportation and automotive fields. Last, but not least, the newly and vastly expanding field of Mechatronics.

Mechanical Engineers are those who understand the need for a basic science program in physics; chemistry; mathematics, with an engineering science program in thermodynamics, fluid mechanics, heat transfer, solid mechanics, materials, and electronics integrated with laboratory experience in measurements, and studies in design and manufacturing using computer facilities and laboratories of the department

Courses in engineering management and various non-technical subjects (humanities) are offered to broaden the student's outlook and understanding of his profession.

The mechanical engineering degree program reflects the trend in industry generally toward recruiting a greater proportion of graduates into executive positions.

Graduates of the department often find careers in the shipping and offshore petroleum industries either as designer inspectors or operating engineers.

The department also qualifies the students in areas such as Drilling Technology, oil and gas production, offshore Oil and Gas pipelines, underwater Technology, Safety and reliability of ships and Offshore Structures. In addition, automation engineering, fluid machinery, production and processing machinery include the petroleum and chemical fields.

Many Mechanical Engineering graduates pursue positions in management, while others prefer a career along technical and professional lines because a mechanical engineer might work in any of the above mentioned fields, The Mechanical Engineering Program has been designed in a way that offers a challenging education. It is designed to provide knowledge of the basic physical sciences, and to encourage the development of ingenuity for the purpose of creating well-engineered solutions to technological problems that contribute positively to their communities and countries.

Academic Program Sheet
Energy and Power + Refrigeration/Air Conditioning Engineering

Year 1			
Semester 1		**Semester 2**	
BA 113	Physics (I)	BA 114	Physics (II)
BA 118	Chemistry	BA 124	Mathematics (II)
BA 123	Mathematics (I)	BA 142	Engineering Mechanics (II)
BA 141	Engineering Mechanics (I)	CC 112	Structured Programming
CC 111	Introduction To Computers	IM 112	Manufacturing Technology
IM 111	Industrial Relations	LH 132	English For Special Purpose (II)
LH 131	English For Special Purpose (I)	ME 151	Engineering Drawing & Projection
Year 2			
Semester 3		**Semester 4**	
BA 223	Mathematics (III)	BA 224	Mathematics (IV)
EE 238	Electrical Engineering Fundamentals	EE 218	Instrumentation & Measurements
LH 231	Technical Report Writing	IM 212	Manufacturing Processes (I)
ME 232	Thermodynamics (I)	ME 276	Stress Analysis
ME 252	Mechanical Engineering Drawing	ME 241	Experimental Methods
ME 274	Materials Science	ME 333	Thermodynamics (II)
Year 3			
Semester 5		**Semester 6**	
BA 323	Mathematics (V)	CC 413	Numerical Analysis
EE 329	Electrical Machines	ME 357	Machine Design (II)
ME 355	Theory Of Machines	ME 362	Hydraulics
ME 356	Machine Design (I)	ME 382	Internal Combustion Engines (II)
ME 381	Internal Combustion Engines (I)	ME 431	Heat Transfer
NE 466	Environmental Science And Technology	NE 264	Scientific Thinking

Year 4			
Semester 7		**Semester 8**	
CC442	Digital Design & Introduction To Microprocessor	EE 448	Electrical Power
EE 418	Automatic Control Engineering	IM 423	Operations Research
ME 455	Computer Aided Design	ME 423	Steam Plant Engineering
ME 458	Mechanical Vibration	ME 434	Refrigeration & Air Conditioning
ME 461	Fluid Mechanics	ME 464	Hydrualic Systems
NE 364	Engineering Economy	ME 465	Computational Fluid Dynamics
Year 5			
Semester 9		**Semester 10**	
ME 501	Senior Project (I)	IM 535	International Operations Management
ME 520	Thermal Plant Engineering	ME 503	Senior Project (II)
ME 565	Turbomachinery	ME 542	Maintenance Planning
ME XXE	Elective Subject	ME XXXE	Elective Subject
ME XXXE	Elective Subject	ME XXXE	Elective Subject

Department Restricted Electives			
Group A (Energy & Power)		**Group B (Refrigeration & Air Conditionning)**	
IM 542	Reverse Engineering	ME 532	Refrigeration Applications
ME 481	Automotive Technology	ME 533	Air Conditionning Applications
ME 522	Power Plant Analysis And Design	ME 534	Energy Management
ME 523	Power Plant Operation & Management	ME 535	Refrigeration Equipment & Control
ME 524	Renewable Energy Resources	ME 536	Air Conditioning Units And Control
ME 526	Power Plant Measurements & Control	ME 537	Refrigeration Plant Design & Selection
ME 555	Material Handling Equipment	ME 538	A/C System Design & Selection
ME 591	Mechatronics	ME 539	Cryogenic Systems

Graduation Requirements

College Requirements					
A total of 81 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 81 Cr. Hr. of the following compulsory courses					
BA	1	BA 113	Physics (I)	3	None
	2	BA 114	Physics (II)	3	BA 113
	1	BA 118	Chemistry	2	None
	1	BA 123	Mathematics (I)	3	None
	2	BA 124	Mathematics (II)	3	BA 123
	1	BA 141	Engineering mechanics (I)	3	None
	2	BA 142	Engineering mechanics (II)	3	BA 141
	3	BA 223	Mathematics (III)	3	BA 124
	4	BA 224	Mathematics (IV)	3	BA 223
	5	BA 323	Mathematics (V)	3	BA 224
CC	1	CC111	Introduction to Computer	3	None
	2	CC112	Structured Programming	3	CC 111
	6	CC 413	Numerical Analysis	3	CC 112 & BA 224
	7	CC 442	Digital Design and Introduction to Microprocessors	3	EE 218 & CC 112
IM	1	IM 111	Industrial Relations	2	None
	2	IM 112	Manufacturing Technology	2	None
	8	IM 423	Operations Research	3	90 Credit Hours
	10	IM 535	International Operation Management	3	126 Credit Hours
	-	IM 400 ME	Practical Training	0	None

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 81 Cr. Hr. of the following compulsory courses					
ME	2	ME 151	Engineering Drawing and Projection	2	None
LH	1	LH 131	English for Special Purposes(I)	2	None
	2	LH 132	English for Special Purposes(II)	2	LH 131
	3	LH 231	Technical Report Writing	3	LH 132
EE	4	EE 218	Instrumentation and Measurements	3	EE 238
	3	EE 238	Electrical Engineering Fundamentals	3	BA 124
	5	EE 329	Electrical Machines	3	EE 238
	7	EE418	Automatic Control Engineering	3	EE 329
NE	6	NE 264	Scientific Thinking	3	None
	7	NE 364	Engineering Economy	3	54 Credit Hours
	5	NE 466	Environmental science and technology	3	None

Department Requirements

A total of 99 credit hours are required by the department, which are distributed as follows:

- ▸84 credit hours of compulsory courses.
- ▸A minimum of 15 Cr. Hrs. of department electives selected from these two main groups.
- ▸Students of Energy and Power Engineering Major should register 3 power subjects at least from group A + remaining Cr. Hrs. from Group B
- ▸Students of Refrigeration and Air Conditioning Engineering Major should register 3 refrigeration subjects at least from group B + remaining Cr. Hrs. from Group A
- ▸A senior project divided on two parts constituting 9 credit hours.

The required compulsory and restricted elective courses are listed in the following table.

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 87 Cr. Hr. of the following compulsory courses					
IM	4	IM 212	Manufacturing Process (I)	3	IM 112
EE	8	EE 448	Electrical Power	3	EE 329
ME	3	ME 232	Thermodynamics (I)	3	BA 114
	4	ME 241	Experimental Methods	3	54 Credit Hours
	3	ME 252	Mechanical Engineering Drawing	3	ME 151
	3	ME 274	Materials Science	3	BA 114 & BA 142
	4	ME 276	Stress Analysis	3	ME 274
	4	ME 333	Thermodynamics (II)	3	ME232
	5	ME 355	Theory of Machines	3	BA 142
	5	ME 356	Machine Design (I)	3	ME 276 & ME 252
	6	ME 357	Machine Design (II)	3	ME 356
	6	ME 362	Hydraulics	3	BA 114
	5	ME 381	Internal Combustion Engines(I)	3	ME 232
	6	ME 382	Internal Combustion Engines(II)	3	ME 381

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 87 Cr. Hr. of the following compulsory courses					
ME	8	ME 423	Steam Plant Engineering	3	ME 431
	6	ME 431	Heat Transfer	3	333 or 231
	8	ME 434	Refrigeration & Air Conditioning	3	ME 431
	7	ME 455	Computer Aided Design	3	ME 356 or ME 454
	7	ME 458	Mechanical Vibrations	3	ME 355
	7	ME 461	Fluid Mechanics	3	ME 362
	8	ME 464	Hydraulic Systems	3	ME 362
	8	ME 465	Computational Fluid Dynamics	3	ME 461 & ME 431
	9	ME 501	Senior Project (I)	3	S.S.*
	10	ME 503	Senior Project (II)	6	ME 501
	9	ME 520	Thermal Plant Engineering	3	ME 423
	9	ME 565	Turbo machinery	3	ME 461
	10	ME 542	Maintenance Planning	3	126 Credit Hours

Department Restricted Electives

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Five elective courses from Group A and Group B					
Group A	9, 10	IM 542	Reverse Engineering	3	126 Credit Hours
	9, 10	ME 481	Automotive Technology	3	ME 381
	9, 10	ME 522	Power Plant Analysis And Design	3	ME 520
	9, 10	ME 523	Power Plant Operation & Management	3	ME 423
	9, 10	ME 524	Renewable Energy Resources	3	126 Credit Hours
	9, 10	ME 526	Power Plant Measurements & Control	3	EE 418
	9, 10	ME 555	Material Handling Equipment	3	126 Credit Hours
	9, 10	ME 591	Mechatronics	3	CC 442
Group B	9, 10	ME 532	Refrigeration Applications	3	ME 434
	9, 10	ME 533	Air Conditionning Applications	3	ME 434
	9, 10	ME 534	Energy Management	3	126 Credit Hours
	9, 10	ME 535	Refrigeration Equipment & Control	3	ME 434
	9, 10	ME 536	Air Conditioning Units And Control	3	ME 434
	9, 10	ME 537	Refrigeration Plant Design & Selection	3	ME 434
	9, 10	ME 538	A/C System Design & Selection	3	ME 434
	9, 10	ME 539	Cryogenic Systems	3	ME 434

Major: Mechatronics Engineering

Year 1			
Semester 1		**Semester 2**	
BA 113	Physics (I)	BA 114	Physics (Ii)
BA 118	Chemistry	BA 124	Mathematics (Ii)
BA 123	Mathematics (I)	BA 142	Engineering Mechanics (Ii)
BA 141	Engineering Mechanics (I)	CC 112	Structured Programming
CC 111	Introduction To Computers	IM 112	Manufacturing Technology
IM 111	Industrial Relations	LH 132	English For Special Purpose (Ii)
LH 131	English For Special Purpose (I)	ME 151	Engineering Drawing & Projection
Year 2			
Semester 3		**Semester 4**	
BA 223	Mathematics (Iii)	BA 224	Mathematics (Iv)
EE 238	Electrical Engineering Fundamentals	EE 218	Instrumentation & Measurements
LH 231	Technical Report Writing	IM 212	Manufacturing Processes (I)
ME 232	Thermodynamics (I)	ME 276	Stress Analysis
ME 252	Mechanical Engineering Drawing	ME 241	Experimental Methods
ME 274	Materials Science	ME 333	Thermodynamics (Ii)

Year 3			
Semester 5		**Semester 6**	
BA 323	Mathematics (V)	EC 331	Electronics
CC 213	Programming Applications	CC 413	Numerical Analysis
EE 329	Electrical Machines	CC 442	Digital Design & Introduction To Microprocessors
ME 355	Theory Of Machines	ME 357	Machine Design (Ii)
ME 356	Machine Design (I)	ME 362	Hydraulics
ME 381	Internal Combustion Engines (I)	ME 431	Heat Transfer
		ME 151	Engineering Drawing & Projection
Year 4			
Semester 7		**Semester 8**	
EE 416	Microcontroller Applications	IM 423	Operations Research
EE 418	Automatic Control Engineering	EE 419	Modern Control Engineering
ME 455	Computer Aided Design	ME 465	Computational Fluid Dynamics
ME 458	Mechanical Vibrations	ME 591	Mechatronics
ME 461	Fluid Mechanics	ME XXXE	Elective Subject (Group A)
NE 364	Engineering Economy	NE 264	Scientific Thinking

Year 5			
Semester 9		**Semester 10**	
EC 534	Analogue & Digital Signal Processing	IM 535	International Operations Management
ME 501	Senior Project (I)	ME 503	Senior Project (Ii)
ME 592	Mechatronics Systems	ME 542	Maintenance Planning
ME 593	Electromechanical Systems	ME 594	Robotics And Applications
ME XXXE	Elective Subject (Group B)	ME 595	Automation Of Mechanical Systems
NE 466	Environmental Science And Tech.		

Department Restricted Electives			
Group A		**Group B**	
IM 542	Reverse Engineering	ME 425	Power Plant Technology
ME 464	Hydraulic Systems	ME 481	Automotive Technology
ME 555	Material Handling Equipment	ME 524	Renewable Energy Resources

Graduation Requirements

College Requirements					
A total of 90 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 90 Cr. Hr. of the following compulsory courses					
BA	1	BA 113	Physics (I)	3	None
	2	BA 114	Physics (II)	3	BA 113
	1	BA 118	Chemistry	2	None
	1	BA 123	Mathematics (I)	3	None
	2	BA 124	Mathematics (II)	3	BA 123
	1	BA 141	Engineering mechanics (I)	3	None
	2	BA 142	Engineering mechanics (II)	3	BA 141
	3	BA 223	Mathematics (III)	3	BA 124
	4	BA 224	Mathematics (IV)	3	BA 223
	5	BA 323	Mathematics (V)	3	BA 224
CC	1	CC111	Introduction to Computer	3	None
	2	CC112	Structured Programming	3	CC 111
	5	CC 213	Programming Applications	3	CC 112
	6	CC 413	Numerical Analysis	3	CC 112 & BA 224
	6	CC 442	Digital Design and Introduction to Microprocessors	3	EE 218 & CC 112
IM	1	IM 111	Industrial Relations	2	None
	2	IM 112	Manufacturing Technology	2	None
	8	IM 423	Operations Research	3	90 Cr. Hours
	10	IM 535	International Operation Management	3	126 Cr. Hours
	-	IM 400 ME	Practical Training	0	None

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 90 Cr. Hr. of the following compulsory courses					
EC	9	EC534	Analogue and Digital Signal Processing	3	EC 331
ME	2	ME 151	Engineering Drawing and Projection	2	None
LH	1	LH 131	English for Special Purposes (I)	2	None
	2	LH 132	English for Special Purposes (II)	2	LH 131
	3	LH 231	Technical Report Writing	3	LH 132
EE	4	EE 218	Instrumentation and Measurements	3	EE 238
	3	EE 238	Electrical Engineering Fundamentals	3	BA 124
	5	EE 329	Electrical Machines	3	EE 238
	7	EE 418	Automatic Control Engineering	3	EE 329
	8	EE 419	Modern Control Engineering	3	EE 418
NE	8	NE 264	Scientific thinking	3	None
	7	NE 364	Engineering Economy	3	54 Credit Hours
	9	NE 466	Environmental science and technology	3	None

Department Requirements

A total of 90 credit hours are required by the department, which are distributed as follows:

- ▸84 credit hours of compulsory courses.
- ▸6 credit hours of department restricted electives that are selected from groups C & D.

The required compulsory and restricted elective courses are listed in the following table.

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 81 Cr. Hr. Of the following compulsory courses					
ME	3	ME 232	Thermodynamics (I)	3	BA 114
	4	ME 241	Experimental Methods	3	54 Credit Hours
	3	ME 252	Mechanical Engineering Drawing	3	ME 151
	3	ME 274	Materials Science	3	BA 114 & BA 142
	4	ME 276	Stress Analysis	3	ME 274
	4	ME 333	Thermodynamics (II)	3	ME232
	5	ME 355	Theory of Machines	3	BA 142
	5	ME 356	Machine Design (I)	3	ME 276 & ME 252
	6	ME 357	Machine Design (II)	3	ME 356
	6	ME 362	Hydraulics	3	BA 114
	5	ME 381	Internal Combustion Engines (I)	3	ME 232
	6	ME 431	Heat Transfer	3	ME 333
	7	ME 455	Computer Aided Design	3	ME 356 or ME 454
	7	ME 458	Mechanical Vibrations	3	ME 355
	7	ME 461	Fluid Mechanics	3	ME 362
	8	ME 465	Computational Fluid Dynamics	3	ME 461 & ME 431

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 81 Cr. Hr. of the following compulsory courses					
ME	9	ME 501	Senior Project (I)	3	S.S.*
	10	ME 503	Senior Project (II)	6	ME 501
	8	ME 591	Mechatronics	3	CC442
	9	ME 593	Electromechanical Systems	3	ME 591
	9	ME 592	Mechatronic Systems	3	ME 591
	10	ME 594	Robotics Applications	3	ME355
	10	ME 595	Automation of Mechanical Systems	3	ME 593
EC	6	EC331	Electronics	3	EE238
	9	EC534	Analogue & Digital Signal Processing	3	EC331
IM	4	IM 212	Manufacturing Process (I)	3	IM 112
EE	7	EE416	Microcontroller Applications	3	CC442

Department Restricted Electives

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Select 1 course from each group A & B (total of 6 Cr. Hrs.) from the following list					
Elective A	8	IM 542E	Reverse Engineering	3	126 Cr. Hours
	8	ME 464	Hydraulic Systems	3	ME 362
	8	ME 555	Material Handling Equipment	3	126 Cr. Hours
Elective B	9	ME 425	Power Plant Technology	3	ME 234 or ME 333
	9	ME 481	Automotive Technology	3	ME 381
	9	ME 524	Renewable Energy Resources	3	126 Cr. Hours

Major: Automotive Engineering

Year 1			
Semester 1		**Semester 2**	
BA 113	Physics (I)	BA 114	Physics (Ii)
BA 118	Chemistry	BA 124	Mathematics (Ii)
BA 123	Mathematics (I)	BA 142	Engineering Mechanics (Ii)
BA 141	Engineering Mechanics (I)	CC 112	Structured Programming
CC 111	Introduction To Computers	IM 112	Manufacturing Technology
IM 111	Industrial Relations	LH 132	English For Special Purpose (Ii)
LH 131	English For Special Purpose (I)	ME 151	Engineering Drawing & Projection
Year 2			
Semester 3		**Semester 4**	
BA 223	Mathematics (Iii)	BA 224	Mathematics (Iv)
EE 238	Electrical Engineering Fundamentals	EE 218	Instrumentation & Measurements
LH 231	Technical Report Writing	IM 212	Manufacturing Processes (I)
ME 232	Thermodynamics (I)	ME 276	Stress Analysis
ME 252	Mechanical Engineering Drawing	ME 241	Experimental Methods
ME 274	Materials Science	ME 333	Thermodynamics (Ii)
Year 3			
Semester 5		**Semester 6**	
BA 323	Mathematics (V)	CC 413	Numerical Analysis
EE 329	Electrical Machines	ME 357	Machine Design (Ii)
ME 355	Theory Of Machines	ME 362	Hydraulics
ME 356	Machine Design (I)	ME 382	Internal Combustion Engines (Ii)
ME 381	Internal Combustion Engines (I)	ME 431	Heat Transfer
NE 466	Environmental Science And Technology	ME 482	Automotive Engines

Year 4			
Semester 7		**Semester 8**	
CC 442	Digital Design & Introduction To Microprocessors	IM 423	Operations Research
EE 417	Automatic Control Engineering	ME 434	Refrigeration & Air Conditioning
ME 455	Computer Aided Design	ME 481	Automotive Technology
ME 458	Mechanical Vibrations	ME 483	Alternative Fuels & Power Systems
ME 461	Fluid Mechanics	ME 591	Mechatronics
ME 581	Automotive Fuel & Ignition Systems	NE 264	Scientific Thinking
Year 5		ME 483	Alternative fuel & power systems
Year 5			
Semester 9		**Semester 10**	
ME 501	Senior Project (I)	IM 535	International Operations Management
ME 582	Automotive Chassis Systems	ME 503	Senior Project (II)
ME 583	Vehicle Control & Safety Systems	ME 586	Vehicle Design & Engineering
ME 584	Automotive Electric & Electronic Systems.	ME 587	Automotvie Manufacturing
ME 585	Automotive Power Trains	ME 588	Vehicle Maintenance & Repair
NE 364	Engineering Economy		

Graduation Requirements

College Requirements					
A total of 81 credit hours are required by the college as per the following table:					
Subject Field	**Semester**	**Course Code**	**Course Title**	**Cr. Hr.**	**Prerequisite**
Compulsory Courses A total of 81 Cr. Hr. of the following compulsory courses					
BA	1	BA 113	Physics (I)	3	None
	2	BA 114	Physics (II)	3	BA 113
	1	BA 118	Chemistry	2	None
	1	BA 123	Mathematics (I)	3	None
	2	BA 124	Mathematics (II)	3	BA 123
	1	BA 141	Engineering mechanics (I)	3	None
	2	BA 142	Engineering mechanics (II)	3	BA 141
	3	BA 223	Mathematics (III)	3	BA 124
	4	BA 224	Mathematics (IV)	3	BA 223
	5	BA 323	Mathematics (V)	3	BA 224
CC	1	CC111	Introduction to Computer	3	None
	2	CC112	Structured Programming	3	CC 111
	6	CC 413	Numerical Analysis	3	CC 112 & BA 224
	7	CC 442	Digital Design and Introduction to Microprocessors	3	EE 218 & CC 112
IM	1	IM 111	Industrial Relations	2	None
	2	IM 112	Manufacturing Technology	2	None
	8	IM 423	Operations Research	3	90 Credit Hours
	10	IM 535	International Operation Management	3	126 Credit Hours
	-	IM 400 ME	Practical Training	0	None

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 81 Cr. Hr. of the following compulsory courses					
ME	2	ME 151	Engineering Drawing and Projection	2	None
LH	1	LH 131	English for Special Purposes (I)	2	None
	2	LH 132	English for Special Purposes (II)	2	LH 131
	3	LH 231	Technical Report Writing	3	LH 132
EE	4	EE 218	Instrumentation and Measurements	3	EE 238
	3	EE 238	Electrical Engineering Fundamentals	3	BA 124
	5	EE 329	Electrical Machines	3	EE 238
	7	EE 418	Automatic Control Engineering	3	EE 329
NE	8	NE 264	Scientific Thinking	3	None
	9	NE 364	Engineering Economy	3	54 Credit Hours
	5	NE 466	Environmental science and technology	3	None

Department Requirements

A total of 99 credit hours are required by the department, which are distributed as follows:

- 99 credit hours of compulsory courses.

The required compulsory and restricted elective courses are listed in the following table.

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 99 Cr. Hr. Of the following compulsory courses					
IM	4	IM212	Manufacturing Process (I)	3	IM112
ME	3	ME 232	Thermodynamics (I)	3	BA 114
	4	ME 241	Experimental Methods	3	54 Credit Hours
	3	ME 252	Mechanical Engineering Drawing	3	ME 151
	3	ME 274	Materials Science	3	BA 114 & BA 142
	4	ME 276	Stress Analysis	3	ME 274
	4	ME 333	Thermodynamics (II)	3	ME232
	5	ME 355	Theory of Machines	3	BA 142
	5	ME 356	Machine Design (I)	3	ME 276 & ME 252
	6	ME 357	Machine Design (II)	3	ME 356
	6	ME 362	Hydraulics	3	BA 114
	5	ME 381	Internal Combustion Engine (I)	3	ME 232
	6	ME 382	Internal Combustion Engine (II)	3	ME 381
	7	ME 431	Heat Transfer	3	333 or 231
	8	ME 434	Refrigeration & Air Conditioning	3	ME 431
	7	ME 455	Computer Aided Design	3	ME 356 or ME 454
	7	ME 458	Mechanical Vibrations	3	ME 355
	7	ME 461	Fluid Mechanics	3	ME 362
	8	ME 481	Automotive Technology	3	ME 381
	6	ME 482	Automotive Engines	3	ME 381

Subject Field	Semester	Course Code	Course Title	Cr. Hr.	Prerequisite
Compulsory Courses A total of 99 Cr. Hr. of the following compulsory courses					
ME	8	ME 483	Alternative Fuel & Power Systems	3	ME 381
	9	ME 501	Senior Project (I)	3	S.S.*
	10	ME 503	Senior Project (II)	6	ME 501
	7	ME 581	Automotive Fuel & Ignition System	3	ME 381
	9	ME 582	Automotive Chassis Systems	3	ME 381
	9	ME 583	Vehicle Control & Safety Systems	3	ME 481
	9	ME 584	Automotive Electric & Electronic Systems	3	ME 381
	9	ME 585	Automotive Power Trains	3	ME 381
	10	ME 586	Vehicle Design and Engineering	3	ME 356
	10	ME 587	Automotive Manufacturing	3	ME 482
	10	ME 588	Vehicle Maintenance & Repair	3	ME 482 & ME 483
	8	ME 591	Mechatronics	3	CC 442

Course Summary Description

IM 400 ME – Practical Training

Cr.0. Prerequisite: None.

This course is a non-credit course and is a college graduation requirement. Students are asked to undertake a minimum of four weeks of practical training in off-campus sites recommended by the college and the department in order to pass this course. Students are required to submit a recognition letter from the site where they received their training, besides a report and a presentation. Course is a Pass/ Fail one.

ME 501 - Senior Project I

Cr.3. Prerequisite: Senior Standing - Completion of 138 Credit Hours and a GPA of at least 2.00.

Application-oriented project to show competence in major academic area. Where, an independent research project is conducted under the guidance of a faculty member in the Department of Mechanical Engineering. The research should contribute to the advancement of knowledge in the field. Written report and formal presentation are required.

ME 503 - Senior Project II

Cr.6. Prerequisite: ME 501

Application-oriented project to show competence in major academic area. Where, an independent research project is conducted under the guidance of a faculty member in the Department of Mechanical Engineering. The research should contribute to the advancement of knowledge in the field. Written report and formal presentation are required.

Power Plant Engineering Courses - (ME X2X)

ME 423 - Steam Plant Engineering

CR: 3. Prerequisite: ME 431

Thermodynamics of vaporous: ideal and practical cycles, re-heating superheating and regeneration. Steam tables and charts. Boilers: types and classification, heating surfaces, mountings and fittings, combustion and combustion equipment , insulation, de-superheats control systems Turbines: theory, types, flow through nozzles, jet deflection, super saturation, power calculations, design of components, governors. Plant : Real cycle , steam systems, feed water system, plant performance, air ejector, dearators, evaporators condenser

ME 425- Power Plant Technology

CR: 3. Prerequisite: ME 333

Thermodynamics Review (1st, 2nd laws of thermodynamics) - Steam Formation - Steam Properties and Process - Simple Rankine Cycle - Modified Rankine Cycle - Reheat and Regeneration Cycles - Steam Turbine, Steam Generator and Steam Condenser - Power Plant Control - Simple Gas Turbine Cycle - Gas Turbine Cycle with Reheat, Intercooling and Regeneration - Combined Cycle Power Plant Nuclear Power Plant - Renewable Power Generation, Solar Energy - Wind Energy - Geothermal Energy.

ME 520- Thermal Plant Engineering

CR: 3. Prerequisite: ME 423

Thermodynamics Review. Steam Plant Components. Modifications of Steam Plant Cycle. Design of Feedwater Heater. Gas Turbine Power Plant. Modifications of Gas Turbine Cycle. Combined Cycle. Nuclear Power Plant . Pressurized Water Reactors. Boiling Water Reactors

ME 522- Power Plant analysis and design

CR: 3. Prerequisite: ME 520

Thermal system design process - Design Considerations - Thermal power plants components and systems design: boiling, condensation and gas radiation. Design of steam generator, condensers, evaporators, dearators economizers, air preheats. Air feed waters and drains systems, Design of gas turbine combustion chamber, intake and exhaust systems, Design of waste heat recovery boiler and combined cycle, Design of cooling towers, Simulation of components and systems, Dynamic, Geometric and linear programming - Case Study(Term project).

ME 523- Power Plant Operation and Management

CR: 3. Prerequisite: ME 423

Fuel handling, Piping systems, boiler codes, starting and shut down of power plant, trouble shooting, lubricating systems, load matching, load curves, effect of variable load on plant design and operation. Economics of meeting the variable loads. Plant economics. Maintenance programs

ME 524- Renewable Energy Resources

CR: 3. Prerequisite: 126 Credit Hours

This Course concentration on the theoretical and practical aspects of solar, wind, tidal and wave sources of energy. Design feasibility studies are undertaken on particular aspects of energy conversion from these resources. The impact of the environment of consumption of conventional energy forms is investigated .The nature and magnetite of energy consumption World-Wide and locally is considered

ME 526- Power Plant Measurements and Control

CR: 3. Prerequisite: EE 418

Introduction to Theory and equipment. Fuel analysis. Flue gas analysis. Types of measuring instruments (accuracy and calibration). Frequency and output measurements. Continues and remote recording equipment. Logging of data. Safety devices on plant components. Simple theory of the control of a variable control devices and systems. Introduction to microprocessor's control.

Thermodynamics and Heat Courses (ME X3X)

ME 231- Thermodynamics (Industrial and Marine)

CR: 3. Prerequisite: BA 114

Classical thermodynamics-Heat transfer by conduction, convection and radiation-Air standard cycles-Steam cycles- Gas turbine cycle-Introduction to refrigeration and air conditioning-psychrometry.

ME 232- Thermodynamics (I)

CR: 3. Prerequisite: BA 114

Air standard cycles, steam cycles, combustion. Exhaust gas analysis. Heat transfer by conduction, convection and radiation. Single and multistage compressors. Introduction to refrigeration. Laboratory work

ME 333- Thermodynamics (II)

CR: 3. Prerequisite: ME 232

Gas turbine units, practical application of modified gas units, mixtures Dalton's Law and Gibbs Dalton Law. Mixture analysis, gas and vapor mixture. Psychometric mixture. Nozzle steam and gas nozzles, Design of a selected topic.

ME 234 Thermo-fluids (Electrical)

CR: 3. Prerequisite: BA 114/ CR: 3

Basic thermodynamics concepts- Energy transfer- First law of thermodynamics- Second law of thermodynamics- Engine cycles- Properties of a pure substance- Steam Cycles-Introduction to fluid mechanics, and fluid properties- Measurements of pressure and Pascal law- Bernoulli, Energy, Momentum equations - Pipe flow.

ME 431- Heat Transfer

CR: 3. Prerequisite: ME 231or ME 333

Steady State Conduction in One Dimension - General Conduction Equations – External Surfaces - Steady State Conduction in Two Dimensions – Thermal system design process - Design Considerations - Conduction applications- Principles of convection - Empirical Relations for Forced Convection - Natural Convection Systems - Radiation Heat Transfer - Convective heat transfer applications - Radiation Heat transfer applications- Design of surface heat exchangers - Design of compact heat exchangers.

ME 434- Refrigeration & Air conditioning

CR: 3. Prerequisite: ME 431/ CR: 3

Vapor compression cycles - Refrigeration systems -Air conditioning systems – Insulation and marine insulation requirements – Cooling and heating load calculation – Refrigerant choice – Choice of refrigeration cycle – Design of cycle elements- Refrigeration control – maintenance and trouble shooting

ME 532- Refrigeration Applications

CR: 3. Prerequisite: ME 434/ CR: 3

Domestic systems - Commercial. – Industrial - Ice manufacturing - Food refrigeration - Freezing units - Freezing cycles - Low temperature refrigeration - Gas liquefaction - Industrial refrigeration plants.

ME 533- Air conditioning Applications

CR: 3. Prerequisite: ME 434/ CR: 3

Domestic air conditioning and ventilation-Industrial air conditioning and ventilation- Transportation units' air conditioning and ventilation-Laboratories-Clean spaces-Printing factories-Textile Processing-Hospitals and clinics- Photo graphic industries-Environmental control of animals and plants- Dry and storing farm corps-Air conditioning of wood and paper products-Electronic industry

ME 534- Energy Management

CR: 3. Prerequisite: 126 Credit Hours

Energy classification- Sources and utilization - Principal fuels for energy conversion. - Petroleum fuels characteristics - World natural gas production and reserves -Gas pipe lines and underground storage - Liquefied natural gas and absorption of acidic gases from natural gas - Energy storage - Environmental impact of combustion of fuel - Source monitoring of NOx and SOx - Monitoring of carbon monoxide emissions - NOx control by furnace and burner design - Energy management systems - Total energy schemes - Energy recovery -Process integration- Pinch technology- Computer simulation using (MESSAGE).

ME 535- Refrigeration Equipment and control

CR: 3. Prerequisite: ME 434

Design and Selection of : Compressors, Heat exchangers, Condensers, and Evaporators Liquid chillers - Measuring components- Accessories- Cycle selection- Control systems - Automatic control device-Hunting and cycle simulation – Simple and integrated systems control - Case Study (Term project).

ME 536- Air conditioning units and control

CR: 3. Prerequisite: ME 434

Domestic units small power - medium power- high power- Air cycle units- Thermo-electric unit- AHU and FCU Modules- Absorption units- Safety- Fire fitting. Measuring components- Control systems - Temperature and Humidity Controllers – Simple and integrated systems control - Case Study (Term project).

ME 537- Refrigeration plant design & selection

CR: 3. Prerequisite: ME 434

Cold stores, freezers, dualConstructional requirements and materials- Loading and unloading- Direct and Brine systems- Design systems- M/C room-work shop requirements- Capacity control system- Freezing tunnels- Trouble shooting- Case Study (Term project).

ME 538- Air Conditioning Systems, design & selection

CR: 3. Prerequisite: ME 434

Introduction to air conditioning system design process and its considerations - Air Conditioning Load Estimation- HAVAC- Units Capacity Requirements- All Air – All Water – Air/Water Control Systems- Air Distribution and Flow Control- Air Duct DesignAir Duct fabrications- Air Duct Material, accessories- Air Duct drawingsTechnical Repair and Commissioning- Case Study (Term project).

ME 539- Cryogenic Systems

CR: 3. Prerequisite: ME 434

Historical survey, Cryogenic safety, Properties of cryogenic fluids - Super-fluids-the helium's, superconductors, and BEC gases - Low Temperature mechanical properties of materials - Quantum Turbulence - Theory of refrigeration and liquefaction of gases - Cryostat construction; Insulation techniques; Cryogenic instrumentation - Hydrogen economy - Recycling trash and space applications - Insulation, storage, and transfer of cryogens - Cryogenic Simulation - Case study

General Mechanical Courses - (ME X4X)

ME 241- Experimental Methods

CR: 3. Prerequisite: 54 Credit Hours

Introduction to experimental methods, sensors, and computer-aided data acquisition with emphasis on mechanical applications. Survey of transducers and measurement methods for a broad range of phenomena significant for mechanical engineers. Particular emphasis will be given to data retrieval, oral and written communication of experimental results. Laboratories experiments will give students hands-on

ME 542- Maintenance Planning

CR: 3. Prerequisite: 126 Credit Hours

Maintenance definition, concept, objectives, Management functions, Types of maintenance, maintenance cycle, construction of maintenance planning system, computer management maintenance system, diagnostic capabilities of Predictive maintenance, Economic aspects of maintenance engineering, Investigation of failure, statistical techniques, Reliability, availability, system redundancy.

Applied Mechanics Courses - (ME X5X)

ME 151- Engineering Drawing & Projection

CR: 2. Prerequisite: None

Drawing practices and techniques – Geometrical constructions – Dimensioning and free hand sketching – Methods of projection – Orthogonal projection — Sectioning and conventions – Intersection of geometrical surfaces and development – Standard metal sections and metal structures – Pictorial projection (Isometry) – Surface intersections – Perspective projection – An introduction to Computer Aided Drafting using AutoCAD.

ME 252- Mechanical Engineering Drawing

CR: 3. Prerequisite: ME 151

AutoCAD basics – Object construction and manipulation – Geometric construction – Layers, text generation and dimensioning – Section views, hatching and construction of blocks – Solid modeling – Assembly drawing with applications in Mechanical, Industrial and Marine Engineering – Free hand sketching – Conventional representation of Mechanical elements – Surface finish and machining symbols – Fits and tolerances – Welding and hydraulic symbols.

ME 355- Theory of Machines

CR: 3. Prerequisite: BA 142

Types of motion – Velocity analysis – Acceleration analysis – Dynamic force analysis – Balancing of rotating masses – Balancing of reciprocating masses – Kinetic energy storage and flywheel – Gear geometry – Gear trains – Gyroscopic couples

ME 356- Machine Design (I)

CR: 3. Prerequisite: ME 276 and ME 252

Machine Design I: Introduction to system design - Design process and its considerations- Stresses in machine parts- Material selection, and factor of safety- Application to design of machine elements- Design of members subjected to fatigue loading – Design of Power screws for different applications - Bolted and welded joints for brackets - Pressure vessels - Design of different types of springs - Case studies (term project)

ME 357- Machine Design (II)

CR: 3. Prerequisite: ME 356

Power transmission systems - Design considerations - Specifications of different types of belts (Belt selection) - Chains types and selection - Wire rope design - Gear types and force analysis - Design of spur gears- Design of helical gear force analysis- Bevel and worm gears - Design of shafts based on strength and rigidity- Introduction to anti-friction bearings -Selection of ball and roller bearings - Introduction to sliding bearings - Design and selection of sliding bearings -Clutches and Brakes - Case studies (term project)

ME 454- Machine Design (Marine)

CR: 3. Prerequisite: ME 252 & ME 276

The course includes an introduction to stress in machine parts, screws, fasteners, welded joints, flexible mechanical elements (belts, chains & wire ropes), sliding bearings, roller bearings, spur gears, helical gears, bevel gears, worm gears, and shafts

ME 455 - Computer Aided Design

CR: 3. Prerequisite: ME 356 or 454 or 456

Engineering design process -Introduction to computer aided design - MATLAB analysis and graphics – Symbolic operations using MATLAB software - Design of different machine elements using MATLAB - Simulation of dynamic Hydraulic and Thermal systems - Optimization and design constraints - Case studies for optimum system and element design. Term project, using computer programming - Introduction to the software "Solid Edge"

ME 456- Machine Design (Industrial)

CR: 3. Prerequisite: ME 252 & ME 277

Introduction & Stresses in Machine Parts - Stresses in Machine Parts - Screws - Fasteners and Connections - Welded Joints - Flexible Mechanical Elements - Sliding Bearings - Roller Bearings -
Gears - Shafts.

ME 458 - Mechanical Vibrations

CR: 3. Prerequisite: ME 355

Introduction to vibrations and its resources - Free vibrations - Forced vibrations and resonance - Whirling -Transmissibility and isolation - Isolation design of machine foundations - Vibration measurements and applications – Base excitations – Two- degree of freedom systems -Vibrations absorber –Multi-degree of freedom and rotor vibrations - Condition monitoring and diagnosis – Term project

ME 555 – Material Handling Equipment

CR: 3. Prerequisite: 126 Credit Hour

Introduction to hoisting machinery. Cranes (types, drives, and design considerations). Elevators and miscellaneous types of hoisting machinery. Introduction to conveying machinery . Belt conveyors, bucket and cradle conveyors. Introduction to land reclamation machinery. Loaders, Bulldozers, shovels and grades theory and practice. Maintenance and safety measures.

Hydraulics & Fluid Mechanics Courses - (ME X6X)

ME 361- Fluid Mechanics (Industrial)

CR: 3. Prerequisite: 54 Credit Hour

Differential analysis of fluid flow – Kinematics of fluid flow – Linera motion, angular motion and deformation – Conservation of mass and stream function – Velocity potential and irrotational flows – General equations of motion (Navier-Stokes equations) – Euler's equations of motion – Basic two-dimensional potential flows – Superposition of plane potential flows – Introduction to compressible fluid flow - Mach Number and speed of sound – Isentropic and Non-isentropic flow of an ideal gas – Normal shock waves.

ME 362 –Hydraulics

CR: 3.Prerequisite: BA 114

Introduction - Physical properties of fluids – Fluid statics – Forces on submerged surfaces and buoyancy – Introduction to fluids kinematics – Dynamics of incompressible flow – Flow and velocity measurement – Similitude and dimensional analysis – Flow through pipes – Pumps (Types and performance)

ME 461 - Fluid Mechanics

CR: 3.Prerequisite: ME 362

Differential analysis of fluid flow – Kinematics of fluid flow – Linera motion, angular motion and deformation – Conservation of mass and stream function – Velocity potential and irrotational flows – General equations of motion (Navier-Stokes equations) – Euler's equations of motion – Basic two-dimensional potential flows – Superposition of plane potential flows – Introduction to compressible fluid flow - Mach Number and speed of sound – Isentropic and Non-isentropic flow of an ideal gas – Normal shock waves.

ME 464- Hydraulic Systems

CR: 3.Prerequisite: ME 362

Introduction to fluid power system -Fluid controlling elements -Valve and simple circuits – Hydraulic cylinder - Actuators – Hydraulic motor and fluid- Shock absorbers- Hydraulic servomechanisms – Hydraulic cranes – Hydraulic coupling and torque converters.

ME 465- Computational fluid dynamics (CFD)

CR: 3.Prerequisite: ME 461 and ME 431

Introduction – The finite difference method (FDM) – Solution of fluid flow problems using FDM with MATLAB – The finite element method (FEM) - Solution of fluid flow problems using FEM with MATLAB (PDE Tool) – The finite volume method (FVM) - Solution of fluid flow problems using FVM with MATLAB – Thermofluid problems using the FVM with FLUENT software.

ME 565 - Turbo machinery

CR: 3.Prerequisite: ME 461

Various types of turbo-machines, from wind turbines to high-ratio compressors. Compressible flow turbo-machines and their characteristics. Emphasis on practical design and performance parameter. Theory, practice and educational of turbine Components

Materials Science Courses - (ME X7X)

ME 274 - Materials Science

CR: 3.Prerequisite: BA 114 and BA 142

Classification of engineering materials, metals and non-metals - Crystalline structure Properties of engineering material, mechanical properties, other properties – Testing & inspection of materials, tension test, compression test, bending test, shear test, impact test, hardness test, fatigue test – Non-destructive tests – Solidification of metals and alloys, thermal equilibrium diagrams – Heat treatment of metals and alloy– Corrosion .

ME 276 - Stress Analysis

CR: 3.Prerequisite: ME 274

Concept of stress and strain, Normal stresses and strains, shearing stresses and bearing stresses, Stresses due to torsion, Normal forces, shearing forces and bending moments in beams, Stresses due to bending, Stress and strain transformations, Thin and thick walled cylinders, Stress concentration, Experimental stress analysis, Deflection and buckling of beams and columns

ME 277- Strength of Materials (Industrial)

CR: 3. Prerequisite: ME 274

Direct stresses, tension stress, compression stress, shear stress deformation and strain Simple beams and cantilevers, normal force, shearing force and bending moment diagrams – Bending theory, bending stress, shear stress in beams – Torsion stress & deformation – Statically indeterminate axial members - Computer applications

Automotive & Internal Combustion Engines Courses - (ME X8X)

ME 381 - Internal Combustion Engines (1)

CR: 3.Prerequisite: ME 232

Study of theoretical and operating cycles, construction aspects of engines, combustion in the spark ignition engines, carburetor, injection systems, ignition systems, combustion chamber design, lubricating systems, cooling systems, and lubrication engine performance analysis. Natural gas and hydrogen engines. Hands-on laboratory work is an integral part of this course.

ME 382 - Internal Combustion Engines (2)

CR: 3.Prerequisite: ME 381 and ME333

Comparison of characteristics and performance of several forms of internal combustion engines including the Otto, and Diesel types of piston engines (LHR Engines – Dual Fuel Engines). Construction aspects of engines, air-intake, exhaust and supercharging systems, fuels, fuel injection systems, lubricating systems, cooling systems, starting systems combustion, diesel knocking, engine performance and heat balance analysis, operation and fault management. Hands on laboratory diesel work are an integral part of this course.

ME 481 - Automotive Technology

CR: 3.Prerequisite: ME 381

Engine construction, engine systems, exhaust and emission control systems, suspension and steering systems, brakes, clutches, transmission systems, tires, heating and air conditioning systems, safety systems.

ME 482 - Automotive Engines

CR: 3.Prerequisite: ME 381

Gasoline & Diesel engine operation – Cooling system – Lubrication system – Starting & charging systems – Ignition systems – Fuel & emission control systems – Engine condition diagnosis – Engine removal & disassembly – Engine service & assembly – Engine installation and in-vehicle service.

ME 483 - Alternative Fuels and Power Systems

CR: 3.Prerequisite: ME 381

Methanol – Ethanol – Biodiesel – LPG – Natural gas – Hydrogen – Wankel rotary engine – Gas turbines – Electric vehicles – Hybrid vehicles.

ME 581 - Automotive fuel and Ignition Systems

CR: 3.Prerequisite: ME 381

Carburetors – Engine manifolds – Air Filters – Fuel supply systems – Fuel injection – Ignition coils – Condensers – Spark advance – Distribution service – Spark plugs – Electronic

ME 582 - Automotive Chassis Systems

CR: 3.Prerequisite: ME 381

Introduction to Chassis - analysis of dynamic system - tire dynamics - Ride dynamics - Handling dynamics - Acceleration - Suspensions (Conventional System) - Suspensions (electronic System) - Steering conventional System - Steering electronic System - Chassis Frames - Application to the design of special case chassis system.

ME 583 - Vehicle Control and Safety Systems

CR: 3.Prerequisite: ME 481

Main Vehicle Control - Modeling of Vehicle - Cruise Control - Adaptive Cruise Control - Intelligent vehicle High Way System (IVHS) - Active Control - Passive Control - Safety requirements - Active and semi active Suspension - Emission Control - Restraint System Electronics.

ME 584 - Automotive Electric & Electronic Systems

CR: 3.Prerequisite: ME 381

Generators and alternators – Starting motor – Storage batteries – Body electrical wiring – Meters and gauges – Wipers and washes – Engine management systems – Anti-lock brake systems – Electronic stability – Vision enhancement systems – Parking aids – Intelligent vehicle diagnostics.

ME 585 - Automotive Power Trains

CR: 3.Prerequisite: ME 381

Automotive clutches -Manual transmissions – Fundamental hydraulic and mechanical principles of automatic transmissions – Automatic transmissions – Transaxle transmission –- Universal joints – Drive lines – Axels – Automotive differentials - Four-wheel drive applications – Maintenance and repair operations of power trains .

ME 586 - Vehicle Design and Engineering

CR: 3.Prerequisite: ME 356

Modern materials and vehicle design - Body design: The styling process and Aerodynamics - Chassis design and analysis - Crash worthiness - Noise, vibration and harshness - Occupant accommodation - Suspension systems and components - Control systems in vehicles - The design of engine characteristics for vehicle use - Transmissions and driveline - Braking systems - Application to design special case vehicle.

ME 587 – Automotive Manufacturing

CR: 3.Prerequisite: ME 482

Automotive materials – Materials selection - Manufacturing and assembly processes – assembly lines – Design of production line – Quality control and inspection – Testing and failure prediction – Testing of the fuel product – Economics of manufacturing and assembly operations

ME 588 - Vehicle Maintenance & Repair

CR: 3.Prerequisite: ME 482 & ME 483

Maintenance schedule – Workshop layout and planning – Tools instruments testers and analyzers – Engine performance tests – Engine reconditioning and tune-up – Fault diagnosis for different systems – Body repairing and refinishing – Management of auto-service and repair centers.

Mechatronics Engineering Courses - (ME X9X)

ME 591 - Mechatronics

CR: 3.Prerequisite: CC 442

Introduction to Mechatronics and Measurement Systems- Mechatronics Key Elements-Introduction to Sensors and Transducers- Specifications, applications and limitations of different analog and digital sensors used to measure displacement, velocity, acceleration, force, temperature, pressure, flow- Actuating Devices - Basic designs of analog and digital signal conditioning- Analog to Digital and Digital to Analog Conversion - Data Acquisition Systems - Application of the appropriate tools to analyze the design of mechatronics systems - Case Studies - Carry out case design

ME 592 - Mechatronic Systems

CR: 3.Prerequisite: ME 591

Mechatronics Systems Performance and Design Considerations- Computer Control - Discrete Controllers - Interfacing Sensors and Actuators to Computer - Real-Time Interfacing - Computer I/O Cards and Software - Data Acquisition and Control - Economic and Optimum Solutions- Case Studies - Robotics Applications- Design and Execute a Project in the Field of Mechanical Power Engineering.

ME 593 - Electromechanical Systems and Microprocessor Applications

CR: 3.Prerequisite: ME 591

The course includes the following: An introduction to Mechatronics applications, electric circuits and components, semi conductors, diode rectifiers, power transistors, digital systems and circuits, actuators, microprocessors and micro controllers

ME 594 - Robotics Applications

CR: 3.Prerequisite: ME 355

Introduction and field of applications of robotics. Basic concepts in robotics. Homogeneous transformation and coordinate frames. Direct kinematics and forward kinematic algorithm. Inverse kinematics. Control circuits and path control of robots. External and internal sensors for robots. Fluid and electric actuator for robotic applications.

ME 595 - Automation of Mechanical Systems

CR: 3.Prerequisite: ME 593

Review of Ladder diagram programming - Mathematical operations - Mathematical operations - Structured programming - Data blocks programming - Data blocks programming - Wiring diagram - - Wiring diagram - Communications - Communications - Application - SCADA and HMI interfaces - SCADA and HMI interfaces - DCS Systems - Applications.

This Program is accredited by the Engineering Accreditation Commission of ABET.

http://www.abet .org

The program educational objectives and student outcomes are listed in the (CET) site.

Graduate Engineering Department

The Master of Science (M.Sc.) degree program aims at providing students with an engineering education spanning across various engineering disciplines, with special focus on one discipline.

This M.Sc. degree program provides its graduate students with a multitude of advantages including:

- An excellent opportunity to interact with high-calibre faculty members on modern issues and concepts in the emerging new areas of research and development in a variety of managerial, scientific, engineering, maritime and technological fields.
- Recent advances in different topics, fields and disciplines based on the creative and critical thinking skills.
- Ways to enhance the students' thinking and research capabilities in a chosen discipline using the latest scientific and engineering methodologies and techniques.
- Leverages to assist the participants in career development.

The College offers the Master of Science degree which has been accredited by the Supreme Council of Universities (SCU) in Egypt in the following programs:

- Architectural Engineering and Environmental Design
- Computer Engineering
- Construction and Building Engineering
- Electrical and Control Engineering
- Electronics and Communications Engineering
- Industrial and Management Engineering
- Marine Engineering
- Mechanical Engineering

The number of graduate students admitted since February 1994 exceeds 1800. A total of 427 students have earned their M.Sc. degrees in all of the above programs over the past 13 years. Over 680 graduate students are currently enrolled in all eight programs. For further information, please consult the graduate catalogue or visit our site at the following link: www.aastmt.org

List of all laboratory facilities within the College of Engineering and Technology, a brief description of each, and the future plans for further extensions
Laboratory experience is an indispensable part of the educational process and a key factor in preparing students for real engineering practical life; for this reason, the College of Engineering and Technology operates more than 40 laboratories within its premises.

All the laboratories are equipped with state of the art tools and facilities that provide hands-on practice for students; furthermore, the laboratories also provide a test bed for research to the faculty.

Professional personnel are always available to give help and support to students in projects and experiments; hence, a free access policy outside the regular lab hours in a safe and secure environment for experimentation and research is one of the privileges enjoyed by our students.

Current Facilities

Advanced Manufacturing Laboratory

An up-to-date Laboratory with facilities that contain contemporary contains two advanced CNC machines made by DMG MORI: a turning machine (EcoTurn 310) and a vertical milling machine (Milltap 700) to support experimentation and research in industrial automation and solving problems arising in integrated and flexible manufacturing production systems. This laboratory also contains two Additive Manufacturing (AM) machines (3D printing) made by 3D Systems that produce parts layer upon layer directly from CAD design: The first one is a Fused Deposition Modelling (FDM) machine called CUBE and the second one is a Sterolithogrpahy machine called Forms1.

Antennas and Microwave

The purpose of this laboratory is teaching the students how to measure and test experimentally the different antenna specifications such as directivity, half power beam width, bandwidth, antenna pattern,…, etc. for many different antenna configurations to simulate those different antennas on computer using NEC and computer FORTRAN codes, to measure the standards and specifications of the different transmission lines and waveguides.

Electromagnetic Wave Propagation and Electromagnetic Transmitting Media courses are taught in this laboratory.

Analogue Control

The lab is equipped with different process control analogue systems simulators; pressure, temperature, flow and level trainers. Different types of related sensors and actuators are available for demonstrating their construction, characteristics and applications. Furthermore, control system for different types of DC and AC motors are available.

Architectural Computer Laboratories

The Architectural Computer Labs at the Architectural Engineering & Environmental Design Department, AASTMT, are useful aid to architectural students where they boast the latest technologies in desktop computers.

With computer technicians constantly at hand, the computers are always updated with the latest software and drivers. To encourage architectural students' artistic side, graphic design and animation programs are at their disposal as well as top of the line architectural rendering and Computer Aided Design (CAD) programs that help the students deliver their creative ideas across to their professors.

In addition to direct access to the computer network that connects to the internet at all times, and the wireless network that can be accessed in from every class, the research process that is essential to the design process, is made a little easier, saving the architectural students time and allowing them to be more productive.

Automatic Control Laboratory
In this laboratory students are introduced into the basic principles of mastery of industrial applications. Using instrumentation and measurement equipment's; various areas of analogue automatic control are investigated such as pressure and flow, valve calibration and temperature control. The interfacing of analogue and digital circuit and control principles are also investigated such as computer control of motor speed and transient analysis of control systems using computer interface.

Automation Laboratory
The automation laboratory offers great opportunity to understand the industrial automation systems using high tech programmable logic controller kits of Siemens available in the market. The laboratory contains most of the equipment required in industrial applications such as pressure, temperature sensors, motors and controllers.

CAD/CAM Laboratory
A laboratory that contains up to date computers for use in computer aided design and computer aided manufacturing courses. There are CAD software like AutoCAD, Solid Edge and Solidworks that help students in designing and drawing parts and components. These software packages help students to understand the basic concepts of engineering drafting and design. Moreover, there is computer aided manufacturing (CAM) software NX developed by Siemens which is an integrated product design, engineering and manufacturing solution that helps students to deliver better products faster and more efficiently. In addition to the advanced solutions for conceptual design, 3D modelling and documentation, NX provide multi-discipline simulation for structural, motion, thermal, flow and multi-physics applications and also complete part manufacturing solutions for tooling, machining and quality inspection. Furthermore, this laboratory contains statistical software: Minitab to be used in courses like statistics, statistical analysis and design of experiments.

Chemistry Lab (1)
The lab contains devices used for chemical analysis of water and lubricating oils,The devices and apparatuses are found in this lab are pH meter to measure acidity and alkalinity for solution, conductivity and salinity meter measures the electrical conductivity and total dissolved solids in a solution, spectrophotometer DR-3900 determine the concentration for different elements and groups in waste water with very high accuracy, BOD (biological oxygen demand) to determine how fast biological organisms use up oxygen a body in water and oil kits for test different lubricating oil properties.

Chemistry Lab (2)
The lab contains devices used for chemical analysis of water and fuel oil, The devices and apparatuses are found in this lab are spectrophotometer DR-2000 for digital reading of the different elements and groups concentration in water, titration apparatus for quantitative analysis of solution, distillatory to prepare a distilled water and flash point meter for determination of the lowest temperature at which the material can form ignitable mixture with air.

Chemistry Lab (3)
The lab contains devices used for chemical analysis of water, corrosion and corrosion protection, The devices and apparatuses are found in this lab are pH meter to measure acidity and alkalinity for solution, spectrophotometer DR-2010 determine the concentration for different elements and groups in water, COD (chemical oxygen demand) to use indirectly measure the amount of organic compounds in water and apparatus used to determine the corrosion rate, efficiency of cathodic protection and passivation.

Communications Engineering Labs
Electronics and communications engineering department has advanced communications engineering laboratory facilities which are totally accessible to all students and faculty members in AASTMT. The analogue and digital communication laboratories are designed and developed to provide students with hands-on experiences related to communications engineering courses. The two communications engineering laboratories support undergraduate and postgraduate courses and projects delivered in the electronics and communications engineering program.

Computer Labs
Computer labs are equipped with high technology Intel® 4th generation Core TM 7-4770, 3.40 GHz, Microsoft Operating System windows 7-64 bit and Ubuntu Linux, Java Development Kit(JDK6), C#, and Java . Courses taught are Data Structures, Structured Programming, Database systems, Operating Systems, Data Security, Introduction to Computers, Programming Applications, Object Oriented programming, Advanced Programming, Introduction to Software Engineering, Computer Graphics, Pattern Recognition, Modelling and simulation

Computer and Network Lab
The computer and network lab services the courses of computer networks, advanced networks, data & computer communication, database, data security, object oriented programming, and mobile applications. Computer and Network Lab is equipped with Workstation, dual core AMD 2.6GHz,Intel IXDP465 Development Platform, Serial to Ethernet Application Kit Rabbit Core RCM3000, Airborne 802.11 Wireless LAN Node Module Evaluation and Development Kit, 4 port USB KVM switch kit "Trendnet", 8 port10/100 desktop switch "Netgear", LINKSYS Ethernet DSL router with 4 port switch, 3 COM 8 port switch, LINKSYS by Cisco Wireless G Broadband Router, Tripp.lite Isobar, office home and student 2007, Java Development kit(JDK 6), Eclipse + ADT plugin, Android SDK Tools, Android Platform-tools, Oracle.

Construction Surveying and Geology Lab

The construction surveying and geology laboratory provides the students with the sufficient practical training to perform the essential surveying processes which include theodolite traversing, profile levelling, levelling applications and countering, and layout of construction projects. In addition, the objective of the construction surveying and geology laboratory extends also to serve both the courses of postgraduate studies and the research effort in the area of the construction surveying. Construction surveying and geology lab may also serve the construction industry through the ability for conducting different construction surveying processes and photogrammetric and remote sensing.

Construction Materials Lab

The construction materials laboratory was established with the objective to provide an appropriate environment for students to examine some basic properties of different construction material such as aggregates, cements, concrete, masonry, wood and wood products and steel reinforcement. Through various experiments, the properties of both physical and mechanical properties of different construction materials are examined thoroughly. Students will also get hand-on experience with the way concrete is mixed, transported, placed and compacted. The tests are conducted to determine the engineering properties in terms of strength, strain, elasticity, stiffness durability, and workability. This lab is also used for the designing, proportioning, mixing, casting, curing, and tooling of concrete batches. All tests are performed based on ASTM, ACI, and AASHTO testing specifications. The objective of the construction materials laboratory extends also to serve both the courses of postgraduate studies and the research effort in the area of the properties and testing of advanced materials in construction. Moreover, the construction materials laboratory is capable of serving the community and the construction industry through conducting different quality control tests for various raw building materials and final products needed in the construction industry.

Diesel Engines Lab
The Lab contains diesel engines covering hands-on training purposes for marine, mechanical engineering and maritime transport students in addition to vocational tutoring; including the SULZER® diesel engine of 4 stroke type, having 6 cylinders of trunk type piston producing 1100 hp at 750 rpm.
Another engine of 2 stroke type having 3 cylinders producing 750 hp at 320 rpm is also available and can be operated either locally or remotely from the engine control room, similar to that normally found on board ships. Two FIAT® diesel engines driving two alternators are available. Beside the previously mentioned engines, another two engines are dedicated to dismantling and assembly purposes. A small workshop equipped with a lathe, a drill, and welding tools is allocated for maintenance operations.

Digital Circuits Lab
The Digital circuits Labs is completely equipped laboratory that contains precision measurement equipment and tools for use in digital logical experiments, design and simulation. The lab houses a collection of equipment used for generating signals and visualizing it. It is also equipped with Programmable Logic Digilent D2FT, Accessory Board Memory, Accessory Board Network (NET1), Accessory Board Digilent Analog I/O (ALO), logic Pulsar, Oscilloscopes, function Generator, digital Multimeter, Power supplies. It serves the courses Digital Logic design and digital and microprocessor systems.

Digital Control Lab
This laboratory attempts to clarify some of the concepts of digital control and digital circuit applications. Using advanced digital design computer software, students gain the knowledge of the various methods of digital circuit integration, circuit analysis and also power system analysis. Practical digital applications are investigated using microcontroller kits, circuit kits, programmable logic controllers and robotic equipment.

Electronics Laboratories
The Electronic labs, electronics Lab 1 (232) and 2 (230) are required to serve the Electronic group courses. Lab 1 (232) serves the courses taught in other departments (ex. The Fundamentals of electricity and electronics) and the devices courses, while lab 2 (230) serves the electronic circuits courses. The students, in both labs, are required to design and construct the different experiments with the help of different simulation programs the most important of which is the PSPICE program. Fundamentals of Electricity and Electronics, Electronic Amplifiers, Microelectronic Circuits, Analogue Signal Processing and Electronic Devices 2 courses among other electronics courses sessions are held in these laboratories.

Electrical Engineering Workshop
The workshop is equipped with different – easy to assemble- component panels that help the students to build electrical protection systems. In addition, several demo relays are available to demonstrate their internal structure. Furthermore, sets for demonstrating electric machines testing and construction are available. The workshop also serves the analogue measurement experiments.

Electrical Circuits Lab
It provides the essential knowledge for the student to understand and validate the AC and DC electric circuits' concepts. The laboratory also familiarize the student with measurements devices, power supplies and different circuit elements.

Electric Drives Laboratory
The electrical drives laboratory offers a great chance for undergraduate as well as postgraduate students to experience and be familiar with conventional electrical drives systems as well as modern advanced drives systems by experimenting AC and DC machine drive systems. Moreover the renewable energies trainers provide the student with the essential knowledge for PV, wind and fuel cell systems.

Field-Programmable Gate Array Lab
The Field-Programmable Gate Array (FPGA) Lab is devoted to the application of FPGA technology to information processing and general computing using VHDL synthesis methods for hardware development. Lab is equipped with commercial CAD software for VHDL simulation, synthesis, and implementation of systems in programmable XILINX XUP 100,000 gates FPGA devices. The courses taught in this lab are Digital System Design, Computer Architecture, and Computer Performance.

Fluid Mechanics and Hydraulics
The lab provides facilities for undergraduate teaching, final year projects and for research work leading to postgraduate degrees.
This lab consists of several experimental setups for verifying the basic laws of fluid mechanics and some flow measuring devices. It can also be used for fundamental studies into the structure of wake-flows and turbulent boundary layers. Throughout the laboratory there is access to fresh and salt water (which can be chilled and filtered), drainage trenches, and compressed air. Also available are oil hydraulic power supplies. The laboratory equipment are venturi meter, orifice meter, smoke tunnel, pumping station, wind tunnel, fluid circuit demonstrator, hydraulic flow channel, fluid power trainer, hydraulic bench, Pipe friction and Flow in closed channel.
The laboratory provides supports to both undergraduate and graduate teaching so that students have the opportunity to see by themselves the essential fluid mechanics principles, and to verify the applicability of various assumptions, models and analysis methods. It also provides facilities for researches in hydraulics, fluid mechanics and related fields to support graduate studies. Thus much of the fundamental research in the laboratory is comprised of thesis investigations.

Global Maritime Distress and Safety System

The purpose of the Global Maritime Distress and Safety System (GMDSS) laboratory is teaching the students how to acquire skills using some computer programs such as:

The NEC and computer FORTRAN codes for measuring the different antenna specifications such as directivity, half power beam width, bandwidth, antenna pattern,…,etc.; and simulating those different antenna configurations.

The computer MATLAB codes for simulating the different communication systems to teach students the principles of those systems; and teaching students how to deal with the program for quantitative measurement of the phenomena of the communication systems and signals processing without the use of expensive instruments.

Heavy Structures Laboratory

The laboratory experiments conducted in heavy structures laboratory are a part of the construction and building engineering program. The laboratory serves both undergraduate projects and post-graduate research. For undergraduate students, the laboratory provides the necessary skills for performing appropriate experiments on R.C., steel member, and composite members to determine their behaviour such as; load capacity, failure modes, load-deflection and stress versus strain, using the sufficient equipment for measuring these variables when subjected to static loading. The objective of the heavy structures laboratory covers also the courses of post-graduate studies and the research effort concerning with the engineering properties and behaviour of R.C. and steel heavy structures. Moreover it can also serve the building and construction industry by conducting the required researches on reinforced concrete and metallic structures elements e.g. (columns, beams, slabs and joints), as well as structural types e.g. (frames, trusses, arches).

Human Factors and Ergonomics

The Human Factors and Ergonomics Laboratory is actively involved with the Industrial and Management Engineering department, offering training services, and consultation to the local and regional industrial community. In addition, it facilitates the education and research development of both undergraduate and graduate students.The lab conducts work in theoretical and applied ergonomics, work physiology, primarily relating to worksite, workstation, and equipment evaluation and design.

It specifically focusing on: biomechanics of the human body (modelling, strength, motions, and working postures); human engineering of systems, equipment, tools, workstations, and work tasks; and ergonomic design for safety, comfort, and performance.

This Laboratory is particularly well equipped to do research in a variety of areas including: Dexterity and Coordination, involving the use of hands, development over time and activities that involve precise hand-eye coordination. Strength measurement includes equipment for measuring the muscle fatigue when performing different tasks. Physiological measures, testing the human limitations and abilities of individuals to perform a specific task such as: testing the lifting abilities of humans, recommending the right posture for lifting. Anthropometrics, the lab comprises a wide range of anthropometric equipment for different human body measurements, to gather the characteristic measurements of a population.

Intelligent Embedded Systems & Multimedia Laboratory
It includes the design, development and application of computer-based systems and solutions to engineering problems in the field of embedded system design, embedded software development, embedded real-time OS, system testing, validation and simulation. The lab is equipped with Microcontrollers kis, ARM processor embedded solution, embedded development software, platform solution and embedded development kit (EDK). Computer vision and omage processing, robots platforms, XILINX Zynq-700 Soc video and imaging kit, Atlys Spartan 6 FPGA development board.

Light Structures Laboratory
The objective of the experimental tests taking place in the light structures laboratory is to provide students with the necessary information to understand the theory of structures basics using modern tools that are available in the lab. The laboratory includes various devices for applying the required experimental tests such as bending of beams, torsion of circular rods, buckling of columns, and deflection of beams. Students are supplied with booklets showing the different experiments steps and the procedure for obtaining results. Students are required to submit a final report showing in engineering curves the outputs of the experiments and their comments. The light structures laboratory can serve the courses of post-graduate studies and researches in the scope of the structural behaviour of light structures. Moreover, the laboratory may help the building and construction industry through performing the needed researches concerning the light structures.

Marine Engineering Lab (1)
This lab is used for educational and training purposes of marine engineering and maritime transportation students and graduates. The lab incorporates some of the equipment a trainee would face in marine engine rooms, such as; Valves and main thrust bearings. This lab covers areas related to the different types of valves, their purposes of use, how to maintain valves e.g. packing a gland, preparing gaskets, and lapping of valves to their respective seats using proper tools and materials. A main thrust bearing is available for the purpose of dismantling, inspection, measuring the clearances, re–conditioning of thrust pads, and assembly.

Marine Engineering Lab (2)

This lab is assigned to pumps, compressors, and steering gear training for marine engineering and maritime transport students. The lab covers areas related to the different types of pumps and compressors, their applications in use, their constructional details, probable defects and faults and their remedial actions. Trainees from different disciplines, related to those areas, practice the importance of steering gear, its vital role in a ship, and its operational procedure at sea, especially in emergency situations.

Materials Testing and Characterization Laboratory

The materials testing and characterization laboratory focuses on the mechanical behaviour of a variety of materials, from polymers to super alloys. The laboratory could be involved in a research concerning the investigation of material structure and mechanical properties such as yield strength, ultimate tensile strength, ductility resilience, toughness, hardness, elastic modulus, Poisson's ratio, and strain-hardening properties. The laboratory contains the following testing equipment and associated capabilities:

- A Universal Testing Machine (UTM) with varying load capabilities and specialized gripping for brittle and straight-side samples which is characterized with the following features:
  - Test methods include tensile, compression and bending tests
  - Testing is conducted under computer control
  - A Post-test characterization via optical microscopy
- An Optical microscope equipped with an image analysis system. The microscope allows obtaining and interpreting microscope images of high quality, to perform quantitative optical measurements, and to produce high quality digital images for documentation and analysis.
- A Universal Hardness Testing Machine which is a high precision, easy operation, high sensitivity metal hardness instrument which combines the Rockwell, Brinell, and Vickers hardness principles widely used in factory workshops, laboratories, universities and research institutions. The machine is equipped with a large LCD and Microchip control system, makes hardness testing be automatically operated. Also, a built-in printer is attached to record the main technical data of the entire testing process.

Materials Testing Lab

The Materials Testing Lab is one of the first labs established in the College of Engineering, AASTMT. The Materials Testing Lab currently serves different educational and scientific activities. The lab plays a pioneering role in the QC/QA of construction work using its up-to-date facilities.

The material testing laboratory includes Tensile Testing, Impact Testing, Crack Tip Opening Displacement (CTOD), Fracture Toughness Test (FTT), Fatigue Test (FT), Bend and Hardness Test, Stress Rupture Test, Oscilloscope machine, Pressure vessel machines and many other destructive tests on metals.

The lab services the mechanical, marine and the industrial departments. The lab service subjects like material science, mechanics of materials and stress analysis. It provides facilities for undergraduate teaching, final year projects, and for researchers work leading to postgraduate degree.

Mechanical Vibration Lab

The Mechanical Vibrations Lab is a modern facility for performing advanced vibration analysis. The Vibrations Lab is used for undergraduate education, graduate education, senior design projects, and advanced research. Equipment in the lab includes accelerometers, miniature accelerometers, load sensors, impact hammers, miniature impact hammers, shakers, and piezo-ceramic patch actuator/sensors, Velocity Sensor (Screw Mounting) ,Seismic Vibration Transmitter (Screw Mounting), Seismic Accelerometer Sensor, Seismic Indicator Transmitter, Signal Conditioner for Remote Sensor, Strain Gauges (Precision Strain), Proximity Sensor with cable Proximity Probe Driver, Proximity Signal Conditioner, Proximity Sensor Calibrator, Extension Cable with Insulator, Trend Setter, Miniature Vibration Meter Device, Hydro Scout Toil Cartridges, Portable Shaker System, Velocity Transducer, Vibration Switch, Audio Amplifier, Digital Vibration Controller, Triaxial Accelerometer, Blower (Compressed Air),Flow meters for Liquid Low Frequency Accelerometer, Industrial Accelerometer, Noise Level Meter, Linear Strain Gauge, Differential Pressure Transducer, Absolute Pressure Transducer, Tachometer Speed Range, Signal Generator and Handy Oscilloscope Fluke. Data is analysed using oscilloscopes Basic experiments performed in the lab for undergraduate education include time and frequency domain vibration analysis of simple structures including MDOF modal analysis.

Mechatronics Lab

Mechatronics is the synergistic integration of mechanical engineering, electrical engineering, electronics, computer science, and control theory for the design of intelligent systems. Mechatronic systems are used in automotive systems, aerospace systems, consumer

electronics, and robotics. The Lab Equipment include ProLight 3000 Turning Centre, versatile 2-axis CNC lathe for training, engineering and light-duty industrial turning applications, The SCORBOT-ER 9Pro, Robot with 6 degree of freedom, Intelitek, Robot with 4 degree of freedom, Automatic Storage and Retrieval System (ASRS), Conveyor. One PC per station and CAD/CAM software. The Mechatronics Laboratory was established to support embedded control systems in Mechanical Applications. Mechatronics Lab objective is to expect the student to understand the real pleasure of research through finding research themes, establishing theories, developing systems, conducting experiments, and presenting results. The lab supports courses like introduction to Mechatronics, Mechatronics systems, Robotics and Applications and Final year Graduation projects as well as graduate studies.

Microprocessor Labs

The Microprocessor labs are equipped with all the necessary lab equipment, Micro Controller Kits, and all types of tools, accessories and a variety of Digital / Analogue components. These labs characterize the computer engineering department. Continuous upgrades are conducted on it to assure that it is compatible with the latest technological advances. The lab work aims to develop and enhance the students' capabilities in several relevant aspects. Practical skills are developed through experiencing real life scenarios. Present in the labs practical facilities for all Micro Processor Basics, Interfacing, Programming, Controlling and Monitoring and it is further being enhanced with the addition of many new Micro Controllers, Micro Controller Kits, Micro Processors / Controller Training stations and Interfacing Units. Courses taught in these labs are Digital Electronics, Introduction to Microprocessor, Data Acquisition Systems, Intelligent Robotics and Microcomputer Based Design.

Mobile and web Engineering Lab

Mobile and Web lab have high technology computers and printers. It is equipped with technology Intel® 4th generation Core TM 7-4770, 3.40 GHz, Microsoft Operating System windows 7-64 bit and Ubuntu Linux, Java Development Kit(JDK6), Oracle, SQL server.
This lab services the courses operating systems, web engineering, Java/OOP and Mobile applications.

Non-Destructive Testing Laboratory

The NDT Lab provides tools for the non-destructive testing of welding, detecting flaws and discontinuities in materials as well as tools for measuring the thickness of coating layers and materials. The lab also contains equipment that is used in detecting the macroscopic structure of materials. It contains the following instrumentation:
A group of approved welding defects specimens, dye penetration test, magnetic particle test for surface defects of welds, X-ray test demo kit, Ultrasonic devices for (Paint layer thickness measurement, material thickness measurements and flaw detection of welding), Eddy current devices for flaw and crack detection of materials, grinding machine with water cooling for metal surface preparation before

microscopic examination, dry polishing machine for final preparation of surfaces, endoscope for micro internal examinations, optical microscopes with different magnifications and one with image analysis system and a heat treatment oven up to 1200° C. The lab services the undergraduate and graduate students and has a good connection with the industry. It is used in the practical training for welding courses and diplomas and its instrumentation is used for the external inspection services and consultations activities carried out by its professional staff.

Physics Lab (1)
The lab is equipped to help engineering students to carry out Physics experiments covering several topics in current electricity, magnetism and optics.
Electricity, Magnetism, and Light is an engaging introductory treatment of electromagnetism and optics for first semester physics and engineering majors. Lab experiments focus on conceptual understanding, with an emphasis on relevance and historical development. Mathematics is specific and avoids unnecessary technical development. They emphasize on physical concepts, analysing the electromagnetic aspects of many everyday phenomena, and guiding readers carefully through mathematical derivations. They Provides a wealth of interesting information, from the history of the science of electricity and magnetism, to connections with real world phenomena in science and engineering to common sense advice and insight on the intuitive understanding of electrical and magnetic phenomena.

Physics Lab (2)
The lab is equipped to help engineering students to carry out Physics experiments covering several topics in thermodynamics, heat transfer, waves and sound.
Engineering curricula are notoriously demanding. One way to make the material easier to grasp and more fun to learn is to emphasize the experimental or "hands-on" aspects of engineering problems. This unique laboratory is about learning through active participation in experiments, and it specifically aims to dispel some of the mystery so many students associate with the study of thermodynamics and heat transfer. A collection of experiments are performed in heat transfer and thermodynamics contributed by leading engineering educators. Each experiment follows the same step-by-step format, which includes the objective of the experiment, apparatus needed, procedure, suggested headings, and references. The experiments use apparatus that is easily built or attainable. Among the topics covered are heat conduction, convection, boiling, mixing, diffusion, radiation, heat pipes and exchangers, and thermodynamics.

Physics Lab (3)
The lab is equipped to help nautical students to carry out various physics experiments covering several topics in mechanics, wave, sound, magnetism and optics. Laboratory sessions will usually be preceded with class discussion or demonstration explaining specific procedures to be followed. Laboratory exercises are designed to complement the theory presented in class and, as such, are often a compromise between the abstract world of point masses, frictionless tables, and mass-fewer strings usually assumed and the real world. We are trying to reinforce the abstract concepts of force, velocity, vectors, etc. with some real everyday phenomena in order to make the physics meaningful. Often the student will discover enough disagreement that you can make some intelligent observations as to the cause of the discrepancy.

Radar Laboratory
Several skills are added to the students through the study in this laboratory such as how to measure and test experimentally the principles of radar system using the lab-Radar trainer, also how to measure the different phenomena of the radar without the use of expensive instruments and to upkeep and repair the instruments such as TV and Radar (Trouble shooters). GMDSS and Applied Telecommunication System use the laboratory facilities.

Refrigeration and Air Conditioning Lab
Refrigeration and air conditioning industry is considerably growing all over the world. It covers a wide range of activities in industry, science and research applications for the comfort and benefit of mankind and his living environment. The focus of the refrigeration and Air conditioning lab is to aid the refrigeration and air-conditioning industry in the transition from CFC-11, CFC-12 and HCFC-22 to new, environmentally acceptable refrigerants.
Equipment in the lab includes advanced Commercial Refrigeration Trainer, building Management Trainer, Commercial Refrigeration Trainer, Recalculating Air Conditioning Demonstrator, Thermoelectric Pump, vapour Compression Cycle Demonstrator, Refrigerant Recovery Units, Container Reefer, Cooling Tower and Air conditioning cycle.
Practical training on refrigeration and air conditioning systems is conducted within this lab, where the trainees could improve their experience and technical knowledge concerning various related equipment. The lab current capabilities permit a variety of technical courses for engineers working in the field of that industry.

Renewable Energy
The lab provides facilities for undergraduate teaching, final year projects and for research work leading to postgraduate degrees. The laboratory equipment are Mobile Solar Systems trainer and Solar Photovoltaic trainer.

Sculpture Lab
Sculpture Lab introduce students to varieties of topics and media to enhance their artistic capabilities. The lab is set up for using different materials in making artistic models such as clay, brass and copper. The lab is equipped with metal rotational stands for holding models. Small-Scale Metal works and Casting is offered in addition to advanced finishing techniques such as soldering, forming, colouring, and various finishing processes.

Soil Mechanics and Transportation Engineering Laboratory
The experimental tests of soil mechanics is a part of the Construction and Building Engineering program. The educational objective of experimental work is to provide the undergraduate students with the necessary skills for performing appropriate laboratory experiments on the soil samples to determine the physical and engineering properties of the samples using modern tools available in the lab. Students also get hand-on experience with the way of analysing the tests results and using the results in preparing a technical soil report. All tests are performed based on ASTM testing specifications. The soil mechanics lab may also serve the practical research activities in geotechnical engineering for post-graduate students. The laboratory can also take a place in the building and construction industry by conducting the required experimental tests on soil samples used for preparing soil technical reports, analysis of pile-load tests results, proposing soil improvement techniques for external projects.

The laboratory experiments conducted in transportation engineering lab is a part of the highway design and construction course. The laboratory serves both of undergraduate and post-graduate students. For undergraduate students, the lab provides the necessary skills for conducting the different experimental tests on asphalt samples and pavement materials such as: California bearing ratio (CBR), M California bearing ratio (CBR), Marshal Test for asphalt samples, Marshal Test, and flow and stability for asphalt samples. The post-graduate students can also use the laboratory equipment in the experimental work necessary for researches. Moreover the transportation engineering lab can also serve the building and construction industry by conducting the required tests of construction asphalt materials as well as developing new materials through the use of recycled and waste materials.

Steam Power Engineering Lab

This lab is used for operations related to Boiler and purifiers training of mechanical, marine, and maritime transport students.

The lab includes two models of fire tube boilers, enabling the trainees to analyse the operation of boilers and their safety devices, how to raise steam in a boiler, the operational faults and how to rectify them. Purification of oil, getting rid of sediments and impurities are very important on board ship to protect the main engine and auxiliary systems of lubrication.

A steam turbine model is available for the purpose of examining the internal parts such as nozzles, fixed blades, and bearings …etc.

Thermodynamics Lab

The Thermodynamics Lab covers a wide range of interests in the areas of Mechanical Engineering associated with energy use and efficiency. The Lab helps in developing practical solutions to problems in thermodynamics and heat transfer. The Lab houses undergraduate experiments in heat transfer and internal combustion engines as well as research equipment used by postgraduates and research staff. Equipment in the lab includes Vortex Tube Refrigerator, Modular Heat Exchanger, Forced Convection Demonstrator, Gas Turbine Trainer, Steam Turbine Trainer, Cross Flow Heat Exchanger, Air Compressor System and Concentric tube heat exchanger. During the final year of the undergraduate degree, students can specialize in courses associated with the Thermodynamics Lab and undertake final year projects in the laboratory.

Workshop & Architectural Models Lab

The Workshop and Architectural Models Lab at the Architectural Engineering & Environmental Design Department, AASTMT, is a useful aid for the exclusive use of architecture students. The Lab facilitates the bond between designing and making models. The lab contains tools and machinery for working with wood, foam, cardboard and plastics. Students build prototypes, models and mock-ups of famous buildings and take classes on how to use different materials and different models to express their ideas. The Lab also offers support in the following fields:

- Expressing architectural drawings into 3D Models.
- Using different materials for expressing models.
- Working as a team-work for making a model for a famous building

Future Expansions

The College of Engineering and Technology is continuously reviewing, updating and even developing its lab facilities. The following is a short list of the planned expansions for the College's laboratories in the near future:

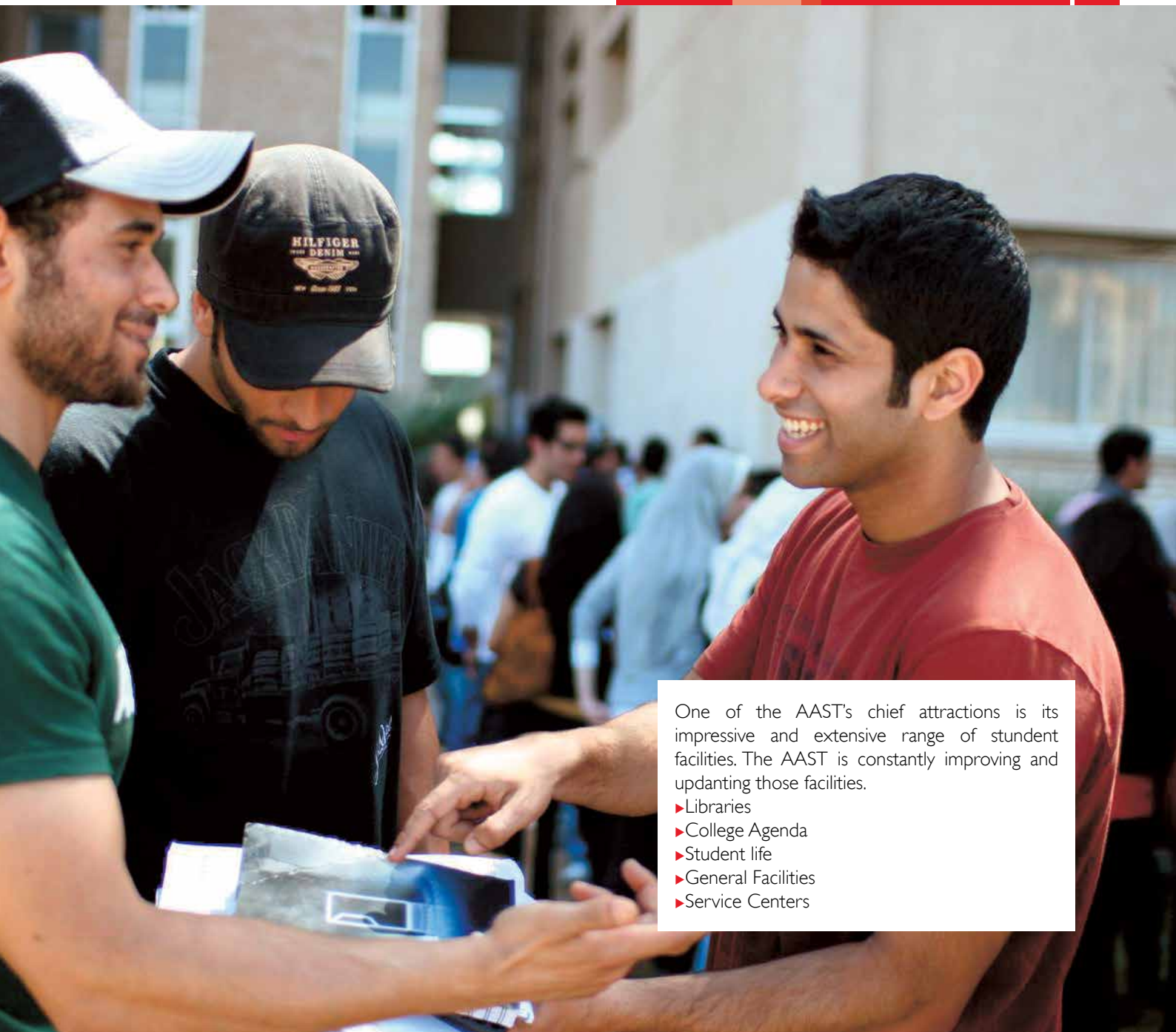
- Upgrading the digital systems and computer architecture lab.
- Upgrading the microprocessor laboratory.
- Developing a new lab for Intelligent Embedded Systems & Multimedia Laboratory.
- Upgrading the materials testing and characterization laboratory.
- Developing a new lab for Optical fibres.
- Upgrading the equipment in Electronics and Communications lab.
- Developing a new lab for wave making tank..
- Planning for a new lab in the Architectural Department.

Environmental Design Laboratory

The overarching goal of the Environmental Design Laboratory EDL is to advance sustainable design through research, education, and community outreach, with the aim of improving the dynamic interaction among the built, natural, and human environments. The Lab's primary purpose is to support the department's curriculum and the educational experience of our under/postgraduate students. The EDL is committed to providing hands-on measurements and experimentation as a viable component of the environmental design educational programs. In addition to providing specific environmental performance rigs and tests, EDL provides number of computational simulation facilities which support students' various design projects, assignments and students' requirements. The EDL may work jointly with the facilities of the wood shop and the metal shop, as well as the model-making cutter workshop.

The EDL is equipped with simple and advanced devices in order to monitor both indoor and outdoor onsite environments. The Environmental Design Laboratory EDL underpins many of the activities of the Architectural Engineering & Environmental Design Dept. EDL works jointly with the EDRG Environmental Design Research Group as well as supporting postgraduate/research students. EDL and EDRG facilities offer support in:-

- Environmental Awareness Programs
- Physical scale Models,
- Lighting Laboratory Applications
- Natural Ventilation and Airflow Laboratory Applications
- Numerical and Computational Simulation Tests and Modelling,
- Laboratory-Based Rigs and Onsite-field Monitoring.



One of the AAST's chief attractions is its impressive and extensive range of stundent facilities. The AAST is constantly improving and updanting those facilities.

- Libraries
- College Agenda
- Student life
- General Facilities
- Service Centers

Libraries

Since its inception in 1972, the Arab Academy for Science & Technology, and Maritime Transport (AASTMT) saved no effort in supporting the educational process. And because academic libraries play a major role in supporting educational activities and enriching the academic life of students and faculty members, AASTMT established a specialized library in order to make use of the information published in different media.

Due to the change in the role libraries play in the information field in general, and the academic field in particular, the Library's name changed to "Libraries & Information Services Centre" A change that was crucial due to the emergence of new information resources - in addition to books - and the growing reliance on diverse information sources that meet users" information needs.

The Centre serves the academic community in all branches of the Academy. It consists of: The Main Library (Abu-Qir), Architecture Library (Abu-Qir), Maritime Library (Abu-Qir), Management Library (Miami), Graduate School of Business Library - Alexandria (Miami), Sheraton Engineering Library, Sheraton Management & Logistics Library, Dokki Management & Logistics Library, Graduate School of Business Library (Sheraton), Port Saeed Library, Smart Village Library, Wabour Elmaya Library, and Ganoub Elwadi Library.

The libraries are all connected through online interactive terminals to ensure easy access to the centre's in-house database. In order to offer a distinguished information service, the Centre established an integrated information system that facilitates direct search through a computerized catalogue and electronic databases.

The Main Library

The Main Library in Abu-Qir campus mainly serves the College of Engineering and Technology, the College of Computing & Information Technology, and the College of International Transport & Logistics, in addition to performing all technical activities of acquisition and cataloguing of all information media. The Main Library comprises a collection of books, in addition to Periodicals, Dissertations, Projects, and Electronic Journals.

The Main Library building consists of 3 floors, and can host (225) users at the same time.

The first floor comprises the references, periodicals, graduation projects, and dissertations. It also comprises a computer lab for Library users to retrieve information from the Internet, Online Public Access Catalo (OPAC), and search our set of databases and e-journals.

The second floor comprises English books in the fields of: Mechanical, Marine, Construction, Industrial Engineering, and International Transport & Logistics, in addition to a photocopy unit.

The third floor comprises English and Arabic books. English books are in the fields of: Computer, Electrical and Control, and Electronics and Communications Engineering, and Basic and Applied Sciences.

The Main Library's collection consists of (15125) books, (87) Printed Periodicals, (1243) Dissertations, and (463) Projects, in addition to Full-Text e-journals, e-books and e-dissertations.

THE ARCHITECTURE LIBRARY

The Architecture Library in Abu-Qir campus serves the department of Architectural Engineering and Environmental Design of the College of Engineering and Technology. It comprises a collection of the latest publications in architecture. Its collection consists of (2580) titles, (64) Dissertations (10) periodicals, in addition to Full-Text e-journals, e-books and e-dissertations.

The Library is equipped with (5) terminals for Library users to retrieve information from the Internet, Online Public Access Catalo (OPAC), and search our set of databases and e-journals. Users can also scan and save/print images from books or periodicals available in the library. The Architecture Library can host up to (50) users at the same time.

The Maritime Library
The Maritime Library in Abu-Qir campus serves the Nautical Specializations of the College of Maritime Transport and Technology. It comprises a collection of the latest publications in the maritime field which consist of (2633) titles, (406) Dissertations, (16) Printed Periodicals, as well as all (489) International Maritime Organization (IMO) publications, as the AASTMT's Library is a depository library of IMO publications, in addition to Full-Text e-journals, e-books and e-dissertations. The Maritime Library can host up to (50) users at the same time.

The Management Library
The Management Library in Miami campus serves the College of Management and Technology. It comprises a collection of the latest publications in management fields. Its collection consists of (4804) titles, (34) periodicals, (263) Dissertations, (2500) Researches, in addition to Full-Text e-journals, e-books and e-dissertations, and a number of U.N. publications. The Management Library can host up to (35) users at the same time.

The Graduate School Of Business (Gsb) Library (Alexandria)
The Graduate School of Business (GSB) library in Miami campus serves graduate courses in management fields. It comprises (1280) titles, (361) Dissertations, in addition to Full-Text e-journals, e-books and e-dissertations. It also comprises the Books of the College of Language and Communication: (787) titles. Photocopying services are available for all library users.

Wabour Elmaya Library
The Library in Wabour Elmaya campus serves Graduate studies in Engineering, Computing, and Language & Communication. It comprises (368) titles, and (496) Dissertations, in addition to Full-Text e-journals, e-books and e-dissertations. Photocopying services are available for all library users. The Library can host up to (31) users.

Engineering Library – Sheraton
The Engineering Library in Sheraton branch serves the specializations the College of Engineering & Technology and the College of Computing & Information Technology in Cairo. The Library can serve (70) users at the same time. Its collection of engineering books is (4730) titles, (1112) Dissertations, and (78) Projects, (20) Periodicals, in addition to Full-Text e-journals, e-books and e-dissertations. Photocopying services are available for all library users.

Management & Logistics Library - Sheraton
The Management & Logistics Library in Sheraton serves the specializations the College of Management and Technology and the College of International Transport & Logistics in Cairo (Sheraton). The Library can serve (40) users at the same time. Its collection of management books is (3333) titles and (147) Dissertations, (2) Periodicals, in addition to Full-Text e-journals, e-books and e-dissertations. Photocopying services are available for all library users.

Management & Logistics Library - Dokki

The Management & Logistics Library in Dokki serves the specializations the College of Management and Technology and the College of International Transport & Logistics in Cairo (Dokki). The Library can serve (25) users at the same time. Its collection of management books is (1380) titles, and (72) Dissertations, in addition to Full-Text e-journals, e-books and e-dissertations. Photocopying services are available for all library users.

Smart Village Library

The Library in Smart Village mainly serves the departments of the College of Engineering and Technology: Architectural Engineering & Environmental Design, Electronics & Communication, Mechatronics, and Construction & Building Engineering College of Management & Technology, and the College of International Transport & Logistics.

The Library can serve (65) users at the same time. Its collection of books is (877) titles, (307) Dissertations, in addition to Full-Text e-journals, e-books and e-dissertations. Photocopying services are available for all library users.

Ganoub Elwady Library

The Library in Ganoub Elwady serves the specializations of Engineering and Management. It comprises (1922) titles, and (55) Dissertations, in addition to Full-Text e-journals, e-books and e-dissertations. The Library can host up to (55) users. Photocopying services are available for all library users.

Port Said Library

The Library in Port Said campus serves the specializations of Maritime Transport, Engineering, Management, and Logistics. It comprises (1840) titles, and (132) Dissertations, in addition to Full-Text e-journals, e-books and e-dissertations. The Library can host up to (31) users. Photocopying services are available for all library users.

College Agenda

Engineering Day

This day is held on a yearly basis. It is the summit of all the College's activities throughout the year. Samples of all the departments' and students' academic and extracurricular activities are presented. Final year graduation projects and students' work are displayed.

The General Director of the Academy and the Dean of Engineering honor distinguished faculty and students who showed excellence on the academic, social and sportive levels. Students' families are invited to attend, take tours of the College and to witness the advancements made by the College and the achievements of the students.

Parents Day

On a yearly basis the College of Engineering in cooperation with all the colleges in the Arab Academy for Science and Technology celebrates the parents' days. The General Director of the Academy invites all the Arab countries representative and all the deans and faculty members to attend. All the Student Organizations and Associations are invited to participate in this special day, giving students the opportunity to represent and showcase their home country. Dance, Music, Lights and Fashion a true live cultural entertainment with music, and beautiful clothes inspired by different countries and ethnicities! During this festival, students from all nationalities present their tradition and get a chance to share their culture, to show their activities of all nature and to display their scientific and artistic work.

Industry Advisory Committee

Biannually, the industry advisory committee of the College of Engineering and Technology meets. The committee comprises CEOs and top managers and senior engineers from different industry and services corporation sectors in addition to the College's Council and a number of faculty members.

Sectors and industries represented include the petroleum industries, food industries, construction, electrical and electronics and telecommunications. The meetings discuss industry trends and needs, and help to keep the Engineering curriculum up-to-date and to maintain department's program goals. The College Council discusses with the committee the different aspects of the engineering program, focusing on recent and planned changes, enrolment, and events.

Job Fair

The Job fair is a biannual one-day recruiting event that provides a forum for developing productive relationships between the College of Engineering graduates and the corporate world. It is a way of applying to career opportunities and serves as a networking tool with regional corporate professionals. The program also includes training courses for graduates to inform them how to well prepare for the job fair and make the best use of this event.

Companies participating in this event include, but are not limited to:

- Uniliver
- Procter & Gamble
- Alexandria Black Carbon
- El-Salama Hospital
- Aramex Company
- City Bank
- Bank El-Ahly
- Demline (Egypt) For Maritime Transportation
- Pharma Scope Company for Medicine
- Swedex Cables Company
- Om-saeed Port (Qatar)
- Kuwaiti Oil Tankers
- Modern Construction Chemicals Company (CMB).
- Aliens Company for Insurance

Blood Donation Campaign

A campaign is organized annually for blood donation. The College of Engineering insists in preserving this campaign as a part of its social as well as its educational role.

Summer Club

In cooperation with the alumni association the college of engineering offers its alumni opportunities to remain in contact with the Academy through many social, entertaining and professional gatherings. The idea of summer club achieved great success during the past years for the graduates' families and their friends along the three months of summer. The program of the summer club includes the following activities:

- Educational Courses: Computer- English.
- Social and cultural activities: painting and Arts works- Quran.

Also the program includes a one day trip for the contributors, in addition to organizing a celebration at the end of the summer club in Abu-Quir. The party includes competitions, maritime journeys, lunch meals, D.J. and distributing prizes and certificates for the competitors.

Orphans day

The alumni administration is honoured to declare that one of the main targets from establishing the alumni is offering all social, humanitarians, cultural, and proficiency services.

The alumni have achieved a great effort by offering more services foremost to the orphans' cases. A specialized group has taken place for studying the cases with social supervisors in the schools. Celebrations for the orphans and day trips are usually organized in the academy in Abu-Quir. These celebrations include participation of some members of the alumni in a lyrical evening party, cultural, athletics and lyrical competitions, offering presents, toys and a lunch meal as well.

These celebrations are held during February, March, May, September, November and December.

Trips

Throughout the year the College of Engineering organizes trips to different places inside Egypt. These are one or two day trips over the weekend period to main Egyptian cities. It is an opportunity for students to know their country and to have a break of the academic life.

During the semester breaks with the cooperation of the Alumni Association longer period trips are usually organized. Places like Sharm El-Sheikh, Marsa Matrouh, Luxor and Aswan, El-Ein El- Sokhna, Beirut, Paris, London, Vienna, Amsterdam, Istanbul were among the visited destinations.

Practical training

The College of Engineering and Technology has put in place a mechanism that guarantees the quality of practical training for the college students, as it has a positive effect on the students in particular, and on the educational process in general. This training is mandatory and is a college requirement for students' graduation. Using the College industrial liaisons students are guaranteed training opportunities inside and outside Egypt.

Practical Training inside Egypt

- Keeping agreements with industrial corporations and service organizations inside Egypt, to provide training opportunities for students from the College of Engineering and Technology during summer time.
- Students are mandated to finish a training period of at least one month after the completion of the sixth and the eighth semester.
- Students are being evaluated after the submission of a report that describes the nature of the training that has been performed, and presenting a thorough preview to a group of representatives from the department.
- Practical training has been an official academic requirement for the student to accomplish before graduation.

Practical Training in Foreign Countries

- Coordination between the College of Engineering and Technology and the Egyptian Committee for Students Exchange for practical training to provide multiple opportunities for training outside of Egypt.
- The College of Engineering and Technology provides 8 to 14 training opportunities internationally every year in (Germany, Norway, Turkey, Finland, England, Thailand, Slovenia, Jordon, Syria, Lebanon, Romania, Poland, and… etc).

The outside of Egypt training opportunities are awarded to the top students of each department.

College Weekly Seminars

Every Tuesday at 2:00 pm The College of Engineering and Technology holds a gathering for its entire faculty where a faculty member or a guest speaker is invited to give a talk about his latest research or the state of the art in his field of specialty or any matter of general interest to the College community. These seminars became a tradition of the College and present an opportunity for mutual and interdisciplinary cooperation. The event is also open to senior students and graduates. The following is a short list of the seminars held during the past two semesters.:

- Optimal Facility Layout under Different Topologies and intra-Plant Stochastic Flow Considerations
- Educational Software Package for Electromagnetic
- Scattering from Simple Two and Three Dimensional Objects
- Hardware design of Network Intrusion detection System
- Fault Detection and Fault Tolerant Systems for Process Control System
- Absorption Gas Cooling
- Noise Pollution Control
- Differential Motion of Structures Supports During Earthquakes
- New urban community, North coast, Alexandria
- Revolution of Nanotechnology
- Cognitive Radio: Making Wireless Communications Environment Aware
- The Science of Bioenergetics
- Artificial Submerged Reefs: A solution for Erosion Problems along Alexandria Coastline, Egypt?
- Pattern Recognition Using Spread Spectrum Approach
- Exploration of Quantum Cryptography in Network Security
- Optimum Ship Weather Routing
- Concurrent Engineering
- Problematic Soils
- Prediction of Solidification Defects in Single Crystal Nickel-base Supperalloys
- Mirrors of Civilization : Architecture and Music Statistical Methods in Software Engineering
- Direction of Arrival Estimation
- Biographical sketch
- A Road to World Class Industry: The 6 Sigma Concept.

The College of Engineering and Technology creates an exciting environment for students to experience unlimited opportunities and to interact with other students in addition to their traditional academic life. This interactive environment provides a student development experience that fosters individual student growth.

Students are in class almost one third of the time during the normal week of college. However, student life is more than just academics it is the remaining out of class time as well. Students are encouraged to maximize their college experience through participation in a variety of campus activities.

Students are encouraged to participate in student organizations, attend campus events and become involved in leadership and community service projects. They are encouraged to explore their opportunities for involvement in campus life and enrich their college experience. They are motivated to create as well as participate in scientific, cultural, social, and sports events.

Student Organizations and Societies

Student Council

The Student Council plays a very important role in the College of Engineering and Technology. It is a way that helps share students' ideas, interests, and concerns with college faculty and administration. Student Council Representatives attend after school meetings regularly and meet with classmates to discuss ideas and concerns about the educational process at the academy. They serve as a positive role model to other students.

Student Council is a representative structure, through which students can become involved in the affairs of the College, working in partnership with college officials, faculty and staff for the benefit of the College of Engineering and Technology and its students. The student council plays a very important role as it helps share students' ideas, interests, and concerns with faculty and college administration. Representatives have regular meetings where they discuss ideas and concerns about the educational process at the College of Engineering. They often also help raise funds for different activities, including social events and community projects. They work in cooperation with all the other societies and student organization in campus.

The student council consists of the following:
- Assistant Dean for Student Affairs
- Student Council President
- Vice President and Secretary
- Public Relations
- Vice President of Educational, Literature, & Arts Committee
- Members of Educational, Literature, & Arts Committee
- Vice President of the Scientific Committee
- Members of the Scientific Committee
- Vice President of the Sports Committee
- Members of the Sports Committee
- Vice President of the Social Committee
- Members of the Social Committee
- Assistant of Student's Basic Studies

Care Club

The Care Club is a community service club in the AAST that aims at providing Entertainment, Charity, Awareness, and Human Development programs.

The Care Club (CC) society has been found in 2003 and has attracted many students. CC has organized many social and athletic events. They adopted a campaign for promoting poor villages in Alexandria. Also, CC shares in Collecting Clothes campaign annually.

CC organizes each semester CCC (Care Club Cup) in different sports (Football, Basketball, and Table-tennis) and celebrates the winners with CCC trophy in a fruitful gathering.

Care Club's Vision is achieving deep relationships between students through a self-sufficient community that will benefit the students' educational and social life.

Care Club's Goal is gathering the AAST student under the theme of helping each other.
Some of the CC Activities include: Care Club Cup, Ibrahim Elfiky's programs at Alexandria, Cancer Campaign, and trips.

IEEE

The International Electrical & Electronic Engineers Society (IEEE) comprises the student activities mainly in electrical, electronic & communication and computer engineering departments. IEEE has its board elected annually under the supervisor of a staff counsellor.

IEEE in College of Engineering & Technology in AAST&MT is a part of Egypt Chapter among international region 8, which includes Africa continent. The IEEE student branch organizes many tutorials for AAST engineering students ranging from PCB, PSPICE and EWB tutorials to advanced AVR microcontroller design and programming.

The IEEE student branch has many sections

- WIE: Women In Engineering, was responsible for the organization of the Conference towards a smarter life , and Tri-profession cross roads events, they are interested in improving the role of women in the engineering fields
- JEEE: Junior Electrical & Electronics Engineers, concerned with the students from basic terms (1, 2, 3 and 4). The JEEE organizes a big event to inform all the new students with the faculty, the departments, fields of studies, services, and laboratories. This event is organized every semester.
- Computer Chapter: newly added to the branch to deal with computer engineering students, they were responsible for the organization of the IBM recruitment event.

It also organizes many events like:

- Leading your career... Leading your society, organized in cooperation with Amideast, career mideast, P & G, it is usually held in Bibliotheca Alexandrina BA, with a professional accredited training from IEEE international, and it is open for all fields of studies to learn the soft skills required for today's recruitment
- Tomorrow's wireless world, in cooperation with CISCO systems, Mobinil, Vodafone, SWS
- Towards a smarter life, in cooperation with The Rock for smart cards and access systems, and the WHO
- IBM recruitment event,
- The Tri-profession cross road, which gathered the medicine, the engineering and the business management, in cooperation with Philips, Siemens, EIO.
- Also, the branch organizes a trip every year to the EED, Egyptian Engineering Day, held in Cairo.

American Concrete Institute (ACI)

(ACI) has been found since 1904. It is advancing concrete knowledge to structural engineers and construction engineering students by several ways with 99 chapters, 65 students chapters and nearly 20,000 members spanning over 120 countries.

ACI in college of Engineering & Technology in AAST & MT is a part of the Egyptian student chapter. The student chapter develops many activities and various programs for students . This committee's mission is to provide students with the opportunity to better understanding concrete ,its uses, and properties, through seminars, researches, student projects and student competitions.

The ACI student chapter organizes many events for AAST CONSTRUCTION Engineering Students . These events have many sections like :

- Seminars (Project nationalism scientific research, the latest findings of the building material science, research ideas)
- Student projects and competitions (ACI mortar workability , ACI egg protection device)
- Tours (Engineering offices , construction sites, cement plants, ready mixed concrete plants, and chemical production plants)

Arctivity Society

This society has been initiated among Architectural Engineering and Environmental Design Department in College of Engineering & Technology in AAST&MT. It has organized many student galleries which showed the students skills in painting, drawing, sculpturing.

Arctivity Society has organized many musicals playing inside the college premises by students and to students.

Computer & Computing Club (CCC)

This society has been initiated among Electrical Engineering Department since 1999 and has outputted many student projects.

CCC organized each semester ROBOT Adventure Competition where 6 or more teams (each has designed his own ROBOT) are competed to get the winner in a pre-made play ground inside college premises.

Also many student projects are prepared to be presented in college activities such as Engineering Day or Annual Arab Festival.

Computer Engineering Club (CEC)
CEC is one of the scientific comities in the college of engineering and technology. It was created on 2007 under the supervision of computer engineering department; however, its activities are available for all other departments. The basic objective of the CEC is to improve the knowledge and practical skills of the students in different disciplines including:

- Programming languages.
- Database programming.
- Microcontrollers' applications.
- Artificial Intelligence.
- PC assembly.
- Computer vision.
- Computer controlled applications.
- Intelligent Robots design and implementation.
- Games programming.
- CCTV systems.
- Implementing Printed Circuit Boards (PCB).
- Computer Networks installation.

Some competitions are also organized by the CEC including:

- Academy Robotics Contest (ARC).
- Games 2 Games contest. (G2G)

International Mechanical Engineering Society (I-Mech)
This society has been initiated among Mechanical Engineering Department since 2006 and has attracted many department students especially Mecha-Tronic section students.

I-Mech Society shared in organizing many activities such as Engineering Day and Annual Arab Festival. I-Mech also made many industrial field trips.

Electrical Scientific Club (ESC)
This society is mainly interested in student projects and skills learning activities. ESC helps students from all departments to design and execute any scientific idea using needed components supplied by ESC.
ESC shared in all college activities and collect distinguished student projects to be presented in ESC Gallery.

Star-X Family
This family has been established in 2007 and since then has attracted many students to join in.
Star-X shares in welcoming fresh students each semester. Star-X helps fresh students by knowledge and information such as college map and staff résumé.

Cultural, Social, Trips and Sports Activities

Sports Activities

- Holding a Sports Day for every department throughout the semester.
- Holding regular tournaments for some sports between different departments on an agreed upon day weekly.
- Participation of the college sports teams in tournaments involving other colleges.

Social Activities

- Visiting Egyptian museums and attend cultural performances in Bibliotheca Alexandrina.
- Holding regular fund-raising events or collection of donations for orphans and the poor.
- Arrangement of visits to orphanages and hospitals for handicapped patients and giving them gifts on special occasions.
- Invitation of orphans and handicapped patients for a visit to the Academy and organizing entertaining activities for them on special occasions.

Art and Trips

- Organization of educational seminars under the supervision of the Student Affairs.
- Presentation of a program of trips for various departments including educational and scientific field trips.
- Organizing educational competitions between different departments.
- Organizing art and talent competitions (music and singing) and awarding prizes.
- Holding exhibitions for paintings and various art works and pieces.
- Organizing an annual arts festival as a social event.

Scientific Activities

- Forming various scientific committees by students
  - Committee of Marine Engineering
  - Committee of Electronics & Electrical Engineering
  - Committee of Mechanical & Industrial Engineering
  - Committee of Architectural & Construction Engineering
- Organization of various seminars in different fields throughout the academic year.
- Having an exhibition at the end of every semester displaying all students graduation projects and inviting some companies to attend.
- Organization of extra-curricular workshops in various fields after school hours for all students.
- Organization of extra and revision lectures at the end of every semester held by professors and teacher assistants.

General Facilities

Clinic

A modern clinic is available at the Abu-Quir campus. Physician of all specialties are present in the clinic. The clinic provides its medical services without any additional charge. Pharmacies are also attached to the clinic.

Dorms

Three hotels were built in AAST Abu-Quir campus. All the hotels provide 4 stars accommodation along with world class restaurants. Single and double rooms are available. A separate hotel for girls was built on the campus as well. All the hotels are built to the highest standards, and are maintained by professional staff.

Gymnasium

There are two fully equipped Gymnasiums at the Abu-Quir Campus.They include saunas and massage facilities as well as all the standard equipment. Professional staff supervises the operation of the facilities and gives guidance to the trainees. Fitness assessments including body fat analysis, and cardiovascular, muscular, and flexibility tests can be carried at the Gym. Personal fitness training is available to students and members by the session and is focused on teaching beginning, intermediate, and advanced exercisers the proper techniques and habits in order to reach their desired fitness goals

Restaurant

AAST offers several restaurants and cafeterias within the campus that deliver full meals at very reasonable prices. The main restaurant serves the students living on-campus and provides meals for breakfast, lunch and dinner. Many cafeterias are also available to students offering a variety collection of meals and snacks.

Cyber Cafe

The cyber café connects the students and instructors to the world through the Internet. It is fully equipped with the latest computers and skilled information technology (IT) professionals to help deliver the best service, during a non-stop working day starting from 9 AM to 7 PM daily (Except Friday) . The cyber café provides Emails, browsing, chatting, webpage development and training services to all the students on campus.

Service Centers

The Engineering Center

The Engineering Centre for Consultancy, Research and Community service (ECCRCS) is a state of the art centre that offers exclusive consultancy development services in the different fields of engineering. ECCRCS was established to provide the critical link between the industrial marketplace and the College of Engineering and Technology.

ECCRCS works closely with the College faculty, industry, government agencies and the local community to support and encourage the transformation of cutting edge research into innovative and commercially exploitable development services that are implemented using new and high technological procedures.
In addition, ECCRCS uses its extensive links with industry to help forge business and research partnerships and to market the College's research capabilities both nationally and internationally.

As ECCRCS continues its mission 'SHAPING THE FUTURE TODAY' it expects to maintain and enhance not only the quality of its services offerings and delivery but also adopting new approaches in design.
Fields and Scopes

ECCRCS works with the College of Engineering and Technology faculty and researchers along with a short list of international and local experts and consultants to identify innovations with commercial potential and to offer its distinguished services within the different fields of engineering.

Architectural And Environmental Design
Urban Planning, Urban Design, Landscaping, Architectural Design, Feasibility Studies and Arbitrating Engineering Disputes.

Civil Engineering
Structural design of concrete, metallic in addition to hydraulic constructions, design and structure of road projects, site surveying, soil investigations, reconstruction and repairing recommendations, projects management and construction material testing.

Computer Engineering
Feasibility studies, analysis, design and specifications of information systems.

Electronics And Communications Engineering
Feasibility studies and design for indoor and outdoor communication systems, design and implementation of electronic equipment for industrial application in the PCBs, feasibility study and design of solar cell powered system, designing special communication system for GMDSS on board ships as well as offshore and setting technical specifications for radar system on radar ships and coastal stations.

Electrical And Control Engineering
Design of distribution networks, lighting interior and exterior, power distribution, automatic control, alarm systems and laboratory facilities.

Industrial And Management Engineering
Strategy development, business process re-engineering and asset restructuring of organizations, productivity and quality improvement, feasibility studies of planned industrial projects, engineering analysis, equipment, selection and facility planning.
Development and analysis of computerized maintenance management systems, Management Information System (MIS), and supply chain design. Design and development of manufacturing processes, Conventional Machining, Forming, Casting, and welding process. Non-conventional and computer assisted manufacturing AM), work measurement and analysis of industrial processes operations, quality system design and management. Precision management standardization and calibration of equipment process.

Mechanical - Mechatronics And Marine Engineering
Preparation of technical studies, determination of technical specifications, carrying out research and designing projects. Moreover; conducting and management of training programs and preparation of maintenance programs. Conducting and management of training programs and preparation of maintenance programs.

Industry Service Centre (ISC)

The Industry Service Complex (ISC) is one of the leading entities in the Arab Academy for Science, Technology and Maritime Transport (AASTMT), which provides high quality services that support different industrial and educational sectors through Productive & Service Department and Research & Development Department. The ISC provides the practical training part of postgraduate and undergraduate courses.

The ISC contains Technical and Vocational Institute (TVI), which is internationally accredited by Pearson – BTEC, graduates skilful technicians who are highly demanded in the labour market.

The ISC mission is to serve industry and fulfil its demands by facilitating the transfer of modern technology, offer consultancies, and support industry with advanced skilled and qualified technicians who comply with the international standards. So, they can contribute in raising the competitiveness level of the Arab product and also the Arab worker in the labour market, to share in the development of the Arab societies.

Labs

The Industry Service Centre (ISC) is currently equipped with the following lab facilities:

- Industrial Engineering Labs
- Reverse Engineering Lab
- Marine Engineering Labs
- Steam Power Engineering Lab
- Automotive Engineering Lab
- Diesel Engines Lab
- Woodworking Lab
- Electronic Circuits Labs
- Programmable Logic Controllers Lab
- Mechatronics Lab
- Hydraulic and Pneumatic Systems Lab
- Computer Application Labs
- CNC & Advanced Manufacturing Lab
- Industrial Systems Simulator Lab
- Truck Simulator Lab

Information and Documentation Centre

Academy Information and Documentation Centre (IDC) was established in 1983. The main objective of IDC is to develop administrative and management information systems that help users and managers in different departments of the Academy to do their work in an easy, accurate, productive, and compact way. IDC has developed Information Systems for main Academy sectors for example, Registration, Student Affairs, Education, Finance, Logistics, Human Resources, Colleges, etc. More than 600 personal computers in colleges and different departments in Miami, and AbuKir campuses in Alexandria, and in Sheraton and Dokki campuses in Cairo are connected to our main servers through our local and wide area networks. IDC objectives are:

- Developing the information systems included in the AASTMT strategic information systems plan.
- Maintain and enhance the existing information systems.
- Ensure the quality of the developed systems and information services provided to all AASTMT users in different organizational level in order to increase user's satisfaction.
- Increase the awareness about the effective and important role of information systems in operational, tactical, and strategic AASTMT organizational levels.
- Continuous development of the main central servers used to provide information services to all AASTMT departments and colleges to ensure their compatibility with the current technologies.
- Preparation of the necessary documentation of the developed information systems according to the ISO standards.
- Provide technical support and training courses related to information technology to the AASTMT employees.
- Continues development of the capabilities and skills of all employees in the Centre.

Several software systems have been developed by IDC to serve and manage different activities within the departments and colleges of the AASTMT. These activities include Admission and Registration, Finance, Human Resources, Logistics, Library, Colleges and Education, Students Affairs, and Security Affairs.

Computer Networking Centre

Computer Networks and Data Centre (CNDC) provide a structured environment that effectively coordinates operational activities with all network users. CNDC services extend to all faculty members, administrative staff, students and classroom activities to provide services that meet the Academy goals

CNDC manages a wide range of services like wired and wireless internet, Email, IT support, Video Conference, SharePoint and others. Also, it provides a tier-one network support for each campus as well as a wide area network to AASTMT regional campuses.

While providing these services, CNDC offers oversight of problem, configuration and change management, network security, performance and policy monitoring, reporting quality assurance, scheduling and documentation.

The Abu-Quir network, being the main campus (220,000 square meters) is covered by the state of the art ATM network using a fibber infrastructure to guarantee best performance.

CNC sustains an infrastructure of a wide area network for all AAST campuses, which integrates data, voice and video. This infrastructure permits a full automation of administrative and educational mechanisms and permits a strong infrastructure for distant learning.

Multimedia Centre (MMC)

Founded in 1995, the Multimedia Centre (MMC) is an integrated multimedia production house specialized in the development of educational and training multimedia courses on the Internet, CD-ROM, and DVD-ROM.

The MMC in Alexandria is considered one of the largest specialized centres that produce interactive educational programs in the Middle East. MMC main expertise is the development of educational and training e-learning and multimedia courseware. E-learning and e-training multimedia integrated courseware packages are prepared on the Internet (WWW), Intranets and CD-ROM discs. CD/online hybrids are also produced to make use of the strengths of both environments speed of multimedia on CD-ROM and online updating and dynamic performance of the Internet.

The several successful projects witness an increasing success in the emerging field of multimedia and e-learning production, which can be justified by focused planning, creativity, innovation, and a highly qualified team.

As an integrated studio, the centre furthermore offers other services in design, printing, audio recording and editing, and video capturing and editing. The Centre comprises a number of specialized departments:

- Instructional design
- Graphic design & illustrations
- 2D & 3D animation
- Video
- Audio
- Programming
- Planning and quality assurance
- Research, development and technical support

Computer Service Centre

The Computer Services Centre (CSC) was established January 2000 in order to provide professional accredited training and testing services to all the new careers available in the market. CSC sensed the new trend taken by the employers on the lookout for specific professional computer skills varies from the Network administrators, Database administrators, Programmers, Web designers, Solution Providers etc. Though CSC guides the students to improve their computer skills and become professional, certified candidates in the race of job seeking tournament.

Computer Services Centre employs certified professional trainers are dedicated to carry out the training sessions, as a matter of fact they are market leaders in our professional tracks who accomplish high recent technology, science, teamwork, motivation and transfer them to the students.

Overall, CSC is considered a facility that provides IT services to the Alexandrian Community. The Centre main areas are the Professional Training, Authorized Testing, and Business/IT Centre Services.

International Partnerships & Accreditations

- Microsoft Certified Partner.
- Prometric Authorized Testing Centre.
- Pearson VUE Authorized Testing Centre.
- Certiport Authorized Testing Centre.
- Certified Business Professional (CBP).
- Authorized Testing Centre EC-Council (ECC).
- TOEFL iBT Testing Centre.
- International Computer Driving License (ICDL).
- Advanced International Computer Driving License (ICDL Advanced).
- International Business Driving License (IBDL).

Professional Training

The Computer Services Centre provide graduates, undergraduates and employees with the knowledge and modern skills to meet the requirements of the labour market of renewable in the field of information technology and communications, etc.

CSC also carries the responsibilities, mission & vision in raising their level of competency in essential IT and computer skills, improving their productivity at work, improving job prospects, providing an internationally recognized qualification to strengthen their future in a world full of business is accelerating and is evolving every day.

Training Tracks offered by Computer Services Centre are in Microsoft Networks, Microsoft Programming, Microsoft Office, Microsoft Professional Applications as SharePoint and Exchange Server. Other highly qualifying offers include CISCO, ICDL, IBDL, CBP, Oracle, MOS, BULATS, etc.

Authorized Testing

The Computer Services Centre Authorized Testing Partners are a trusted test and delivery provider to more than 400 organizations worldwide, like Microsoft, Oracle, CISCO, CompTIA, IBM, EC-Council, Adobe, SAP, etc. On their behalf, we securely deliver an average of 10 million exams per year to people who are seeking to improve their lives.

CSC delivers this by starting a new career to students who seek a professional certification, further developing their skills to improve on an existing one, adding to their qualifications for a promotion, taking school entrance exams or simply for professional development, people taking tests want a reliable, convenient and hassle-free experience.

The Authorized Testing Centre have partners who had decades of expertise in test development and delivery help organizations create and deliver exam programs that accurately measure the skills, knowledge and abilities they need to measure. Computer Services Centre is a trustful reliable partner who works closely with our clients to help determine their business requirements, as well as identify the goals of their test programs. For example, we provide the MCSE certification through Pearson VUE testing centre, which is considered the valid only way to be certified as a Microsoft Certified Solutions Expert in Windows Server 2012, and hundreds of many other different specializations as MCP, MCPD, OCA, OCP, CCNA, CCNP, CCIE, CompTIA, etc.

Business Centre Services

The Computer Services Centre Business Centre provides an essential support services for the students not only during the academic year but through the whole year including writing reports, scanning, photocopying, and printing. Also the business centre aims to represent student's interests, needs and provide services and facilities for all of them.

Business/IT Centre offers a range of comprehensive services including technical support to satisfy the student's needs starting in helping them to use the software required. The Business Centre PCs are dedicated for the services of the students including the latest software applications available.

Practical Training and Community Service

Practical Training and Community Service is considering the vitality of practical training in site. The College of Engineering and Technology provides training opportunities in companies and organization inside and abroad in all engineering fields.

The goal of practical training is to:

- Promote mutual student exchange.
- Increase the international training opportunities.
- Developing the agreements- MOU's with International and local Universities.
- Create protocols with companies for practical Training.
- Provide onsite training.
- Implement the dual degree program.
- Increase the awareness for practical training.
- Design specialized training programs.
- Raise the number of visits to the companies during the year.
- Establish an industrial advisory committee from the field to each department.
- Support short term study abroad.
- Increase the number of Faculty participation in the international practical training and projects.

All the training courses offered are related to the College of Engineering departments, a sample group of these courses is listed below:

- Flow Measurements & Calculation
- Orifice & control Valves Calculations
- Advanced Control loop Analysis & Trouble Shooting
- Advanced Programmable Logic Controller PLC
- Instrumentation Calibration series, Calibration Level and Flow instruments
- Microprocessor in instrumentation and control
- Environmental Management Systems Auditor / Lead Auditor
- Digital Image Processing Using Matlab®
- Electronic Circuits Analysis by Computer (PSPICE).
- Marine pipeline and Subsea Systems
- Structural Design of Offshore Platforms
- Condition Based Maintenance IE
- Industrial Facilities Planning
- Project Scheduling
- Industrial Warehouses Planning

The college is devoted to serve the surrounding society through the consultation centre and student onions. The college intends to extend its role in community services by introducing its facilities, technical, human and other resources for this purpose. The goal of community service is to:

- Provide technical support to companies and organizations in all Engineering fields.
- Share Technical expertise and research findings with industrial sector.
- Invite industrial leaders and business entrepreneurs to leaders and to Supervise on the graduation projects.
- Raise the participation in solving problems of the society.
- Establish the small student unions that are serve the surrounding society.
- Involve the faculty numbers with governmental agencies in applied Engineering.
- Provide efficient consul tendency services indifferent fields.

Regional Informatics Centre

As a new contribution in its leading role in offering higher education standards and spreading the information technology, Arab Academy for Science, Technology and Maritime Transport established the first Regional Informatics Centre (RIC) in the Middle East and North Africa.

RIC is a division of the Arab Academy for Science and Technology founded in 2001 and located in Alexandria, Egypt. The Academy is aware that this new century has brought with it enormous revolutionary changes and developments in all field of human knowledge specifically the field of informatics. The idea of establishing the Regional Informatics Centre (RIC) originated from the desire to catch up with the amazing development in this field, to help in promoting the minds and talents of the AASTMT engineering students, and the necessity of creating a broad base of distinguished students who can catch up with the increasing acceleration in the development of Informatics and Robotics worldwide.

RIC organizes the following:

- Training courses in informatics and robotics.
- Workshops and exhibitions in the robotics field.
- The Egyptian Olympiad in informatics.
- The Robokids completion, in Robotics and Artificial Intelligence.

Accreditation

Based on the Presidential Decree number (82) for the year 2006, the National Authority for Quality Assurance and Accreditation of Education (NAQAAE) was founded to enhance the quality of education in Egypt.

In the light of NAQAAE's mandates, developing National Academic Reference Standards (NARS) for higher education comes on the top of its priorities. NARS are intended to set out clearly the graduate attributes and academic characteristics expected to be achieved in the academic programs of different disciplines.

The NARS for Engineering set out generic statements which represent general expectations about standards for the Bachelor degree in Engineering.

These statements clarify the attributes associated with the award of engineering degrees:

- The awards are in accord with the frameworks for contemporary engineering education.
- The Engineering degrees address the national expectations of the graduate engineers.
- The degrees satisfy the actual and expected market needs.

Engineering is the knowledge of the mathematical and natural sciences, gained by study, experience, and practice, applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind. It is the ability to initiate and conduct activity associated with engineering processes, systems, problems, opportunities, history, future, impacts, ethics and consequences. It involves knowledge, ways of thinking and acting and capabilities. It helps preparing individuals to make well-informed choices in their roles as consumers, workers, citizens and members of the global community.

The engineering education should achieve excellence in undergraduate and graduate education, research, public service and advancement of the state-of-the-art within the discipline. It aims to produce able, broadly educated, highly qualified engineers and useful creative high quality research and technology through academic excellence. Moreover, it intends to challenge the students, faculty and staff to learn, grow, achieve and serve the needs of society nationally, regionally and internationally. It means also to prepare students for a productive and rewarding career in engineering based on strong moral and ethical foundation.

The Attributes of the Engineer

The engineer should have the ability to:

- Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
- Design a system; component and process to meet the required needs within realistic constraints.
- Design and conduct experiments as well as analyse and interpret data.
- Identify, formulate and solve fundamental engineering problems.
- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
- Work effectively within multi-disciplinary teams.
- Communicate effectively.
- Consider the impacts of engineering solutions on society& environment.
- Demonstrate knowledge of contemporary engineering issues.
- Display professional and ethical responsibilities; and contextual understanding
- Engage in self- and life- long learning.

National Academic Reference Standards (NARS) for Engineering

The academic reference standards represent the general expectations about the qualifications, attributes and capabilities that graduates of the engineering programs should be able to demonstrate.

Knowledge and Understanding:

Acquiring knowledge and understanding of:

- Concepts and theories of mathematics and sciences, appropriate to the discipline.
- Basics of information and communication technology (ICT)
- Characteristics of engineering materials related to the discipline.
- Principles of design including elements design, process and/or a system related to specific disciplines.
- Methodologies of solving engineering problems, data gathering and interpretation
- Quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
- Business and management principles relevant to engineering.
- Current engineering technologies as related to disciplines.
- Topics related to humanitarian interests and moral issues.
- Technical language and report writing
- Professional ethics and impacts of engineering solutions on society and environment
- Contemporary engineering topics.

Intellectual Skills

The ability to:

- Select appropriate mathematical and computer-based methods for modelling and analysing problems.
- Select appropriate solutions for engineering problems based on analytical thinking.
- Think in a creative and innovative way in problem solving and design.
- Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.
- Assess and evaluate the characteristics and performance of components, systems and processes.
- Investigate the failure of components, systems, and processes.
- Solve engineering problems, often on the basis of limited and possibly contradicting information.
- Select and appraise appropriate ICT tools to a variety of engineering problems.

▸Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
▸Combine economic, societal, and environmental and risk management dimensions in design.
▸Analyse results of numerical models and assess their limitations.
▸Develop a systematic and methodical approach in dealing with new and advancing technology.

Practical and Professional Skills

The ability to:
▸Apply knowledge of mathematics, science, information technology, design, business context and engineering practice on integrative base to solve engineering problems.
▸Merge professionally the engineering knowledge, understanding, and feedback to improve design, products and/or services.
▸Create and/or re-design a process, component or system, and carry out specialized engineering designs.
▸Practice the neatness and aesthetics in design and approach.
▸Use computational facilities and techniques, measuring instruments, workshops and laboratories equipment to design experiments, collect, analyse and interpret results.
▸Use a wide range of analytical tools, techniques and equipment, and software packages pertaining to the discipline and develop required computer programs.
▸Apply numerical modelling methods to engineering problems.
▸Apply safe systems at work and appropriate steps to manage risks.
▸Demonstrate basic organizational and project management skills.
▸Apply quality assurance procedures and follow codes and standards.
▸Commercialize knowledge and skills to engineering community and industry.
▸Prepare and present technical reports.

General and Transferable Skills

The ability to:
▸Collaborate effectively within multidisciplinary team.
▸Work in stressful environment and within constraints.
▸Communicate effectively.
▸Demonstrate efficient IT capabilities.
▸Lead and motivate individuals.
▸Manage tasks, time, and resources effectively.
▸Search for information and adopt life-long learning.
▸Acquire entrepreneurial skills.
▸Refer to relevant literature effectively.

NARS Characterization for Engineering Disciplines

Indicative Curricula Content by Subject Area

Table 1: Indicative curricula content by subject area

	Subject Area	%	Tolerance
A	Humanities and Social Sciences (Univ. Req.)	11	9-12 %
B	Mathematics and Basic Sciences	21	20-26 %
C	Basic Engineering Sciences (Faculty/Spec. Req.)	21	20-23 %
D	Applied Engineering and Design	21	20-22 %
E	Computer Applications and ICT	10	9-11 %
F	Projects* and Practice	9	8-10 %
	Subtotal	93	92-94 %
G	Discretionary (Institution character-identifying) subjects	7	6-8 %
	Total	100	100%

Definition of Subject Areas

A – Humanities and Social Sciences

▸Acquiring knowledge of non-engineering fields that strengthen the consciousness of the engineer of the society and its culture, including business, marketing, wellness, ethics, law, arts, etc.

▸The ability to consider and evaluate the impact of the technology on the society, public health and safety.

▸The ability to appreciate and engage in social and entrepreneurial activities essential to the engineering practice and reflect on the management of the economics and social science

▸The ability to engage in life-long learning and respond effectively to the needs of the society.

B – Mathematics and Basic Sciences

Mathematics

▸Acquiring knowledge in mathematical and analytical methods.

▸The ability to reason about and conceptualize engineering components, systems or processes using analytical methods as related to the discipline.

▸The ability to analyse and model engineering components, systems and processes specific to the discipline.

▸The skill of using probability and statistical methods

Basic Sciences

▸Acquiring knowledge of physics, chemistry, mechanics, earth sciences, biological sciences and other specific subjects which focus on understanding the physical world.

▸The ability to select and apply scientific principles in practical problem solving.

▸The ability to analyse, model and reason about engineering components, systems or processes using principles and knowledge of the basic sciences as applicable in each engineering disciplinary context.

▸The ability to adopt scientific evidence-based techniques in problems solving

C – Basic Engineering Sciences

▸Integrating knowledge and understanding of mathematics and physical sciences to develop basic engineering laws and concepts related to the discipline.

▸The ability to extend knowledge and develop models and methods and use techniques, principles and laws of engineering sciences in order to lead to engineering applications across disciplinary boundaries.

▸The ability to deal effectively with numbers and concepts to identify/solve complex and open ended engineering problems.

D – Applied Engineering and Design

▸Attaining knowledge of operational practice, engineering codes and design techniques relevant to the subject

▸The ability to apply engineering knowledge and creative, iterative and open-ended procedures when conceiving and developing components, systems and processes.

▸The ability to integrate engineering knowledge, engineering codes, basic and mathematical sciences in designing a component, a system or a process.

▸The ability to work under constraints, taking into account time, economy, health and safety, social and environmental factors and applicable laws.

E – Computing and ICT

▸Attaining knowledge of ICT principles.

▸The ability to use computers, networks and software to support engineering activity, and to enhance personal/team productivity.

▸The ability to assess, use and validate results produced by packages and create software as required in discipline.

▸The ability to use general ICT tools effectively.

F – Project

▸Gaining the knowledge and experience of applying the different principles and techniques introduced in the program of study.

▸The ability to work within defined constraints, tackle work which lacks a well-defined outcome or which has a wide range of possible solutions and exhibit creativity in dealing with unfamiliar real-life problems.

▸The ability to investigate, plan and execute technical research specific to the discipline over an extended period of time; meeting deadlines and putting technical work in a social and commercial context.

▸The ability to work in a team, search published sources of information, interprets technical data and analyses and presents findings in various ways.

G – Discretionary Subjects

▸Attaining knowledge and understanding of subjects selected by the institution to identify its character and/or satisfy the needs of the society.

▸The ability to recognize, appreciate and respond effectively to the needs of the society via investing the technical knowledge specific to the discipline.

▸The ability to lead and motivate people as well as organize and control tasks, people and resources.

Deanery

Amr Ali Hassan,
Dean of College.
Gihan Mossad Hannalla,
Vice Dean, Education Affairs.
Alaa Khalil,
Vice Dean, Graduate Studies and Research.
Tarek Mostafa,
Vice Dean, Student Affairs.
Iman Morsi,
Vice Dean, Practical Training and Community Service.

Department Heads

El-Sayed Saber,
Head of Department of Mechanical Engineering.
Alaa El Din Sarhan,
Head of Department of Architectural Engineering and Environmental Design.
Mostafa Abdel Gelil,
Head of Department of Electrical and Control Engineering.
Maha Sharkas,
Head of Department of Electronics and Communications.
Nasser Mohamed El-Maghraby,
Head of Department of Basic and Applied Science.
Khaled S. El-Kilany,
Head of Department of Industrial and Management Engineering.
Sherin Youssef,
Head of Department of Computer Engineering.
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Head of Department of Construction and Building Engineering.
Ashraf Sharara,
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Deanery Cairo

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Adel Belal,
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Sherief El_Flfiki,
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Samir Yossuef,
Head of Basic and Applied Science Department.
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Rania El_sharkawy,
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Faculty

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- **Hussein Ezzat Abul khair,** *Professor, PhD, 1982, Faculty of Fine Arts, Alexandria University, Egypt, Interior Design, Architecture & Urban Design.*
- **Karim Abu Gad, Assistant,** *Professor, PhD, 1997, Faculty of Engineering, Alexandria University, Egypt in affliation with Howard University Washington, DC.*
- **Maye Abbas Yehia,** *Associate Professor, PhD, 2007. Faculty of Engineering, Alexandria University, Egypt, Architecture & Urbanism.*
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- **Mohamed Adel El Desoky,** *Assistant Professor, PhD, 2012, Faculty of Engineering, Cairo University, Egypt, Architectural Conservation.*
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- **Mohamed Ibrahim Gomaa,** *Professor, PhD, 1982, D.P.L.G. Beaux Arts, Paris, France, Architecture & Urban Design.*
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- **Mostafa Mohamed Gabr,** *Professor, PhD, 1990, Edinburgh University, UK, Landscape Architecture & Urban Design.*
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- **Wael Mahmoud Hassab,** *Associate Professor, PhD, 2004, Faculty of Engineering, Alexandria University, Egypt, Sustainable Architecture.*
- **Yasmin Sobhy Kandil,** *Assistant Professor, PhD, 2011, Faculty of Engineering, Cairo University, Egypt, Urban Design.*
- **Yasser Ahmed Farghaly,** *Associate Professor, PhD, 2005, Faculty of Fine Arts, Alexandria University, Egypt, Architectural Education, Urban Landscape.*

Basic and Applied Science

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Computer Engineering

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Construction and Building Engineering

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Electronics and Communications Engineering

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Electrical and Control Engineering

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Industrial and Management Engineering

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- **Noha M. Galal,** *Assistant Professor, Ph.D. (2010) Alexandria University, Egypt, Production Engineering.*
- **Yehia M.Youssef,** *Associate Professor, Ph.D. (2003) Imperial College London, UK, Material Science and Engineering.*

Mechanical Engineering

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