Eastern Mediterranean University
Faculty of Engineering

To those who seek the best knowledge
To those who desire better future
To the new generation

Software Engineering Program
Computer Engineering Department
http://cmse.emu.edu.tr

Undergraduate Catalogue
2011 - 2012
GENERAL INFORMATION

The Department of Computer Engineering was established in 1993. The first group of thirty students graduated in 1997. The M.Sc. and Ph.D. programs were established in 1996. The department moved to its current building in 1998. Currently there are 420 undergraduate students and 102 graduate students. As of October 2011, the total number of students who graduated from the department reaches 1570.

The department has undergraduate and graduate programs of study leading to the degrees of Bachelor of Science (B.Sc.), Master of Science (M.Sc.), and Doctor of Philosophy (Ph.D.) in Computer Engineering.

The department offers a balanced undergraduate program which covers computer software, computer hardware, and computer networks with a strong background on mathematics. The emphasis is mainly on the engineering aspects, analysis and design of hardware and software systems. In addition to Calculus, Physics, English, Economics, and Industrial Management courses, students may take non-technical electives.

The fourth year program has five area elective courses, in addition to a two-term graduation project, developing independent research, report writing and oral presentation skills. All the departmental courses are supplemented by laboratory works and tutorial hours. This approach provides graduates of the program with a breadth of experience, and with the impetus to continue their development throughout their careers.

The department has nine PC laboratories, all with Internet connections via satellite directly to the USA. There are more than 350 PC’s in these laboratories. The logic design laboratories and the microprocessors laboratory are equipped with the latest hardware and software for component based design and for integrated circuit based design. A study room provides the students a quiet and friendly environment for studying in the department.

The department is involved in a number of national and international research projects, in collaboration with various universities and organizations. Currently, research in the following areas is being pursued: ATM Networks, VLSI Routing, Multimedia, Graphical User Interfaces, Expert Systems, Neural Networks, Distance Education, Fuzzy Logic and Parallel Processing. Faculty members are also carrying out some projects within Gazimağusa Technology Development Region.

THE MISSION OF THE COMPUTER ENGINEERING PROGRAM

The mission of the EMU Computer Engineering Program is to educate its students to become multilingual, highly qualified computer engineers who can effectively manage current and future challenges for the benefit of society.

PROGRAM EDUCATIONAL OBJECTIVES OF COMPUTER ENGINEERING DEPARTMENT

1. Practice computer engineering in various industrial/technological sectors at both national and international levels.
2. Communicate their ideas effectively within a bilingual environment, and perform efficient teamwork both in supportive and leadership roles.
3. Be conscious of the necessity for high ethical standards in their profession.
4. Appreciate the need to engage in life-long learning activities, starting with the pursuit of graduate studies.
PROGRAM OUTCOMES OF COMPUTER ENGINEERING DEPARTMENT

Graduates of the Computer Engineering program should attain:

a. An ability to apply knowledge of mathematics, science, and engineering,
b. An ability to design and conduct experiments, as well as to analyze and interpret data,
c. An 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,
d. An ability to function on multidisciplinary teams,
e. An ability to identify, formulate, and solve engineering problems,
f. An understanding of professional and ethical responsibility,
g. An ability to communicate effectively,
h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,
i. A recognition of the need for, and an ability to engage in life-long learning,
j. A knowledge of contemporary issues,
k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice,
l. A knowledge of probability and statistics, mathematics through differential and integral calculus, discrete mathematics, basic sciences, computer science, and engineering sciences necessary to analyze and design software, and systems containing hardware and software components,
m. An ability of multilingual communication.
**EASTERN MEDITERRANEAN UNIVERSITY**
**2011 – 2012 ACADEMIC CALENDAR**

### Fall Semester

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 13 2011</td>
<td><strong>ON LINE COURSE REGISTRATION COMMENCES (REGISTERED STUDENTS)</strong></td>
</tr>
<tr>
<td>September 07</td>
<td><strong>LAST DAY FOR CHANGING 'INCOMPLETE' GRADES</strong></td>
</tr>
<tr>
<td>September 13</td>
<td><strong>ENGLISH PROFICIENCY TEST 1st STAGE ; LAST DAY FOR ONLINE REGISTRATION</strong></td>
</tr>
<tr>
<td>September 14</td>
<td><strong>ENGLISH PROFICIENCY TEST 2nd STAGE</strong></td>
</tr>
<tr>
<td>September 14-16</td>
<td><strong>COURSE REGISTRATION PERIOD (WITH SUPERVISOR )</strong></td>
</tr>
<tr>
<td>September 17 2011</td>
<td><strong>ORIENTATION DAYS FOR NEW STUDENTS</strong></td>
</tr>
<tr>
<td>September 19 2011</td>
<td><strong>CLASSES COMMENCE</strong></td>
</tr>
<tr>
<td>September 26 2011</td>
<td><strong>ACADEMIC YEAR OPENING CEREMONY (NO CLASSES BETWEEN 9.30 - 12.20)</strong></td>
</tr>
<tr>
<td>October 03 2011</td>
<td><strong>LAST DAY FOR LATE REGISTRATION</strong></td>
</tr>
<tr>
<td>October 29 2011</td>
<td><strong>LAST DAY FOR SUBMISSION OF GRADE CHANGE TO THE REGISTRAR</strong></td>
</tr>
<tr>
<td>October 30 2011</td>
<td><strong>LAST DAY FOR SUBMISSION OF GRADUATION MAKE – UP EXAM GRADES TO THE REGISTRAR</strong></td>
</tr>
<tr>
<td>November 06-09 2011</td>
<td><strong>RELIGIOUS HOLIDAY (EID AL-ADHA)</strong></td>
</tr>
<tr>
<td>November 11-23 2011</td>
<td><strong>MID-TERM EXAMS PERIOD</strong></td>
</tr>
<tr>
<td>November 15 2011</td>
<td><strong>TRNC REPUBLIC DAY (NATIONAL HOLIDAY)</strong></td>
</tr>
<tr>
<td>December 02 2011</td>
<td><strong>LAST DAY FOR COURSE WITHDRAWAL</strong></td>
</tr>
<tr>
<td>December 05 2011</td>
<td><strong>LAST DAY FOR APPLYING TO GET LEAVE OF ABSENCE</strong></td>
</tr>
<tr>
<td>December 01 2011</td>
<td><strong>ON LINE COURSE REGISTRATION COMMENCES (REGISTERED STUDENTS)</strong></td>
</tr>
<tr>
<td>January 01 2012</td>
<td><strong>NEW YEAR’S DAY</strong></td>
</tr>
<tr>
<td>January 03-18 2012</td>
<td><strong>FINAL EXAMS</strong></td>
</tr>
<tr>
<td>January 25 2012</td>
<td><strong>LAST DAY FOR THE SUBMISSION OF GRADES TO THE REGISTRAR</strong></td>
</tr>
<tr>
<td>January 27 2012</td>
<td><strong>LAST DAY FOR SUBMISSION OF THE GRADUATION DECISIONS TO THE REGISTRAR</strong></td>
</tr>
<tr>
<td>February 01 2012</td>
<td><strong>GRADUATION CEREMONY FOR FALL GRADUATES</strong></td>
</tr>
</tbody>
</table>

### Spring Semester

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 01 2011</td>
<td><strong>LAST DAY FOR ENTERING COURSES TO BE OFFERED IN SPRING SEMESTER</strong></td>
</tr>
<tr>
<td>December 05 2011</td>
<td><strong>ON LINE COURSE REGISTRATION COMMENCES (REGISTERED STUDENTS)</strong></td>
</tr>
<tr>
<td>February 04 2012</td>
<td><strong>RELIGIOUS HOLIDAY (MEVLİD KANDİLİ)</strong></td>
</tr>
<tr>
<td>February 05 2012</td>
<td><strong>LAST DAY OF ONLINE REGISTRATION</strong></td>
</tr>
<tr>
<td>February 06 2012</td>
<td><strong>LAST DAY FOR CHANGING 'INCOMPLETE' GRADES</strong></td>
</tr>
<tr>
<td>February 07 2012</td>
<td><strong>ENGLISH PROFICIENCY TEST 1st STAGE</strong></td>
</tr>
<tr>
<td>February 09 2012</td>
<td><strong>ENGLISH PROFICIENCY TEST 2nd STAGE</strong></td>
</tr>
<tr>
<td>February 12 2012</td>
<td><strong>LAST DAY FOR ONLINE REGISTRATION</strong></td>
</tr>
<tr>
<td>February 13-15 2012</td>
<td><strong>COURSE REGISTRATION PERIOD (WITH SUPERVISOR )</strong></td>
</tr>
<tr>
<td>February 16 2012</td>
<td><strong>CLASSES COMMENCE</strong></td>
</tr>
<tr>
<td>February 23 2012</td>
<td><strong>FIRST DAY OF REGISTRATION WITH PENALTY</strong></td>
</tr>
<tr>
<td>March 01 2012</td>
<td><strong>LAST DAY FOR LATE REGISTRATION</strong></td>
</tr>
<tr>
<td>April 04 - 14 2012</td>
<td><strong>MID-TERM EXAMS PERIOD</strong></td>
</tr>
<tr>
<td>April 23 2012</td>
<td><strong>NATIONAL SOVEREIGNTY &amp; CHILDREN’S DAY</strong></td>
</tr>
<tr>
<td>April 27 2012</td>
<td><strong>LAST DAY FOR COURSE WITHDRAWAL, LAST DAY FOR APPLYING TO GET LEAVE OF ABSENCE</strong></td>
</tr>
<tr>
<td>May 01 2012</td>
<td><strong>WORKERS’ AND SPRING DAY</strong></td>
</tr>
<tr>
<td>May 19 2012</td>
<td><strong>ATATÜRK COMMEMORATION, YOUTH AND SPORTS DAY</strong></td>
</tr>
<tr>
<td>May 24 2012</td>
<td><strong>LAST DAY OF CLASSES</strong></td>
</tr>
<tr>
<td>May - June 28-12 2012</td>
<td><strong>FINAL EXAMS PERIOD</strong></td>
</tr>
</tbody>
</table>

* Fall term consists of 88, Spring term consists of 88 and summer school consists of 42 work days.
** In case of late registration, 15 TL is paid for each day.
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 18, 2012</td>
<td><strong>LAST DAY FOR THE SUBMISSION OF GRADES TO THE REGISTRAR</strong></td>
</tr>
<tr>
<td>June 21, 2012</td>
<td><strong>LAST DAY FOR SUBMISSION OF THE GRADUATION DECISIONS TO THE REGISTRAR</strong></td>
</tr>
<tr>
<td>June 26, 2012</td>
<td><strong>GRADUATION CEREMONY FOR SPRING GRADUATES</strong></td>
</tr>
<tr>
<td>Summer School</td>
<td><strong>LAST DAY FOR ENTERING COURSES TO BE OFFERED IN SUMMER</strong></td>
</tr>
<tr>
<td>May 04, 2012</td>
<td><strong>ON LINE COURSE REGISTRATION COMMENCES</strong></td>
</tr>
<tr>
<td>June 19 - 20, 2012</td>
<td><strong>COURSE REGISTRATION PERIOD (WITH SUPERVISOR )</strong></td>
</tr>
<tr>
<td>June 21, 2012</td>
<td><strong>CLASSES COMMENCE</strong></td>
</tr>
<tr>
<td>June 22, 2012</td>
<td><strong>LAST DAY FOR LATE REGISTRATION</strong></td>
</tr>
<tr>
<td>June 28, 2012</td>
<td><strong>LAST DAY FOR ADD / DROP</strong></td>
</tr>
<tr>
<td>July 06, 2012</td>
<td><strong>LAST DAY FOR ENTERING COURSES TO BE OFFERED IN FALL SEMESTER</strong></td>
</tr>
<tr>
<td>July 11, 2012</td>
<td><strong>ON LINE COURSE REGISTRATION COMMENCES (REGISTERED STUDENTS)</strong></td>
</tr>
<tr>
<td>July 20, 2012</td>
<td><strong>PEACE AND FREEDOM DAY</strong></td>
</tr>
<tr>
<td>July 23, 2012</td>
<td><strong>LAST DAY FOR COURSE WITHDRAWAL</strong></td>
</tr>
<tr>
<td>August 01, 2012</td>
<td><strong>NATIONAL HOLIDAY</strong></td>
</tr>
<tr>
<td>August 10, 2012</td>
<td><strong>LAST DAY OF CLASSES</strong></td>
</tr>
<tr>
<td>August 13 - 15, 2012</td>
<td><strong>FINAL EXAMS PERIOD</strong></td>
</tr>
<tr>
<td>August 18 - 20, 2012</td>
<td><strong>RELIGIOUS HOLIDAY (EID AL-FITIR)</strong></td>
</tr>
<tr>
<td>August 24, 2012</td>
<td><strong>LAST DAY FOR THE SUBMISSION OF GRADES TO THE REGISTRAR</strong></td>
</tr>
<tr>
<td>August 28, 2012</td>
<td><strong>LAST DAY FOR SUBMISSION OF THE GRADUATION DECISIONS TO THE REGISTRAR</strong></td>
</tr>
<tr>
<td>August 30, 2012</td>
<td><strong>VICTORY DAY (TURKEY)</strong></td>
</tr>
<tr>
<td>August 31, 2012</td>
<td><strong>DIPLOMA AWARDING TO SUMMER SCHOOL GRADUATES</strong></td>
</tr>
</tbody>
</table>
FACULTY

Chair
Assoc. Prof. Dr. Muhammed Salamah
Ph.D. 1996, Middle East Technical University, Ankara, Turkey
e-mail: muhammed.salamah@emu.edu.tr

Vice Chairs
Asst. Prof. Dr. Cem Ergün
Basic Interests: Speaker Recognition in Low Bit Rate Channels, Speech Enhancement, and Application of Genetic Algorithms and Neural Networks to Communication/Signal Processing Problems
e-mail: cem.ergun@emu.edu.tr

Asst. Prof. Dr. Önsen Toygar
Basic Interests: Unimodal and Multimodal Biometric Recognition Systems (Face, Iris and Facial Expression Recognition), Human Age Classification/Estimation, Multiple Classifier Combination, Evolutionary Computation.
e-mail: onsen.toygar@emu.edu.tr

Professors
Dr. Erden Başar
Ph.D. 1981, Aegean University, İzmir, Turkey
Basic Interests: Programming Languages, Data structures, Database Systems and Design, Visual Programming, Object Oriented Design and Programming
e-mail: erden.basar@emu.edu.tr

Dr. Marifi Güler
Ph.D. 1986, The University of Edinburgh, Scotland, UK
Basic Interests: Computational Neuroscience, Neural Networks, Stochastic Neuron Models
e-mail: marifi.guler@emu.edu.tr

Dr. Hasan Kömürçügil
Basic Interests: Microprocessor Based Systems, Analog and Digital Circuit Design, Fuzzy Logic Control, Soft Computing, Control Systems
e-mail: hasan.komurcugil@emu.edu.tr

Dr. Omar Ramadan
Basic Interests: Communications, Computational Electromagnetic, Digital Signal Processing, Parallel Programming, Fiber Optics, Numerical Mathematics
e-mail: omar.ramadan@emu.edu.tr

Associate Professors
Dr. Hakan Altıncay
Ph.D. 2000, Middle East Technical University, Ankara, Turkey
Basic Interests: Pattern Recognition, Speech Processing, Information Fusion, Multiple Classifier Systems
e-mail: hakan.altincay@emu.edu.tr

Dr. Doğu Arifler
Ph.D. 2004, The University of Texas, Austin, Texas, USA
Basic Interests: Network Measurements, Statistical Inference of Network Properties, Network Performance Analysis, Stochastic Geometry
e-mail: dogu.arifler@emu.edu.tr

Dr. İşık Aybay
Ph.D. 1989, Middle East Technical University, Ankara, Turkey
Basic Interests: Distance Education, Real-Time Multimedia Systems, Parallel Computer Architecture, Neural networks
e-mail: isik.aybay@emu.edu.tr
Dr. Zeki Bayram  
Ph.D. 1993, The University of Alabama, Birmingham, Alabama, USA  
**Basic Interests**: Programming Languages, Automated Deduction, Semantic Web, Constraint Programming, Logic, Cloud Computing  
e-mail: zeki.bayram@emu.edu.tr

Dr. Alexander Chefranov  
Ph.D. 1984, Taganrog Radio-Engineering Institute, Taganrog, Russia  
D.Sc. 1998, Taganrog State University of Radio-Engineering, Taganrog, Russia  
**Basic Interests**: Parallel Processing and Programming, Operating Systems, Real-Time Systems, Data Bases, Artificial Intelligence, Information Security, Modeling of Physical Processes  
e-mail: alexander.chefranov@emu.edu.tr

**Assistant Professors**

Dr. Adnan Acan  
Ph.D. 1992, Middle East Technical University, Ankara, Turkey  
**Basic Interests**: Evolutionary Computation, Nature-Inspired Metaheuristics, Neural Networks, Classifier Systems, Face Recognition  
e-mail: adnan.acan@emu.edu.tr

Dr. Gürçü Öz  
**Basic Interests**: Computer Networks, Distributed Systems, Advanced System Simulations, Wireless Networks  
e-mail: gurcu.oz@emu.edu.tr

Dr. Yıltan Bitirim  
**Basic Interests**: Information Retrieval Systems, Database Management Systems, Wireless Personal Communication, Artificial Intelligence  
e-mail: yiltan.bitirim@emu.edu.tr

Dr. Mehmet Bodur  
Ph.D. 1991, Middle East Technical University, Ankara, Turkey  
e-mail: mehmet.bodur@emu.edu.tr

Dr. Ahmet Ünveren  
**Basic Interests**: Multi-Objective Optimization, Evolutionary Algorithms, VLSI Design and Routing, Genetic Algorithms for VLSI Design and Routing, Graph Theory  
e-mail: ahmet.unveren@emu.edu.tr

Dr. Ekrem Varoğlu  
**Basic Interests**: Natural Language Processing (NLP), Biomedical Text Mining, Information Extraction, Bioinformatics, Data Mining  
e-mail: ekrem.varoglu@emu.edu.tr
Ph.D. Assistants

Abdulkarim A. M. Abed  
B.Sc. 1990, Electronic Engineering Department, Queen Mary and Westfield College, University of London  
M.Sc. 2003, Computer Engineering Department, Middle East Technical University  
e-mail: abdulkarim.abed@emu.edu.tr

Maryam Eskandari  
B.S. 2005, Computer Engineering Department, Tabriz University  
M.Sc. 2009, Computer Engineering Department, Eastern Mediterranean University  
e-mail: maryam.eskandari@emu.edu.tr

Omid Sharifi  
B.S. 2005, Computer Engineering Department, Tabriz University  
M.Sc. 2009, Computer Engineering Department, Eastern Mediterranean University  
e-mail: omid.sharifi@emu.edu.tr

Cem B. Kalyoncu  
B.Sc. 2005, Computer Engineering Department, Cyprus International University  
M.Sc. 2010, Computer Engineering Department, Cyprus International University  
e-mail: cem.kalyoncu@emu.edu.tr

Shahin Mehdipour Ataee  
B.Sc. 2006, Computer Engineering Department, University of Science & Technology of Mazandaran, Iran.  
M.Sc. 2010, Computer & IT Department, Qazvin Azad University, Iran  
e-mail: shahin.mehdipour@emu.edu.tr

Zixiang Xu  
B.Sc. 1990, Computer Information System Department, European University of Lefke  
M.Sc. 2003, Computer Engineering Department, European University of Lefke  
e-mail: zixiang.xu@emu.edu.tr

Saed Alqaraleh  
B.S. 2008, Software Engineering, Al-Hussein Bin Talal University, Jordan  
M.Sc. 2011, Computer Engineering Department, Eastern Mediterranean University  
e-mail: saed.alqaraleh@emu.edu.tr

Mohammad Azhari  
B.S. 2009, Computer Engineering, Eastern Mediterranean University  
M.Sc. 2011, Computer Engineering, Eastern Mediterranean University  
e-mail: mohammad.azhari@emu.edu.tr

Zhavat Sherinov  
B.S. 2009, Computer Engineering, Eastern Mediterranean University  
M.Sc. 2011, Computer Engineering, Eastern Mediterranean University  
e-mail: zhavat.sherinov@emu.edu.tr

Dima Badawi  
B.Sc. 2003, Computer Engineering, Palestine Polytechnic University, Palestine.  
M.Sc. 2008, Computer Engineering, AlQuds University, Palestine.  
e-mail: dima.badawi@emu.edu.tr

M.Sc. Assistants

Mina Farmanbar  
B.Sc. 2007, Computer Engineering, Mahshahr University, Iran  
e-mail: Mina.farmanbar@emu.edu.tr

Igwe John, Kalu  
B.Sc. 2010, Electrical and Electronic Engineering, Eastern Mediterranean University  
e-mail: igwe.kalu@emu.edu.tr

Anurika Okoli  
B.Sc. 2010, Information Technology, Eastern Mediterranean University  
e-mail: anurika.okoli@emu.edu.tr

Chukwudi James OJUKWU  
B.Sc. 2010, Computer Engineering, Eastern Mediterranean University  
e-mail: chukwudi.ojukwu@emu.edu.tr
Alexandr Polisciuc  
B.S. 2009, Economic Cybernetics, Ukrainian Academy of Banking  
M.S. 2010, Economic Cybernetics, Ukrainian Academy of Banking  
e-mail: alexandr.polisciuc@emu.edu.tr

Faize Özerek  
B.S. 2011, Computer Engineering, Eastern Mediterranean University  
e-mail: faize.ozerek@emu.edu.tr

Secretary  
Sulan Yiğithan  
Diploma, 1996, Namık Kemal Lisesi.  
Tel: +90 392 366 6588 – 0392 (630) 1484 (Ext.)  
Fax: +90 392 365 0711  
e-mail: sulan.gul@emu.edu.tr

System Administrator  
Hürol Mear  
B.Sc. 1993, Electrical and Electronics Engineering Department, Eastern Mediterranean University  
M.Sc. 1998, Electrical and Electronics Engineering Department, Eastern Mediterranean University  
e-mail: hurol.mear@emu.edu.tr

Administrative Officer  
Erdal Altun  
e-mail: erdal.altun@emu.edu.tr

Operator  
Mehmet Topal  
e-mail: mehmet.topal@emu.edu.tr
## Undergraduate Program and Facilities

### I. Undergraduate Curriculum

#### First Year

##### First Year: Fall Semester (First Semester)

<table>
<thead>
<tr>
<th># of crs.</th>
<th>R.Code</th>
<th>Crs.Code</th>
<th>Course Name</th>
<th>Prequisite</th>
<th>Lect.</th>
<th>Lab/Tut</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29711</td>
<td>CMPE 101</td>
<td>Foundations of Computer Engineering</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>29712</td>
<td>MATH 163</td>
<td>Discrete Mathematics</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>29713</td>
<td>ENGL 191</td>
<td>Communication in English I</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>29714</td>
<td>MATH151</td>
<td>Calculus I</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>29715</td>
<td>PHYS101</td>
<td>Physics I</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

S.Tot. = 5  
Sem. Cr. Total: 17  
Cr. Sub-Total: 17

##### First Year: Spring Semester (Second Semester)

<table>
<thead>
<tr>
<th># of crs.</th>
<th>R.Code</th>
<th>Crs.Code</th>
<th>Course Name</th>
<th>Prequisite</th>
<th>Lect.</th>
<th>Lab/Tut</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29721</td>
<td>CMSE 100</td>
<td>Introduction to Profession</td>
<td>-</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>29722</td>
<td>CMPE 112</td>
<td>Programming Fundamentals</td>
<td>CMPE 101</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>29723</td>
<td>ENGL 192</td>
<td>Communication in English II</td>
<td>ENGL 191</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>29724</td>
<td>MATH 152</td>
<td>Calculus II</td>
<td>MATH 151</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>29725</td>
<td>PHYS 102</td>
<td>Physics II</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

S.Tot. = 5  
Sem. Cr. Total: 17  
Cr. Sub-Total: 34

#### Second Year

##### Second Year: Fall Semester (Third Semester)

<table>
<thead>
<tr>
<th># of crs.</th>
<th>R.Code</th>
<th>Crs.Code</th>
<th>Course Name</th>
<th>Prequisite</th>
<th>Lect.</th>
<th>Lab/Tut</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29731</td>
<td>CMSE 201</td>
<td>Introduction to Software Engineering</td>
<td>MATH 163</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>29732</td>
<td>CMPE 211</td>
<td>Object-Oriented Programming</td>
<td>CMPE 112</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>29733</td>
<td>CMPE 231</td>
<td>Data Structures</td>
<td>CMPE 112</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>29734</td>
<td>MATH 241</td>
<td>Linear Algebra and Ordinary Diff. Equations</td>
<td>MATH 152</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>29735</td>
<td>UE-01</td>
<td>Restricted Elective-Phys/Chem/Bio</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

S.Tot. = 5  
Sem. Cr. Total: 19  
Cr. Sub-Total: 53

##### Second Year: Spring Semester (Fourth Semester)

<table>
<thead>
<tr>
<th># of crs.</th>
<th>R.Code</th>
<th>Crs.Code</th>
<th>Course Name</th>
<th>Prequisite</th>
<th>Lect.</th>
<th>Lab/Tut</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29741</td>
<td>CMSE 222</td>
<td>Introduction to Computer Organization</td>
<td>MATH 163</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>29742</td>
<td>CMPE 242</td>
<td>Operating Systems</td>
<td>CMPE 112</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>29743</td>
<td>MATH 373</td>
<td>Numerical Analysis for Engineers</td>
<td>MATH 201</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>29744</td>
<td>ENGL 201</td>
<td>Communication Skills</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>29745</td>
<td>UE-AH 02</td>
<td>Univ. Elective- Arts &amp;Humanities-II</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

S.Tot. = 5  
Sem. Cr. Total: 17  
Cr. Sub-Total: 70
**Third Year**

<table>
<thead>
<tr>
<th># of crs.</th>
<th>R.Code</th>
<th>Crs.Code</th>
<th>Course Name</th>
<th>Prerequisite</th>
<th>Lect.</th>
<th>Lab/Tut</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29751</td>
<td>CMSE 321</td>
<td>Software Req. Analysis &amp; Specifications</td>
<td>CMSE 201</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>29752</td>
<td>CMSE 323</td>
<td>Human/Computer Interaction</td>
<td>CMSE 201</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>29753</td>
<td>CMPE 371</td>
<td>Analysis of Algorithms</td>
<td>CMPE 231</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>29754</td>
<td>CMSE 326</td>
<td>Software Quality Assurance &amp; Testing</td>
<td>CMSE 201</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>29755</td>
<td>MATH 322</td>
<td>Probability and Statistical Methods</td>
<td>MATH 152</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

S.Tot. = 5  
Sem. Cr. Total: 19  
Cr. Sub-Total: 89

**Third Year: Spring Semester (Sixth Semester)**

<table>
<thead>
<tr>
<th># of crs.</th>
<th>R.Code</th>
<th>Crs.Code</th>
<th>Course Name</th>
<th>Prerequisite</th>
<th>Lect.</th>
<th>Lab/Tut</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29761</td>
<td>CMSE 322</td>
<td>Software Design</td>
<td>CMSE 321</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>29762</td>
<td>CMPE 318</td>
<td>Principles of Programming Languages</td>
<td>CMPE 211</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>29763</td>
<td>CMSE 346</td>
<td>Computer Networks &amp; Communication</td>
<td>CMSE 222</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>29763</td>
<td>CMPE 354</td>
<td>Database Management Systems</td>
<td>CMPE 231</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>29785</td>
<td>UE-AH 03</td>
<td>Uni. Elective- Arts &amp; Humanities III</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

S.Tot. = 5  
Sem. Cr. Total: 19  
Cr. Sub-Total: 108

**Fourth Year**

**Fourth Year: Fall Semester (Seventh Semester)**

<table>
<thead>
<tr>
<th># of crs.</th>
<th>R.Code</th>
<th>Crs.Code</th>
<th>Course Name</th>
<th>Prerequisite</th>
<th>Lect.</th>
<th>Lab/Tut</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>29771</td>
<td>CMSE 400</td>
<td>Summer Training</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>-</td>
<td>29772</td>
<td>CMSE 401</td>
<td>Graduation Project I</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>29773</td>
<td>CMSE 471</td>
<td>Automata Theory</td>
<td>MATH 163</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>29774</td>
<td>CMSE 473</td>
<td>Software Process &amp; Management</td>
<td>CMSE 322</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>29775</td>
<td>CMPE 423</td>
<td>Embedded System Design</td>
<td>CMSE 222</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>29776</td>
<td>AE 01</td>
<td>Area Elective I</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>29777</td>
<td>AE 02</td>
<td>Area Elective II</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

S.Tot. = 5  
Sem. Cr. Total: 21  
Cr. Sub-Total: 129

**Fourth Year: Spring Semester (Eighth Semester)**

<table>
<thead>
<tr>
<th># of crs.</th>
<th>R.Code</th>
<th>Crs.Code</th>
<th>Course Name</th>
<th>Prerequisite</th>
<th>Lect.</th>
<th>Lab/Tut</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29781</td>
<td>AE 03</td>
<td>Area Elective III</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>29782</td>
<td>AE 04</td>
<td>Area Elective IV</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>29783</td>
<td>CMSE 402</td>
<td>Graduation Project II</td>
<td>CMSE 401</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>29784</td>
<td>UE-SB 01</td>
<td>Restrictive Elective - ECON/MGMT/FIN</td>
<td>-</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Restrictive Elective - BANK/ACCT</td>
<td>-</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>29785</td>
<td>UE-SB 02</td>
<td>Restrictive Elective - Ethics</td>
<td>-</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

S.Tot. = 5  
Sem. Cr. Total: 17  
C.Tot.=40  
Cum. Cr. Total: 146
ELECTIVES

A. Non-technical Electives

Non-technical electives approved by the department are announced at the beginning of each semester. Students can choose any of those courses announced as a non-technical elective.

B. Area Electives

Area elective courses offered by the Computer Engineering Department are announced by the Department at the beginning of each semester. A list of area elective courses is given below. The Department may add further courses to this list. In addition to these courses, at the beginning of each semester, the Department will list courses offered by other Engineering Faculty Departments that may be chosen as area electives. Registration to such courses will require Departmental consent.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMSE 401</td>
<td>Graduation Project I/II</td>
<td>(-, -)</td>
<td>4th year standing</td>
</tr>
<tr>
<td>CMSE 402</td>
<td>Graduation Project II/II</td>
<td>(-, -)</td>
<td>CMSE 401</td>
</tr>
<tr>
<td>CMSE 412</td>
<td>Formal Specification of Software Sys.</td>
<td>(4, 1)</td>
<td>CMSE 322</td>
</tr>
<tr>
<td>CMSE 413</td>
<td>Software Security</td>
<td>(4, 1)</td>
<td>CMSE 201</td>
</tr>
<tr>
<td>CMSE 414</td>
<td>Software Testing</td>
<td>(4, 1)</td>
<td>CMSE 322</td>
</tr>
<tr>
<td>CMSE 415</td>
<td>Systems Analysis</td>
<td>(4, 1)</td>
<td>CMSE 323</td>
</tr>
<tr>
<td>CMSE 421</td>
<td>Software Construction</td>
<td>(4, 1)</td>
<td>CMSE 201</td>
</tr>
<tr>
<td>CMSE 422</td>
<td>Software Project Management</td>
<td>(4, 1)</td>
<td>CMSE 323</td>
</tr>
<tr>
<td>CMSE 423</td>
<td>Low-Level Design of Software</td>
<td>(4, 1)</td>
<td>-</td>
</tr>
<tr>
<td>CMSE 491</td>
<td>Selected Topics in Software Eng. I</td>
<td>(4, 1)</td>
<td>-</td>
</tr>
<tr>
<td>CMSE 492</td>
<td>Selected Topics in Software Eng. II</td>
<td>(4, 1)</td>
<td>-</td>
</tr>
<tr>
<td>CMPE 413</td>
<td>Compiler Construction</td>
<td>(4, 1)</td>
<td>CMPE 343</td>
</tr>
<tr>
<td>CMPE 414</td>
<td>Modern Programming Platforms</td>
<td>(4, 1)</td>
<td>CMPE 211</td>
</tr>
<tr>
<td>CMPE 415</td>
<td>Visual Programming</td>
<td>(4, 1)</td>
<td>CMPE 112</td>
</tr>
<tr>
<td>CMPE 416</td>
<td>OO-Programming and GUI</td>
<td>(4, 1)</td>
<td>CMPE 218</td>
</tr>
<tr>
<td>CMPE 423</td>
<td>Embedded System Design</td>
<td>(4, 1)</td>
<td>-</td>
</tr>
<tr>
<td>CMPE 443</td>
<td>Real-time System Design</td>
<td>(4, 1)</td>
<td>CMPE 242</td>
</tr>
<tr>
<td>CMPE 462</td>
<td>Functional and Logic Programming</td>
<td>(4, 1)</td>
<td>CMPE 218</td>
</tr>
<tr>
<td>CMPE 474</td>
<td>Perf. Anal. of Comp. Sys. and Netw.</td>
<td>(4, 1)</td>
<td>MATH 322</td>
</tr>
<tr>
<td>CMPE 475</td>
<td>Operation Research</td>
<td>(4, 1)</td>
<td>MATH 201</td>
</tr>
<tr>
<td>CMPE 476</td>
<td>System Simulation</td>
<td>(4, 1)</td>
<td>MATH 322</td>
</tr>
</tbody>
</table>

SUMMER TRAINING

As a part of the fulfilment of the graduation requirements, all students must complete 40 work days of summer training after the second and/or third year, during summer vacations. The summer training should be carried out in accordance with the rules and regulations set by the department.

(CMPE 400 Summer Training (40 work days) (-, -) 3rd/4th year standing)
II. UNDERGRADUATE COURSES  (COURSE DESCRIPTIONS)

CMPE 101  Foundations of Computer Engineering  
This course introduces the student to the fundamental concepts of the computer engineering discipline. Topics covered include: Computers and information processing -notion of computers, concepts of data and information, applications of computers, history of computing. Computer hardware -CPU, memory, input/output interface, secondary storage, ports, types of computer systems, computer software -system software, utilities, application software, data communication, an overview of operating systems. General Problem Solving Concepts: basic data types, constants and variables, basic operators and expressions, algorithms, pseudocodes, and flow charts, sequential, and conditional problem solving (IF statements and CASE logic), looping (WHILE/WHILE-END, REPEAT-UNTIL, FOR structures), formatted output, examples in C programming language. (Pre-requisite: none)

CMPE 112  Programming Fundamentals  
An overview of C programming language, Sequential structure Data types and classes of data, arithmetic operators and expressions, assignment statements, type conversions, simple I/O functions (printf, scanf, fprintf, fscanf, gets, puts, fgets, fputs). Selective structure Relational operators, logical operators, conditional expression operator, conditional statements (if, switch). Repetitive structures While, do-while, for loops, loop interruptions (goto, break, continue), Null statement, comma operator. Functions Function definition and function call, external variables, storage classes, recursion. Arrays Array declaration, array initialization, arrays as function arguments. Pointers Basics of pointers, functions and pointers, arrays and pointers, strings and pointers, library functions for processing strings, pointer arrays. Structures Basics of structures, structures and functions, arrays of structures. (Pre-requisite: CMPE 101)

CMSE201  Introduction to Software Engineering  
Phases of the software development process. Estimation, system modeling, requirements analysis. Project management, modular software design, object-oriented analysis and design techniques. Design documentation using symbolic representations, UML diagrams. Software testing, quality issues.  (Prerequisites: CMPE112)

CMPE 211  Object-Oriented Programming  
Basics of C++ and Control structures. Program design, Object-Oriented programming and its specific features. Layout of a simple C++ program (elementary C++ programming. Fundamental types, scope. Overview of selection and iteration structures of C and C++ languages. Examples of C++ programs. Functions and Arrays. Review of functions and arrays. Prototypes (declarations), function definition, function overloading, inline functions, scope resolution operator (:), call-by-value, call-by-reference (reference parameters), default arguments, array declarations, operations on arrays, using arrays as function arguments. Pointers, C strings and C++ strings. Pointer variables, declaration and initialization. Use of pointers in call-by-reference function calls, returning a reference, arrays of pointers, pointers to arrays, pointers to functions, dynamic memory allocation with C++ operators new and delete, C-strings, input/output operations, standard C-string functions, formatted and unformatted input/output, C++ string type (the standard string class). Classes and Data abstraction. Structure definition, accessing members of structures, class declarations, constructors, constructor initialization lists. Class destructor, member access specifiers public and private, const member functions, friend functions and classes, static data and function members. Operator Overloading. Fundamentals and restrictions of operator overloading, this pointer, overloading unary and binary operators. Composition and Inheritance. Base classes and derived classes, protected class members, virtual functions and polymorphism, virtual destructors, private access vs. protected access, abstract base classes. Revision of the material discussed in the course. (Pre-requisite: CMPE 112)

CMPE 218  Principles of Programming Languages  
Formal specification of programming languages: syntax, analysis, and semantics; evolution of programming languages and concepts; names and scope; data representation; evaluation sequence in expression, statement, and subprogram levels; OO implementation issues: abstraction, inheritance, polymorphism, concurrency and exception handling; sampling of other paradigms such as functional, logical, scripting, high-performance, etc. as time permits. Weekly homework and lab work are assigned in parallel to lectures. (Pre-requisite: CMPE 211)
CMSE 222  Introduction to Computer Organization  

CMPE 231  Data Structures  

CMPE 242  Operating Systems  
Operating system definition, simple batch systems, multiprogramming, time-sharing, personal computer systems, parallel systems. Introduction to process, process scheduling, operations on processes, cooperating processes, interprocess communications, interrupts, process synchronization, critical-section problem, atomic instructions, semaphores, synchronization problems, CPU scheduling, scheduling criteria and algorithms, multiple processes and real-time scheduling, algorithm evaluation, deadlocks, characterization and handling of deadlocks, deadlock prevention avoidance and detection, deadlock recovery, memory management and virtual memory, address spaces, swapping, memory allocation, paging, segmentation, file-systems, file concepts, access methods, directory structure. (Pre-requisite: CMPE 112)

CMSE321  Software Requirements Analysis & Specification  
Functional, non-functional and domain requirements. User and system requirements. Feasibility study. Estimation techniques. Languages and models for representing requirements. Performance, reliability, availability, safety, and security issues. Requirements documentation standards. Requirements management: handling requirements changes. (Prerequisites: CMSE201)

CMSE322  Software Design  
Modular software design. Different architectural design styles for software. UML diagrams, Client/server paradigm. Choice of appropriate software and hardware system capabilities. Dealing with timing constraints. Formal software design specification techniques. Configuration management. Software design for distributed systems. Reusability and commercial off-the-shelf software modules. (Prerequisites: CMSE321)

CMSE323  Human/Computer Interaction  
Human factors in computing. Cognitive modeling, user interfaces. Usability engineering. Task analysis, user-centered design, and prototyping. Design of windows, menus, and commands. Voice and natural language I/O. Multimedia systems. User interface architectures and API’s. (This course involves case studies and a term project.(Prerequisites: CMSE201)

CMSE326  Software Quality Assurance and Testing  
CMSE346  Computer Networks and Communication (4,1)4

This course addresses the general principles of computer networks and communication with emphasis on the software aspects of networking. In the study of the multilayered model, it begins with application level and works its way down towards the lower layers. Topics include: Internet and Internet applications, transport protocols, switching and routing, link layer and LANs. Software support for networks. (Prerequisites: CMPE222)

CMPE 354  Database Systems Design (4, 1) 4

This course introduces the student to the fundamentals of database management. Topics covered include: the Entity-Relationship model; the Relational model and its mathematical foundations; most important features of Structured Query Language (including basic structure, aggregate functions, nested queries, index definition, stored procedures and functions, views, database modification, domain constraints, assertions, triggers, transaction definition, data definition language, granting privileges, security), query languages Datalog and QBE; Object-Oriented and Object-Relational databases; design principles of Relational databases (normal forms, functional dependencies, decomposition). (Pre-requisite: CMPE 231)

CMPE 371  Analysis of Algorithms (4, 1) 4


CMSE 400  Summer Training (-, -) 0

As a part of the fulfillment of the graduation requirements, all students must complete 40 work days of summer training after the second and/or third year, during summer vacations. The summer training should be carried out in accordance with the rules and regulations set by the department. (3rd/4th year standing)

CMSE 401  Graduation Project I/II (-, -) 0

4th academic year students in Computer Engineering are required to prepare and present a project under the supervision of a faculty member of the Department. Each student has to prepare a separate (individual) project. The purpose of the project is to develop an understanding of independent research by studying a particular Computer Engineering topic. It is an extended exercise in the professional application of the skills and experience gained in the undergraduate program. Topics will be chosen in consultation with faculty members. (4th year standing)

CMSE 402  Graduation Project II/II (-,4) 4

4th academic year students in Computer Engineering are required to prepare and present a project under the supervision of a faculty member of the Department. Each student has to prepare a separate (individual) project. The purpose of the project is to develop an understanding of independent research by studying a particular Computer Engineering topic. It is an extended exercise in the professional application of the skills and experience gained in the undergraduate program. Topics will be chosen in consultation with faculty members. (Pre-requisite: CMSE 401)

CMSE412  Formal Specification of Software Systems (4, 1) 4

Review of mathematical foundations for formal methods. Formal languages and techniques for software system specification and design. Analysis of software specifications and designs. Verification of consistency with requirements. Reliability validation. Automated program and design transformation. (Prerequisites: CMSE322)
CMSE 413  Software Security (4, 1) 4

CMPE 413  Compiler Construction (4, 1) 4
This areal elective course mainly focuses on the following topics; Introduction to compilers, A simple one-pass compiler, Lexical analysis, Syntactic specification of programming languages, The parsing problem, top-down and bottom-up parsing, Syntax-directed translation, Symbol tables, Run time environment and storage administration, Code generation and optimization, Compiler development (Pre-requisite: CMPE 343)

CMSE 414  Software Testing (4, 1) 4
Testing techniques and principles. Black-box and white-box testing. Testing strategies: Unit testing, boundary testing and integration testing. State based testing, configuration testing, compatibility testing, web site testing. Alpha, beta, and acceptance testing. Test coverage criteria. Testing tools. Developing effective test plans. Problem reporting, tracking, and analysis. (Prerequisites: CMSE 322)

CMPE 414  Modern Programming Platforms (4, 1) 4
This course covers software development in the .Net framework and the C# programming language that makes full use of this framework and has all the important features that a modern language should have. The topics include the philosophy of the .Net framework and the .Net class library, object-oriented programming, event handling, graphical user interfaces, graphics and media, multithreading, exception handling, strings and characters, files and database connections. (Pre-requisite: CMPE 211)

CMSE 415  Systems Analysis (4, 1) 4
Life cycle phases: requirements determination, logical design, physical design, and implementation planning; interpersonal skills, interviewing, presentation skills; group dynamics; risk and feasibility analysis; group-based approaches: project management, joint application development (JAD), and structured walkthroughs; structured versus object oriented methodologies; RAD, prototyping; database design; software package evaluation, global and inter-organizational issues and system integration. (Prerequisites: CMSE 323)

CMPE 415  Visual Programming (4, 1) 4
The main concern of this course is to teach Graphical User Interface, event-driven programming and object-oriented programming for Windows and Internet environments with a visual programming language. Windows Presentation Foundation (WPF) Graphical User Interface, WPF Graphics and Multimedia, XML and XAML, Strings, and Database and Web Application development will also be introduced. (Pre-requisite: CMPE 112)

CMSE 416  Object-Oriented Programming and Graphical User Interfaces (4, 1) 4
The purpose of this course is to expose the Object Oriented Programming approach and its use in building Graphical User Interfaces. It will be done in fact through the presentation of the JAVA language. The student is to learn the language structure of JAVA, its object oriented aspect, the similarities and differences with C. He must also acquire a practical programming experience in Java through a number of exercises and projects. Concerning the applications of the language, we will focus on the implementation of Graphical User Interfaces as well as animation programs. Blueprints and a practical object oriented development methodology will be given for such applications. (Pre-requisite: CMPE 218)

CMSE 421  Software Construction (4, 1) 4
(Prerequisites: CMSE201)

CMSE422  Software Project Management  (4, 1) 4


CMSE423  Low-Level Design of Software  (4, 1) 4

Detailed software design and construction in depth. In-depth coverage of design patterns and refactoring. Introduction to formal approaches to design. Analysis of designs based on internal quality criteria. Performance and maintainability improvement. Reverse engineering. Disciplined approaches to design change. (Prerequisites: None)

CMPE 423  Embedded System Design  (4, 1) 4

The objective of the course is to introduce the concept of Harvard + RISC architecture microcontrollers and design of embedded computing systems on typical applications including interrupts, timers, LCD and LED displays, keypads, a/d converters, rotary coders, stepper motors, serial and parallel communication interfacing. The design applications are introduced on a very widely used typical 16-bit embedded microcontroller unit, PIC18F452. The scope of the course is the simple, distinct PIC18F452 embedded system design with the applications in C and RISC assembly programming. The design/theory scale of the course is around 60/40. (Pre-requisites: CMPE 325, 328)

CMPE 443  Real-time System Design  (4, 1) 4

Course goal is to introduce students to key ideas, concepts and tools of Real-time systems design. Introduction to real-time systems, ADA programming, architecture and design of real-time systems, concurrent programming and synchronization, real-time scheduling, reliability and exception handling, real-time OS, and distributed real-time systems. (Pre-requisite: CMPE 242)

CMPE 462  Functional and Logic Programming  (4, 1) 4

This course is about the two main declarative programming paradigms, namely functional and logic. Prolog will be taught as a representative of the Logic programming paradigm, and ML will be the language used to demonstrate the functional paradigm. (Pre-requisite: CMPE 218)

CMPE 471  Automata Theory  (4, 1) 4


CMSE473  Software Process and Management  (4, 1) 4

Software processes: standards, implementation, and assurance. Project management: requirements management and long-term evolution. Human effort, duration and cost estimation. Planning and tracking projects. Risk analysis, project control, change management. (Prerequisites: CMSE322)

CMPE 474  Performance Analysis of Computer Systems and Networks  (4, 1) 4

Queueing models of computer systems and networks and applications of queueing theory to computer network modeling. Bounds on system performance. Mean-value analysis of computer systems. Modeling specific subsystems. Queueing models for analysis. Limitations of
queueing models. Analysis of transaction processors, terminal-oriented systems, and batch processing. (Pre-requisite: MATH 322)

**CMPE 475 Operations Research**

(4, 1) 4

This course focuses on: Linear programming. Solution techniques of linear programs. The transportation problem. Project scheduling by critical path method. Nonlinear programming. Integer programming. (Pre-requisite: MATH 201)

**CMPE 476 System Simulation**

(4, 1) 4


**CMSE491 Selected Topics in Software Engineering I**

(4, 1) 4

This course is to be arranged as seminar course. Students and faculty members participate in studying recent articles published on the research interests of the department. (4'th year standing) (Pre-requisite: none)

**CMSE492 Selected Topics in Software Engineering II**

(4, 1) 4

This course is to be arranged as seminar course. Students and faculty members participate in studying recent articles published on the research interests of the department. (4'th year standing) (Pre-requisite: none)

**MATH 151 Calculus I**

(4, 1) 4


**MATH 152 Calculus II**

(4, 1) 4


**MATH 163 Discrete Mathematics I**

(3, 1) 3

Set theory, functions and relations; introduction to set theory, functions and relations, inductive proofs and recursive definitions. Combinatorics; basic counting rules, permutations, combinations, allocation problems, selection problems, the pigeonhole principle, the principle of inclusion and exclusion. Generating functions; ordinary generating functions and their applications. Recurrence relations; homogeneous recurrence relations, inhomogeneous recurrence relations, recurrence relations and generating functions, analysis of algorithms. Propositional calculus and boolean algebra; basic boolean functions, digital logic gates, minterm and maxterm expansions, the basic theorems of boolean algebra, simplifying boolean function with karnaugh maps. Graphs and trees; adjacency matrices, incidence matrices, eulerian graphs, hamiltonian graphs, colored graphs, planar graphs, spanning trees, minimal spanning trees, Prim's algorithm, shortest path problems, Dijkstra's algorithms. (Pre-requisite: none)

**MATH 201 Linear Algebra and Differential Equations**

(4, 1) 4

Linear Algebra; Matrix algebra, special matrices and row operations, Gaussian elimination method, determinants, adjoint and inverse matrices, Cramer's rule, linear vector spaces, linear independence, basis and dimension. First order ordinary differential equations; definitions and general properties of solutions, separable, homogeneous and linear equations, exact equations
and integration factors. Higher order equations with constant coefficients; Basic theory and the method of reduction of order, second order homogeneous equations with constant coefficients, nonhomogeneous equations, the method of undetermined coefficients, the method of variation of parameters, the Cauchy-Euler equations. Power series solutions; classification of points, ordinary and singular points, power series solutions about ordinary points, power series solutions about regular singular points, the method of frobenius. Systems of differential equations; general properties of constant coefficient systems, eigenvalues and eigenvectors, diagonalizable matrices, solutions of linear systems with constant coefficients. Boundary value problems. (Pre-requisite: MATH 152)

MATH 322 Probability and Statistical Methods (3, 1) 3

MATH 373 Numerical Analysis for Engineers (3, 1) 3

PHYS 101 Physics I (4, 1) 4

PHYS 102 Physics II (4, 1) 4

ENGL 191 English – I (3, 1) 3
(Pre-requisite: none)

ENGL 192 English – II (3, 1) 3
(Pre-requisite: ENGL 192)

ENGL 201 Communications Skills (3, 1) 3
ENGL 201 is a second year Basic/Mainstream/Advanced Communication Skills course for students at the Faculty of Engineering. The course aims to introduce a range of skills, including effective written and oral communication, research skills and study skills. Throughout the course the students will be involved in project work intended to help them in their immediate and future academic and professional life. This will include library research, technical report writing and an oral presentation. By investigating a topic of their own choice, students will develop their understanding of independent research skills. During the report writing process, students will improve their writing and develop the ability to produce organized, cohesive work. The oral presentation aims to enhance spoken fluency and accuracy and provide training in the components of a good presentation. (Pre-requisite: none)

HIST 280/299 History of Turkish Reforms (2, 0) 2
A history of the foundation of the Turkish Republic under the light of Kemal Ataturk’s principles. A required course for all Turkish students (This course is given in Turkish). (Pre-requisite: none)

TUSL 180/ TURK 199 Introduction to Turkish Language (3, 0) 3
TURK 100/199 is a Basic Turkish course introducing the Turkish language. It incorporates all four language skills and provides an introduction to basic grammar structures. Students will be encouraged to develop their writing skills through a variety of tasks. The aim of this course is for students to be able to understand and communicate in everyday situations, both in the classroom and in a Turkish-speaking environment. (Pre-requisite: none)
III. LABORATORIES

Undergraduate Computer Laboratories

Laboratories are for undergraduate courses provide a wide range of software tools to students for various computing needs in courses and projects. These laboratories are equipped with more than 350 networked Pentium personal computers, with connections to file and print servers, as well as to the Internet. Students can access Novell Netware, Windows NT, UNIX and LINUX servers from these laboratories.

Undergraduate Research/Project Laboratory

This laboratory is used for project and research studies of 4th year students. PC’s in this lab have hard disks and multimedia support.

Computer Research Laboratory

This laboratory provides general-purpose research facilities under various software platforms for graduate students.

Electric and Electronics Laboratory

This laboratory provides facilities for performing experiments on electrical circuits and basic electronics. It includes voltmeters, ammeters, signal generators, power supplies, oscilloscopes and relevant discrete components.

Logic Design Laboratory

Intended for teaching the fundamentals of combinatorial and sequential logic circuits. The equipment includes construction boards with power supplies, clock generators, LED displays and IC’s.

Microprocessor Laboratory

Provides facilities for performing experiments on microprocessors and single-board microcomputers. The equipment includes evaluation kits, 80386 based PC/AT interface experimental boards and PC’s. The kits incorporate EPROM programmers, parallel and serial input/output ports, keyboard and displays, stepper and DC motors, DAC’s and ADC’s and relevant IC’s.
REGISTRATION

The Academic Advisor
Each student is assigned an Academic Advisor who assists the student with matters related to course selection, registration, and scheduling. The advisor plays a key role in the student’s progress through University studies, but it is ultimately the student’s responsibility to meet all University requirements, and it is the responsibility of the Office of the Registrar to ascertain and certify that these requirements have been met.

Students must obtain their advisors’ approval for registration, selection of core and elective courses, adding, dropping, or withdrawing courses.

Registration Procedure
A) Course Registration Procedure

Please go to one of the following access points with your ‘ID card’ and ‘bank receipt’ to obtain access for course registration.
- Department of Computer Engineering
- Faculty of Communication and Media Studies Building
- Registrar’s Office
- Accounting Office

Please go to your academic advisor at your department to complete your registration.

Important Notes:
- Course registration is complete when you see your advisor face-to-face and he/she confirms your registration on the computer.
- Students who do not take access cannot complete their registration.
- You can learn the tuition fee or any debts that needs to be settled from http://students.emu.edu.tr
- Students have to register for courses in person. Please do not ask your friend(s) to do it for you and do not give anyone “power of attorney”. It will not be accepted.
- Students, who complete their registration after COURSE REGISTRATION period, should pay penalty per day even they did pay their tuition fees earlier.
- In case of problem, please go directly to the Registrar’s Office.

B) On-Line Course Registration Procedure

Access to online registration: http://students.emu.edu.tr
Please log on to this web site and choose your courses online. Then, get online confirmation from your advisor regarding your course selection.

Your course registration will be completed when your advisor will confirm online. However, you will also need to see your advisor face to face before the date that will be announce to get the final approval for your course registration. (Students who will not take approval from their advisor until the specified date will have to pay late registration penalty starting from the very beginning of registration).

Important Notes:
- Students who do not take access cannot register online.
- Access is opened automatically in 24 - 48 hours following the payment to the bank.
- You can learn the tuition fee or any depts. That needs to be settled from http://students.emu.edu.tr
- Students who do not take approval from their advisor until the specified date are required to pay late registration penalty per day starting from very beginning of registration.
- In case of problem, please go directly to the Registration’s Office.
- Master/PhD students and first semester, freshman undergraduate students, cannot register online.

Late Registration
Students who have not completed formal registration processes during the scheduled period may be permitted to register late with a late registration penalty, if the delay has been involuntary.
Registration Changes

a) Adding Courses
With the approval of their Academic Advisor and the Chairman of the Department, students may request addition of courses to their schedule during the first two weeks of classes in a regular term. Such requests will be granted if:
1) The maximum allowable student course load is not exceeded;
2) Added courses can be scheduled properly.

b) Dropping Courses
With the approval of his/her Academic Advisor and the Chairman of the Department, a student may drop courses from his/her schedule during the first two weeks of classes in a regular term.

c) Withdrawing from a Course
Course withdrawal may take place not later than the week of the semester announced in the academic calendar, with the approval of the Academic Advisor and the Chairman of the Department. A student who withdraws from a course will receive a “W” grade on his/her transcript. Such courses must be registered again in the following semester.

TRANSFERS

Transfer from another Academic Institution
A student, who has completed at least one academic semester of an equivalent program at another university, may apply for transfer to the Computer Engineering Department. Such an application will be considered provided the applicant:

a) has not been dismissed from that institution, either on academic or any other grounds,
b) has an adequate knowledge of English, and
c) the quota for transfer students has not been exceeded.

A transfer student may be exempted from certain courses. Decisions concerning exemption will be made by the Transfer Committee of the Department.

Transfer applications can only be made for entry to the second, third, fourth or fifth academic terms, and thus the student is required to complete at least one-half of the total course load requirement at EMU.

Transfer within the University
Transfer from another four year degree program to Computer Engineering may be permitted, if the student has successfully completed at least one term of study in a department (English Preparatory School is not counted); and if the quota for transfer students has not been exceeded. Students who already made one internal transfer before or students who have an academic warning are not eligible for application.

A student may transfer to a two-year diploma program with the consent of the Director of the two-year program concerned.

A two-year diploma program student who graduates with a high cumulative grade-point average may apply for transfer to the first year of the Computer Engineering four-year degree program.
COURSE-LOAD AND ASSESSMENT

The Academic Year
Academic activities take place in an "Academic Year", from the end of September to the end of June, consisting of two periods of at least 16 weeks each, possibly followed by a "Summer Session". The two periods of study are referred to as the "Fall" and "Spring" semesters. There is a two to three weeks of break between the two semesters. Summer sessions are offered in July and August.

The Academic Term
The current academic term of a student is determined by the cumulative credited courses he/she registered to during his/her whole period of studies at EMU. The total course load is distributed over eight academic terms, and four academic years.

Courses
Courses consist of two to four hours of instruction and, where appropriate, tutorial and laboratory work, for each week of the Fall or Spring semester; or the equivalent total number of hours per week in a Summer session.

The Credit-Hour
Courses offered for academic credit are described in terms of a number that is proportional to the academic involvement they required from the student. This number is called the "Credit-Hour."

For each course, one credit hour is equivalent to one lecture hour per week. Any additional hour that may be required for preparation outside the class, or any additional hour required for laboratory or tutorial work, is considered to be equivalent to one-third of a credit-hour.

A course consisting of both lecture and laboratory/tutorial sessions, meeting for 3 lecture hours and 2 laboratory/tutorial hours per week would be assigned 4 credit-hours. It would receive a credit rating of "(3,2)4," where the first digit indicates the weekly lecture hours, the second digit the weekly laboratory/tutorial hours, and the last the credit-hours associated with the course.

Prerequisite Courses
Prerequisite course requirements are given in parentheses at the end of each course description, if applicable. They are also shown in the tabular undergraduate curriculum. When course A is a prerequisite to course B, a student cannot register to course B before passing from course A.

The Course Load
The semester course load is defined as the number of credit-courses for which a student is registered in a semester. The regular course load for Computer Engineering students varies between 5 and 6 credited courses, depending upon the academic term of the student. A student may increase it by at most one credited course, if he/she has a high GPA and CGPA, with the approval of his/her Academic Advisor and the Chairman of the Department. A student may reduce his/her load by at most two credited courses. However, these courses must be completed by the following semester if offered. A student who is in his/her last academic term (graduation term) may be permitted to register for course loads deemed appropriate by his/her Academic Advisor, and with the approval of the Chairman of the Department. During a Summer Session, students may carry loads from 1 to 2 credited courses.

Course Grades and Grade-Points
Thirteen categories of scholastic achievement, ranging from "superior" to "failure" (A, A-, B+, B, B-, C+, C, C-, D+, D, D-, F, NG), are recognized as valid end-of-course grades or letter grades. These grades are indexed on a scale of "0 to 4", termed "Grade-Points". The symbol "NG" (Nil Grade) indicates poor attendance and/or a failure to complete assigned work (including exams). The letter grades are indexed to Grade-Point equivalents as follows: A=4.0; A-=3.7; B+=3.3; B=3.0; B-=2.7; C+=2.3; C=2.0; C-=1.7; D+=1.3; D=1.0; D-=0.7; F=0.0; NG=0.0.

Four other symbols are also used in grading, for special circumstances. "W" (withdrawn), indicates withdrawal from a course before the end of a term. In case where a student has been authorized to delay completion of course work past the normal end-of-term, the "I" (incomplete) grade may be given until a formal grade is reported. Achievement in a non-credit-hour course is indicated by the symbol "S" (satisfactory) or "U" (unsatisfactory). In the case of repeated course work, the last grade earned is considered the official course grade. No grade-point equivalent is assigned for the notations I, W, S, and U.
Credits Earned
A student earns credits based on the level of his/her achievement in a course. The credits earned are the product obtained by multiplication of the "Credit-Hour" and the "Grade-Point" obtained. For example, if a student gets grade A- for a 4-credit course, then the credits earned for that course is 4*3.7=14.8.

The Grade-Point Average: GPA
A student’s academic achievement for each semester is expressed numerically by a real number referred to as the “Grade Point Average” (GPA). The GPA is obtained by:

1. calculating credits earned for each course,
2. adding these earned credits for all courses in the semester to obtain the total credits, and
3. dividing the total credits by the total credit-hours registered in that semester.

The GPA can range from 0.00 to a maximum number of 4.00. A student’s GPA is calculated and reported to two decimal places.

The Cumulative Grade Point Average: CGPA
A student’s overall academic achievement is expressed by a real number called the “Cumulative Grade Point Average” (CGPA). The CGPA is obtained by:

1. adding the credits earned in each completed semester to find the total credits earned,
2. adding credit-hours registered in all completed semester to find the total credit-hours registered, and
3. dividing the total credits earned by the total credit-hours attempted.

When a course is repeated, the last credit earned is substituted in place of the previous value.

Example:
Assume that a student is registered the following courses and got the following grades.

<table>
<thead>
<tr>
<th>Semester I:</th>
<th>Semester II:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Grade</td>
</tr>
<tr>
<td>CMPE 101</td>
<td>B-</td>
</tr>
<tr>
<td>MATH 163</td>
<td>D-</td>
</tr>
<tr>
<td>ENGL 191</td>
<td>D</td>
</tr>
<tr>
<td>MATH 151</td>
<td>C</td>
</tr>
<tr>
<td>PHYS 101</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Total of new credits = 10</td>
<td></td>
</tr>
<tr>
<td>Credits earned = 3<em>2.7+3</em>0.7+3<em>1+4</em>2+4*0 = 21.2</td>
<td>Credits earned = 3<em>3.3+3</em>3+3<em>1+4</em>2.3+4*1 = 35.1</td>
</tr>
<tr>
<td>GPA = 21.2 / 17 = 1.25</td>
<td>GPA = 35.1 / 17 = 2.06</td>
</tr>
<tr>
<td>CGPA = 21.2 / 17 = 1.25</td>
<td></td>
</tr>
<tr>
<td>Total credits registered = 17+10 = 27 (excluding repeated MATH163 and PHYS 101)</td>
<td></td>
</tr>
<tr>
<td>Total credits earned = 35.1 + 19.1 = 54.2 (excluding 2.1 in Semester I for the D- of MATH163)</td>
<td></td>
</tr>
<tr>
<td>CGPA = Total credits earned / total credits registered = 54.2 / 27 = 2.01</td>
<td></td>
</tr>
</tbody>
</table>
**ACADEMIC EVALUATION**

**Evaluation of a Course**

A course is said to have been successfully completed if a student obtains a grade of A, A-, B+, B, B-, C+, C, C-, D+, D or S. A course in which a student receives a grade of D-, F, NG or U is not satisfactorily completed, and the student is required to repeat such a course in the next semester it is offered.

**Satisfactory/Probation/Unsatisfactory Status**

*For a student registered in and after 2007-2008: her/his Satisfactory/On-Probation/Unsatisfactory Status is based on the following table:*

<table>
<thead>
<tr>
<th>Actual Academic Term</th>
<th>Satisfactory (S)</th>
<th>Satisfactory Progress (Y)</th>
<th>On Probation (P)</th>
<th>Unsatisfactory (U)</th>
<th>Compulsory Transfer/DISMISS (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4.00≥CGPA ≥ 2.00</td>
<td>2.00&gt;CGPA ≥ 1.50</td>
<td>1.50&gt;CGPA ≥ 1.00</td>
<td>1.00&gt;CGPA ≥ 0.00</td>
<td>-----</td>
</tr>
<tr>
<td>3</td>
<td>4.00≥CGPA ≥ 2.00</td>
<td>2.00&gt;CGPA ≥ 1.50</td>
<td>1.50&gt;CGPA ≥ 1.00</td>
<td>1.00&gt;CGPA ≥ 0.00</td>
<td>-----</td>
</tr>
<tr>
<td>4</td>
<td>4.00≥CGPA ≥ 2.00</td>
<td>2.00&gt;CGPA ≥ 1.50</td>
<td>1.50&gt;CGPA ≥ 1.00</td>
<td>1.00&gt;CGPA ≥ 0.00</td>
<td>***1.00&gt;CGPA ≥ 0.00</td>
</tr>
<tr>
<td>5</td>
<td>4.00≥CGPA ≥ 2.00</td>
<td>2.00&gt;CGPA ≥ 1.80</td>
<td>1.80&gt;CGPA ≥ 1.50</td>
<td>1.50&gt;CGPA ≥ 0.00</td>
<td>***1.00&gt;CGPA ≥ 0.00</td>
</tr>
<tr>
<td>6</td>
<td>4.00≥CGPA ≥ 2.00</td>
<td>2.00&gt;CGPA ≥ 1.80</td>
<td>1.80&gt;CGPA ≥ 1.50</td>
<td>1.50&gt;CGPA ≥ 0.00</td>
<td>***1.00&gt;CGPA ≥ 0.00</td>
</tr>
<tr>
<td>7</td>
<td>4.00≥CGPA ≥ 2.00</td>
<td>2.00&gt;CGPA ≥ 1.80</td>
<td>1.80&gt;CGPA ≥ 1.50</td>
<td>1.50&gt;CGPA ≥ 0.00</td>
<td>***1.00&gt;CGPA ≥ 0.00</td>
</tr>
<tr>
<td>≥8</td>
<td>4.00≥CGPA ≥ 2.00</td>
<td>-----</td>
<td>2.00&gt;CGPA ≥ 1.80</td>
<td>1.80&gt;CGPA ≥ 0.00</td>
<td>***1.00&gt;CGPA ≥ 0.00</td>
</tr>
</tbody>
</table>

- **Actual Academic Term** refers to the number of semesters that a student has registered so far (English Preparatory School and summer semesters are not counted).
- **On Probation status**: Student can register to a maximum of two new courses.
- **Unsatisfactory status**: Student cannot register to any new course.
- **Compulsory Transfer/DISMISS**: Students who completed a minimum of 4 academic semesters (if the fourth semester is Spring Semester, then at the end of the Summer School) and who have a **CGPA below 1.00** are dismissed from the program. In case of Compulsory Transfer/DISMISS, the student may transfer to another faculty (with the same tuition fees) or may continue his education in the same program with new student registration fees.

*For a student registered before 2007-2008: her/his Academic Warning(s) Status is based on the following table:*

A student receives an Academic Warning if in a given semester he/she obtains a CGPA lower than the required minimum semester CGPA limit.

<table>
<thead>
<tr>
<th>Academic Term</th>
<th>CGPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the end of the second term</td>
<td>1.15</td>
</tr>
<tr>
<td>At the end of the third term</td>
<td>1.35</td>
</tr>
<tr>
<td>At the end of the fourth term</td>
<td>1.55</td>
</tr>
<tr>
<td>At the end of the fifth term</td>
<td>1.70</td>
</tr>
<tr>
<td>At the end of the sixth term</td>
<td>1.80</td>
</tr>
<tr>
<td>At the end of the seventh term</td>
<td>1.90</td>
</tr>
</tbody>
</table>

- **Academic Term**: The current academic term of a student is determined by the cumulative credited courses he/she registered to during his/her whole period of studies at EMU. The total course load is distributed over eight academic terms, and four academic years. In other words, the semester of a student is determined by the number of courses taken so far.
- **First Academic Warning**: Student may register for a maximum of two new courses.
- **The students with Second, Third, ... Academic Warning** cannot register for any new course.
- **The students with Fourth Academic Warning** are dismissed from the program. In this case, the student may transfer to another faculty (with the same tuition fees) or may continue his education in the same program with new student registration fees.

**Honor and High Honor Students**

A student who (with a normal course load) obtains a GPA between 3.00 and 3.49 is designated an "Honor Student". A student who obtains a GPA between 3.50 and 4.00 is designated a "High Honor Student".
Registration of Students with Academic Warning

In the semester following the first academic warning, the student will not be allowed to register for more than two new courses. The student will be asked to repeat some of the courses which he/she had already taken in the previous semesters with priority given to the grades F, NG, D-.

At the end of the semester following an academic warning, if a student's probation status continues (i.e., if he/she receives another academic warning for that semester and thus has two consecutive academic warnings) then the student will be asked to repeat courses already taken in the previous semesters, only. Such students are not allowed to register for new courses. The courses with F, NG, and D- grades are to be repeated first. The student may also be asked to repeat courses which he/she already passed with other grades. A student who receives an academic warning in three consecutive semesters failing to raise his/her CGPA above the limit receives a Final Academic Warning.

Dismiss

If a student registered before 2007-2008 and s/he received a Final Academic Warning fails to raise his/her CGPA above the limit in the following semester, he/she will be academically dismissed from the Computer Engineering Department program.

Graduation

A student is entitled to graduate if he/she:

1. Satisfactorily completes all the required course work (40 courses with credits, and other compulsory courses),
2. Completes the 40-day summer training, and
3. Attains a CGPA of at least 2.00.

If at the time of his/her graduation a student has achieved a CGPA of 3.00 or greater, this will be indicated on his/her graduation Diploma/Certificate and official transcript as follows: students with a CGPA in the range 3.00-3.49 "Honors"; students with a CGPA in the range 3.50-4.00 "High Honors".

Graduation is conferred by the University Senate upon the request of Faculties and Schools. The Diplomas/Certificates are prepared by the Office of the Registrar, and describe the name of the program, the date of graduation, and the degree or title obtained.
ADDITIONAL REGULATIONS

Attendance Requirements
The University believes that the benefits of academic studies come not only from independent study and the preparation of materials for formal grading, but also from participation in class and laboratory activities. Regular attendance of EMU students is therefore required in all courses.

When a student fails to show regular class attendance, an EMU faculty member may report an “NG” for the student. Such action may be taken when the number of unexcused absences exceeds 20% of the total class/laboratory hours scheduled for the course. Specific rules for NG grades are announced by instructors for each course at the beginning of each semester. Students should be aware that course grades can be adversely affected through absence, whether excused or unexcused.

Leave of Absence
A student, who has an important excuse for having a break from University studies for a period of time, may appeal for leave of absence. The total duration of leaves of absence for a student can not exceed a total of four semesters during his/her studies.

Written appeals are made to the Chairman of the Department at the beginning of each semester, within five weeks of the commencement of classes. Medical cases are dealt with separately. Permission for leave of absence must be approved by the Office of the Rector upon request by the Dean/Director of the program concerned.

Withdrawal from the University
A student who wishes to withdraw from the University must initiate withdrawal procedures with the Office of the Registrar. The official withdrawal procedure requires that the student obtain clearances from the Registrar, the Library, the Bookstore, Student Housing, and the Accounting Department.

Student Transcript of Academic Record
At the end of each semester, students are provided with a copy of his/her academic records. Errors or suspected errors should be brought to the immediate attention of the Registrar. An official transcript of a student's entire academic record will be provided upon submission of a written request from the student to the Registrar. The official transcript will be mailed by the Registrar to the intended recipient and cannot be handed directly to the student. Student copies of transcripts may also be issued upon request.

Summer Session
Summer session is organized mainly to help students with low scholastic achievement. Students may register to Summer session courses with the approval of the Department. These form periods of intensive study which last for eight weeks. The number of courses offered is based on student demand and faculty availability. The grading policy is the same as the regular terms.

Summer Training
The Computer Engineering students are encouraged to take part in industrial work/organizations relating to their fields of study. This required as part of the fulfillment of the degree program. Students are required to complete a total 40 working days of Summer Training session after finishing their second or third year of studies.

Starting from 2010-2011 academic year, students who have completed the curriculum apart from the summer training must pay 1/20 of the semester fees to register for only summer training.

Disciplinary Matters
The principles of truth and honesty are recognized as fundamental to an academic community. It is expected that both teachers and students will honor these principles. In the event of academic dishonesty or behavior that may damage University functions, disciplinary actions as described in the “Disciplinary Regulations” may be enforced by the Disciplinary Committee of the University.