



**CYPRUS INTERNATIONAL UNIVERSITY**  
**FACULTY OF ENGINEERING**

DEPARTMENT OF COMPUTER ENGINEERING  
**Undergraduate Curriculum**

1st Semester				2nd Semester			
CODE	COURSE NAME	CREDIT	ECTS	CODE	COURSE NAME	CREDIT	ECTS
CMPE100	Introduction to Computer Engineering	(1-0) 0	3	CMPE112	Introduction to Programming	(3-2) 4	7
CMPE101	Introduction to Computing	(2-2) 3	5	ENGL142	Reading and Writing Skills-II	(2-2) 3	4
CHEM110	General Chemistry	(3-2) 4	6	MATH102	Calculus-II	(3-2) 4	6
ENGL141	Reading and Writing Skills-I	(2-2) 3	4	MATH122	Discrete Mathematics	(3-1) 3	5
MATH101	Calculus-I	(3-2) 4	6	PHYS101	General Physics-I	(3-2) 4	6
MATH121	Linear Algebra	(2-0) 2	4	TURK/TREG100	Turkish/Turkish Language	(2-0) 0	2
TARH/HIST 100	History of Modern Turkey / History of Civilization	(2-0) 0	2				
<b>TOTAL</b>		<b>16</b>	<b>30</b>	<b>TOTAL</b>		<b>18</b>	<b>30</b>
3rd Semester				4th Semester			
CODE	COURSE NAME	CREDIT	ECTS	CODE	COURSE NAME	CREDIT	ECTS
CMPE221	Digital Logic Design	(3-2) 4	5	CMPE 214	Visual Programming	(3-1) 3	6
CMPE223	Algorithms & Programming	(3-2) 4	5	CMPE226	Computer Architecture and Organization	(3-2) 4	6
CMPE233	Internet Programming	(3-0) 3	4	CMPE242	Data Structures and Data Organization	(3-2) 4	6
MATH203	Differential Equations	(3-1) 3	6	EELE202	Circuit Theory I	(3-2) 4	6
MATH205	Introduction to Probability & Statistics	(4-1) 4	6	INDE232	Engineering Economy	(3-0) 3	4
PHYS102	General Physics-II	(3-2) 4	6				
<b>TOTAL</b>		<b>22</b>	<b>32</b>	<b>TOTAL</b>		<b>18</b>	<b>28</b>
5th Semester				6th Semester			
CODE	COURSE NAME	CREDIT	ECTS	CODE	COURSE NAME	CREDIT	ECTS
CMPE313	Object Oriented Programming	(3-2) 4	7	CMPE314	Software Engineering	(3-2) 4	7
CMPE331	Data Transmission in Computer Communication	(3-2) 4	4	CMPE324	Microprocessors	(3-2) 4	7
CMPE343	Database Management Systems & Programming-I	(3-2) 4	6	CMPE332	Fundamentals of Computer Networks	(3-2) 4	6
CMPE351	Operating Systems	(3-2) 4	6	CMPE344	Database Management Systems & Programming-II	(3-2) 4	5
EELE321	Signals and Systems	(3-2) 4	7	EFE-XXX	Faculty Elective**	(3-0) 3	5
<b>TOTAL</b>		<b>20</b>	<b>30</b>	<b>TOTAL</b>		<b>19</b>	<b>30</b>
7th Semester				8th Semester			
CODE	COURSE NAME	CREDIT	ECTS	CODE	COURSE NAME	CREDIT	ECTS
CMPE415	Artificial Intelligence	(3-1) 3	7	CMPE411	Systems Programming	(3-2) 4	8
CMPE431	Computer Network Design & Application	(2-2) 3	8	ENGI402	Capstone Project	(2-4) 4	8
ENGI401	Project Management	(3-0) 3	4	EFE-XXX	Faculty Elective	(3-0) 3	5
EFE-XXX	Faculty Elective	(3-0) 3	5	EFE-XXX	Faculty Elective	(3-0) 3	5
XXX XXX	Free Elective	(3-0) 3	4	XXX XXX	Free Elective	(3-0) 3	4
CMPE 300	Summer Training	-	2				
<b>TOTAL</b>		<b>15</b>	<b>30</b>	<b>TOTAL</b>		<b>17</b>	<b>30</b>

**FACULTY ELECTIVE COURSES**

CODE	COURSE NAME	CREDIT	ECTS	CODE	COURSE NAME	CREDIT	ECTS
CMPE 336	Introduction to Cryptography & Network Security	(3-0)3	5	CMPE 452	Signal Processing with Matlab	(3-0)3	5
CMPE 419	Computer Graphics	(3-0)3	5	CMPE 454	Data Structures and Algs. in Java	(3-0)3	5
CMPE 421	Internet Protocols	(3-0)3	5	CMPE 455	Embedded Systems	(3-0)3	5
CMPE 423	Content Management Systems	(3-0)3	5	CMPE 471	Algorithmic Graph Theory	(3-0)3	5
CMPE 424	Desktop Application Development	(3-0)3	5	CMPE 481	Cloud Computing	(3-0)3	5
CMPE 425	Mobile Application Development	(3-0)3	5	CMPE 482	Distributed Parallel Computing	(3-0)3	5
CMPE 434	Network Security	(3-0)3	5	CMPE 483	Advanced Internet Programming	(3-0)3	5
CMPE 436	Fundamental of Neural Networks	(3-0)3	5	CMPE 486	Introduction to Unix Programming	(3-0)3	5
CMPE 444	Information Systems Engineering	(3-0)3	5	CMPE 488	Game Programming	(3-0)3	5

**FACULTY OF ENGINEERING**  
**Department of Computer Engineering**  
**Undergraduate Course Descriptions**

**1st Semester**

**CMPE 100 Introduction to Computer Engineering**

This course presents the basics of the Computer Engineering Department, as well as the Computer Engineering science. The fundamentals of both the hardware and software in a computer system are discussed. Other topics include representation of information, logic design, fundamentals of software life cycles, software methodologies, programming languages, Computer Engineering in business and business applications. Also, ethical and social responsibilities of Computer Engineers are studied. Departmental facilities and the software's used in the university like registration software (SIS) or course management site (moodle) are also studied and introduced to students. Besides, the campus life and the curriculum of the department are in the scope of the course. Moreover, academic life and its procedures like grade average calculations, letter grades and other academic issues are discussed.

**CMPE 101 Introduction to Computers and Programming**

This course presents the basics of the computer systems. It is possible to analyze the course in two parts. Including a short history of computers, the first part of this course presents the history, basic concepts and terminology of information technology, basic hardware and software components of a computer system, and integration of computer system components. Besides the terminologies and abbreviations, the students learn about the hardware setup of a personal computer and the relations between the processor, memory and secondary devices. The laboratory part includes basic computer usage and office programs (MS Word, Excel). In the second part, basics of problem-solving approaches, components and construction of computer programs, flowcharting, and modular programming issues are discussed. Basics of C programming language are covered in classroom.

**CHEM 110 General Chemistry**

Types of matter, measurements, properties of substances; atoms and atomic theory, components of the atom, introduction to the periodic table, molecules and ions, formulas of ionic compounds, names of ionic compounds; atomic masses, the mole, mass relations in chemical formulas, mass relations in reactions; measurements on gases, the ideal gas law, gas law calculations, stoichiometry of gaseous reactions, gas mixtures: Partial pressures and atomic spectra, the hydrogen atom, quantum numbers, atomic orbitals; shape and sizes; electron configurations in atoms, orbital diagrams of atoms; polarity of molecules; principles of heat flow, measurements of heat flow, calorimetry, enthalpy, thermo-chemical equations, enthalpies of formation, the first law of thermodynamics, liquids and solids.

**ENGL 141 Reading and Writing Skills-I**

The aim of the course is to develop students' listening, speaking, reading, writing and study skills. It further provides the opportunity to improve students' communication skills through guided activities and also aims at equipping students with basic study skills that they will need throughout their academic life. The course will assist the students to follow their curriculum in English and will build skills on the abilities already gained. The main focus will be on the development of productive (writing, speaking) and receptive (reading and listening) skills in academic settings, and on the improvement of study skills in general. Credits: ( 2-2 ) 3 Prerequisites: None ECTS credits: 3 Abbreviated Title: Communication in English I Category: University Core Course Teaching Language: English

**MATH 101 Calculus I**

This course provides the methods of differential and integral calculus with applications in geometry, physics and engineering. Students in this course will learn how to use mathematical language needed for applying the concepts of calculus to numerous applications in science and engineering such as: identifying types of functions, evaluating limit of functions, evaluate derivative of functions, evaluate integrals of functions, state fundamental problems in terms of mathematical language, use concepts of limit, derivative and integral in solving fundamental engineering problems.

**MATH 121 Linear Algebra**

Calculus-I provides the methods of differential and integral calculus with applications in geometry, physics and engineering. Students in this course will learn how to use mathematical language needed for applying the concepts of calculus to numerous applications in science and engineering such as identifying types of functions, graph of functions, evaluating limit of functions, limit of elementary functions (polynomial, trigonometric, logarithmic, exponential,...), methods to solve the undefined limits (L'Hopitals Rule), continuous functions, evaluate derivative of functions, definition of derivative, derivative of elementary functions, derivative of product of two functions and division of functions, applications of derivative, evaluate integrals of functions,

definition of the integral, integral of elementary functions, substitution method, integration by parts, integral of rational functions, application of the integral (finding the area) .

### **TARH 100 Modern Turkish History**

In this course, Ottoman state and society, factors causing the collapse of the state; Ottoman modernization; Tripoli and Balkan Wars, World War I, Mudros Armistice and Sevres Agreement; parties and associations, the national resistance movement led by Mustafa Kemal, the Havza and Amasya Circulars, the Congresses, the National Pact, the Turkish Grand National Assembly; the rebellions, the regular army and the War of Independence; the Mudanya Armistice, the Lausanne Peace Treaty; Revolution in the political field, secularization of the state and society, abolition of the sultanate, declaration of the republic, abolition of the caliphate; 1921 and 1924 constitutions, constitutional changes; Sheikh Said Rebellion; Multi-party experience, secularization and modernization in law, nationalization and secularization in education, Kemalism and 6 principles, Turkish foreign policy(1923-1938) are covered.

### **HIST 100 History of Civilization**

The aim of this course is to outline the development of civilizations in the course of history. It firstly focuses on the concepts such as “Civilization”, “Prehistoric”, and “Historic” and on the factors forcing the emergence of the first civilizations. As well as examining the prehistoric periods and their characteristics in the course of human life since the first appearance of human beings on earth, the course mainly focuses on the early civilizations, namely the Mesopotamian, Egyptian, Aegean, Classical Greek, Hellenistic, Indian, Chinese and Roman Civilizations. Political, social, economic, cultural, intellectual, philosophical and scientific aspects in these entities are also examined in this course.

## **2nd Semester**

### **CMPE 112 Introduction to Programming**

The course will introduce basic and fundamental programming constructs and techniques through using the C++ programming language in order to generate algorithmic solutions to problems. Upon completion of the course, students will learn an introduction to algorithms, solving problems by flowcharts and pseudo codes, header files, data types, arithmetic & logic operators, control statements (if, if/else, switch-case) and use them as inner statements, loop statements (while, do/while, for), functions, standard functions of programming language, random number generation and their area of use, user-defined functions, global and local variables, recursion, arrays, searching algorithms on arrays, sorting algorithms on arrays, pointers, pointer operators, using pointers with arrays and functions. In the laboratory hours, students are writing full programs or modifying existing programs for other solutions.

### **ENGL 142 Reading and Writing Skills II**

The objective of the course is to develop students' academic reading, writing, speaking and listening skills. The course also aims at equipping students with basic study skills they will need throughout their academic life. The course will assist the students to follow their curriculum in English and will build skills on the abilities already gained. Students are also encouraged to reflect their personal interpretations on the subjects studied in participative discussions. Additional activities will also be included for improving critical thinking and communication abilities of the students. The course will also focus on emphasizing documentation and presentation skills in academic settings. Credits: ( 2-2 ) 3 Prerequisites: ENGL141 ECTS credits: 3 Abbreviated Title: Communication in English II Category: University Core Course Teaching Language: English

### **MATH 102 Calculus II**

This course provides the methods of differential and integral calculus with applications in geometry, physics and engineering. Topics included are as follows: Sequences and infinite series, properties of sequences, test for convergence, tests for series with both positive and non-positive series, absolutely convergence and conditionally convergence. Power series, Taylor and Maclourin series, radius of convergence. Parametric equations and Polar coordinates, graph of polar equations, area in polar coordinates, arc length, speed on a curve and derivative of polar equations. Vectors and vector valued functions, dot product and cross product of two vectors. Lines and Planes. Functions of several variables, their domain, limit and partial derivatives and definite integral of a function over a region.

### **MATH 122 Discrete Mathematics**

The objective of the course is to introduce the student fundamental principles: logic and Boolean algebra, set theory, induction, relations( Partial ordering and Hasse diagrams, Equivalence relations and equivalence classes), functions(one-to-one, onto, identity, inverse and composition of functions), inductive proofs and recurrence relations, counting techniques(multiplication and addition rules, permutations, combinations, unordered samples with repetitions, principle of inclusion and exclusion) and introduction to graph theory(basic terminology like vertex, edge, degree of a vertex in directed and undirected graphs, Eulerian and Hamiltonian graphs, trees and spanning trees).

### **PHYS 101 General Physics-I**

This course, provides a basic grounding in elementary physics including mechanics. The basic subjects of the course are: Units and dimensions, uniformly accelerated motion in one-dimension, Free fall, Vector mathematics, Two-dimensional motion, Newton's laws of motion, Applications of Newton's laws, Free body diagrams, Circular motion, Work and energy, Conservation of energy, Momentum, impulse, and collisions, Rotational kinematics, Torque, Static equilibrium. For completeness, the students are supposed to do 6 experiments all are related to the subjects of the course.

### **TURK 100 Turkish**

This course provides an orientation to modern Turkish language for foreign students who wish to communicate in this language for their needs. It mainly focuses on the differences between Turkish and English Alphabets, especially the sounds and the letters which are not included in the English alphabet (i.e. Turkish letters ç-ğ-i-ö-ş-ü). In addition, basic grammar and sentence structure forms in Turkish are practiced. The required grammar and vocabulary will also be developed through their adaptation to daily situations in contexts such as introducing yourselves, greeting, talking about the things they possess by using possessive adjectives, forming positive, negative and question sentences by using present simple, telling the time, talking about their own timetables, using demonstrative pronouns when describing the place of objects and becoming familiar with vocabulary related to family members.

### **3rd Semester**

#### **CMPE 221 Digital Logic Design**

This course presents the basic tools for the design and analysis of digital circuits and provides methods and procedures suitable for a variety of digital design applications in computers, control systems, data communications, etc. The course introduces data representation in binary systems, complements, Boolean algebra, logic gates, truth tables, logic circuits, timing diagrams, De Morgan's law, algebraic manipulation, minterms and maxterms, Sum of Products (SOP) and Product of Sums (POS) forms, Boolean function simplification tools and Karnaugh Map method, NAND and NOR implementations, don't care conditions, combinational circuit design and analysis procedures, and design of Adders, Subtractors and Code Converters.

#### **CMPE 223 Algorithms and Programming**

The course mainly focuses on software implementations in C Programming Language. Firstly, basic concepts of algorithms are discussed and then structures of programming are studied. Then, arrays and searching and sorting algorithms on arrays are studied. Fundamentals of basic data structures, which are arrays, structures and unions are discussed together with bitwise operations and enumerations in C. Pointers, functions and file processing are studied in the second part of the course, after midterm examination. Case studies related to searching and sorting algorithms are also studied. Functions, characters and strings are studied as last topics of algorithm developments and course is finalized with complexity analysis of algorithms.

#### **CMPE 233 Internet Programming**

The aim of this course is to provide the students a comprehensive introduction to start building websites from the ground up. The students will learn how to create web pages using XHTML; including images, links, lists, tables, forms, CSS; which provide the standard way of imposing style on the content specified in XHTML tags and JavaScript; a powerful language that could be used for variety of different applications including object models, control statements, pop-up windows, arrays, functions, constructors and pattern matching. All web content will be hand coded using a simple text editor with a strong emphasis on well-formed valid code.

#### **MATH 203 Differential Equations**

In this course, the ordinary differential equations and their applications will be considered. The course will demonstrate the usefulness of ordinary differential equations for modeling physical and engineering problems. Complementary mathematical approaches for their solution will be presented, including analytical methods. The basic content of the course includes first order ordinary differential equations and their types of exact, separable, Bernoulli, first order, homogeneous ordinary differential equations, linear independence of the solutions, higher order ordinary differential equations and their solutions. The undetermined coefficient methods, variation of parameter method, Cauchy-Euler equations. The definition of the Laplace transforms and some important applications of the Laplace transform will be included in this lecture.

#### **MATH 205 Introduction to Probability and Statistics**

The objective of the course is to introduce basic probability concepts and statistical methods. Treatment of data, graphical displays (bar chart, pie chart, histogram, frequency polygon, cumulative frequency histogram), descriptive measures (range, arithmetic and weighted mean, median, mode, variance, standard deviation, coefficient of variation, quartiles, deciles, percentiles). Frequency distribution, cumulative distribution. Sample space, events, counting sample points. Probability of an event, probability axioms, laws of probability, conditional probability, Bayes' rule. Random variables. Probability distributions and Cumulative Probability

Distributions. Some important Discrete and Continuous Probability Distributions: Binomial, Geometric, Hypergeometric, Poisson, Uniform Continuous and Normal Distributions. Expectation and Covariance of Random Variables. Random sampling, sampling distributions.

### **PHYS 102 General Physics-II**

This course, provides a basic grounding in elementary physics including Electricity and Magnetism. The basic subjects of the course are: Properties of electric charges, Coulomb's law. Electric field, Electric field of a continuous charge distribution, Gauss's law and electric flux. Application of Gauss's law to charged insulators, Obtaining the value of electric field from the electric potential, Electric potential and the potential energy due to point charges, Electric potential due to continuous charge distributions, Electric current, Resistance and Ohm's law, Electromotive force, Resistors in series and in parallel. Kirchoff's rules. For completeness, the students are supposed to do 6 experiments all are related to the subjects of the course.

### **4th Semester**

#### **CMPE 214 Visual Programming**

This course is an introductory programming course for visual programming. Event-driven, visual and structured programming concepts will be presented. Initially, the emphasis will be on fundamentals of visual programming and basic controls. Then, advanced controls, file and database management features will be presented. Programming projects will involve common problems that require data entry, display of calculated results, conditional testing, arithmetic operations, array processing, searching, sorting, reading and writing files, and operations on databases.

#### **CMPE 226 Computer Architecture and Organization**

This course presents the basic tools for the analysis and design of synchronous sequential circuits consisting of both flip-flops and combinational logic. The course introduces flip-flops, synchronous sequential circuit analysis and design methods, registers, shift registers, ripple counters, and synchronous binary counters. Furthermore, the topics binary adders and sub-tractors, multiplexers, and decoders which are the combinational circuit building blocks are included. Lastly, the structure, design, and internal characteristics of processor components are also provided. In the laboratory hours, the students are experiencing the circuit designs discussed in the lecture hours both in software environment by using the simulator program and in hardware environment by using the integrated circuits in order to setup and test their designs.

#### **CMPE 242 Data Structures and Data Organizations**

The objective of this course is to provide the basics of data structures and data organization. The course will introduce C/C++ and algorithms for the implementation of data structures which are stack, queue, linked list, tree. Also, the applications of data structures covering stack applications which are parenthesis checker, infix to postfix and prefix conversions, recursion, dynamic stack and queue, tree traversals. Linked lists with their types and implementations are also studied in details. Theoretical aspects of most widely used data structures will be covered during the lectures. Programming assignments and lab-works cover the C/C++ implementations of applications of data structures that are discussed in the lectures.

#### **EELE 202 Circuit Theory I**

Fundamental Concepts of Circuit Theory: Current, Voltage, Power and Energy. Definitions of Circuit Components: Voltage Current Sources; Resistors and Ohm's Law. Computation of Power over a Resistor, Set Up Circuit Model. Kirchoff's Current and Voltage Laws. Resistors in Series and Parallel Configuration; Voltage and Current Divider Circuits. Ampere-meter, Voltmeter and Ohmmeter Circuits. Wheatstone Bridge, Triangle-Star Transformation. Loop Currents and Node Voltages Techniques, Source Transformation. Linearity and superposition principles, source transformations. Thevenin's and Norton's Theorems, Maximum Power Transfer, Graf Theory. . Inductance and capacitance. The natural and forced response of the first – order (RL and RC) circuits. Natural and step responses of second-order RLC circuits.

#### **INDE 232 Engineering Economy**

The purpose of this course is to give an introduction to economic analysis for decision making in engineering design, manufacturing equipment and industrial projects. This course aims to supplement engineering students with the knowledge and capability to perform financial analysis especially in the area of capital investment. Emphasizes the systematic evaluation of the costs and benefits associated with proposed technical projects. The student will be exposed to the concepts of the "time value of money" and the methods of discounted cash flow. Students are prepared to make decisions regarding money as capital within a technological or engineering environment. Assignments and homework's are very helpful to students that give them chance to apply the knowledge that is gained during the course.



## **5th Semester**

### **CMPE 313 Object Oriented Programming**

The objective of course is to identify the classes (including attributes, behaviors and methods), object and their relationships by reading the problem description, draw objects diagrams by looking to the defined problem description, implement Java class by looking at the given UML Class Diagram, use existing industry standard coding and formatting conventions, event mechanisms in Java, construct a GUI based applications using Java and Eclipse and debug those applications, technically identify the differences between classes, objects, inheritances, polymorphism, interfaces, aggregation, composition and abstract class. In addition, the issues of code re-use and software quality will be discussed and the use of inheritance will be shown through for code re-use.

### **CMPE 331 Data Transmission in Computer Communications**

The aim of this course is to provide a unified overview in the basic principles of data transmission and computer communications. The lecture emphasizes basic principles and topics of fundamental importance concerning the technology and architecture of this field, as well as providing the state-of-the-art topics. Basic objectives include providing a conceptual foundation for the study of data communications using the open systems interconnect (OSI) model for layered architecture and developing an understanding in basic hardware and software environments for data communications and computer networks.

### **CMPE 343 Database Management Systems and Programming I**

At the end of this course, students are expected to have experience and knowledge on databases, database design and SQL. Introduction to DBMS (Definition, characteristics, levels of abstraction, advantages, query types), Relational database (relational model, database design), Relational Algebra, SQL, Data Manipulation Language (DML), nested queries, sub-queries, joins, grouping, row functions, aggregate functions, Data Definition Languages (DDL) with constraints like primary key, foreign key and case constraints will be covered. Also, database user management and user rights will be explained.

### **CMPE 351 Operating Systems**

This course examines basic issues in operating system design and implementation. The course will start with a brief historical perspective of the evolution of operating systems over the last fifty years, and then cover the major components of most operating systems. This discussion will cover the trade-offs that can be made between performance and functionality during the design and implementation of an operating system. Particular emphasis will be given to these major OS subsystems: Process management (processes, threads, CPU scheduling, synchronization, and deadlock), memory management (segmentation, paging, swapping), file systems, and networking/distributed systems. Also, basic Unix programming skills will be given during lab hours.

### **EEE321 Signals and Systems**

Classification of Signals and Basic Signal Properties. Time Domain Models of Linear Time Invariant (LTI) Systems: Continuous time systems. Causal LTI systems described by differential equations. System block diagrams. The solutions of differential equations. The unit impulse response and convolution integral. State variable analysis of LTI systems. Discrete time systems. The unit sample response and discrete convolution. Fourier series and Fourier transform representation of continuous-time and discrete-time periodic signals. Time and frequency characterization of signals and systems. Z-transform and inverse z-transform. Region of convergence of the z-transform. z-domain analysis of discrete LTI systems. LTI Systems With Random Inputs. Definition of Random variables, stochastic process, first and second order statistics, moment, correlation and covariance, stationary process, ergodicity. System response.

## **6th Semester**

### **CMPE 314 Software Engineering**

Introducing fundamentals of Software Engineering. Understanding the importance of Software Engineering. Introducing techniques for the development of software within an engineering project perspective. Creating awareness for the quality and severity of software aspects. Effective Communication, Requirements Engineering, Project Management Fundamentals, Software Testing Principles, Software Architecture Concepts, CASE Tools for Configuration Managements and Unit Testing. Introduction to Methodologies and Quality Systems.

### **CMPE 324 Microprocessors**

The Microprocessors course includes the understanding of the main components and working principals of the microprocessor. Intel 80x86 family is used as a base microprocessor architecture. Course content includes the understanding of the memory organization and memory interfacing, programming and debugging in assembly, developing programs that perform unsigned arithmetic (addition, subtraction, multiplication, and division), BCD, ASCII, logical and bitwise manipulation operations, performing input/output device programming in assembly, input characters or strings from keyboard, output characters or strings to the screen, convert data to ASCII,

packed BCD, unpacked BCD. Also, understanding the properties and interfacing of the parallel and serial ports and the design and interfacing of microprocessor-based systems using the real-world example of the 80x86 IBM PC are in the scope of the course.

### **CMPE 332 Computer Network Fundamentals**

This is an introductory course in computer networks. It first introduces uses of Computer Networks in Business, Home and Mobile environment. Next discuss types of computer network range from personal area network to Internet. It then studies the implementation principles and design issues at each layer of network models. Lecture topics include: OSI and TCP/IP models, data transmission basics, data-link, application Layer protocols, guided and unguided transmission, satellite communication ( LEO, MEO, GEO) digital modulation and multiplexing, PSTN and Mobile telephone systems. Laboratory work focuses on building and studying a physical network using network devices, wired and wireless medium.

### **CMPE 344 Database Management Systems and Programming II**

Fundamental concepts and applications about DB architectures will be discussed like properties of popular databases, backup, recovery, replication and reverse engineering. Also, students will gain knowledge on transactions, indexes, PL/SQL, Triggers, stored, functions, stored procedures and cursors. Views, materialized views, query performance optimization, database application Development with a programming language and SQL injection will also be explained. Case studies will cover the topics studies in this lecture.

## **7th Semester**

### **CMPE 415 Artificial Intelligence**

This course teaches artificial intelligence from an intelligent systems perspective which includes the methods (tools) to build systems that can plan, learn, reason and interact intelligently with their environment. The course introduces the key components of the artificial intelligence (AI), the agent-based AI architecture, artificial intelligence techniques to solve problems for a particular domain, appropriate search methods in achieving desired goals, and knowledge representation using various techniques. The topics are as follows: intelligent agents, problem solving, uninformed search strategies, informed search strategies, knowledge representation, logical inference, propositional logic, first-order logic. The artificial intelligence methods studied are experimented using a programming language and the students are expected to complete a project related to an artificial intelligence algorithm with its software implementation.

### **CMPE 431 Computer Network Design and Applications**

This course gives basic working principles and the architecture underlying computer networks, and will go over the main components and applications of TCP/IP and the Internet. Course especially focused on Application layer architectures (client/server, peer-to-peer) and protocols (HTTP-web, SMTP-mail, etc), Transport layer operation (reliable transport, congestion and flow control, UDP, TCP); Network layer operation (routing, addressing etc) After completing this course, students have gained the basic knowledge to understand the architecture of the Internet and how it has evolved. Also be able to understand how the Internet works, design and code their own TCP/IP applications and protocols, and solve simple configuration and performance problems that arise in practice.

### **EPR 401 Project Management**

This course is designed to focus on project management framework, project integration management, project scope management, project communication management and teamwork, health & safety, engineering ethics, environmental management, risk management and sustainability, entrepreneurship and feasibility report, legal aspects in project management. This course also prepares the senior students to select their capstone design projects and form teams. The students undertake literature review for their projects, prepare feasibility report, and a written/oral presentation at the end of the term.

### **CMPE 300 Summer Training**

A minimum of six weeks of training at an Information Technology related company with an advisor from the similar field. This involves observation of the computer systems, software development and networking. In this period, students should take role in an active project and gain experience. In order to apply for Summer training, the student should be successful or registered to at least six third year courses. Students who satisfy this condition can go to Summer training in one period. There should be an engineer in the related field. The evaluation of the Summer training is done by the daily filled logbook and the Summer training report written by the students after the training period.

## **8th Semester**

### **CMPE 411 Systems Programming**

The aim of this course is to make students to have experience and knowledge on advance programming skills with threads, sockets, xml parsers and etc. Debugging, Java GUI development with Swing, platform independent

software development, using the powers of operating system, applets, Database applications, file operations, threads and logging are the main subjects of this course.

### **EPR 402 Capstone Project**

An interdisciplinary project-based course involving engineering design, cost estimating, environmental impacts, project schedule and team work. Students are expected to work in preassigned team under the supervision of faculty on a predetermined project. Each team will submit final report including drawing, specification, and cost estimate that completely describe their proposed design. Each team will make oral presentation defending their final design and project feasibility before peers and faculty members.

## **ELECTIVE COURSES**

### **CMPE 336 Introduction to Cryptography and Network Security**

Introducing the main concepts used in the modern cryptography is the main aim of the course. Mathematical concepts necessary for the modern crypt-algorithms are in the scope of the course. Classical encryption techniques are studied in the first chapters. Block ciphers and Data Encryption Standard (DES) is one of the main objectives of the course. Also, Advanced Encryption Standard (AES) algorithm is studied in details. Public key cryptography and RSA algorithm theory and implementations are the last topics for encryption models. The course ends with network security concepts and IP security standards. The students are expected to improve their skills with a project that requires the implementation of a cryptography algorithm and encryption/decryption of real data through the network.

### **CMPE 419 Computer Graphics**

Hardware and software components of graphics systems. Output and filled-data primitives. 2D and 3D geometric transformations. Two dimensional viewing: Viewing pipeline, clipping, and windowing. Three dimensional viewing: Viewing pipeline, viewing parameters, projections, viewing transformations, clipping. Visible surface detection. Introduction to illumination models and surface rendering.

### **CMPE 421 Internet Protocols**

This course aims to prepare students to participate actively in information technology. Course equip students with a knowledge not only about a broad range of Internet protocols that make it work, but also help students to develop critical insight into their design, and a first-hand feel for implementation through lab exercises. Specifically, students will study internet protocols including transport (TCP, UDP), network (IP, IPng), routing (RIP, OSPF), network management (SNMP, SNMPv2, RMON), and other important protocols like ARP, ICMP, DNS, BOOTP, DHCP and HTTP. Advanced topics like Mobile IP, QoS architecture for the Internet (Int-serv, Diff-serv, RTP, RSVP), IP multicast (IGMP, MBONE, Multicast Routing) and Network security (IPSEC and firewalls) will also be covered.

### **CMPE 423 Content Management Systems**

Installing PHP, MySQL and Apache, locally and remotely. Installing Content Management Systems (CMS) and getting required files, using browser installation. Likely benefits of applying CMS principles and technologies within their organizations. Extending and configuring a CMS by adding or creating modules and components. Developing a Web Site with CMS by customizing templates, modules and components. Managing a Web Site with CMS Administration and allowing other users to access Administrator Control Panel with different permissions. Developing a real-life web site by using CMS.

### **CMPE 424 Desktop Application Development**

Students will learn to create complete Windows desktop applications using their choice of C# or VB . NET. Full software development cycle issues will be addressed; including design, implementation, help system integration, testing, and deployment. Topics will include the .NET Framework, Structured Exception Handling, advanced Object-Oriented features (such as inheritance, polymorphism, patterns, etc.), ADO.NET, XML and Serialization, Globalization, Application Security.

### **425 Mobile Application Development**

Introduction to Mobile Application Development, Mobile Application Platforms, Object-Oriented Programming, Java,XML and Hello Android Application, Activities, Fragments, and Intents, Getting to Know the Android User Interface, Designing Your User Interface with Views, Displaying Pictures and Menus with Views, Data Persistence, Location-Based Services, Networking- Consuming Services, Publishing Android Applications

### **CMPE434 Network Security**

This class aims to provide a thorough grounding in network security suitable for those interested in conducting research in the area, as well as students more broadly interested in either security or networking. Topics will include: network attacks and defences, social engineering, denial-of-service, network intrusion detection, worms,



forensics scanning, traffic analysis, legal issues, web attacks, anonymity, wireless security, botnets and honeypots.

### **CMPE 436 Fundamental of Neural Networks**

This course introduces the concept of neural networks which is inspired from biological neurons of humans. The topics start with introducing neural networks with single neuron and perception concept. Study learning processes and perception learning algorithm. Applying single perception learning to Boolean function implementation with perceptions. Studying multilayer perceptions and back propagation algorithm is the next step. Applying multilayer perception learning to basic pattern recognition problems and the other network models are the next topics. Other network models include the Hopfield model of neural networks for pattern classification, self-organized feature maps (Kohonen's model) and principal component analysis with applications to pattern classification problems. With the help of the software simulator, the neural network models are experimented.

### **CMPE 444 Information Systems Engineering**

This course introduces key elements and processes required for designing, analysing, developing, and integrating complex information systems. The course focuses on the systems engineering approach with specific emphasis on design, development, and deployment. Topics covered include requirements engineering, architecture development, security engineering, cost-benefit analysis, information and networking technologies, and operations.

### **CMPE 452 Signal Processing with Matlab**

Covered topics are defined as: Vectorised calculations, Matrix and Array Manipulation and Data Handling, Two-dimensional graphing, Functions, Control Flow Structures: Branches and Loops, Basic applications of iteration and the solving of equations, Applications on Signal Processing, GUI representations.

### **CMPE 454 Data Structures and Algorithms in Java**

The objective of this course is to get wide knowledge about Data Structures and develop complex algorithms with Java. This course covers; Algorithm Efficiency and Analysis, Stacks, Queues, Lists, Recursion, Trees, Dictionaries and Search (Static and Dynamic Table Searching), Sets, Sorting, Selection and Graphs (Graph Traversal Shortest Path, Minimal Spanning Tree, Directed Graphs)

### **CMPE 455 Embedded Systems**

In this project-based course, students will design and develop applications for an embedded system platform, and then investigate low-level performance tuning and optimization. This course incorporates topics from the domains of software engineering, compilers, operating systems, input sensors, output devices and provides students with the foundation they will need for addressing the concerns of developing real-world embedded systems. Students are expected to be proficient in both C and Java.

### **CMPE 466 Introduction to Biometric Systems**

This course will present an introduction to the principles of operation, design, testing, and implementation of the unimodal and multimodal biometric systems. Major and emerging biometric technologies (fingerprint, face, hand, iris, hand geometry, palmprint, keystroke, handwriting, signature, gait, voice etc.) performance and issues related to the security and privacy aspects of these systems will be addressed. Students will be introduced to a variety of methods used for processing data from various biometrics (especially signature biometric modality) and to statistical methods employed to achieve acceptable performance rates (i.e. false accept rate, false reject rate, equal error rate and correct classification rates).

### **CMPE 471 Algorithmic Graph Theory**

An introduction to the study of graphs. Topics include the following: paths and circuits, connectedness, trees, shortest paths, networks, planar graphs, the colouring of graphs, and directed graphs, basic and advanced techniques of counting, recurrent relations. Applications of graph theory.

### **CMPE 481 Cloud Computing**

This course covers a series of current cloud computing technologies, including technologies for Infrastructure as a Service, Platform as a Service, Software as a Service, and Physical Systems as a Service. For different layers of the cloud technologies, practical solutions such as Google, Amazon, Microsoft etc. solutions as well as theoretical solutions (covered by a set of papers) are introduced.

### **CMPE 482 Distributed Parallel Computing**

The objective of the course is to introduce the students with the concept of parallel computing systems and paradigms. Today's personal computers are implemented with parallel processor architecture which is one of the parallel computing paradigms. The students will gain knowledge on the issues considered in parallel computing platforms such as memory organization, communication and cache coherence in parallel architectures. Topics

included are as follows: Parallel Architectures. Parallel and Distributed Computing. Parallel Algorithms. Performance and Scalability.

### **CMPE 483 Advanced Internet Programming**

Introduction to Internet Programming. Overview of Html language. Brief overview of CSS and Javascript. The building blocks of Php. Flow control and functions. Working with forms. Cookies and User Sessions. Interaction with MySQL using Php. Sample applications.

### **CMPE 486 Introduction to Unix Programming**

UNIX Programming introduces the basics of UNIX system commands and script programming. The goal of this course is to become familiar with the UNIX operating system, to learn the art of scripting and to support courses in data structures and operating systems. Students will learn special features of the Unix shell, commonly used tools and commands for file manipulation, text editing, task management, and the basics of system administration, and the programming languages. You will also learn how to compile and debug C/C++ programs as well as design well-written, maintainable software. These skills can also be applied to software designed outside of a Unix environment, and so are relevant to anyone writing software, regardless of the platform.

### **CMPE 488 Game Programming**

This course introduces fundamental topics related to 2D and 3D game programming. Students will learn high level game logic programming by writing scripts to implement character behaviours, explore the different techniques and animation in computer games; and implement techniques for creating gravity, collusion and momentum. On successful completion of the course, students should be able to design, implement and evaluate sprite handling, animation, sound and user input using the Unity Game Engine (Unity 4.3). Additionally, students would incorporate game play, collision detection, basic artificial intelligence, scoring, game states and levels to create indie-type games (such as pong, asteroids). Furthermore, students will be able to use object-oriented programming techniques in game design, Cartesian co-ordinates, Vectors and motion with constant velocity or constant acceleration. Finally, students will learn physics for game development: Rigid-body, particle, and articulated-body dynamics for modelling or animation: force, gravity, momentum, and collisions.