Department of Computer Engineering

General Information

Contact

Karadeniz Technical University,
Faculty of Engineering
Department of Computer Engineering
61080 TRABZON, TURKEY
Phone : +90 462 325 22 35, +90 462 377 31 57
Fax : +90 462 325 74 05
Web : http://ceng.ktu.edu.tr/

Administration

Head of Department: Prof. Dr. Rıfat YAZICI
Phone : +90 462 377 29 68 and +90 462 377 31 57
E-mail : **yazici@ktu.edu.tr**

Deputy Head of Department: Asst. Prof. Dr. Murat Ekinci
Phone : +90 +90 462 377 35 84
e-mail : **ekinci@ktu.edu.tr**

Deputy Head of Department: Asst. Prof. Dr. Hüseyin Pehlivan
Phone : +90 462 377 2994
e-mail : **pehlivan@ktu.edu.tr**

SOCRATES/ERASMUS Coordinator: Asst. Prof. Dr. Cemal KÖSE
Phone : +90 462 377 31 67
e-mail : **ckose@ktu.edu.tr**

SECRETARY: Ahmet YILMAZ
Phone : +90 462 462 325 22 35 and +90 462 377 31 57

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About the Department

Department of Computer Engineering at the Faculty of Engineering at the Karadeniz Technical University was founded in 1993. The Department of Computer Engineering offers degrees in undergraduate and graduate programs. The department serves over 300 undergraduate and over 35 graduate students in its building located in the main campus (Kanuni Kampus) which overlooks BlackSea and Trabzon Airport and every year about 50 distinguished students join to the department. The graduates of the department will be qualified to be in the following fields: System Administration, Software Engineering, Computer Hardware and Software Systems, Control Systems.

The Department of Computer Engineering can be divided in three divisions for research interests; computer hardware, computer software, and computer science. Research areas of the computer hardware division are computer hardware elements, computer architecture, computer networks, hardware design, theory and aplications of hardware. Research areas of the computer software division are programming languages, operating systems, data representation and data structures, informatics and application, software and system engineering, and software design techniques. Research areas of the computer science division are theory of computation, numerical methods, modeling methods and computer engineering.

The main goals of the department are the investigation and teaching of the computer science and engineering in its broader sense. Graduate and undergraduate programs of the department are designed to train qualified students and researchers in computer engineering.

A year English Language course is compulsory before proceeding to department programs.
The objectives of the programs are:
Educate students so that they acquire relevant knowledge about computer science and engineering and related fields; develop student's ability to solve computer engineering problems using the techniques, skills and modern engineering tools; develop student's ability to utilize his/her knowledge in designing and conducting and analyzing results for solving basic computer engineering problems; develop student's ability to effectively communicate.

During the undergraduate education, besides to lectures students enjoy active laboratory experiments, project and applications, and technical trips. Students, who completed undergraduate programs with at least 2.4 (out of 4) academic average, may apply to graduate programs. The graduate programs are designed to lead MSc degree in many branch of computer engineering.

The research interests of staff cover a wide spectrum of computer sciences and engineering applications and theory including computer hardware, computer software, system engineering, database systems and management, networking and network programming, electronic commerce, computer architecture, artificial intelligence, speech and pattern recognition, parallel computers, parallel and distributed computing, multiprocessing and process control, computer vision and image processing, and computer graphics, artificial neural systems, cryptography, etc.

Facilities:
The department has the following laboratories for both teaching and research:
Computer (PC) laboratory: The laboratory intends to provide the students with practical knowledge about the hardware and system software that make up a computer, and programming and equipped with personal computers.

Basic Electronic Laboratory: The aim of this laboratory is to use basic laws with experiments, and to measure electrical quantities. It is equipped with electrical and electronic experiment sets.
Digital Electronic Laboratory: The laboratory intends to provide the students with practical knowledge about the logic and electronic devices and equipped with digital electronic experiment sets.

Digital Design Laboratory: The laboratory intends to provide the students with practical knowledge about the advanced logic and electronic devices and equipped with digital experiment sets.

Microprocessors Laboratory: The laboratory intends to provide the students with practical knowledge about the microcomputer systems and equipped with computers and microprocessor sets.

Computer Systems Laboratory: This laboratory introduces the application of process control, system control, operating, systems, and system programming and equipped with computers, parallel computers, and programmable logic controllers.

Computer Graphics Laboratory: The laboratory intends to provide the students with practical knowledge about the generation of computer graphics and equipped with computers and graphic devices.

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Academic Staff and Research Interests

Subdivision	Researcher	Research Interests
Computer Hardware	Prof. Dr. Rıfat YAZICI	Computer Hardware, Graphics, Artificial Neural Systems.
	Asst. Prof. Dr. Cemal KÖSE	Parallel Computers, Computer Networks, Computer Graphics, Pattern Recognition.
	Asst. Prof. Dr. Murat EKİNCİ	Computer Vision, Real-time Image Processing, Pattern Recognition.
	Lect. Ömer Cakir	Software Engineering and parallel computers
	Res. As. Murat Aykut	İmage processing, computer vision, Machine Learning, Computer networks, Graphics
	Res. As. Mehmet Emin Tenekeci	İmage processing, computer vision
Computer Software	Asst. Prof. Dr. Hüseyin PEHLİVAN	Operating Systems, Programming Paradigms, Web Technologies.
	Res. As. Aykut Avcı	Computer Software
	Res. As. M. Bilsay Karadeniz	Computer Software
	Res. As. Eyüp Gedikli	Computer Software
	Res. As. Cevat İkibaş	Computer Software, Database, Web Technologies.
	Res. As. Kamil Öncü ŞEN	Computer Software
Computer Science	Prof. Dr. Vasif V. NABİYEV	Artificial Intelligence, Algorithms, Discrete Systems
	Dr. Lect. Tuğrul Çavdar	Robotics
	Expert Zafer Yavuz	Artificial Intelligence, and Computer Software
	Res. As. Yasemin Bekiroğlu	Artificial Intelligence

SUBDIVISION RESEARCHER RESEARCH INTEREST

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Program and Cources

Undergraduate Program (Schedule)

FIRST YEAR					
Code	**Course Title**	**EC***	**H+T+L***	**C/E***	**Lang.***
BİL 111	Introduction to Computers	6	4+0+0	C	T
ELK 111	Electrical Circuits	4	3+0+0	C	T
FİZ 117	General Physics	4	4+0+0	C	T
MAT 109	Linear Algebra	4	3+0+0	C	T
MAT 117	Mathematics-I	4	4+0+0	C	T
YDI 111	English-I	4	3+0+0	C	E
TDB 101	Turkish Language-1	2	2+0+0	C	T
AITB 191	History of Turkish Rev. -1	2	2+0+0	C	T
First Semester TOTAL		**30**	**25+0+0**		
BİL 114	Programming - I	5	4+0+0	C	T

BİL 118	Logical Circuits	4	3+0+0	C	T
ELK 112	Electronic Components	5	4+0+0	C	T
MAT 118	Mathematics-II	4	4+0+0	C	T
MAT 168	Probability and Statistics	4	4+0+0	C	T
YDI 112	English-II	4	3+0+0	C	E
TDB 102	Turkish Language-2	2	2+0+0	C	T
AITB 194	History of Turkish Rev.	2	2+0+0	C	T
Second Semester	**TOTAL**	**30**	**26+0+0**		
FIRST YEAR	**TOTAL**	**60**	**51+0+0**		

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SECOND YEAR					
Code	**Course Title**	**EC***	**H+T+L***	**C/E***	**Lang.***
BİL 205	Data Structures	4	3+0+0	C	T
BİL 207	Programming II	6	4+0+0	C	T
BİL 233	Basic Electronic Lab.	4	0+0+2	C	T
BİL 243	Digital Design	4	3+0+0	C	T
ELK 207	Electronic Circuits	4	3+0+0	C	T
MAT 203	Mathematics-III	4	4+0+0	C	T
YDI 211	English Reading and Writing	4	2+0+0	C	T
Third Semester	**TOTAL**	**30**	**19+0+2**		
BİL 202	Signals and Systems	4	3+0+0	C	T
BİL 206	Computation Methods	4	3+0+0	C	T
BİL 208	Discrete Mathematics	4	3+0+0	C	T
BİL 236	Programming Languages	6	3+1+0	C	T
BİL 224	Digital Electronic Lab.	4	0+0+2	C	T
MAT 204	Mathematics-IV	4	4+0+0	C	T
YDM 214	Professional English-I	4	2+0+0	C	E
Fourth Semester	**TOTAL**	**30**	**18+1+2**		
SECOND YEAR	**TOTAL**	**60**	**37+1+4**		

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THIRD YEAR					
Code	**Course Title**	**EC***	**H+T+L***	**C/E***	**Lang.***
BİL 315	Microprocessors	5	4+0+0	C	T

BİL 327	File Organisation	4	3+0+0	C	T
BİL 337	Operating Systems	5	4+0+0	C	T
BİL 307	Numerical Analysis	4	3+0+0	C	T
BİL 315	Digital Design Lab.	4	0+0+2	C	T
YDM 313	Professional English-II	4	2+0+0	C	E
	Elective Course I				
Elective Courses					
SEC 301	Digital Control-I	4	3+0+0	E	T
SEC 303	Object Oriented Programming	4	3+0+0	E	T
Fifth Semester	**TOTAL**	**30**	**19+0+2**		
BİL 318	System Programming	5	3+0+0	C	T
BİL 326	Database Management	4	3+0+0	C	T
BİL 338	Computer Architecture	5	4+0+0	C	T
BİL 348	Automata Theory	4	3+0+0	C	T
BİL 376	Microprocessors Lab.	4	0+0+2	C	T
YDM 314	English in Engineering	4	2+0+0	C	T
	Technical Elective-I				
Elective Courses					
SEC 302	Digital Signal Processing	4	3+0+0	E	T
SEC 304	Software Engineering	4	3+0+0	E	T
Sixth Semester	**TOTAL**	**30**	**18+0+2**		
THIRD YEAR	**TOTAL**	**60**	**37+0+4**		

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FOURTH YEAR					
Code	**Course Title**	**EC***	**H+T+L***	**C/E***	**Lang.***
BİL 405	Artificial Intelligence	5	3+0+0	C	T
BİL 415	Computer Graphics I	4	3+0+0	C	T
BİL 425	Computer Networks	5	4+0+0	C	T
BİL 350	Term Project	4	0+3+0	C	T
BİL 457	Computer systems Lab.	4	0+0+2	C	T
	Elective Course I				
	Elective Course II				
Elective Courses					
SEC 401	Image Processing	4	3+0+0	E	T
SEC 403	Optimization	4	3+0+0	E	T
SEC 405	Fuzzy Logic	4	3+0+0	E	T
SEC 407	Compiler Design	4	3+0+0	E	T

SEC 409	Engineering Economy	4	3+0+0	E	T
Seventh Semester TOTAL		**30**	**16+3+2**		
BİL 406	Parallel Computers	6	4+0+0	C	T
TEZ 400	Graduation Project	12	0+6+0	C	T
BİL 416	Computer Graphics Lab.	4	0+0+2	C	T
	Technical Elective -I				
	Technical Elective -II				
Elective Courses					
SEC 408	Digital Control- II	4	3+0+0	E	T
SEC 402	Computer Graphics-II	4	3+0+0	E	T
SEC 404	Artificial Neural Networks	4	3+0+0	E	T
SEC 406	Computer Network Programming	4	3+0+0	E	T
SEC 410	Logical Programming	4	3+0+0	E	T
Eighth Semester TOTAL		**30**	**10+9+2**		
FOURTH YEAR TOTAL		**60**	**26+6+4**		
SUM OF EIGHT SEMESTERS		**240**	**151+10+12**		

*EC = ECTS Credits
H = Hours T = Training L = Laboratory
C/E = C: Compulsory; E: Elective
Lang. = Language; E: English; T: Turkish

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BİL 111 INTRODUCTION TO COMPUTERS (4+0+0) EC:6

Year / Semester	1st year fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (56 hours) - 4 hours per week
Lecturer	Prof. Dr. Rıfat Yazıcı
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course

The course intends to provide the students with basic knowledge about how a computer works and a good understanding of the operating concepts, the hardware, and system software that make up a computer.

Contents of the Course

Number Systems, Data Formats, Representing Integer Data, Floating Point Numbers, Boolean Algebra and Logic Networks, Computer Arithmetic, Logic Components, Computer Architecture, Editors and Debuggers, Assemblers, Compilers, Interpreters, Linkers and Loaders, Boot-up Process, Data Storage, I/O Devices, Multimedia, Networks.

Textbook / Material	Lecture Notes: To be delivered during the lectures
Recommended Reading	White, R., 1995, How Computers Work, ZD Press, California; 220pp. Nagin, P., Impagliazzo, J., 1995, Computer Science, John Wiley, 730pp. Hill, F., J., Peterson G., R., 1981, Introduction to Switching Theory and Logical Design, John Wiley, 616pp.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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ELK 111 ELECTRIC CIRCUITS (3+0+0) EC:4

Year / Semester	1st year fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Türen Demircioğlu
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The students should obtain a basic knowledge of voltage, current, resistance and circuit.

Contents of the Course
Circuit elements and laws: Voltage, current, circuit elements, Kirchhoff ‘s Voltage and Current Laws, ideal voltage and current sources, the resistor, signal waveforms.
Analysis methods for resistive circuits: Serial and parallel connections of resistors, voltage and current division, superposition, Thévenin and Norton equivalent circuits, node voltage and mesh current analysis, power.
The energy storage elements: The capacitor, the inductor, transformers and coupled coils, energy.
AC circuits: complex numbers, the phasor circuit, average power, reactive power and power factor, maximum power transfer, resonance, RL, RC, RLC circuits.

Textbook / Material	C.R. Paul / S.A. Nasar / L.E. Unnewehr, Introduction to Electrical Engineering, McGRAW-HILL
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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FIZ 117 GENERAL PHYSICS (4+0+0) EC:4

Year / Semester	1st year fall semester
Status	Compulsory
Department	Physics
Prerequisite / Recommended	None
Form of Teaching	Lectures (56 hours) - 4 hours per week
Lecturer	Physics Department

Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The main objective of this course is to provide the student with a clear presentation of the basic concepts and principles of physics.

Contents of the Course
Physics and measurement, Motion in one dimension. Motion in two dimensions. The Laws of motion. Circular motion and other application of Newton's laws. Work and Energy. Potential energy. Linear momentum and collisions. Rotation of a rigid body. Electric fields. Gauss' law. Electric potential. Capacitance and dielectrics. Current and resistance. Direct current circuits. Magnetic fields. Sources of the magnetic field. Faraday's law. Inductance.

Textbook / Material	Physics for Scientists & Engineers with Modern Physics, 3rd Ed. Vols. I & II, R.A.Serway.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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MAT 109 LINEAR ALGEBRA (3+0+0) EC:4

Year / Semester	1st year fall semester
Status	Compulsory
Department	Mathematics
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Osman Kazancı
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
To teach the foundations of the linear algebra

Contents of the Course
Vector spaces, Linear system equations, homogenous equations, linear transformations, matrices, Eigen values and Eigen vectors.

Textbook / Material	Lecture Notes: To be delivered during the lectures
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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MAT 117 MATHEMATICS –I (4+0+0) EC:4

Year / Semester	1st year fall semester
Status	Compulsory
Department	Mathematics
Prerequisite / Recommended	None

Form of Teaching	Lectures (56 hours) - 4 hours per week
Lecturer	Ömer Pekşen
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The aim of the course is to teach the basic mathematical techniques, introducing at the same time a number of mathematical skills that can be used for the analysis of problems. The emphasis is on the practical usability of mathematics; this goal is mainly pursued via a large variety of examples and applications from these disciplines.

Contents of the Course
Real numbers. Absolute value. Inequalities. Functions of one variable. Kinds of functions: Rational, algebraic, exponential, logarithmic and trigonometric functions and their graphics. Limit. Continuity. Derivative. Rolle and Mean Value theorems. Higher order derivatives. Leibnitz formula for derivatives. Maximum and minimum problems. L'Hospital Rule. Asymptotes and constructing graphs. Sequences and convergence. Convergence in Series. Power series and radius of convergence. Taylor and Maclauran Series. Indefinite integral their calculations. Definite integral and their applications. Fourier Series.

Textbook / Material	Differential and Integral Calculus, N.Piskunov
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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YDI 111 ENGLISH –I (3+0+0) EC: 4

Year / Semester	1st year fall semester
Status	Compulsory
Department	Department of Foreign Language
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Muhammet KUL
Co-lecturer	Mesut DEMİRKIRAN, Yusuf AYKANAT
Language of instruction	English

Objectives of the Course
To be able to read, write and translate in the field.

Contents of the Course
Course description: English at upper-intermediate and advanced level

Textbook / Material	Reading and Writing-the English of Science and Technology by Karl Drobnic, Sharon Abrams and Marjorie Morray, PranticeHall, Inc.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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TDB 101 TURKISH LANGUAGE-1 (2+0+0) EC:2

Year / Semester	1st year fall semester
Status	Compulsory
Department	Department of Turkish Language
Prerequisite / Recommended	None
Form of Teaching	Lectures (28 hours) - 2 hours per week
Lecturer	Department of Turkish Language
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course

The main aim of the Turkish language lecture is to explain the structural specialties of Turkish language to the students of higher education. By doing so it is aimed to tell the importance of Turkish language in our national unity

Contents of the Course

In this lecture, first, the following subjects will be examined:

The description of the language, its qualities and place in a nation's life. The relation of language and culture, languages in the world and the place of Turkish language among them, The development of Turkish language and present situation of it, thinking reading and understanding language and explanation, construction of sentences in Turkish language, Words, the writing and the felling of Turkish words.

Textbook / Material	Adem KILIÇOĞLU, Şükür GÖRMÜŞ, Yılmaz İNCE, Osman DEMİRAYAK, YÖK Çerçeve Programına Uygun "Türk Dili ve Kompozisyon Bilgileri"
Recommended Reading	Prof. Dr. Zeynep KORKMAZ, Prof. Dr. Ahmet Bican ERCİLASUN, Prof.Dr. Hamza ZÜLFİKAR ve diğerleri, " Yüksek Öğretim Öğrencileri İçin Türk Dili ve Kompozisyon Bilgileri" Prof.Dr. Kemal YAVUZ, Prof.Dr. Kazım YETİŞ, Prof.Dr. Necat BİRİNCİ, "Üniversite Türk Dili ve Kompozisyon Dersleri"
Method of Assessment	One midterm exam (50%) and a written end-of-term exam (50%)

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AITB 191 HİSTORY OF TURKİSH REV.-1 (2+0+0) EC:2

Year / Semester	1st year fall semester
Status	Compulsory
Department	Department of Atatürk Principles and Revolution History
Prerequisite / Recommended	None
Form of Teaching	Lectures (28 hours) - 2 hours per week
Lecturer	Department of Atatürk Principles and Revolution History
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course

The main goal of the lecture is to give realistic knowledge about the main quality and characteristics of the Turkish Republic, which was based on the reliable text and documents. The results of foundation of the Republic of Turkey, and its establishment and development periods will be offered to the students with the objective and scientific methods; and to comprehend the students with information about Atatürk Principles and Revolutions.

Contents of the Course

In the light of World developments that were in the origins Western Europe (Geographical discovery, Renaissance and Reform movements, Industry revolution, French revolution etc. and their results), starting from Fall down period of the Ottoman Empire;

Textbook / Material	Türk Ansiklopedisi, Mustafa Kemal Atatürk, Nutuk, Mustafa Kemal Atatürk, Atatürk'ün Söylev ve Demeçleri, A. Afetinan, Türkiye Cumhuriyeti ve Türk Devrimi, Ankara 1991, Mehmet Koçak et al., Atatürk İlkeleri ve Türk Devrim Tarihi, Trabzon 2001, Temuçin Faik Ertan (ed.), Atatürk ve Türkiye Cumhuriyeti Tarihi, Ankara 2001, And the materials, which belonging to Atatürk and History of the Turkish Republic: All Archival, Printing (books, periodicals and newspapers), Imaging (Videotape, VCD / DVD) and Sounding materials.
Recommended Reading	None
Method of Assessment	One midterm exam (50%) and a written end-of-term exam (50%)

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BIL 114 PROGRAMMING I (4+0+0) EC: 5

Year / Semester	1st year spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures 56 hours (4 hours per week)
Lecturer	Prof. Dr. Rıfat Yazıcı
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course

The course intends to teach the students for understanding the programming concepts in C Programming language.

Contents of the Course

The Turbo C Programming Environment, C Building Blocks, Loops, Decisions, Functions, Arrays and Strings, Pointers, Structures and Unions, The Character Display, Turbo C Graphics Functions, Files, Large Programs, Advanced Variables.

Textbook / Material	Lafore, R., 1990, The Waite Group's C Programming Using Turbo C++, The Waite Group, Inc., USA, 796pp.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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COM 118 LOGICAL CIRCUITS (3+0+0) EC: 4

Year / Semester	1st year spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	BIL 111 Introduction to Computing
Form of Teaching	Lectures 42 hours (3 hours per week)
Lecturer	Asst. Prof. Dr. Murat Ekinci
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
To teach how students should be able to apply switching theory to the solution of logic design problems. Then by combining flip-flops with networks of logical gates, students will learn to design counters, clocked sequential networks-detectors, and similar networks using flip-flops, logical gates, ROM, PLD, MSI integrated circuits etc.

Contents of the Course
Introduction, Quine-McCluskey method, Multiple output networks, Flip-Flops, Counters and similar sequential networks, Analysis of clocked sequential networks, Derivation of state graphs and tables, Reduction of state tables state assignment, MSI Integrated circuits in sequential network design, Sequential network design with ROMs and PLDs, State machine with SM charts.

Textbook / Material	Charles H. Roth, “Fundamentals of Logic Design” Fourth Edition, West Publishing Company, 1992.
Recommended Reading	M. Morris Mono, Charles R. Kime “ Logic and Computer Design Fundamentals “, Prentice Hall, 1984. V. P. Nelson, H. T. Nagle, J. D . Irwin, B. D. Carroll, “Digital Logic Circuits Analysis & Design”, Prentice Hall, 1995. Ronald J. Tocci, “Digital Systems Principles and Applications”, Prentice Hall.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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ELK 112 ELECTRONIC COMPONENTS (4+0+0) EC: 5

Year / Semester	1st year spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures 56 hours (4 hours per week)
Lecturer	Cahit Altan
Co-lecturer	Asst. Prof. Dr. Cemal Köse
Language of instruction	Turkish

Objectives of the Course
The goals of the course are to provide the student with a basic background on semiconductor materials and semiconductor physics and an understanding of what the semiconductor devices, p-n junctions, Schottky barrier diodes, bipolar transistors, and field effects transistors are, how they work, and how they are used in computer engineering applications.

Contents of the Course

Basic Properties of Semiconductors: Intrinsic Condition, Drift and Diffusion Current, PN junction and Biasing, Junction Capacitance.
Diodes and Their Applications: Ideal diode, real diode, other diodes, half-wave rectification, full-wave rectification, clipping circuits, clamping circuits, logic gate with diodes and resistors.
Transistors and Their Characteristics: The Junction transistors, Transistor current component, Transistors as an amplifiers, Transistors as a Switch, DC analysis of Transistor circuits, The infinite Bypass Capacitor and Coupling Capacitor.
Junction Transistor Small-Signal Analysis: Junction transistors small-signal models, The common Emitter Amplifier, The common Base Amplifier, The common Collector Amplifiers,
Field-Effect Transistors: The Junction Field Effect Transistor(JFET), MOSFET, Graphic Analysis of FET amplifier, Static Characteristics and Rating, Biasing the FET, Dynamic Characteristics, Analysis of FET Amplifiers Circuits.
Logic Gates: The invertor (NOT Gate), Transistor-Transistor Logic(TTL), Emitter-Coupled Logic(ECL), CMOS logic, Comparison of Logic Families.
Other Semiconductor Components: thyristors, triacs, diacs.

Textbook / Material	Donald L. Schilling, Charles Belove, Electronic Circuits, McGraw Hill, USA.
Recommended Reading	Robert Boylestad, Luis Nashelsky, Elektronik Elemanlar ve Devre Teorisi, M.E.B, Ankara.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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MAT 118 MATHEMATICS-II (4+0+0) EC: 4

Year / Semester	1st year spring semester
Status	Compulsory
Department	Mathematics
Prerequisite / Recommended	None
Form of Teaching	Lectures 56 hours (4 hours per week)
Lecturer	Ömer Pekşen
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The aim of the course is to teach the basic mathematical techniques, introducing at the same time a number of mathematical skills which can be used for the analysis of problems. The emphasis is on the practical usability of mathematics; this goal is mainly pursued via a large variety of examples and applications from these disciplines.

Contents of the Course
Matrices and determinants. Solutions of linear equations. Eigenvalues. Eigenvectors. Cartesian coordinate system. Vectors. Linear independence. Inner product. Vector product. Plane analytic geometry: Parabola. Hyperbola. Rotations and translations of axis. Polar, cylindrical and spherical coordinates. Functions of several real variables. Limit. Continuity. Partial Derivatives. Chain rule. Minima and maxima. Lagrange multiplier rule. Taylor and Maclauran Series. Line integrals. Double Integrals and their applications. Double integrals in polar coordinates. Green Theorem. Triple integrals and their applications. Triple integrals in Cylindrical and spherical coordinates. Surface integrals. Stocks theorem.

Textbook / Material	Calculus and Analytic Geometry, Thomas.
Recommended Reading	Advanced Engineering Mathematics, E.Kreyszig.

Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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MAT168 PROBABILITY and STATISTICS (4+0+0) EC: 4

Year / Semester	1st year spring semester
Status	Compulsory
Department	Mathematics
Prerequisite / Recommended	None
Form of Teaching	Lectures 56 hours (4 hours per week)
Lecturer	Prof. Dr. Tahir Khaniev
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
To give information about what probability and statics are

Contents of the Course
Probability concept, set theory, permutation-combination Conditional probability, Statistical independence, discrete and continuous random variables, mean, variance, moments, probability distribution and density functions, Binomial, Gaussian, Rayleigh, uniform, Normal and Poisson distribution, characteristics functions, multivariate random processes and distributions, Transformation of random variables, covariance.

Textbook / Material	None
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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YDI 112 ENGLISH-II (3+0+0) EC: 4

Year / Semester	1st year spring semester
Status	Compulsory
Department	Department of Foreign Languages
Prerequisite / Recommended	None
Form of Teaching	Lectures 42 hours (3 hours per week)
Lecturer	Muhammet KUL
Co-lecturer	Ümit YURDUSEVEN, Mesut DEMİRKIRAN
Language of instruction	English

Objectives of the Course
To be able to read and translate in English

Contents of the Course
Course description: English at upper-intermediate and advanced level
The Physical Sciences: The Sources of Energy: listing in a series Nuclear Power-Yes or No?: comparing, contrasting, supporting opinions

The Earth Sciences: The Explosion of Mount St. Helens: comparing, describing, supporting opinions Volcanoes of the past: reference, chronology, results and causes
Mathematics: Statistics and the Analysis of Information: using statistics to make comparisons Statistics,, Probability, and Population: using facts and opinions together
Applied Science: Automation – For Better or Worse: reported speech Transferring Western Technology to Developing nations: inference, using examples

Textbook / Material	Reading and Writing-the English of Science and Technology by Karl Drobnic, Sharon Abrams and Marjorie Morray, PranticeHall, Inc.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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AITB 192 HİSTORY OF TURKİSH REV.-2 (2+0+0) EC: 2

Year / Semester	1st year spring semester
Status	Compulsory
Department	Department of Atatürk Principles and Revolution History
Prerequisite / Recommended	None
Form of Teaching	Lectures 28 hours (2 hours per week)
Lecturer	Department of Atatürk Principles and Revolution History
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The main goal of the lecture is to give realistic knowledge about the main quality and characteristics of the Turkish Republic, which was based on the reliable text and documents. The results of which birth of the Republic of Turkey, and its establishment and developing periods will be offered to the students with the objective and scientific methods; and to comprehend the students with information about Atatürk Principles and Revolutions.

Contents of the Course
Ottoman Reforms period, First World War, The Turkish National War, Republic of Turkey's establishment, revolutions (radical changes in Turkey), Atatürk's biography and Turkish Revolution's national and international worth.

Textbook / Material	Türk Ansiklopedisi, Mustafa Kemal Atatürk, Nutuk, Mustafa Kemal Atatürk, Atatürk'ün Söylev ve Demeçleri, A. Afetinan, Türkiye Cumhuriyeti ve Türk Devrimi, Ankara 1991, Mehmet Koçak et al., Atatürk İlkeleri ve Türk Devrim Tarihi, Trabzon 2001,
Recommended Reading	Temuçin Faik Ertan (ed.), Atatürk ve Türkiye Cumhuriyeti Tarihi, Ankara 2001, And the materials, which belonging to Atatürk and History of the Turkish Republic: All Archival, Printing (books, periodicals and newspapers), Imaging (Videotape, VCD / DVD) and Sounding materials.
Method of Assessment	One midterm exam (50%) and a written end-of-term exam (50%)

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BIL 205 DATA STRUCTURES (3+0+0) EC: 4

Year / Semester	2nd year / Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	Prerequisite: BIL 114 Programming I
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Prof. Dr. Vasif V. Nabiyev
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The aim of this course is to give information about data structures.

Contents of the Course
Introduction to analysis of space and time requirements of algorithms, elementary data structures, simple and composite string manipulation functions, linear data structures and their sequential representation, arrays stacks and queues, linear data structures and their linked representation, single doubly and circular linked lists, non-linear data structures, binary trees and representations, multi-linked structures, graphs and representations, dynamic memory management systems.

Textbook / Material	Special notes, Data Structures books
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 207 PROGRAMMİNG –II (4+0+0) EC: 6

Year / Semester	2nd year / Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	Prerequisite: BIL 114 Programming I
Form of Teaching	Lectures (56 hours) - 4 hours per week
Lecturer	Asst. Prof. Dr. Murat Ekinci
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
To learn structured programming and especially object-oriented programming with C++.

Contents of the Course
Introduction, Basic elements of C++, Control Structures, User-Defined Functions, User-Defined Simple Data Types, Arrays and Strings, Records (Struct), Classes and Data Abstraction,

Inheritance and Composition, Pointers, Classes, and Virtual Functions, Overloading and templates.

Textbook / Material	C++ Programming Lecture slides
Recommended Reading	D.S. Malik "C++ Programming: From Problem Analysis To Program Design", Thomson Learning Company,
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 233 BASİC ELECTRİCİTY LABORATORY (0+0+2) EC: 4

Year / Semester	2nd year / Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (28 hours) - 2 hours per week
Lecturer	Department Staff
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The goal of this laboratory is to teach basic laws with experiments and measure electrical quantities.

Contents of the Course
Experiments

1. DC motor
2. The ammeter
3. AC circuits
4. Resonant circuits
5. The transformer
6. The transient state
7. The inductor with iron core
8. Thevenin and Norton laws
9. Kirchoff's Current and voltage laws
10. The deflection of the electron beam in the electrical and magnetic fields

Textbook / Material	Text – Laboratory manual available.
Recommended Reading	All related books and lecture notes.
Method of Assessment	Ten oral exams (30%), a) Each student is evaluated by a point out of 100 for each of the experiments by the instructor. b) After completing ten experiments as a project experiment among these 10 experiments one is randomly chosen by each student and carried out by him / her and evaluated by the instructor. c) End-of-semester examination (written).

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BIL 243 DIGITAL DESIGN (3+0+0) EC: 4

Year / Semester	2nd year / Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	Prerequisite: BIL 118 Logical Circuits
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. Murat Ekinci
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
This course intends to teach firstly the special problems encountered in the analysis and design of asynchronous sequential networks. Then it is learned that the basic electronic circuits in each IC digital logic family and analyzes their electrical operation. Finally, to understand the theory of operation and circuit limitations of several types of DACs (Digital Analog Converter) and ADCs (Analog Digital Converter).

Contents of the Course
Introduction, Analysis of Asynchronous Sequential Networks, Derivation and Reduction of Primitive Flow Tables, State Assignment and Realization of Flow Tables, Hazards, Asynchronous Sequential Network Design, Discrete and Integrated Circuit Logic Gates, Interface with Analog World.

Textbook / Material	Charles H. Roth, “Fundamentals of Logic Design” Fourth Edition, West Publishing Company, 1992.
Recommended Reading	M. Morris Mono, “ Digital Design “, Prentice Hall, 1984. V. P. Nelson, H. T. Nagle, J. D . Irwin, B. D. Carroll, “Digital Logic Circuits Analysis & Design”, Prentice Hall, 1995. Ronald J. Tocci, “Digital Systems Principles and Applications”, Prentice Hall.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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ELK 207 ELECTRONIC CIRCUITS (3+0+0) EC: 4

Year / Semester	2nd year / Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Dr. Tuğrul Çavdar
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
This course is intended to give juniors in computer engineering an introduction to the design of amplifiers, filters, oscillators, A/D and D/A converters, and basic logic gates, with an emphasis on designs suitable for implementation in monolithic IC fabrication.

Contents of the Course
Field Effect Transistors(JFET, MOSFET etc…),Amplifier Frequency Response(Miller Theorem, Bode Plots, Low and High Frequency Responses, Bandwidth, Multistage Amplifiers etc…),Operational Amplifiers (Input Modes and Parameters, Negative Feedback, Inverting and Non-inverting Amplifiers, Voltage Follower, Open Loop Response, Gain-Frequency Relation, Phase and Frequency Responses, Close Loop Response, Op-Amp Applications: Comparators, Schmitt Trigger, Output Bounding, Inverting and Non-inverting Summing Amplifiers, Differential Amplifier, Integrator and Differentiators etc…), Osilators (Square-wave Generators, 555 Timers, Voltage-controlled Osilator, Astable – Monostable – Bistable Circuits etc…),Voltage Regulators,Active Filters

Textbook / Material	Jacob Millman&Arvin Grabel, Microelectronics, McGraw-Hill, USA.
Recommended Reading	Thomas A. DeMassa, Zack Ciccone, Digital Integrated Circuits, John Wiley&Sons, USA. Joseph J. Carr, Integrated Electronics: Operational Amplifiers and Linear Ics with Applications, Harcourt Brace Jovanovich, USA
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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MAT 203 MATHEMATICS –III (4+0+0) EC: 4

Year / Semester	2nd year / Fall semester
Status	Compulsory
Department	Mathematics
Prerequisite / Recommended	None
Form of Teaching	Lectures (56 hours) - 4 hours per week
Lecturer	Prof. Dr. Ziya Yapar
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
This is one of the basic calculus courses that serve as the foundation of all advanced subjects in applied and theoretical mathematics.

Contents of the Course
Constructing Differential equations and solutions. Ordinary differential equations. Higher order linear differential equations. The system of differential equations. Introduction to the partial differential equations. Separation of variables.

Textbook / Material	Şafak Alpay, Ersan Akyıldız, Albert Erkip; Lectures on Differential Equations. Matematik Vakfı, 1995.
Recommended Reading	None

Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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YDI 211 ENGLISH READING AND WRITING (2+0+0) EC:4

Year / Semester	2nd year / Fall semester
Status	Compulsory
Department	Department of Foreign Languages
Prerequisite / Recommended	None
Form of Teaching	Lectures (28 hours) - 2 hours per week
Lecturer	Mesut Demirkıran
Co-lecturer	None
Language of instruction	English

Objectives of the Course
To be able to read, write and translate in the field.

Contents of the Course
Academic studies in reading and writing beyond the secondary level.
Life Sciences: The Science of Living Things: recognizing and using formal definitions From Aristotle to DNA: Greek roots, using chronological order Genetic Engineering: examples with ''such as'': The Manipulation of Genetic Traits: thinking in English, deduction and subdivisions **Applied Science**: Automation – For Better or Worse: reported speech Transferring Western Technology to Developing nations: inference, using examples

Textbook / Material	Reading and Writing-the English of Science and Technology by Karl Drobnic, Sharon Abrams and Marjorie Morray, PranticeHall, Inc.
Recommended Reading	None
Method of Assessment	A written midterm exam (50%) and a written end-of-term exam (50%)

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BIL 202 SIGNALS AND SYSTEMS (3+0+0) EC: 4

Year / Semester	2nd year fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. Ali Gangal
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
This course aims to provide Computers Engineering students with the basic mathematical

concepts that useful for data communications, circuit design, control, image and speech processing. MATLAB based examples included in response to software developments, the wider availability of information technology, developments in the teaching of signal processing.

Contents of the Course

Continuous and discrete signals: Classification of signals.

Time domain analysis of continuous systems: Linearity, homogeneity, time invariance, properties of linear time invariant continuous systems, differential equation model, systems structures, impulse response model, convolution, state-space model, causality and stability.

Frequency domain analysis of continuous systems: Fourier series, Fourier transform properties of Fourier series and Fourier transforms, transfer function, amplitude response, and phase response.

S-domain analysis of continuous systems: Bilateral and Lateral Laplace transforms properties of Laplace transforms, inverse Laplace transform. Differential equation model, impulse response, state-space model in s-domain, transfer function, stability, pole-zero diagrams.

Time, frequency and z-domain analysis of discrete systems: Discrete systems, z-transform, discrete time Fourier transform.

Continuous and discrete systems with random inputs: Correlation and convolution

Textbook / Material	PowerPoint presentations, practical notes. Oppenheim, A.V., Willsky, A. S., "Signals and Systems", Prentice Hall Int., Inc. 1997. Hsu, H., Hse, H. P., "Schaum's Outline of Theory and Problems of Signals and Systems", 1995. Hayes, M. H., "Digital Signal Processing", Schaum's Outlines, McGraw-Hill, 1999.
Recommended Reading	Kamen, E.W., Heck, B. S., “Fundamentals of Signals and Systems using MATLAB", Prentice Hall, Inc., 1997.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 206 COMPUTATION METHODS (3+0+0) EC: 4

Year / Semester	2nd year fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	Programming and Data Structures
Form of Teaching	Lectures (42 hours) – 3 hours per week
Lecturer	Prof. Dr. Vasif Nabiyev
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course

The aim of this course is to teach the programming techniques.

Contents of the Course

Deterministic and non-deterministic algorithms, Algorithmic Complexity and efficiency, Analysis of Algorithms. Sorting Algorithms. Bubble sort. Select sort. Shellsort. Quicksort. Removing Recursion. A Linear Sort. Searching Algorithms. Geometric Algorithms. Random Numbers. Matrix Operations. NP-Completeness. Combinatorial algorithms, Optimisation techniques and

Simplex algorithm.

Textbook / Material	Special notes
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 208 DISCRETE MATHEMATICS (3+0+0) EC: 4

Year / Semester	2nd year fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	Logic elements
Form of Teaching	Lectures (42 hours) – 3 hours per week
Lecturer	Prof. Dr. Vasif Nabiyev
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The aim of this course is to teach mathematical basics of computer applications.

Contents of the Course
Logic and Proofs. The language of Mathematics. Recurrence Relations. Graph Theory, The 4-color problem. Boolean Algebra and Combinatorial Circuits. Sets. Formal systems. Hamilton and Euler loops.

Textbook / Material	Special notes, Discrete Mathematics (Kennet Rosen,Gorbatov) books
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 236 PROGRAMMING LANGUAGES (3+1+0) EC: 6

Year / Semester	2nd year fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (56 hours) - 4 hours per week
Lecturer	Asst. Prof. Dr. Hüseyin Pehlivan
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The course aims to teach different programming languages paradigms. For each programming paradigm, a particular language is selected and its main features are introduced.

Contents of the Course
Introduction: The role of programming languages, syntactic structure.

Imperative Programming: Statements, types, procedure activations.
Object-Oriented Programming: Groupings of data and operations, object-oriented thinking.
Functional Programming: Elements of functional programming, functional programming with lists.
Concurrent Programming: Streams, concurrecy as interleaving.
Script Programming: Interpretation, execution methods.

Textbook / Material	Special notes, lab demonstrations Sethi, R., 1996, Programming Languages: Concepts and constructs, Addison Wesley, 640pp. Hoare, C. A. R., 1990, Programming language concepts and paradigms, Prentice-Hall, 322pp.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 224 DIGITAL ELECTRONIC LAB. (0+0+2) EC: 4

Year / Semester	2nd year fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	BİL 233 Basic Electronic Lab
Form of Teaching	Lectures (28 hours) - 2 hours per week
Lecturer	Asst. Prof. Dr. Murat Ekinci
Co-lecturer	Research Assistants
Language of instruction	Turkish

Objectives of the Course
To have practical learning with set up the logic and electronic devices, to compare theories of the lectures information with practical devices.

Contents of the Course
Rectifiers,
Cliping and clamping circicuits
The Switching Behaviors of transistor
Operational Amplifiers
Schmitt trigger circuits
Logical Gates
Multivibrators
Binary multiplications
Boolean functions
Coding and Fault finding techniques

Textbook / Material	Printed lecture notes
Recommended Reading	None
Method of Assessment	One training and learning stage in the course period(%30), One semester project(%20) and one examination at the end of the course(%50)

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BIL 204 MATHEMATICS –IV (4+0+0) EC:4

Year / Semester	2nd year fall semester

Status	Compulsory
Department	Mathematics
Prerequisite / Recommended	College mathematics
Form of Teaching	Lectures (56 hours) - 4 hours per week
Lecturer	Prof. Dr. Ziya Yapar
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
This is an introductory course in complex analysis, giving the basics of the theory, with an emphasis on complex integration.

Contents of the Course
Complex numbers and functions of complex variables, analytic functions.
Complex sequences and series.
Elementary functions.
Complex integration and Cauchy's theorem, Cauchy' integral theorem.
Residues, Residue theorem.
Conformal mapping.
Laplace and Fourier transformations.

Textbook / Material	R.V.Churcill, J.W.Brown; Complex Variables and Applications, McGraw-Hill, 1984
Recommended Reading	S.D.Fisher; Complex Variables, Wadsworth&Brodes/cole, 1990 J.E.Marsden; Basic complex analysis, W.H.Freeman and Co. 1973
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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YDM 214 PROFESSIONAL ENGLISH – I (2+0+0) EC:4

Year / Semester	2nd year fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (28 hours) – 2 hours per week
Lecturer	Asst. Prof. Dr. Murat Ekinci
Co-lecturer	None
Language of instruction	English

Objectives of the Course
The aim of this course to give the students good knowledge of written and spoken English in their professional lifes.

Contents of the Course
Symbols and terms used in Computer Engineering. Computer Hardware symbols. Writing instructions. Describing an experiment. Diagram labeling, summarizing. Note taking.
Unit 1. Boot-Up Process
Unit 2. Microchips for Computer
Unit 3. Data Storage
Unit 4. Input/Output Devices in Personal Computer

Unit 5. Multimedia
Unit 6. Networks
Unit 7. Printers

Textbook / Material	Lecture notes and practical notes available. Text book: Ron White, How Computers Work , Ziff-Davis Pres, Second Edition, 1995 All of the other useful books and technical notes.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 315 MICROPROCESSORS (4+0+0) EC:5

Year / Semester	3rd Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (56 hours) - 4 hours per week
Lecturer	Prof. Dr. Rıfat Yazıcı
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The intent of this course is to provide the students with a foundation on digital computer principles with emphasis on the behavior, operation, and application of microprocessor. The basic concepts used in the design of microcomputer-based systems include microcomputer architecture, memory structure, input/output facility, interfacing, and programming.

Contents of the Course
The Central Processing Unit (CPU), Memory circuits, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, Microcomputer Programming, Assembly Language, Memory Addressing, The Stack, Instruction Set, Sample applications.

Textbook / Material	Lecture Notes: To be delivered during the lectures Uffenbeck, J., 1985, Microcomputers and Microprocessors: The 8080, 8085, and Z80 Programming, Interfacing, and Troubleshooting, Prentice-Hall, 670pp.
Recommended Reading	Brey, B., B., 1984, Microprocessor/Hardware Interfacing and Applications, Merrill, 414pp. Leventhal, L., A., 1979, Z80 Assembly Language Programming, Osborne/McGraww-Hill, 612pp.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 327 FILE ORGANIZATION (3+0+0) EC: 4

Year / Semester	3rd Year/ Fall semester
Status	Compulsory
Department	Computer Engineering

Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Instructor Ömer Çakır
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
To teach File Organization techniques.

Contents of the Course
Introduction to file organization and management, magnetic and other storage systems, sequential file organization, I/O control, channel management, external sort/merge, relative file organization, scattered storage techniques, analysis of hash function performance, collision resolution techniques, indexed sequential file organization, multi-key file organization, introduction to database management.

Textbook / Material	Lecture Notes: To be delivered during the lectures
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 337 OPERATING SYSTEMS (4+0+0) EC:5

Year / Semester	3rd Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (56 hours) - 4 hours per week
Lecturer	Asst. Prof. Dr. Cemal Köse
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
This course introduces the theory of operating systems, processes and threads, memory management, file systems, principles of I/O systems, deadlocks, network and distributed operating system, security, and so on.

Contents of the Course
Introduction. Processes and threads; processes, threads, scheduling, interprocess communication.
Memory management; basic management, swapping, virtual memory management, operating system policies for virtual memory management, and segmentation.
File systems; files, directories, file system implementation, file system examples.
Input/Output; Principles of I/O hardware and software, I/O software layers, disks, clocks, terminals, and graphical user interfaces.
Deadlocks; resources, deadlock detection and recovery, deadlock avoidance, and deadlock prevention.
Multimedia operating systems.
Security.
Distributed and networked operating systems.

Textbook / Material	Informal notes, power point presentations. Notes taken by students during lectures. Andrew S. Tanenbaum (2001), Modern Operating System, Prentice Hall.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 307 NUMERICAL ANALYSIS (3+0+0) EC:4

Year / Semester	3rd Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 4 hours per week
Lecturer	Asst. Prof. Dr. Hüseyin Pehlivan
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
Introduction of the Numerical Solutions

Contents of the Course
Introduction; Basic concepts and definitions Errors in Numerical Analysis Matrixes.
Solutions of the Equations in One Variable and the Equation Systems Taylor Series and Finite Differences Interpolations, Extrapolations Numerical Differentiation.
Numerical Integration Numerical Solutions of the Differential Equations Least Square Method and Curve Fitting.

Textbook / Material	Books written in Turkish.
Recommended Reading	1. Akpinar S, Kürüm H;'Sayısal Çözümleme', 2002, Fırat Üniversitesi Yayını, Elazığ. 2. Akpinar S;'Sayısal Çözümleme Dersnotları', 1999, KTÜ Müh.Mim Fakültesi Yayını, Trabzon. 3. Maron J M:'Numerical Analysis', 1990, Wadsforth, Pub.Com. 4. Burdon R I;'Numerical Analysis', 1981, Prindle, Pub.Comp. 5. Burdon F ; 'Numerical Methods', 1993, PWS Pub.Comp.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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ELK 315 DIGITAL DESIGN LAB. (0+0+2) EC:4

Year / Semester	3rd Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lab (28 hours) - 2 hours per week
Lecturer	Asst. Prof. Dr. Murat Ekinci

Co-lecturer	Instructor Ömer Çakır
Language of instruction	Turkish

Objectives of the Course
To have practical learning with set up the logic and electronic devices, to compare theories of the lectures information with practical devices.

Contents of the Course
1. Phase Loop Locked Circuits,
2. Counters,
3. Level-mode sequential networks,
4. Pulse-mode sequential networks,
5. Hazards and Risks in the logic circuits and their elimination,
6. Edge triggered D Flip-Flop,
7. Sequential network design with ROMs and PLDs,
8. Design sequential network with MSI Integrated circuits.

Textbook / Material	Lecture Notes: To be delivered during the lectures
Recommended Reading	None
Method of Assessment	One training and learning stage in the course period, One semester project and one examination at the end of the course.

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YDM 313 PROFESSIONAL ENGLISH-II (2+0+0) EC:4

Year / Semester	3rd Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (28 hours) - 2 hours per week
Lecturer	Asst. Prof. Dr. Hüseyin Pehlivan
Co-lecturer	None
Language of instruction	English

Objectives of the Course
This course aims to students English.

Contents of the Course
In this course various computer engineering texts will be examined carefully improve.

Textbook / Material	Text book, practical notes.
Recommended Reading	Mc Alister, J. and Madane, G. “English for Computer Engineers” Longman, 2001 London.
Method of Assessment	One midterm exam (50%) and a written end-of-term exam (50%)

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SEC 301 DIGITAL CONTROL-I (3+0+0) EC:4

Year / Semester	3rd Year/ Fall semester
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	None

Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. H. İbrahim Okumuş
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
To introduce the student to the fundamentals of control theory as applied to digital controllers or sampled data control systems in general. To familiarize the student with the use of the MATLAB toolbox.

Contents of the Course
Introduction: Digital control system, analog control system, servomotor system model.
Discrete time systems and the z-transform: Discrete time systems, transform methods, properties of the z-transform, solution of difference equations, the inverse z-transform, simulation diagrams and flow graphs, state variables, transfer functions, solutions of the state equations.
Sampling and reconstruction: Sampled data control systems, the ideal sampler, results from the Fourier transform, data reconstruction, digital to analog conversion.
Open-loop discrete time systems: The pulse transfer function, open-loop systems containing digital filters, the modified z-transform, systems with time delays, state variable models, discrete state equations.
Closed-loop systems: derivation procedure, state-variable models.
Stability analysis techniques: Stability, bilinear transformation, the Routh-Hurwitz criterion, Jury's stability test, the Nyquist criterio.

Textbook / Material	Lecture notes available, Digital Control System Analysis and Design by Charles L. Phillips and H. Troy Nagle, Discrete-Time Control Systems by K. Ogata, Prentice Hall, Inc.
Recommended Reading	Computer Controlled Systems Theory and Design by K.J. Astrom and B. Wittenmark, Prentice Hall, Inc. Digital Control of Dynamic Systems by G..F. Franklin and J. D. Powell, Adiison Wesley Matlab, Adem Güneş Otomatik Kontrol Cilt 1, Kemal Sarıoğlu, Sistem yayıncılık, 1995 Otomatik Kontrol Cilt 2, Kemal Sarıoğlu, İTÜ, 1992 Otomatik Kontrol, M.N. Özdaş, A.T. Dinibütün, A. Kuzucu, İTÜ, 1988
Method of Assessment	One midterm exam (50%) and a written end-of-term exam (50%)

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SEC 303 OBJECT ORIENTED PROGRAMMING (3+0+0) EC:4

Year / Semester	3rd Year/ Fall semester
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. Hüseyin Pehlivan
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
This course introduces the object oriented programming (OOP) concept, how a programming

language implements OOP by using the existing and third part supplied classes, and how to write your own reusable classes.

Contents of the Course

Complexity, object model, object and classes, classification, object oriented programming languages (OOP), classes and hierarchy, inheritance, multiple inheritance, polymorphism, abstract classes, and other classes.

Example of object oriented programming languages; C++ and Java. Types, definitions and user defined data types, inheritance and functions, advanced tools and libraries, using existing class libraries, starting to build your own classes, development tools and libraries, analysis, design and implementation of OOP, packages, C++ and java programming applications.

Textbook / Material	Lecture notes 1) Deitel;'Java How to Program', Sixth Edition, Prentice-Hall,1576pp., 2005 2) Jaworski, J., 1998, Java 1.2 Unleashed, Sams. 3) Morrison, M., Ablan, J., 1997, Teach yourself more Java in 21 days, Sams, 479pp. 4) Cornell G., Horstman, C. S., 1996, Core JAVA, The SunSoft Press; A Prentice Hall Title.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 318 SYSTEM PROGRAMMING (3+0+0) EC:5

Year / Semester	3rd Year/ Spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	42 hours (3 hours per week) Theory: Lectures Exercises: Projects
Lecturer	Asst. Prof. Dr. Hüseyin Pehlivan
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course

The aims of this lesson are, teaching system management, on UNIX and Windows systems which is done via the system commands, introducing the UNIX system, teaching system programming, adding new commands to the system with the programs by using system programming knowledge

Contents of the Course

Shell and script basics. Working with files and Directories. Manipulating file attributes. Processes. Variables. Substitution. Quoting. Flow control. Loops. Parameters. Input/Output. Drivers (.so files for UNIX and .dll for Windows). Functions. Text filters. Filtering text using regular expressions. Filtering text with awk. Miscellaneous tools. Dealing with signals. Debugging. Problem solving with functions. Problem solving with shell scripts. Scripting and Unix versions.

Textbook / Material	To be delivered during the lecture
Recommended Reading	Kochan, S. G., Wood, P. H., UNIX Shell Programming Kernighan, B. W., Rob Pike, R., The UNIX Programming Environment Bach, M. J., The Design Of The UNIX Operating System Veeraraghavan, S., 1999, Teach Yourself Shell Programming in 24 Hours, Sams Cooper, M., 2002, Advanced BASH-Scriptting Guide, Brindlesoft, 401pp
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 326 DATABASE MANAGEMENT (3+0+0) EC:4

Year / Semester	3rd Year/ Spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	42 hours (3 hours per week),Homeworks and projects
Lecturer	Prof. Dr. Vasif V. Nabiyev
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The aim of this course is to teach how to design Database Management System

Contents of the Course
Introduction to DBMS, conceptual logical and physical DBs, Data Modeling for a DB. Mapping between views. Structure of a DBMS. Network Data Model, ERD model, normalization, redundancy, functional dependence, Hierarchical Model. The Relational Model. DB Design. DB Security, Integrity and Control. Database Design, query languages, index management, keyword search, data compression.

Textbook / Material	Special notes and relevant books.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 388 COMPUTER ARCHİTECTURE (4+0+0) EC:5

Year / Semester	3rd Year/ Spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	56 hours (4 hours per week), Lectures and laboratory exercises.
Lecturer	Prof. Dr. Rıfat Yazıcı
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
Computer architecture is about the structure and operation of digital computers. Its purpose is to present the nature and characteristics of modern-day computer systems.

Contents of the Course
The Central Processing Unit, DRAM Organization, Cache Memory, Magnetic Disk, RAID, Optical Memory, Parallel I/O, Serial I/O, System Buses, Memory Management, Super scalar Processors, RISCs, Parallel Processing.

Textbook / Material	Stallings W., 1996, Computer Organization and Architecture, Designing for Performance, Prentice-Hall, 682pp.
Recommended Reading	Englander, I., 2000, The Architecture of Computer Hardware and Systems Software, John Wiley, 764pp. Wilkinson, B., 1996, Computer Architecture, Design and Performance, Prentice Hall, 463pp.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 348 AUTOMATA THEORY (3+0+0) EC:4

Year / Semester	3rd Year/ Spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	42 hours (3 hours per week),Homeworks, research topics, examples
Lecturer	Asst. Prof. Dr. Hüseyin Pehlivan
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
Information about theory of computation

Contents of the Course
Formal languages, regular expressions and languages, finite automata, transition graphs, Kleenes Theorem, Meely and Moore machines, non-determinism, Pumping Lemma, Context-free grammars, Chomsky Normal Form, Pushdown automata, decidability, CYK algorithm, Turing machines (TM) , Post machines, 2-stack pushdown machines, Minsky's theorem, Universal TM, halting problem, Chomsky hierarchy of grammars, Churc's Thesis.

Textbook / Material	Special notes, books about Automata Theory
Recommended Reading	Lewis, H. R., Papadimitriou, C. H., 1998, Elements of the theory of computation, Prentice-Hall, 361pp.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 376 MICROPROCESSOR LABORATORY (0+0+2) EC:4

Year / Semester	3rd Year/ Spring semester
Status	Compulsory
Department	Computer Engineering

Prerequisite / Recommended	Microprocessors
Form of Teaching	28 hours (2 hours per week)Laboratory exercises: Tutorial.
Lecturer	Prof. Dr. Rıfat Yazıcı
Co-lecturer	Research assistants
Language of instruction	Turkish

Objectives of the Course
The course intends to provide the students with practical knowledge about the microcomputer system.

Contents of the Course
1. Microcomputer System Implementation
2. Function Generation with Microprocessor
3. Serial Input Output
4. Direct Memory Access Controller
5. Interrupt-Driven Input Output
6. Wait States and Slow Memory Interfacing
7. Multibyte Binary multiplication.
8. CRT Controllers
9. Stepper Motor Control with Microcomputers.
10. A/D converter with microprocessor

Textbook / Material	To be delivered during the lecture
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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YDM 314 ENGLISH IN ENGINEERING (3+0+0) EC:4

Year / Semester	3rd Year/ Spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	28 hours (2 hours per week), Lectures.
Lecturer	Asst. Prof. Dr. Murat Ekinci
Co-lecturer	None
Language of instruction	English

Objectives of the Course
This course aims to improve students' technical writing and speaking.

Contents of the Course
In this course various computer enginerring texts will be examined carefully to improve students technical English.

Textbook / Material	Text book, power point presentations, practical notes.
Recommended Reading	Mc Alister, J. and Madane, G. "English for Computer Engineers" Longman, 2001 London.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 302 DIGITAL SIGNAL PROCESSING (3+0+0) EC:4

Year / Semester	3rd Year/ Spring semester
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	42 hours (3 hours per week), Lectures and practical exercises.
Lecturer	Asst. Prof. Dr. Murat Ekinci
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course

This course intends to teach fast Fourier transform, z- transform, and basic applications and developed areas. It is learned how to design FIR, IIR, and Adaptive filter step by step. End of the lecture, students can be easily apply digital filter to make speech-to-Text problems.

Contents of the Course

Introduction, Discrete transform, The z-transform and its applications in signal processing, Correlation and Convolution, A framework for digital filter design, Finite Impulse Response (FIR) filter design, Design of infinite impulse response (IIR) digital filters, Adaptive digital filters

Textbook / Material	Emmanuel C. Ifeachor, Barrie W. Jervis “Digital Signal Processing
Recommended Reading	N. Dahnoun, “Digital Signal Processing Implementation”, Prentice Hall, 2000 S. M. Bozic,“ Digital and Kalman Filtering“, Edward Arnold, 1994
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 304 SOFTWARE ENGINEERING (3+0+0) EC:4

Year / Semester	3rd Year/ Spring semester
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	Object Oriented Programming
Form of Teaching	42 hours (3 hours per week), Lectures and practical exercises.
Lecturer	Asst. Prof. Dr. Hüseyin Pehlivan
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course

The course deals with efficient coding techniques, and introduces software developing stages, which are then applied to a practical project.

Contents of the Course

Fundamentals of software engineering, Software projects, Elements and variety of software products, Software quality factors, Software development, Requirements analysis, Specifications, Software design, Coding, Software maintenance, CASE tools, Object-oriented

analysis and design.

Textbook / Material	Special notes, book handouts
Recommended Reading	Chapman, Terry, 1999, Software Engineering Using C++.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BİL 405 ARTIFICIAL INTELLIGENCE (3+0+0) EC:5

Year / Semester	4th Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	General information about software and hardware, Programming, Algorithms
Form of Teaching	Lectures (42 hours) and practicals (14 hours) - 4 hours per week, Quiz , homeworks
Lecturer	Prof. Dr. Vasif N. Nabiyev
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The aim of this course is to teach how to use the information that is obtained by students, in the applications and to teach the knowledge modeling.

Contents of the Course
Turing's imitation game. Can machines think? Intelligent Agents. Basic search techniques. Problem Solving Languages of AI. Automated reasoning. Game Playing. Building Knowledge- based systems. Expert systems. Production systems. Frame Systems and Semantic Networks. Pattern recognition. Natural Language Processing.

Textbook / Material	Special notes.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 402 COMPUTER GRAPHICS – I (3+0+0) EC:4

Year / Semester	4th Year/ Fall semester
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	General information about software and hardware, Programming, Algorithms
Form of Teaching	42 hours (3 hours per week)
Lecturer	Prof. Dr. Rıfat Yazıcı
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The course intends to present procedural methods in order to generate solid objects as realistic as possible. A widely accepted graphics library or application programmer's interface (API) is

used to teach key graphics topics, such as 3D graphics, shading, client-server graphics, modeling and implementation algorithms.

Contents of the Course

Points and lines, 2D and 3D transformations, Affine and perspective geometry.Plane and space curves. Surface description and generation. Raster scan graphics. Clipping. Fill algorithms. Antialiasing. OpenGl applications.

Textbook / Material	Informal notes Foley J.D., Dam, A., Feiner, S., K., Hughes, J., F., 1997, Computer Graphics Principles and Practice, Addison-Wesley, 1175pp.Angel, E., 2000, Interactive Computer Graphics, A Top-Down Approach with OpenGL, Addison-Wesley, 613pp.Rogers, D., F., 1985, Procedural Elements for Computer Graphics, McGraw-Hill, 433pp.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BİL 425 COMPUTER NETWORKS (4+0+0) EC:5

Year / Semester	4th Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	General information about software and hardware, Programming, Algorithms
Form of Teaching	56 hours (4 hour per week)
Lecturer	Asst. Prof. Dr. Cemal Köse
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course

To introduce theory of networking, data transmission and modems, packet communication, and internetworking.

Contents of the Course

History of computer networks. Motivation and growth of computer network. Network programming and application. Data transmission; transmission mediums, magnetic media, twisted pairs, baseband coaxial cable, broadband coaxial cable and fiber optics, asynchronous communication, and long-distance communication, Packet transmission; packets, frames and error detection, Local Area Network Technologies and network topologies, multiple access protocols, hardware addressing and frame type identification, Local Area Network wiring, physical topology, and interface hardware. Extending Local area Networks; fiber modems, Repeaters, Bridges, and Switches. Long-distance digital connection technologies. Wide area technologies and routing, routing algorithms, Connection-oriented networking and ATM. Network characteristics; ownership, service paradigm, and performance, protocols and layering. Internetworking; concepts, architecture, protocols, and congestion control algorithms. IP: Internet protocols addresses. Binding protocol addresses. IP datagrams and datagram forwarding. IP encapsulation, fragmentation, and reassembly. The future IP. Error reporting mechanisms. TCP: reliable transport service, simple transport protocol. Internet routing. Network applications.

Textbook / Material	Informal notes, power point presentations. Notes taken by students during lectures.

1. Douglas E. Comer, (2001), Computer Networks and Internets with Internet application, Prentice Hall.
2. Andrew S. Tanenbaum (1996), Computer Networks, Prentice Hall.

Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BİL 450 TERM PROJECT (0+3+0) EC:4

Year / Semester	4th Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	General information about software and hardware, Programming, Algorithms
Form of Teaching	42 hours (3 hours per week)
Lecturer	None
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
Independent computer engineering works, guided by an academic advisor. Subject must consist of application and implementation of a computer-engineering problem, literature search, ending with a formal report.

Contents of the Course
Various projects

Textbook / Material	Special notes.
Recommended Reading	None
Method of Assessment	Oral exam

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BİL 457 COMPUTER SYSTEMS LABORATORY (0+0+2) EC:4

Year / Semester	4th Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	General information about software and hardware, Programming, Algorithms
Form of Teaching	28 hours (2 hour per week)
Lecturer	Asst. Prof. Dr. Cemal Köse, and Lecturers of the Computer Engineering Department
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
This course introduces the application of process control, system control, operating, and system

programming.

Contents of the Course
This laboratory aims to give practices on operating systems, multi-threading, socket programming, dynamic web programming, system programming, parallel and distributed systems and programming on these systems, and process control with programmable controllers.

Textbook / Material	Laboratory text notes are available
Recommended Reading	None
Method of Assessment	Oral and written

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SEC 401 IMAGE PROCESSING (3+0+0) EC:4

Year / Semester	4th Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	General information about software and hardware, Programming, Algorithms
Form of Teaching	42 hours (3 hours per week)
Lecturer	Asst. Prof. Dr. Murat Ekinci
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
To learn basic image processing processes for computer vision deals with the processing of image data for use by a computer and to understand to the major applications areas of computer vision and image processing: image analysis, image restoration, image enhancement, and image compression.

Contents of the Course
Introduction to image processing, Imaging geometry, Preprocessing, Edge/Line detection, Segmentation, Discrete transform (Fourier, Cosine, Walsh-Handmaid, Wavelet, etc.) Feature extraction and Analysis, Image Restoration, Image Enhancement, Image Compression.

Textbook / Material	"Computer Vision & Image Processing", Scott E. Humbug, Prentice Hall, 1998.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 403 OPTIMIZATION (3+0+0) EC:4

Year / Semester	4th Year/ Fall semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	General information about software and hardware, Programming, Algorithms
Form of Teaching	42 hours (3 hours per week)
Lecturer	Prof. Dr. Vasif N. Nabiyev

Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The aim of this course is to teach when to use the optimization techniques in the computer applications.

Contents of the Course
Linear Inequality System, Linear Programming, Simplex Method, Nonlinear Programming, Main Solutions, Infinite Solutions, Artificial Beginning Solution, Finding Local Extremum in Nonlinear Programming, Convex and Concave Functions, Multidimensional Optimization Problems, Lagrange Method, Jacobi Method, Digital Optimization Methods, Approximation Methods, Steep Descent Method, Conjugate Direction Method, Hill Climbing Method, Matlab Examples.

Textbook / Material	Special notes and relevant books.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 405 FUZZY LOGIC (3+0+0) EC:4

Year / Semester	4th Year/ Fall semester
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	General information about software and hardware, Programming, Algorithms
Form of Teaching	42 hours (3 hours per week)
Lecturer	Assoc. Prof. Dr. İsmail H. ALTAŞ
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The main objectives of this course are to provide the student with a clear presentation of the basic concepts and principles of fuzzy logic and its applications in various areas especially in automatic control systems.

Contents of the Course
Fuzzy set theory, fuzzy logic, properties of fuzzy sets and fuzzy logic. Fuzzy operators. Fuzzy relation, extension principles. Fuzzy approximate reasoning. Fuzzy rules, fuzzification and defuzzification. Fuzzy logic controllers. Other applications of fuzzy logic.
Sample simulation studies:

(1) Speed control of a pmdc motor
(2) A fuzzy controller for moving targets
(3) A door position control system
(4) A fuzzy logic controller for controlling the level of the water in a tank

Textbook / Material	No textbook is used. Unpublished course notes and handouts are used as supplemental materials
Recommended Reading	Books: 1. Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence," by J.S.R. Jang, C.T. Sun, and E. Mizutani, Prentice Hall, 1996

	2. Fuzzy Sets, Uncertainity, and Information by G.J. Klir and T.A. Folger, Prentice Hall, Inc. Technical Journals: 1. IEEE Transactions on Fuzzy Systems. 2. IEEE Transactions on Systems, Man, and Cybernetics Part A: Systems and Humans 3. IEEE Transactions on Systems, Man, and Cybernetics Part B: Cybernetics
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 407 COMPILER DESIGN (3+0+0) EC:4

Year / Semester	4th Year/ Fall semester
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	General information about software and hardware, Programming, Algorithms
Form of Teaching	42 hours (3 hours per week)
Lecturer	Asst. Prof. Dr. Hüseyin Pehlivan
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The course intends to introduce the use of attribute grammars and compiler writing tools, giving a practical and pragmatic development of translators of moderate size.

Contents of the Course
Translator classification and structure, compiler construction and bootstrapping, machine emulation, language specification, a simple ASSEMBLER language, advanced assembler features, grammars and their classification, deterministic top-down parsing, parser and scanner construction, syntax-directed translation, using Coco/R – overview and case studies, a simple compiler - the front end and the back end, simple block structure, parameters and functions.

Textbook / Material	Relevant textbooks, special notes
Recommended Reading	1) Terry, P. D., 2000, Compilers and Compiler Generators: An introduction with C++, Rhodes University. 2) Alblas, H., Nymeyer, A., 1996, Practice and principles of compiler building with C, Prentice-Hall, 427pp. 3) Aho, A. V., Sethi, R., Ullman, J. D., 1986, Compilers: Principles, techniques and tools, Addison Wesley, 795pp.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 409 ENGINEERING ECONOMICS (3+0+0) EC:4

Year / Semester	4th Year/ Fall semester
Status	Elective
Department	Computer Engineering

Prerequisite / Recommended	General information about software and hardware, Programming, Algorithms
Form of Teaching	28 hours (2 hours per week)
Lecturer	Computer Engineering
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
A course of economics for the engineering departments

Contents of the Course
Price Theory, Money and Banking, Employment, Investment, Saving, Rationality, Productivity, Law of Diminishing Returns, Rantability, Production, Transformation Curve, Systems of Economics, Turkish Economy, Demand, Supply, Perfect Competition and Formation of Price, Inflation, Deflation, Devaluation, Revaluation, Analysis of Benefit-Loses, Capacity of Production and Costs, Gross National Product, Economic Growth, Balance of Payment, Strategies of Industrialization.

Textbook / Material	Theoretical lectures and classroom discussions
Recommended Reading	None
Method of Assessment	One mid-term examination (50%) and one examination at the end of the course (50%)

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BİL 406 PARALLEL COMPUTERS (4+0+0) EC:6

Year / Semester	4th year spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (56 hours) - 4 hours per week
Lecturer	Asst. Prof. Dr. Cemal Köse
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The purpose of this course is to introduce parallel computers and parallel programming techniques.

Contents of the Course
Introduction. Classifications of parallel computer systems, level of parallelism, parallel operations. Petri nets; for describing organization and coordinations between parallel processes. Parallel processing concepts. Network structures. Basic parallelism; SISD computers and multiple issue CPUs. Pipeline computer; MISD computers, linear and nonlinear pipelines; superscalar and superpipeline computers. Asynchronous parallelism. Structure of MIMD systems. Synchronization and communication in MIMD systems. MIMD programming languages and coarse grain parallel algorithms. System software's for complex problems. Synchronous parallelism. Structure of SIMD systems. Communication in SIMD systems. SIMD programming languages and Maspar algorithms. Non-procedural parallel programming languages. Condition of parallelism and automatic parallelization and vectorization. Evaluating parallel system.

Textbook / Material	Text book, power point presentations. Notes taken by students

	during lectures
Recommended Reading	Thomas Braunl (1993), Parallel Programming an introduction, Prentice Hall. Kai Hwang (1993), Advanced computer architecture; parallelism, scalability and programmability, McGraw Hill. Alan Chalmers (1996), Practical parallel processing, Thomson Computer Press. Barry Wilkinson (1999), Parallel Programming; Techniques and applications using networked workstations and parallel computers, Prentice Hall.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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TEZ 400 GRADUATION PROJETS (0+6+0) EC:12

Year / Semester	4th year spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	Must complete first and 2nd Year/courses.
Form of Teaching	Lectures (84 hours) - 6 hours per week
Lecturer	Lecturers of the Computer Engineering Departments
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
Independent computer engineering-related work, guided by an academic advisor.

Contents of the Course
None

Textbook / Material	None
Recommended Reading	None
Method of Assessment	Oral examination at the end of the study

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BİL 416 COMPUTER GRAPHICS LABORATORY (0+0+2) EC:4

Year / Semester	4th year spring semester
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	Computer Graphics - I
Form of Teaching	Practicals (28 hours) - 2 hours per week
Lecturer	Prof. Dr. Rıfat Yazıcı
Co-lecturer	Research assistants
Language of instruction	Turkish

Objectives of the Course
The course intends to provide the students with practical knowledge about the generation of

computer graphics.

Contents of the Course
Surface Texture Generation
Shading and Solid Object Generation
Transformation and Animation with 3D Studio Max
Applications with OpenGL
Hidden Surface Elimination
Polygon Filling Techniques

Textbook / Material	Lecture Notes: To be delivered during the lectures
Recommended Reading	None
Method of Assessment	Oral examinations during each practice, one oral project exam at the end of term and one written examination at the end of semester.

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SEC 408 DIGITAL CONTROL –II (3+0+0) EC:4

Year / Semester	4th year spring semester
Status	Technical Elective
Department	Computer Engineering
Prerequisite / Recommended	SEC 301 Digital Control I
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. H. İbrahim Okumuş
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
Learn methods of designing automatic control systems that use digital computers to implement control laws: Utilize a parallel treatment of continuous and discrete systems to understand the similarities and differences; develop methods to model and predict the behavior of digital systems. To encourage using Matlab.

Contents of the Course
Basics of z transform theory: Inverse z transform, convolution, recursion relation, reliability. Control loops with samplers: Zero order hold/Digital to Analog conversion, analysis by z transform, the z transfer function and its use, Loop analysis: Closed loop poles, root locus methods, steady state error, transient response, Frequency domain analysis: Nyquist theorem, noise analysis, frequency response/bandwidth considerations, Controller design for SISO systems: Pole zero cancellation, discretisation of analog controllers, digital pdi controller: lead/lag controllers

Textbook / Material	Digital Control System Analysis and Design by Charles L. Phillips and H. Troy Nagle, Discrete-Time Control Systems by K. Ogata, Prentice Hall, Inc. Computer Controlled Systems Theory and Design by K.J. Astrom and B. Wittenmark, Prentice Hall, Inc.
Recommended Reading	Digital Control of Dynamic Systems by G..F. Franklin and J. D. Powell, Adiison Wesley Digital Control Systems by B.C. Kuo,Marcel Decker Inc.

	Feedback Control Systems by C.L. Phillips and R. Harbor, Prentice Hall, Inc. Digital Control System Design by G.H. Hostetter, Holt Reinehart and Wilson, Inc. Matlab, Adem Güneş Otomatik Kontrol Cilt 1, Kemal Sarıoğlu, Sistem yayıncılık, 1995 Otomatik Kontrol Cilt 2, Kemal Sarıoğlu, İTÜ, 1992 Otomatik Kontrol, M.N. Özdaş, A.T. Dinibütün, A. Kuzucu, İTÜ, 1988 Digital Kontrol Sistemleri, Kemal Sarıoğlu, Sistem yayıncılık, 1992 Otomatik Kontrol, İ. Yüksel, Uludağ Üniversitesi, 1991 Endüstriyel Kontrol, M.E. Aydınyüz ve S.Z. Taşcı, Kurtiş Matbaacılık, İst., 1993 Endüstriyel Kontrol El Kitabı, E. A. Parr (Çeviri), M.E.B. yayını, 1994
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 402 COMPUTER GRAPHICS II (3+0+0) EC: 4

Year / Semester	4th year spring semester
Status	Technical Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) – 3 hours per week
Lecturer	Prof. Dr. Rıfat Yazıcı
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The course intends to present procedural methods in order to generate solid objects as realistic as possible. A widely accepted graphics library or application programmer's interface (API) is used to teach key graphics topics, such as 3D graphics, shading, client-server graphics, modeling and implementation algorithms.

Contents of the Course
Clipping, Solid Modeling, Hidden Lines and Hidden Surfaces, Illumination and Shading, Shadowing, Transparency, Texture, Image Manipulation and Storage, Advanced Modeling Techniques, Animation

Textbook / Material	Lecture Notes: To be delivered during the lectures
Recommended Reading	Foley J.D., Dam, A., Feiner, S., K., Hughes, J., F., 1997, Computer Graphics Principles and Practice, Addison-Wesley, 1175pp. Angel, E., 2000, Interactive Computer Graphics, A Top-Down Approach with OpenGL, Addison-Wesley, 613pp. Rogers, D., F., 1985, Procedural Elements for Computer Graphics, McGraw-Hill, 433pp.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 404 ARTIFICIAL NEURAL NETWORKS (3+0+0) EC:4

Year / Semester	4th year spring semester
Status	Technical Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Prof. Dr. Rıfat Yazıcı
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The course intends to teach the students for the principles of Artificial Neural Networks (ANN). The fundamentals of artificial neural systems theory, algorithms for information acquisitions and retrieval, examples of applications, implementation issues are also included.

Contents of the Course
Fundmental concepts and Models of Artificial Neural Systems, Single-Layer Perceptron Classifiers, Multilayer Feedforward Networks, Single-Layer Feedback Networks, Associative Memories, Matching and Self-Organizing Networks, Application of Neural Algorithms and Systems.

Textbook / Material	Lecture Notes: To be delivered during the lectures
Recommended Reading	Zurada, M. J., 1992, Introduction to Artificial Neural Systems, West Publishing Company, 825pp.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 406 COMPUTER NETWORK PROGRAMMING (3+0+0) EC:4

Year / Semester	4th year spring semester
Status	Technical Elective
Department	Computer Engineering
Prerequisite / Recommended	Computer Networks
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. Cemal Köse
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
This course focuses on how network application programs use protocol software to communicate across networks and internets.

Contents of the Course
Introduction (network, network programming, and applications), Client-server interaction. The socket interface. Example of a client and a server. Naming with the domain name system (DNS); the DNS name space, resource records, and name servers. Electronic mail representation and transfer. File transfer and remote file access. World wide web pages and browsing; client side and sever side, locating information on the Web. Dynamic web document technologies. Technology for active web documents. Remote procedure call and middleware. Network management. Network security; traditional cryptography, secret and public key algorithms, and

digital signatures. Multi media; audio, video, data compression, video on demand, and multicast on backbone. Initialization and bootstrapping.

Textbook / Material	Lecture Notes: To be delivered during the lectures, power point presentations. Notes taken by students during lectures
Recommended Reading	Douglas E. Comer, (2001), Computer Networks and Internets with Internet application, Prentice Hall. Andrew S. Tanenbaum (1996), Computer Networks, Prentice Hall.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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SEC 410 LOGICAL PROGRAMMING (3+0+0) EC:4

Year / Semester	4th year spring semester
Status	Technical Elective
Department	Computer Engineering
Prerequisite / Recommended	Artificial Intelligence, Programming Languages
Form of Teaching	Lectures (42 hours) – 3 hours per week
Lecturer	Prof. Dr. Vasif V. Nabiyev
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The aim of this course is to teach the new generation logical languages

Contents of the Course
Objects and Relations. Domains and Predicates. Compound Goals. Finding Solutions in Compound Goal-Backrading. Recursive objects. The Unification of Terms. Arithmetic functions and Predicates. The Cut element. Predicate logic. Model Completeness Theorem. Herbrand model.

Textbook / Material	Special notes
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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Graduate Courses

Code	Course Title	EC	H+T+L	C/E	Lang.
BİL 5000	Ms. S. Thesis	30	0+6+0	C	T
BİL 5010	Seminar	10	0+2+0	E	T
BİL 5020	Project	10	0+6+0	E	T
BİL 5040	Computer Vision	10	3+0+0	E	T
BİL 5060	Object Oriented Technology	10	3+0+0	E	T
BİL 5070	Heuristic Methods in Problem Solving	10	3+0+0	E	T
BİL 5080	Computer Networks and Parallel Computing	10	3+0+0	E	T
BİL 5090	Parallel Processing	10	3+0+0	E	T
BİL 5100	Analog And Digital VLSI Design	10	3+0+0	E	T

BİL 5110	Client/server Systems	10	3+0+0	E	T
BİL 5120	Fault Tolerant Computing	10	3+0+0	E	T
BİL 5140	Neural Networks For Optimization And Signal Processing	10	3+0+0	E	T
BİL7000-7999	Special Topics In Computer Engineering	10	3+0+0	E	T
BİL8000-8999	Special Studies	12	4+0+0	E	T
SUM (Yearly)		**70**	**21+8+0**		

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BİL 5000 MS. S. THESİS (0+6+0) EC:30

Year / Semester	Graduate
Status	Compulsary
Department	Computer Engineering
Prerequisite / Recommended	Must complete and succeed all graduate courses.
Form of Teaching	84 hours (6 hours per week)
Lecturer	Computer Engineering Department
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
Independent computer engineering-related work, guided by an academic advisor.

Contents of the Course

Textbook / Material None
Recommended Reading None
Method of Assessment Oral defense

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BİL 5010 SEMİNAR (0+2+0) EC:10

Year / Semester	Graduate
Status	Selective
Department	Computer Engineering
Prerequisite / Recommended	Must complete and succeed all graduate courses.
Form of Teaching	28 hours (2 hours per week)
Lecturer	Computer Engineering Department
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
Independent computer engineering-related study, guided by an academic advisor.

Contents of the Course
The purpose of this course is that student gets the experience how to handle a given topic with

the scientific and present it to the audience. It is compulsory without credit. The topic can be chosen by the student or given to him/her by his/her advisor. Seminar can be taken in any semester during the program.

Textbook / Material None
Recommended Reading None
Method of Assessment Presentation,oral exam

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BIL 5020 PROJECT (0+6+0) EC:10

Year / Semester	All terms
Status	Technical Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Practicals (84 hours) – 6 hours per week
Lecturer	Lecturers of the Computer Engineering Departments
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
Independent computer engineering-related study, guided by an academic advisor

Contents of the Course
The topic of the project can be chosen by the student or given him/her by his/her advisor in the area of his/her interest. It can be taken in any semester during the program.

Textbook / Material None
Recommended Reading Related subjects
Method of Assessment Presentation, oral exam

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BİL 5040 COMPUTER VISION(3+0+0) EC:10

Year / Semester	All terms (Generally, lectures in Spring semester)
Status	Technical Elective
Department	Computer Engineering
Prerequisite / Recommended	SEC 401 Image Processing
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. Murat Ekinci
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The principal objectives of this course continue to be to provide an introduction to basic concepts and methodologies for computer vision, and to develop a foundation that can be used as the basis for further study and research in this field.

Contents of the Course
Introduction to computer vision,
Image Segmentation

Texture, Classification, Matching
Shape Representation and Description
Object Recognition,
Image Understanding,
3D Vision, geometry, Use of 3D Vision
Mathematical Morphology,
Motion Analysis,
Knowledge-Based Vision

Textbook / Material	Sonka, Hlavac, Boyle, "Image Processing, Analysis, and Machine Vision", An International Thomson Publishing Company, 1999, Lecturer practicle exercises, and slides.
Recommended Reading	R. C. Gonzales, R. E. Woods. "Digital Image Processing", Addison-Wesley Publishing Company, 1992, Bernd Jahne, "Digital Image Processing" Springer, 1997, R. M. Haralick, L. G. Shapiro, "Computer and Robot Vision", Vol. I-II, Addision-Wesley Publishing Company, 1993. Scott E. Umbaugh, "Computer Vision & Image Processing", , Prentice Hall, 1998 M. Ghanbari," Video Coding, an Introduction to standart codecs", The Institution of Electrical Engineering, 1999.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 5060 OBJECT ORIENTED TECHNOLOGY (3+0+0) EC:10

Year / Semester	All terms (generally, lecturen in fall semester)
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures 42 hours (3 hours per week)
Lecturer	Asst. Prof. Dr. Hüseyin Pehlivan
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The course addresses the use of object-oriented technology in various systems.

Contents of the Course
General concepts: Introduction, Client/Server principles, Client / Server hardware, Client / Server software, Network architecture, Network protocols, CORBA, Object orientation.
Programming Languages: C++, VB, C#, Java.
Database systems: Object-oriented tables, schemas.
Web technology: CGI, PHP, ASP, JSP, Client/server applications.
Server technology: Server design, active directory, .net server.

Textbook / Material	Guntle, G., Schildt, H., 2002, Borland C++ Builder, Alfa, 780pp
Recommended Reading	Wright, C., 2002, C# Programming Guide, Alfa, 530pp
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 5070 HEURISTIC METHODS in PROBLEM SOLVING (3+0+0)	EC:10
Year / Semester	All terms (generally, lecturen in fall semester)
Status	Compulsory
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures 42 hours (3 hours per week)
Lecturer	Prof. Dr. Vasif V. Nabiyev
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
Introduction to the methods and research

Contents of the Course
NP-problem, Problem Solving, Heuristic, Evalution Function..

Textbook / Material	Informal notes
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 5080 COMPUTER NETWORKS AND PARALLELCOMPUTING(3+0+0)	EC:10
Year / Semester	Graduate
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. Cemal Köse
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
To introduce theory of parallel computing techniques, parallel programming on cluster of workstations, and the internet as the parallel programming environment.

Contents of the Course
The Internet; network applications. Client server interactions. The socket interface. Example of a client and a server. Java programming language. Remote procedure call. Parallel computers and networked computers as a multi-computer platform. Message passing computing; Using workstation clusters (PVM and MPI). Debugging and evaluating parallel programs. Ideal (embarrassingly) parallel computations. Partitioning and divide-and-conquer strategies. Pipilene techniques. Synchronous computations. Load balancing and termination detection. Programming with shared and virtually shared memory. Multi processing and Pthreads. Algorithms and parallel

applications; sorting algorithms, numerical algorithms, image processing, searching and optimization.

Textbook / Material	Barry Wilkinson (1999), Parallel Programming; Techniques and applications using networked workstations and parallel computers, Prentice Hall.
Recommended Reading	Douglas E. Comer, (2001), Computer Networks and Internets with Internet application, Prentice Hall. Alan Chalmers (1996), Practical parallel processing, Thomson Computer Press. Kai Hwang (1993), Advanced computer architecture; parallelism, scalability and programmability, McGraw Hill.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 5090 PARALLEL PROCESSING (3+0+0) EC:10

Year / Semester	Graduate
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. Cemal Köse
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The purpose of this course is to introduce parallel processing and parallel programming approaches.

Contents of the Course
Introduction to parallel processing. Parallel computer architectures. Parallel Paradigms; PRAM, UMA, NUMA, COMA, and PVM models. Synchronous parallel models. Synchronization and communication primitives. Implementing problems in parallel; Inherited difficulties. Problem decomposition; domain decomposition and algorithmic decomposition. Parallel problem solving methodologies. The SAMD model. Evaluating parallel implementations. Computational models; The data driven model. The demand driven model. Task management. Data management. System communication and network models; Configurations. Communication strategies. Routing and minimization redundant messages. A problem solving methodology. Data diffusion machine. Pseudo codes; Sequential and parallel constructs.

Textbook / Material	Alan Chalmers (1996), Practical parallel processing, Thomson Computer Press
Recommended Reading	Barry Wilkinson (1999), Parallel Programming; Techniques and applications using networked worksataions and parallel computers, Prentice Hall. Kai Hwang (1993), Advanced computer architecture; parallelism, sclability and programmability, McGraw Hill.
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 5100 ANALOG AND DIGITAL VLSI DESIGN (3+0+0) EC:10

Year / Semester	Graduate
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. Murat Ekinci
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The purpose of this course is to introduce VLSI design tecshniques.

Contents of the Course
Practical considerations, IC technology, device modeling, circuit simulation, basic IC building blocks, amplifiers, basic digital building blocks, analog systems, structured digital circuits and systems, design automation and verification.

Textbook / Material	Informal notes and power point presentations.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 5110 CLIENT/SERVER SYSTEMS (3+0+0) EC:10

Year / Semester	Graduate
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	Lectures (42 hours) - 3 hours per week
Lecturer	Asst. Prof. Dr. Cemal Köse
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
This course introduces client/ server paradigm, its applications, and design of the clients and servers.

Contents of the Course
Introduction.
Principles of client/sever approach.
Client/server hardware.
Client/server software.
Network architectures.
Network protocols, RPC, COBRA, Middleware and Object-oriented approaches.
Design of a server.

Design of a clients.
Client/server applications.

Textbook / Material	Text book, power point presentations. Notes taken by students during lectures. 1. Douglas E. Comer, (2001), Computer Networks and Internets with Internet application, Prentice Hall. 2. Andrew S. Tanembaum (1996), Computer Networks, Prentice Hall. 3. Barry Wilkinson (1999), Parallel Programming; Techniques and applications using networked worksataions and parallel computers, Prentice Hall.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 5120 FAULT TOLERANT COMPUTING (3+0+0) EC:10

Year / Semester	Graduate
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	42 hours (3 hours per week), Power point supported lectures
Lecturer	Asst. Prof. Dr. Cemal Köse
Co-lecturer	None
Language of instruction	English

Objectives of the Course
The purpose of this course is to introduce fault teolorance aprocahes, model and tecshniques.

Contents of the Course
Introduction, architecture of fault tolerant computers, taxonomy, high availability systems, long life systems, critical computations. Fault-tolerance in multiprocessor systems, static redundancy, fault detection, recovery strategies. Reliability estimation, element and system reliability, combinatorial and Markov models,system availability (MTBF), behavioral decomposition, reliability model, coverage models, computer-aided reliability estimation. Fault-tolerant software, reliability models for software, acceptance tests, fault trees, bounded models, probabilistic models.

Textbook / Material	To be delivered during the lectures, and power point presentations.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BIL 5140 NEURAL NETWORKS FOR OPTIMIZATION (3+0+0) EC:10

Year / Semester	Graduate
Status	Elective
Department	Computer Engineering

Prerequisite / Recommended	Object Oriented Programming
Form of Teaching	42 hours (3 hours per week), Power point supported lectures.
Lecturer	Prof. Dr. Rıfat Yazıcı
Co-lecturer	None
Language of instruction	English

Objectives of the Course
The purpose of this course is to introduce neural networks for optimiasation and signal processing.

Contents of the Course
Mathematical preliminaries of neurocomputing. Architectures and electronic implimentation of neural network models. Unconstrained optimization and learning algorithms. Neural networks for linear, quadratic programming and linear complementarity problems. A neural network approach to the on-line solution of a system of lineer algebraic equation and related problems. Neural networks for matrix algebra problems. Neural networks for continuous, nonlinear, constrained optimization problems. Neural networks for estimation, identification and prediction. Neural networks for discrete and combinatorial optimization problems.

Textbook / Material	To be delivered during the lectures, and power point presentations.
Recommended Reading	None
Method of Assessment	A written midterm exam (30%), quizzes and practical homework (20%) and a written end-of-term exam (50%)

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BİL 7000-7999 SPECIAL TOPICS IN COMPUTER ENGINEERING (3+0+0) EC:10

Year / Semester	Graduate
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	42 hours (3 hours per week)
Lecturer	Computer Engineering
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The purpose of this course is to introduce special topics in computer science.

Contents of the Course
These courses are not listed in the University Catalogue. Their titles and contents may vary from year to year.

Textbook / Material	None
Recommended Reading	None
Method of Assessment	Two written mid term- and an end-of term exams plus practicals

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BİL 8000-8999 SPECIAL STUDIES (4+0+0) EC:12

Year / Semester	Graduate
Status	Elective
Department	Computer Engineering
Prerequisite / Recommended	None
Form of Teaching	56 hours (4 hours per week)
Lecturer	Computer Engineering
Co-lecturer	None
Language of instruction	Turkish

Objectives of the Course
The purpose of this course is to introduce special topics in computer science.

Contents of the Course
These courses are not listed in the University Catalogue. Their titles and contents may vary from year to year.

Textbook / Material None
Recommended Reading None
Method of Assessment Two written mid term- and an end-of term exams plus practicals

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