FINAL INTERNATIONAL UNIVERSITY
FACULTY OF ENGINEERING

Program	Computer Engineering
Medium of Instruction	English

Category		**Associate Degree**	**X**	**Undergraduate**		**Masters (Project Based)**		**Masters (Thesis)**		**PhD**

CURRICULUM

ABBREVIATIONS

UC: University Core **FC:** Faculty Core **AC:** Area Core
UE: University Elective **AE:** Area Elective

YEAR 1

FALL

Semester	Course code	Course name	Course category	Credit			Pre-requisite	ECTS Credits
				Lec.	Pract.	Tot.		
1	MATH 101	Calculus 1	FC	4	1	4	-	6
1	PHYS 101	Physics 1	FC	3	2	4	-	6
1	MATH 103	Discrete Mathematics	FC	3	0	3	-	6
1	COMP 100	Fundamentals of Computer Eng.	AC	2	2	3	-	3
1	COMP 103	Information Technology and Applications	UC	2	1	2	-	3
1	ENGL101	English I	UC	3	0	3	-	6
Total Credit						**19**		**30**
SPRING								
2	MATH 102	Calculus II	FC	4	1	4	MATH101	6
2	MATH 104	Linear Algebra	FC	3	1	3	-	5
2	PHYS 102	Physics II	FC	3	2	4	PHYS101	6
2	COMP 104	Computer Programming	UC	3	2	4	-	6
2	ENGL102	English II	UC	3	0	3	ENGL101	6
Total Credit						**18**		**29**

YEAR 2

FALL

3	MATH 205	Differential Equations	FC	4	1	4	MATH101 MATH104	6
3	COMP 215	Algorithms and Data Structures	AC	3	2	4	COMP 104	6
3	COMP 225	Digital Logic Design	AC	3	2	4	MATH103	6
3	ELEC 235	Electrical Circuits	AC	3	2	4	MATH101	6
3	GEED-01	General Education Elective-I	UE	3	0	3	-	4
3	ENGL201	English III	FC	2	0	2	ENGL102	4
Total Credit						**21**		**32**

SPRING								
4	MATH 206	Probability and Statistics	FC	3	1	3	MATH102	5
4	COMP 216	Object Oriented Programming	AC	3	2	4	COMP104	6
4	COMP 232	Operating Systems	AC	3	0	3	COMP104	6
4	ELEC 240	Electronics	AC	3	1	3	ELEC 235	5
4	GEED-02	General Education Elective-II	UE	3	0	3	-	4
4	HIST100/ TURK100	History of Turkish Republic/ Turkish as a Second Language	UC	2	0	2	-	2
Total Credit						**18**		**28**
YEAR 3								
FALL								
5	MATH 309	Numerical Analysis	AC	3	1	3	COMP104 MATH205	6
5	COMP 321	Microprocessors	AC	3	2	4	COMP225	6
5	COMP 333	Systems Programming	AC	3	0	3	COMP232	6
5	COMP 341	Database Systems	AC	3	2	4	COMP215	6
5	COMP 351	Analysis of Algorithms	AC	3	2	4	COMP215	6
Total Credit						**18**		**30**
SPRING								
6	COMP 322	Signals and Systems	AC	3	0	3	ELEC 240	6
6	COMP 324	Computer Architecture	AC	3	0	3	COMP 225	5
6	COMP 332	Data Communication and Computer Networks	AC	3	2	4	COMP 215	6
6	COMP 342	Software Engineering	AC	3	2	4	COMP 215	6
	COMP 352	Programming Languages	AC	3	0	3	COMP 216	6
6								
Total Credit						**17**		**29**
YEAR 4								
FALL								
7	COMP 401	Engineering Design I	FC	1	4	3	-	6
7	COMP 403	Summer Training	FC	0	0	0	-	1
7	COMP 471	Computer Simulation	AC	3	0	3	COMP 215 MATH206	6
7	TE-01	Technical Elective	AE	3	0	3	-	7
7	TE-02	Technical Elective	AE	3	0	3	-	7
7	GEED-03	General Education Elective-III	UE	3	0	3	-	4
Total Credit						**15**		**31**
SPRING								
8	COMP 402	Engineering Design II	FC	0	8	4	COMP 401	8
8	COMP 404	Engineering Attributes & Ethics	FC	2	0	2	-	3
8	COMP 454	Automata Theory	AC	3	0	3	MATH103	6
8	TE-03	Technical Elective	AE	3	0	3	-	7
8	TE-04	Technical Elective	AE	3	0	3	-	7
Total Credit						**15**		**31**

AREA / TECHNICAL ELECTIVE COURSES

Course Code	Course Name	Credit			ECTS Credits
		Lec.	Pract.	Tot.	
COMP 421	Embedded Systems	**3**	**0**	**3**	**7**
COMP 422	Real-Time Systems	**3**	**0**	**3**	**7**
COMP 431	Advanced Computer Networks	**3**	**0**	**3**	**7**
COMP 432	Wireless Communication Networks	**3**	**0**	**3**	**7**
COMP 433	Wireless Sensor Networks	**3**	**0**	**3**	**7**
COMP 434	Information and Network Security	**3**	**0**	**3**	**7**
COMP 441	Database Management Systems	**3**	**0**	**3**	**7**
COMP 442	Object-Oriented Programming Languages & Systems	**3**	**0**	**3**	**7**
COMP 443	Object-Oriented Systems Analysis and Design	**3**	**0**	**3**	**7**
COMP 444	Software Construction	**3**	**0**	**3**	**7**
COMP 445	Rapid Application Development	**3**	**0**	**3**	**7**
COMP 461	Computing Systems	**3**	**0**	**3**	**7**
COMP 462	Service-Oriented Computing	**3**	**0**	**3**	**7**
COMP 463	Cloud Computing	**3**	**0**	**3**	**7**
COMP 464	Artificial Intelligence	**3**	**0**	**3**	**7**
COMP 465	Neural Networks	**3**	**0**	**3**	**7**
COMP 466	Expert Systems	**3**	**0**	**3**	**7**
COMP 467	Data Mining	**3**	**0**	**3**	**7**
COMP 472	Computer Graphics	**3**	**0**	**3**	**7**
COMP 473	Digital Image Processing	**3**	**0**	**3**	**7**
COMP 474	Introduction to Parallel Computing	**3**	**0**	**3**	**7**

COURSE BREAKDOWN

	Total		
	Number	Credit	ECTS Credits
All Courses	**44**	**141**	**240**
University Core Courses	5	14	23
Faculty Core Courses	12	40	67
Area Core Courses	19	66	109
Area Elective Courses	4	12	28
University Elective Courses	3	9	12
Summer Internship	1	0	1
Total	**44**	**141**	**240**

Semester	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Average**
Number of courses	6	5	6	6	5	5	6	5	**5.5**
Total credits	19	18	21	18	18	17	15	15	**17.625**
Total ECTS Credits	**30**	**29**	**32**	**28**	**30**	**29**	**31**	**31**	**30**

COURSE DESCRIPTIONS / SYNOPSES

1.	**Course code:** MATH 101	**Course title:** Calculus I
	Functions, limit, continuity and derivative. Mean Value Theorem and applications. Definite and indefinite integrals. Logarithmic, exponential, hyperbolic and inverse trigonometric functions. L'Hopital's Rule. Integration techniques. Area, volume and rotational surface area calculation. Applications in physics. Sequences and series. Power and Taylor series**.** **Text book:** Thomas' Calculus, 13th Edition, George B. Thomas, Maurice D. Weir, Joel R. Hass, Published by Pearson, 2016.	

2.	**Course code:** PHYS 101	**Course title:** Physics I
	Measurement standards and units, vectors and coordinate systems, dynamics, work, energy and power, conservation of energy, systems of particles, collisions, rotation, equilibrium of solids, oscillations, gravity. **Textbook:** Sears & Zemansky's University Physics with Modern Physics. 14th Ed., Hugh D. Young, Roger A. Freedman, Pearson Education Limited, 2016.	

3.	**Course code:** MATH209	**Course title:** Discrete Mathematics
	Set theory, functions and relations; inductive proofs and recursive definitions. Combinatorics; counting rules, permutations, combinations, allocation problems, selection problems. Relations and digraphs. Generating functions; ordinary generating functions and their applications. Recurrence relations. Analysis of algorithms. Propositional calculus and Boolean algebra; basic Boolean functions, digital logic gates, minterm and maxterm expansions, simplifying Boolean functions. Graphs and trees; adjacency matrices, incidence matrices. Eulerian graphs, Hamiltonian graphs, colored graphs, planar graphs, spanning trees, minimal spanning trees. Languages and finite-state machines.	

4.	**Course code:** COMP 100	**Course title:** Fundamentals of Computer Engineering
	Introduction to Computer Engineering. Professional fields in which Computer Engineers perform. Professionalism, values, attributes and ethics for Computer Engineers. Academic integrity and ethical issues in academia and research. Introduction to fundamentals of computer systems; computer organization, hardware and software, operating systems, language processors, user interfaces, computer networks. Introduction to algorithms and programming; machine, assembly and high level languages. Problem solving and algorithm development. Correctness and efficiency of programs. Data validation and exception handling. The C programming language. Arithmetic and logical statements, data types, input/output, structured programming; sequence, selection and iteration; control structures. **Textbook:** Computers Are Your Future Complete, C. Laberta, 12th Ed., Pearson Education Ltd., 2014. **Secondary Textbook:** C How to Program, 8th Ed., Deitel & Deitel, Prentice Hall, 2016.	

5.	**Course code:** COMP 103	**Course title:** Information Technology & Applications
	This course aims to introduce all students to the basic concepts of information technology and to train them in the skills needed to use the office productivity tools. The aim is to learn to apply these skills in their freshman year and to be able to continue to use these skills during their undergraduate studies as well as professional lives after graduation.	

6.	**Course code:** ENGL101	**Course title:** English – I
	This is a first-semester EAP course for freshman students, and it focuses on developing both receptive and productive skills as well as the study skills required for university-level coursework.	

7.	**Course code:** MATH 102	**Course title:** Calculus II
	Plane and polar co-ordinates, area in polar co-ordinates, arc length of curves. Limit, continuity and differentiability of function of several variables, extreme values, method of Lagrange multipliers. Double integral, triple integral with applications. Line integrals, Green's theorem. Sequences, infinite series, power series, Taylor's series. Complex numbers. **Textbook:** Calculus, Thomas- Finney, Addison-Wesley, 1998.	

8.	**Course code:** MATH 104	**Course title:** Linear Algebra
	Matrices, determinant. System of a linear equations. Vector spaces. Base and dimension. Linear transformations.	

	Base transformation. Inverse of a linear transformation. Characteristic equations, eigenvalues and eigenvectors and Jordan form. Numerical techniques for calculation of eigenvalues and eigenvectors. Inner product spaces, diagonality, quadratic forms. Norm of a vector space **Textbook:** Steven, J. Leon, "Linear Algebra with Applications", Prentice Hall, 1998.

9.	**Course code:** PHYS 102	**Course title:** Physics II
	Charge, electrical field and Gauss's Law. Basic circuits and Kirchhoff's Laws. Magnetic field. Ampere's Law. Faraday's Laws. Resistance, Magnetic properties of the material. Maxwell equations. Electromagnetic waves and introduction to modern physics. **Textbook:** Physics for Scientist and Engineering, 5th Ed., Serway-Beichner.	

10.	**Course code:** COMP 104	**Course title:** Computer Programming
	Review of the C programming language. Structured and modular programming using C. Local and global variables. Structured programming constructs. Arrays and array handling. Multi-dimensional arrays. Structures and Unions. Arrays of structures. Defining new data types in C. Functions in C. Call-by-value and call-by-reference. Character and string functions. Scope and extent. Recursion. Pointers and pointer arithmetic. Dynamic memory allocation and simple data structures in C. Arrays of pointers. Bit manipulation. Files; data and file processing. Conditional compilation and exception handling in C. **Textbook:** Deitel & Deitel, C How to Program, 8th Ed., Prentice Hall, 2016.	

11.	**Course code:** ENGL102	**Course title:** English – II
	This course is continuation of ENGL 101- English I. It involves further development of students' EAP oral and written communication skills as well as further development of the study skills essential to success at this level.	

12.	**Course code:** MATH 205	**Course title:** Differential Equations
	Classification of differential equations. Solving methods of first order differential equations. Linear differential equations of higher degrees. Method of undetermined coefficients. Laplace transformation and convolution. Differential equations with several variables. **Textbook:** Elementary Differential Equations and Boundary Value Problems, William E. Boyce – Richard C. Diprima, John-Wiley, 1992.	

13.	**Course code:** ELEC 235	**Course title:** Electrical Circuits
	Circuits, currents and voltages, power and energy, Kirchoff's current and voltage laws. Circuit elements and circuits. Resistive circuits: resistance in series and parallel, resistive network analysis by series and parallel equivalents, node and mesh analysis. Thevenin and Norton equivalents. Superposition. Inductance and Capacitance, physical characteristics, practical capacitor and inductors. Impedance and maximum power transfer.	

14.	**Course code:** COMP 215	**Course title:** Algorithms and Data Structures
	Data structures and their usage. Programming methods, sorting, searching algorithms and applications, storage, time analysis. Stacks and queues. Linked lists and applications. Recursion. Trees and tree searching algorithms. **Textbook:** Algorithms in C (Vol. 1), Sedgewick, 3rd Ed. Addison-Wesley, 1998.	

15.	**Course code:** COMP 225	**Course title:** Digital Logic Design
	Binary Systems. Boolean algebra and logic gates. Simplification of Boolean functions. Analysis and design of combinational circuits. SSI, MSI and LSI elements. Synchronous sequential logic; flip-flops, counters, shift registers. Analysis and design of sequential circuits, state tables, state diagrams, state reduction and state assignment. Sequential MSI elements. Large scale system design with MSI. Timing issues. Registers, memory elements and programmable logic devices (PLDs). FSMs and FSMD; datapath and control. Relationship to simple computing architecture. **Textbook:** Digital Design, 5th Ed., M. Morris Mano and Michael D. Ciletti, Prentice Hall, 2013.	

16.	**Course code:** GEED-01 / 02 / 03	**Course title:** General Education Elective-I / II / III
	Courses in the General Education classification will be available for students to take as an elective non-technical course. The topics will be balanced between Humanities, Arts and Social Sciences. Approved courses will be announced at the start of each semester by the Faculty of Engineering. One of the courses must be among Introduction to Economics, Business/Engineering Management/Management or Accounting-I courses.	

17.	**Course code:** ENGL201	**Course title:** English III
	This second year English course helps develop the academic language skills required to write, format, and reference a short professional or technical report, and to present a summary of its contents to a public audience.	

18.	**Course code:** MATH 206	**Course title:** Probability and Statistics
	Probability concept and basic theorems. Independency, conditional probability and Bayes' rule. Random variables and functions. Some important discrete and continuous distributions. Distribution of random variable functions. Statistics. Unit, mass, data analysis. Sampling and sampling methods **Textbook**: Probability And Statistics For Engineers, I.Miller, J.E.Freund.	

19.	**Course code:** COMP 216	**Course title:** Object Oriented Programming
	Introduction to C++, Classes and Objects, File Processing, Operator Overloading, Object Oriented Programming, Inheritance, Polymorphism, Templates, Stream Input / Output, Exception Handling. **Textbook:** Software Engineering in C, Peter A. Darnell, Philip E. Margolis, Springer Verlag, 1988.	

20.	**Course code:** COMP 232	**Course title:** Operating Systems
	Introduction to operating systems: usage areas, functions and properties. Resource allocation, work and resource organization. Giving precedence to processes. Memory management. Interrupts and their control. Internal communication, control of peripherals. **Textbook:** Abraham Silberscharz, Galvin, Gagne, Operating System Concepts, Eighth Edition, John Wiley & Sons, 2010.	

21.	**Course code:** ELEC 240	**Course title:** Electronics
	Semiconductor diode structures and their characteristics, diode circuits. Structures of transistors, biasing in transistor circuits and transistor amplifiers. Introduction to digital compound circuits. Basic logic gates and memory gates. **Textbook:** Electric Circuits, Nilsson & Riedel, Microelectronic circuits by Sedra & Smith	

22.	**Course code:** GEED-02	**Course title:** General Education Elective-II
	See GEED-01 course description.	

23a.	**Course code:** HIST100	**Course title:** History of Turkish Republic
	This course is designed to provide Turkish-speaking students enrolled in English-medium programs with a brief historical account of the Republic of Turkey.	

23b.	**Course code:** TURK100	**Course title:** Turkish as a Second Language
	This course is designed to provide international students with the basic lexis and grammar of the Turkish language and to develop basic receptive and productive skills in Turkish.	

24.	**Course code:** MATH 309	**Course title:** Numerical Analysis
	Approximate calculation and error concept. Solution of nonlinear equations. Approximate root finding methods: sequential repeating method, sloping method, Newton-Raphson method, Bairstow method. Numeric integration methods. Finite differences. Numeric derivatives. Euler method, Taylor method. **Textbook:** S. C.Chapra, R. P.Canale Numerical methods for Engineers with Software and Programming applications, 2002	

25.	**Course code:** COMP 321	**Course title:** Microprocessors
	Systems based on microprocessors and their design, software and hardware design integration. Memories, input/output elements, interrupts and priorities. Daisy chaining type of processors. Lines, connections, timing, usage of logic state analyzers. Control programming, permanent programs in the memory and programming. Synchronous multi-tasking usage and system design. **Textbook:** 8088/8086 Microprocessors, Triebel & Singh, Prentice Hall	

26.	**Course code:** COMP 333	**Course title:** Systems Programming
	The Unix Operating System. Systems programming in the UNIX environment. UNIX commands. Shell principles,	

	Shell scripting. Permissions and IDs.Terminal Input/Output. Programs in UNIX and programming in UNIX environment; command line parameters. Advanced multi-file C programs. System calls and their classification. System calls for interprocess communication and for network programming. Threads and multithreaded programming. Interprocess communication (IPC); its mechanisms in UNIX and its importance in distributed systems. The client-server paradigm. Pipes, message queues, shared memory, signals and semaphores. Sockets, TCP/IP and their use for interprocess communication in computer networks; the Client/Server model. TCP and UDP sockets for communication in networks. Web client-server in a networked system. Remote procedure call (RPC) mechanisms and uses. Introduction to systems and network programming in Windows operating systems. **Textbook:** W. Richard Stevens, Stephen A. Rago, Advanced Programming in the UNIX Environment, 3rd ed., Addison-Wesley Professional, 2013. **Reading:** Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall, 1988.

27.	**Course code:** COMP 341	**Course title:** Database Systems
	Introduction to database management. Data storing methods and data organization. Hierarchical data modeling and schemas. E-R diagrams. Relational algebra and database processing languages (SQL, Quel etc). Synchronous tasks and their design. Logical database design. Object oriented and fuzzy logic databases. **Textbook:** Fundamentals of Database Systems, Elmasri & Navathe, Addison-Wesley.	

28.	**Course code:** COMP 351	**Course title:** Analysis of Algorithms
	Definition and properties of Algorithms. Design, analysis, and representation of Algorithms. Data abstraction. Pseudo code conventions. Computation models. Mathematical foundations: growth of functions, asymptotic notations. Study of recursive algorithms and associated recurrence relations (substitution method, iteration method, master method, recursion trees). Algorithm design paradigms: Brute-Force (Exhaustive Search), Divide-and-Conquer (Merge Sort, Binary Search Tree), Dynamic Programming (Matrix-Chain multiplication, LCS-length, 01-Knapsack Problem). Greedy algorithms (Greedy Activity Selector, Fractional Knapsack Problem). Graph Algorithms; representation of sets and graphs. Breadth-first search, depth-first search. Minimum spanning trees (MST). Single-source shortest paths. All-pairs of shortest paths.	

29.	**Course code:** COMP 322	**Course title:** Signals and Systems
	Definitions of signals and systems. Linear and time independent systems. Frequency domain. Frequency response. Fourier demonstration of periodic signals. Continuous and discrete signals. Sampling theorem. Filtering; Finite impulse response filters; Sampling and reconstruction. Basic principles of communication systems. **Textbook:** Alan V. Oppenheim, Alan S. Willsky, Signals and Systems, Second Edition, Prentice/Hall Signal Processing Series, 1997.	

30.	**Course code:** COMP 324	**Course title:** Computer Architecture
	Computer management and design, tasks, decoding and execution, CPU control and programming. Microprogramming. ALU and its mechanism. Data input, bus structures, pipelined data processing. Memory control and addressing techniques. **Textbook:** M. Morris Mano, Computer System Architecture, 3/e, Prentice Hall, 1993	

31.	**Course code:** COMP 332	**Course title:** Data Communication and Computer Networks
	Principles of data communications; information transfer, computer networks and their applications. Network structures, architectures and protocols. Open systems and the ISO-OSI reference model; services and network standardization. Communication systems: transmission media, analog and digital transmission. PSTN, modems, PCM, encoding and digital interface. Transmission and switching: FDM, TDM, modulation, circuit, packet and message switching. The store and forward concept. Networking characteristics. Storage, delay, multiplexing, bandwidth sharing and dynamic bandwidth management, QoS. Channel organization, framing, channel access control. PSPDN and integrated digital network concept: ISDN. LANs, MANs and WANs. ATM and gigabit networking. Communication models. De-facto standards. The Internet open architecture and the protocol suite. Modern applications of networking. **Textbook:** Stallings W., Data and Computer Communications", 8th Ed., Prentice-Hall, 2007. **Reading:** Tanenbaum, A.S., "Computer Networks", 4th Ed., Prentice Hall Publ., 201.	

32.	**Course code:** COMP 342	**Course title:** Software Engineering
	Software Engineering paradigms. The software life cycle. Systems analysis. Requirements analysis. Specification of requirements. Software design and selection. Initial design, modularity, structure charts and partitioning.	

	Detailed design and notations. Data structure design. Database Design. User interface Design. Design documentation and software maintenance. **Textbook:** Pressman R.S., Software engineering: Analysis and Design, 5th Int. Ed., McGraw Hill. **Reading:** Sommerville I., Software Engineering, Prentice Hall.

33.	**Course code:** COMP 352	**Course title:** Programming Languages
	Introduction to programming languages. History and development of programming languages. Structures and meanings of the languages: CFG, BNF, recursive descent parsing, attribute grammars, Lexical and syntactic analysis using Lex and Yacc. Basic properties of the variables: name, address, type, value, scope and lifetime. Type checking. Analysis of basic and compound data types. Arithmetic and logical statements, assigning. Control structures. Usage and implementation of functions, parameter passing methods. Data abstraction. Object oriented, functional and logic programming languages. **Textbook:** Krishnamurthi S., Programming Languages: Application and Interpretation, **Reading:** Java - How to Program, (2002), Deitel & Deitel, Prentice Hall	

34.	**Course code:** COMP 401	**Course title:** Engineering Design I
	Engineering Design is an important activity that each engineering student must carry out and go through the phases of the design process. Engineering design is expected to be carried out by students within teams under the supervision of an instructor. It is desired that each project be an interdisciplinary capstone design project. The project is spread to one academic year and it involves the courses COMP401 and COMP402. COMP401 includes the initial problem formulation, a technical survey, the detailed problem study, analysis and description, as well as formulation of a methodical way for the initial solution. A detailed preliminary design documentation for the solution of a realistic and reasonably complex computer engineering problem. It is an extended exercise in the professional application of the skills and experience gained in the undergraduate program. Students form teams, and each team chooses a topic proposed by course instructors. Students are expected to present their progress in the form of reports and presentation, both during the semester and at the end of the semester.	

35.	**Course code:** COMP 403	**Course title:** Summer Training
	In partial fulfillment of the graduation requirements, all students must complete 40 work days of summer training after the end of the second and/or (preferably) third year, during summer vacations. The summer training should be carried out in accordance with the rules and regulations set by the Department/Faculty. Registration of summer training is done during the semester immediately following the training.	

36.	**Course code:** COMP 471	**Course title:** Computer Simulation
	General concept of a system; discrete and continuous systems. Modelling and simulation of systems. State variables. Event scheduling. Comparison of analytical and simulation modelling techniques. Monte-Carlo and discrete event simulation. General structure of a discrete-event simulation system. Probabilistic aspects of simulation. Simulation languages and software. Statistical models in simulation. Random number and random variate generation techniques. Queuing models in simulation. Input modelling. Verification and validation of simulation models. Output (statistical) analysis and representation of simulation results. Applications of simulation. **Textbook:** J. Banks, J.S. Carson II, B.L. Nelson, D.M. Nicol, *Discrete-Event System Simulation*, 5th Ed., Prentice-Hall, 2010.	

37.	**Course code:** TE-01	**Course title:** Technical Elective
	This is a Technical Elective course which will be selected by students in their senior year and is offered by the department alternatively during the Fall and Spring semesters. Please see the Technical Elective courses list.	

38.	**Course code:** TE-02	**Course title:** Technical Elective
	This is a Technical Elective course which will be selected by students in their senior year and is offered by the department alternatively during the Fall and Spring semesters. Please see the Technical Elective courses list.	

39.	**Course code:** GEED-03	**Course title:** General Education Elective-III
	See GEED-01 course description.	

40.	**Course code:** COMP 402	**Course title:** Engineering Design II
	This course is the sequel to COMP401. It consists of the implementation of a realistic, preferably interdisciplinary, engineering capstone design project emphasizing engineering design principles on a computer engineering topic.	

	It is carried out by a team of students under the supervision of an instructor. The team must complete the detailed design and implementation of the preliminary design they started in the COMP401 course. It is an extended exercise in the professional application of the knowledge, experience and skills gained in the undergraduate program. The team has to complete analysis, design, implementation, testing and documentation of a proto-type or actual engineered product, present it and submit a final report in the technical project report format.

41.	**Course code:** COMP 454	**Course title:** Automata Theory
	Automata and formal languages, finite state machines. formal languages and push down automata. Context free languages and grammars. Normal structured grammars. Instability and insolvability. Turing machines and their usage in problem solving. **Textbook:** J.E. Hopcroft, J. D. Ullman, Introduction to Automata Theory, Languages and Computation, Addison Wesley 1979.	

42.	**Course code:** TE-03	**Course title:** Technical Elective
	This is a Technical Elective course which will be selected by students in their senior year and is offered by the department alternatively during the Fall and Spring semesters. Please see the Technical Elective courses list.	

43.	**Course code:** TE-04	**Course title:** Technical Elective
	This is a Technical Elective course which will be selected by students in their senior year and is offered by the department alternatively during the Fall and Spring semesters. Please see the Technical Elective courses list.	

44.	**Course code:** COMP404	**Course title:** Engineering Attributes & Ethics
	This is a final year course which aims to provide knowledge and awareness of a number of important engineering issues. The knowledge areas include but are not limited to: professionalism, ethics, project management, sustainable development, risk management, change management, standards, health, environment, hazards, workplace health and security, societal issues as well as contemporary issues reflecting on the applications of the engineering profession. Awareness areas include but are not limited to enterpreneurship, innovation and the legal ramifications of the engineering solutions.	