THE CONTENTS OF ALL THE COURSES IN THE PROGRAM

THE COURSE BOOK

AND

SUPPLEMENTARY BOOK LISTS

(Computer Engineering / Information Systems Engineering)

1st Semester

MATE 112 Mathematics I (3+2+0) 4

Lines, functions and graphs, exponential functions, inverse functions and logarithms, trigonometric functions and inverse trigonometric functions, parametric equations, limit and continuity, rate of change and limit, limit finding and one-way limit, infinite limit, continuity, tangent, derivative, derivative applications, integration, integration applications, transcendental functions, integration techniques, L'hospital rule and generalized integrations, polar functions.

Course Book:
- Thomas' Calculus, 10th ed., George B. Thomas Jr., Maurice D. Weir, Joel Hass, Frank R. Giordano, Addison-Wesley, 2005.

Supplementary Books/References:
- H. Halilov, A. Hasanoğlu, M. Can, Yüksek Matematik-1, Literatür Yay., 1999.
- Stein &Barcellos, Calculus and Analytic Geometry, McGraw-Hill, 1992.
- Latorre&Kenelly, Houghton Mifflin, Calculus Concepts - An Applied Approach to the Mathematics of Change, 2007.

MATE 113 Linear Algebra (3+0+0) 3

Linear equation systems and matrices, solution of linear equation systems, Gaussian elimination method, homogeneous linear equation systems, matrix and matrix operations, rules of matrix arithmetic, elementary matrices and matrix inverse determinants, vectors in 2 and 3-dimensional space, vector spaces, eigenvalues and eigenvectors.

Course Book:
- G. Strang, Introduction to Linear Algebra, 6th ed., Wellesley-Cambridge Press and SIAM, 2016.

PHYE 112 Physics I (3+0+2) 4

Measurement and unit systems, vectors, kinematics, Newton's laws, motion in one dimension, motion in two dimensions, dynamics, laws of motion, circular motion, work and energy; conservation of energy, momentum and collision, rotational motion. Simple harmonic motion, waves, heat, first law of thermodynamics, kinetic theory of gases, second law.

Course Book:
- Douglas C. Giancoli, Physics for Scientists and Engineers With Modern Physics, 2014

Supplementary Books/References:
- D. Halliday, R. Resnick, and J. Walker, Fundamentals of Physics Extended, 10th ed., Wiley, 2014.
- Richard P. Feynman, Robert B. Leighton, Matthew Sands, The Feynman Lectures on Physics, boxed set: The New Millennium Edition.
- M. Nelkon and P. Parker, Advanced Level Physics, 7th ed., Heinemann, 1995.
- D. G. Giancoli, Physics, 6th ed., Pearson, 2005.

COMP 111 Introduction to Computer Engineering (2+1+0) 2.5

Introduction to information systems, information systems concepts, information design, information structuring, system software, packaged software, their competition and advantages, object-oriented software, databases and their properties, networks and communication systems.

Course Book:
- J. Glenn Brookshear, "Computer Science: An Overview", 13th ed. Addison Wesley, 2018.

Supplementary Books/References:
- D. Reed, "A Balanced Introduction to Computer Science", 2nd ed. Prentice Hall, 2008.

COMP 112 Computer Programming I (3+0+2) 4

Problem solving and algorithm design. Structured programming concepts: sequential processing, selection and loops. Pseudo-code, flowcharts and other techniques. High-level programming environments. Variables, operational expression and equalization. Introduction to Python programming. Structured programming; sequential transactions, decision and cycle structures. Function definition and function calling. Prototype and header files. Repetitive functions. Arrays and pointer structures. Dynamic memory management. Parameter passing rules. Multidimensional arrays. Conditional compilation process, modular programming and multi-file programs. Exception handling. File processing. Formatted input / output. Random file access. Index structures and file organization

Course Book:
- Denny Novikov, Python for Beginners: The Ultimate Beginners Guide to Python Programming With Step by Step Guidance and Hands-On Examples, 2019
- Booch, Grady (1997). Object-Oriented Analysis and Design with Applications. Addison-Wesley
- www.w3schools.com

Supplementary Books/References:
- Core Python Programming, Second Edition, Chun (Prentice Hall Ptr Core Series).
- Introduction to Computation and Programming Using Python, Revised And Expanded Edition By John V. Guttag (2013)

TUR C001 Turkish Language I (2+0+0) 0

The emergence of languages, world languages in terms of origin and structure, the place of Turkish among the world languages, the historical development of Turkish, listening education, spelling rules, punctuation marks, studies of separating Turkish words into roots and affixes in terms of structure and word production, expression defects, By understanding the basic structure and functioning of our language Turkish in subjects such as speech defects, diction, gestures, gestures, intonation, presentation, briefing, panel discussion, forum, debate, writing petitions, preparing a resume, students will have knowledge, skills and skills in oral and written expression. It is aimed to improve the skills.

Course Book:
- Lecture notes.

ATA C001 Ataturk Principles and History of Revolution I (2+0+0) 0

The collapse of the Ottoman Empire and the reasons that prepared the Turkish revolution, the disintegration of the Ottoman Empire, the Armistice of Mondros, the state of the country against the invasions and the reaction of Mustafa Kemal Pasha, Mustafa Kemal Pasha's arrival to Samsun, the first step for the national struggle, rationalize the way through congress, National Forces and the National Pact, the opening of the Grand National Assembly of Turkey, Turkey's Independence War to take over the management of the National Assembly.

Course Book:
- Lecture notes

2nd Semester

MATE 122 Mathematics II (3+2+0) 4

Infinite Series, Vectors in Plane, Vectors and Motion in Space, Functions of Several Variables and Their Derivatives, Multilayer Integrations, Integration in Vector Fields.

Course Book:
- Thomas' Calculus, 11th ed., George B. Thomas, Jr., Maurice D. Weir, Joel Hass, Frank R. Giordano, Addison-Wesley, 2010.

Supplementary Books/References:
- Calculus and Analytic Geometry, Stein & Barcellos, McGraw-Hill, 1992
- Calculus Concepts-An Applied Approach to the Mathematics of Change, Latorre& Kenelly, Houghton Mifflin, 2007.

PHYE 122 Physics II (3+0+2) 4

Electric field: electric charge, Coulomb's law, electric flux, gauss's law, electric potential: potential difference, work and energy in electrostatics, potential energy, calculation of electric field from potential, capacitors: definition and calculation of capacitance, capacitors with dielectric, energy stored in a charged capacitor, an electric dipole in external electric field, current, resistance and electromotive force, direct current circuits, Kirchoff's law, magnetic field; magnetic field sources; electromagnetic induction, Faraday's law, alternating currents.

Course Book:
- Douglas C. Giancoli, Physics for Scientists and Engineers With Modern Physics, 2014
- D. Halliday, R. Resnick, and J. Walker, Fundamentals of Physics Extended, 10th ed., Wiley, 2014.

Supplementary Books/References:
- Richard P. Feynman, Robert B. Leighton, Matthew Sands, The Feynman Lectures on Physics, boxed set: The New Millennium Edition.
- M. Nelkon and P. Parker, Advanced Level Physics, 7th ed., Heinemann, 1995.
- D. G. Giancoli, Physics, 6th ed., Pearson, 2005.

COMP 121 Computer Programming II (3+0+2) 4

Variables, data types, constants, operators, control structures (if else, for, while, switch-case, do-while). Function definitions, uses of functions, canned functions, parameter usage, return type and usage, arrays, strings. Fundamentals of object oriented programming.

Course Book:

- Paul Deitel & Harvey Deitel, C How To Program, Prentice Hall, 2016.

Supplementary Books/References:
- Paul Deitel & Harvey Deitel, C++ How to Program, 9th Edition, ISBN: 9780273793298, 2014.

COMP 126 Discrete Mathematics (3+0+0) 3

Propositions, inference rules, predicates, quantifiers, sets; methods of proof, proof by contradiction, induction; relations, functions, pigeonhole principle; graphs, trees; algebraic structures, partially ordered sets, lattices.

Course Book:
- Discrete Mathematics, Sixth Edt., Kenneth H. Rosen, 2007, McGraw Books
- Discrete Mathematics and Applications, Susanna S. Epp, Brooks, 4th Edt., 2011

Supplementary Books/References:

- Discrete and Combinatorial Mathematics, r.p. Grimaldi, Addison-Wesley, 2004, ISBN 0-321-21103-0.
- Discrete Mathematics and Its Applications, Kenneth H. Rosen, McGraw-Hill

TUR C002 Turkish Language II (2+0+0) 0

The emergence of languages, world languages in terms of origin and structure, the place of Turkish among world languages, the historical development of Turkish, listening education, spelling rules, punctuation marks, studies of separating Turkish words into roots and suffixes in terms of structure and word production, expression defects, by understanding the basic structure and functioning of our mother tongue Turkish in subjects such as speech defects, diction, gestures, gestures, intonation, presentation, briefing, panel discussion, forum, debate, writing petitions, preparing a resume, students will have knowledge, skills and skills in oral and written expression. It is aimed to improve their skills. Reading and examining various novels, poetry books, essay books to support the aim of the course.

Course Book:
- Lecture notes.

ATA C002 Ataturk Principles and History of Revolution II (2+0+0) 0

The national struggle in the field of education and culture, the national struggle in the social and economic field, the strategy of the Turkish revolution, the two great reforms in the political field, the progressive republican party and the period of silence. Turkish law revolution, the revolution of education and culture, economic reform, a multiparty experiment and the realization of some internal political events, social structure and foreign policy reforms in the health sector Republic

of Turkey's geopolitical position. Atatürk's principles: Republicanism, Nationalism, Populism, Secularism, Statism, Revolutionism. Atatürk and his state life, Atatürk and his intellectual life, Atatürk and economics, religion and secularism.

Course Book:
- Lecture notes

CAR C01 Career Planning (1+0+0) 1

3rd Semester

ENF 211 Probability and Statistics (3+0+0) 3

Multiplication rule, permutation, combination, probability concept (Kolmogorov axioms), conditional probability and independence, random variable, probability density function, distribution function, discrete distributions: Bernoulli, Binom, Poisson distributions, continuous distributions: Normal, Gamma and Exponential, Expected value, Moment Generator Function, Mean, Variance, Standard Deviation, Covariance, Correlation, Estimator and its Properties, Maximum Likelihood Estimator, Confidence Interval, Hypothesis Test, Odd and Double Population Mean Hypothesis Test, Regression.

Course Book:

- Sheldon Ross, A First Course in Probability, Prentice-Hall International, 1998.
- I. Miller, M. Miller, Mathematical Statistics, Sixth Edition; Prentice Hall

Supplementary Books/References:

- F. Mosteller, R.E.K. Rourke, G.B. Thomas, Jr., Probability and Statistical Applications, 2nd ed., Addison-Wesley, 1970.
- Murray R. Spiegel, Theory and Problems of Statistics, McGraw-Hill Book Company, 1961.
- Miller and Freund's - Probability and Statistics for Engineers, 2011.

ENF 216 Differential Equations (4+0+0) 4

First order differential equations, second order differential equations, higher order linear equations, series solutions of second order linear equations, Laplace transform first order systems of linear equations.

Course Book:
- W.E. Boyce, R.C. Di Prima, Elementary Differential Equations and Boundary Value Problems.

Supplementary Books/References:
- Shepley L. Ross, Differential Equations, Wiley International Editions,1984.
- Analysis II: Differential and Integral Calculus, Fourier Series, Holomorphic Functions, Godement, Springer, 2005.

ELK 219 Fundamentals of Electronic Circuits (3+0+0) 3

Circuit variables and components, circuit analysis techniques, operational amplifiers, semiconductors, diodes, bipolar junction transistors, digital logic circuits and applications.

Course Book:
- James W. Nilsson and Susan A. Riedel, Electric Circuits, 10/E (International Edition), Prentice Hall, 2011. ISBN -13: 978-0-13-705051-2 and ISBN-10: 0-13-705051-8.
- J. David Irvin, Robert M. Nelms, Basic Engineering Circuit Analysis,2015

Supplementary Books/References:
- Giorgio Rizzoni, Principles and Applications of Electrical Engineering, 5/E (International Edition), McGraw-Hill, 2007. (ISBN-10: 007-125444-7, ISBN-13: 9780071254441).

COMP 211 Object-Oriented Programming (3+0+2) 4

Approaches to modular programming design, basic object concepts: Classes and entities, single and multiple inheritance and object hierarchies, wrapping, polymorphism, interfaces, exception handling, files and streams, error trapping and exception handling.

Course Book:
- P. Deitel, H. Deitel, C++: How to Program, International edition, Pearson Education Inc., 2014.

Supplementary Books/References:
- D.S. Malik, C++ Programming: From Problem Analysis to Program Design, Course Technology, 4th Edition.
- Ulla Kirch-Prinz, Peter Prinz, A Complete Guide to Programming in C++, Jones and Bartlett Publishers.
- B. Stroustrup The C++ Programming Language, , Addison-Wesley 3rd Edition.
- S. Oualline, Practical C++ Programming, O'Reilly Media Inc., 2nd Edition.

COMP 212 GUI Programming (3+0+2) 4

This course provides learning the Javascript programming language. The course covers the syntax, idioms, conditions, loops, functions, arrays and strings of the Javascript language. Using the acquired JAVASCIPT knowledge, code development on the Node-Red application, a visual programming language used in industry 4.0 applications, is discussed.

Course Books / Sources:
- John E. Grayson, Graphical user interfaces for Python programs, Python and Tkinter Programming.
- https://nodered.org/
- http://www.pythonware.com/library/tkinter/introduction/
- www.w3schools.com

Supplementary Books/References:

- P. Deitel, H. Deitel, Visual C#: How to Program, 8th edition, Pearson Education Inc., 2018.

COMP S01 Industrial Training I (0+0+0) 0

<u>4th Semester</u>

COMP 221 Data Structures (3+0+0) 3

One-way and two-way linked lists, circular and hash linked lists, linked list applications. Tree types and operations on trees, binary trees, correlation trees, treę node operations. Stack design (FILO), tail design (FIFO). Sorting algorithms; insertion sorting, selective sorting, bubble, associative, clustering and quick sorting, search algorithms; sequential and linear search, binary search, binary search on tree, hash algorithm, collision analysis. Graph definitions, the way graphs are kept on memory.

Course Book:

- Thomas H. Cormen, Charles E. Leiserson, Ronald L. Livest and Clifford Stein. Introduction to Algorithms, 2nd edition, MIT Press, 2009.
- Clifford A. Shaffer. Data Structures and Algorithm Analysis Edition 3.2 (C++ Version)

Supplementary Books/References:

- Pat Morin, Open Data Structures (in pseudocode), https://opendatastructures.org/ods-python/
- Dr. Rifat ÇÖLKESEN, Veri Yapıları ve Algoritmalar, Papatya Yayıncılık
- William B. Frakes, Ricardo Baeza-Yate, Information retrieval: Data structures and algorithms.

COMP 222 Computer Networks and Internet (3+0+0) 3

OSI reference model, standards of layers (I, V, X standards), Serial communication, cable types, synchronous and asynchronous communication, a character and frame synchronization, modem communication, connection oriented, connectionless methods, Data bus (bus), ring, star topologies, ethernet frame structure, CSMA/CD operating principle, ring operating principle, repeaters, bridges, switches and routers, basic industrial network types, data traffic, generation techniques, simulation. Internal structure of bridges, routing methods (transparent, spanning tree etc.), multi-route algorithms. TCP/IP layers, IP addressing classifications, masking, IP routing.

Course Book:
- Andrew S. Tanenbaum and David J. Wetherall, Computer Networks, 5/E, Prentice Hall 2011. ISBN-13: 9780132126953.

Supplementary Books/References:
- Andrew S. Tanenbaum, Computer networks, 4/e Prentice-Hall, 2003 ISBN: 0-13-038488-7.
- J.F. Kurose and K.W. Ross, Computer Networking a Top Down Approach 4. ed. ISBN:0-321-49770-8 2008

- Fred Halsall, Data Communications, Computer Networks, and Open Systems, Addison-Wesley Pub. Co., Mass.
- William Stallings, Data and Computer Communications, 7th. Edition, Prentice Hall.
- James F. Kurose, Keith W. Ross, Computer Networking, 3rd Edition, Addison Wesley, 2004.
- Douglas Comer, Internetworking with TCP/IP, 3th Ed., Prentice-Hall
- W. Richard Stevens, TCP/IP Illustrated, vol. 1 and 2, Addison Wesley, 1994

ELK 229 Fundamentals of Electronic Devices and Circuits (3+0+0) 3

The course introduces the fundamentals of electronic elements. Topics covered are: Semiconductor Diodes and Applications, Polarization and Analysis in BJT Transistors, FET Transistors and Amplifiers. Homework, design studies and laboratory experiments are also important components of the course.

Course Book:
- Robert L. Boylestad, Electronic Devices and Circuit Theory, 11th Ed., Pearson, 2013. ISBN 10: 0-13-262226-2, ISBN 13: 978-0-13-262226-4.

Supplementary Books/References:
- Muhammad H. Rashid, Microelectronic Circuits Analysis and Design, 2nd Ed. Cengage Learning, 2011. ISBN-13: 978-0-495-66772-8, ISBN-10: 0-495-66772-2.

Faculty Elective Course (3+0+0) 3

Social Elective Course (3+0+0) 3

Social Elective Course (3+0+0) 3

COMP 311 Database Management Systems (3+0+2) 4

Database concepts, correlation model, correlation algebra, querying, application development, database design, normalization, entity-relationship model, concurrent working, movements, locks, NoSQL databases, object-correlation matching.

Course Book:
- Chris J. Date, An Introduction to Database Systems, Addison-Wesley, 2004, ISBN 9780321189561.

COMP 312 Algorithms (3+0+0) 3

This course is an introductory course in algorithms and computational theory. In this course, students learn basic techniques for analyzing and improving algorithms. This course covers the design and analysis of algorithms, the divide and conquer approach, dynamic programming, backtracking and branching and constraint, time and space complexity analysis. In addition, advanced topics such as NP theory, parallel algorithms, and number theory algorithms will be covered.

Course Book:
- T. Cormen, C. Leiserson, R. Rivest and C. Stein, Introduction to Algorithms, Second Edition, McGraw-Hill, 2001 (ISBN: 0-07-013151-1).

Supplementary Books/References:
- R. Neapolitan and K. Naimipour, Foundation of Algorithms Using C++ Pseudocode, Third Edition, Jones and Bartlett, 2004 (ISBN: 0-7637-2387-8).

COMP 313 Web Programming (3+0+2) 4

Designing with interactive web page concept and web programming languages (php, jsp, servlet, asp, cgi, etc.), providing database support and setting up the web server for creating interactive web pages, Interactive web page, information entering / querying, chat, shopping and membership registration etc. Installation of applications, web server and software required for programming (IIS, Apache, etc.), Form and script connections, text box, control box, selection box, buttons and menus, Web programming languages (php, asp, cgi, java, etc.) structural differences, comparison, assignment, loop, array operations, variables, constants and Java applets, Database preparation, database query (SQL, MYSQL etc.) and database connections (ODBC, JDBC etc.). Interactive web page management, data archiving, updating, database editing and publication continuity.

Course Book:
- Julie C. Meloni, PHP Fast & Easy Web Development

ELK 212 Digital Design (2+2+1) 3,5

Boolean algebra, combinational circuit design, analysis and design of synchronous (synchronous) sequential circuits, Sliders, Flip-flops and Timers, Shift Registers, Counters, Memory and Storage.

Course Book:
- Thomas L. Floyd, Digital Fundamentals, 10/E (International Edition), Prentice Hall, 2011. ISBN -13: 978-0-13-814646-7 and ISBN-10 : 0-13-814646-2

Supplementary Books/References:
- M. Morris Mano and Michael D. Ciletti, Digital Design, 5/E, Prentice Hall, January 2012. ISBN-13: 978-0273764526.
- John F. Wakerly, Digital Design Principles & Practices, 4th edition updated, Prentice Hall, 2005.

Social Elective Course (3+0+0) 3

COMP 322 Operating Systems (3+0+2) 4

Introduction, history, concept of processing, concurrent operations and mutual exclusion, process management and job sorting methods, deadlock and prevention algorithms, memory management: segmentation, paging and related methods, image memory, input / output operations, file systems, Unix operating system and other sample systems.

Course Book:
- A. S. Tanenbaum, "Modern Operating Systems", Prentice Hall, 2007.

Supplementary Books/References:
- Operating System Concepts, Enhanced eText, 10th Edition Abraham Silberschatz, Greg Gagne, Peter B. Galvin

COMP 324 Software Engineering (3+0+0) 3

This course introduces students to the different software development lifecycle (SDLC) phases used in developing, delivering, and maintaining software products. Students will also acquire basic software development skills and understand common terminology used in the software engineering profession. Students will also learn and practice using traditional coding standards/guidelines. Python software development libraries and debugging tools will be explored and used in projects to familiarize students with basic tasks involved in modifying, building, and testing software. The course will also lay the foundation for achieving academic and career success in Software Engineering

Course Book:
- Software Engineering, 10th Edition, Author: by Ian Somerville.

Supplementary Books/References:
- Programming in Python 3 with zyLab

COMP 325 Computer Architecture (3+0+0) 3

Computer evolution and performance issues, number systems and computer arithmetic, Intel Microprocessors (80x86 Architecture), cache memory, internal and external memories, basic I/O, instruction sets, addressing modes, processor structure and RISC architecture, advanced applications with assembly programming machine codes, Direct Memory Access (DMA), DMA Controlled I/O and Overclocking, mainboards and ports, manufacturing steps of a microprocessor.

Course Book:
- William Stallings, "Computer Organization and Architecture", 10th Edition, Pearson, 2016.
- M. Moris Mano, Computer System Organisation Prentice Hall, 1999.
- Computer Architecture, Single and Parallel Systems, M. Zargham, Prentice Hall.

Supplementary Books/References:
- Verilog HDL, A guide to Digital Designand Synthesis, Samir Palnitkar, SunSoft Press 1996.
- Computer Organization and Design, The Hardware and Software Interface, D.A.Patterson, Morgan Kaufmann.

Technical Elective Course (3+0+0) 3

Social Elective Course (3+0+0) 3

COMP S02 Industrial Training II (0+0+0) 0

COMP 411 Dissertation Project I (2+3+0) 3.5

The main purpose of this course is to provide students with the ability to analyze the problem/system they are working on and to develop solutions by making use of their theoretical knowledge. The other aim of the course is to enable students to perform an individual study that will gain experience in order to take the first step in their career, which they will start after graduation.

ENF 411 Occupational Health and Safety (2+0+0) 2

Overview of occupational health and safety; Informing about laws and regulations; The importance and effects of occupational accidents and diseases; basic hazards in the work environment and risk assessment; fire and security measures; risk factors; Working with screened vehicles, manual lifting and handling, PPE; occupational safety in ship/shipyard and closed area works

Course Book:
- Lecture notes

Technical Elective Course (3+0+0) 3

Technical Elective Course (3+0+0) 3

Social Elective Course (3+0+0) 3

Faculty Elective Course (3+0+0) 3

COMP 421 Dissertation Project II (2+3+0) 3.5

The main purpose of this course is to provide students with the ability to analyse the problem/system they are working on and to develop solutions by making use of their theoretical knowledge. The other aim of the course is to enable students to perform an individual study that will gain experience in order to take the first step in their career, which they will start after graduation.

Course Book:

- Lecture Notes

Technical Elective Course (3+0+0) 3

Technical Elective Course (3+0+0) 3

Social Elective Course (3+0+0) 3

Faculty Elective Course (3+0+0) 3

SOCIAL ELECTIVE COURSES

HM 001 Humanity and Society (3+0+0) 3

In this course, human history is examined starting from the social structure of primitive societies in the part of human history up to the 20th century. This course examines the cultural, geographical, artistic, scientific, religious, political and legal structures of societies.

Course Book:
- Philip J. Adler, R. L. Rouwels, "World Civilizations", Thompson Publishing, 6th ed., 2011.

HM 002 Philosophy of Science (3+0+0) 3

It is to examine the evolution, development and paradigm transformations of science and technology throughout history and to analyse the philosophical content of knowledge in social dynamics.

Course Book:
- Khun, T., "The Structure of Scientific Revolutions," The University of Chicago Press, 1967.
- Schick, T., "Readings in the Philosophy of Science," Mayfield Publishig Company, 2000.
- Omnes, R., "Quantum Philosophy: Understanding and Interpreting Contemporary Science," Princeton University Press, 1999.

HM 003 History of Culture (3+0+0) 3

Covering Mesopotamian, Egyptian, Anatolian, Ancient Greek, Roman and Byzantine cultures, this chronological and thematic review introduces art and visual culture from prehistoric times to the fifteenth century. Artworks and visual cultural objects are studied in detail through comparative cultural studies, drawing attention to social and historical contexts. This course is supported by lectures and discussions, detailed readings and educational trips to historical sites in Izmir. This course also introduces architectural terminology.

Course Book:
- Gombrich, E. H., The Story of Art, 16th Ed., New York, Phaidon, 1995.
- John B. Nici M.A., Barron's AP Art History, 3rd ed., 2015.
- Adams, L. S., A history of western art. Mc Graw Hill., 2006.
- Harwood, Buie, et.al ., Architecture and Interior Design through the 18th century. New Jersey: Prentice Hall., 2001.
- Blakemore, R. G. , History of interior design and furniture, from ancient Egypt to nineteenth-century Europe. New Jersey: John Wiley and Sons, Inc., 2006.
- Macit Gökberk, Felsefe Tarihi, 1999
- John Meriman, Modern Avrupa Tarihi, 2018

HM 004 History of Science and Technology (3+0+0) 3

This course covers historical developments in science and technology. In particular, the effects of developments in science on the business world and increasing the use of technology are emphasized. Scientific developments in different cultures and technological developments in different geographies will be discussed comparatively. In addition, the possible future effects of science and technology on the business world and its functioning will be discussed in detail.

Course Book:
- James E. McClellan and Harold Dorn, "Science and Technology in World History: An Introduction", Johns Hopkins University Press, 2015.

HM 005 Maritime History and Culture (3+0+0) 3

Within the scope of the course, the first ships in history are examined in the light of archaeological data during the period up to the 5th century BC and examples of different tribes in the Mediterranean are discussed comparatively. The history of the nations that have contributed to the formation of maritime culture is also covered in the course.

Course Book:
- Duncan Redford, "Maritime History and Identity: The Sea and Culture in the Modern World (International Library of War Studies)", I. B.Tauris, 2013.
- Fernand Braudel, Bellek ve Akdeniz: Tarihöncesi ve Antik Çağ, Metis Yayınları, 2013.
- Lionel Casson, Antik Çağda Denizcilik ve Gemiler, Homer Kitabevi, 2002
- İdris Bostan, Osmanlılar ve Deniz, Küre Yay. 2007

HM 006 History of Civilization (3+0+0) 3

Philosophical concepts are taught through cinema films. Films that have an important place in the history of cinema are shown and examined. In addition, the relationship between cinema and philosophy is revealed by following up-to-date movies.

Course Book:
- Christopher Falzon, "Philosophy goes to Movies: an Introduction to Philosophy", Routledge, Taylor & Francis Group, 2015.

HM 007 International Relations and Globalization (3+0+0) 3

This course aims to provide students with the tools necessary to understand globalization with its different dimensions. The course aims to examine the impact of globalization on political, economic and social changes, and what opportunities and constraints it poses for the individual, society and global society by using theoretical and historical approaches together. In the course, the concept of globalization will be examined in a theoretical and historical framework.

Students will be informed about the causes, nature and effects of the globalization process. The effects of globalization on national and international developments and issues, its positive and negative sides, the issues criticized by its advocates and opponents and opponents are among the topics to be examined.

Course Book:
- Ian Clark, "Globalization and International Relations Theory", Oxford University Press, 1999.
- Paul R. Viotti, Mark V. Kauppi International Relations and World Politics: United States Edition
- Andrew Heywood, Global Politics, 2011

HM 008 Science and Society in Modern Times (3+0+0) 3

This course aims to provide students with the tools necessary to understand the relationship between science and society in different dimensions in modern times..

Course Book:
- Andrew Ede, Lesley B. Cormack, "A History of Science in Society, Volume II: From the Scientific Revolution to the Present, Third Edition", University of Toronto Press, 2016.

FRA 102 French I (3+0+0) 3

CEF (Common European Framework) is an evaluation and reference system that shows the specified languages. The course is designed in accordance with this system. The aim and goal of the course is to enable the student to use the French language as a basic user. Through the teaching of integrated reading, comprehension, speaking, listening and writing skills, the student is expected to read short and simple texts, understand the main idea in messages and announcements, and use the necessary sentences and sentences to exchange information on key issues. In this course, students' reading, listening, speaking and writing skills are developed using critical thinking strategies. Topics covered: teamwork and conversation topics, label, personal items, the nature of French, business life and weekend life, clothing and item shopping, habits, vacation periods, socio-cultural reports, symbols of France, future tense.

Course Book:
- TAXI – French method Book 1

RUS 101 Basic Russian I (3+0+0) 3

This course will cover a wide range of activities to develop basic language skills such as reading, speaking, listening and writing, with exercises to enrich students' vocabulary, from general terms to words specific to Marine Sciences. Topics covered: features of the basis of the Russian language of the articulation and phonological system, greeting and farewell, articulation of consonants and vowel formation, main phonemes, self-introduction, features of Russian word making, the Russian intonation system and the intonation and semantic structure of the Russian dialogue, thanking, questioning to ask and some question words, simple sentences, gender categories of nouns as subject, personal and possessive pronouns, numbers

as subject, gender categories of nouns, gender category, numbers, case system of nouns for different communicative purposes: place, direction, time, etc. numbers, plural forms of nouns, giving information about self, personal information, work and occupation, time, months, days of the week telephone conversations.

Course Book:
- Stanislav Chernyshov, Alla Chernyshova "Poyekhali. 2.1. Basic Course for Adults", Zlatoust Publishers, Saint-Petersburg, 2007

Supplementary Books/References:
- Shkatulka. "Textbook for Russian learners", Russkiy Yazyk Publishers, Moscow, 2008

CHN 101 Basic Chineese I (3+0+0) 3

This course will cover a wide range of activities to develop basic language skills such as reading, speaking, listening and writing, with exercises to enrich students' vocabulary, from general terms to words specific to Marine Sciences. Topics covered: features of the basis of the Chinese language of the articulation and phonological system, greeting and farewell, articulation of consonants and vowel formation, main phonemes, self-introduction, features of Chinese word making, the Chinese intonation system and the intonation and semantic structure of the Chinese dialogue, thanking, questioning to ask and some question words, simple sentences, gender categories of nouns as subject, personal and possessive pronouns, numbers as subject gender categories of nouns, gender category, numbers case system of nouns for different communicative purposes: place, direction, time, etc. numbers, plural forms of nouns, giving information about self, personal information, work and occupation, time, months, days of the week telephone conversations.

Course Book:
- New Concept Chinese 1, Beijing Language and Culture University Press

SPN 101 Spanish I (3+0+0) 3

Spanish I teaches students to greet people, describe family and friends, talk about hobbies, and communicate about other topics, such as home life, occupations, travel, and medicine. Each lesson presents vocabulary, grammar, and culture in context, followed by explanations and exercises. Vocabulary includes terms to describe school subjects, parts of the body, and people, as well as idiomatic phrases.

Course Book:

- Lecture notes

ENF 111 Academic English I (3+0+0) 3

Four operations and formulas, numbers, functions, geometric figures, motion and direction terms. Technical English terms related to information technologies, English terms in electrical and electronics, technology terms. Cause-effect structures, adjective and noun clauses, conjunctions, passive sentences, causative sentences, tenses used in academic publications, sentence structures, academic terms. Translation of articles from a foreign language, translation of professional book chapters and user manuals. Translation of articles from Turkish to a foreign language, translation of professional book chapters and translation of user manuals.

Course Book:
- Bates, Martin, Dudley, Tony, English for Science and Technology – General Science, Longman Group, Essex, GB

Supplementary Books/References:
- Lecture notes.

ENF 121 Academic English II (3+0+0) 3

Cause-effect structures, adjective and noun clauses, conjunctions, passive sentences, causative sentences, tenses used in academic publications, sentence structures, academic terms. Translation of articles from a foreign language, translation of professional book chapters and user manuals. Translation of articles from Turkish to a foreign language, translation of professional book chapters and translation of user manuals

Course Book:
- Bates, Martin, Dudley, Tony, English for Science and Technology – General Science, Longman Group, Essex, GB

Supplementary Books/References:
- Lecture notes.
- Bailey, Stephen (2011) Academic writing for international students: Routledge, Taylor & Francis. London.

ENF 122 Business English I (3+0+0) 3

This course focuses on vocabulary and phrases used in the global business environment, with the aim of improving the use of English in professional settings, as well as the grammar and skills needed to succeed in business. Topics covered: application of relationship building terminology, application of meeting participation terminology, application of meeting management terminology, application of situations and interests terminology, application of brainstorming and grading terminology, application of inquiry and explanation terminology, application of social network terminology, application of bargaining terminology, a difficult experience active practice of listening as, application of terminology from acquaintance to partner, application of agreement terminology, application of action point terminology

Course Book:
- British Council courses: https://www.teachingenglish.org.uk/teaching-adults/ resources/ english-business
- Scott Smith, "Business Communication Strategies", MK publications, 2010.

ENF 311 Law (3+0+0) 3

In this course, it is aimed to teach the principles and basic concepts of Turkish law. The methodology of this course is based on the distinction between private law and public law and the discussion of basic issues related to private law with the student.

Course Book:
- İlhan Helvacı, "Introduction to Contract Law", Springer, 2017.
- Şaban KAYIHAN, Hukukun Temel Kavramları, 8. Baskı, Seçkin: Eylül 2020
- Yücel OĞURLU, Bünyamin GÜRPINAR, Introduction to Turkish Law, On İki Levha, 2015

ENF 313 Economics (3+0+0) 3

This course tries to introduce basic concepts in economics for beginners. Economic Organization Problems, Supply and Demand Components, Level of Output and Prices, Benefit and Demand Theory, Cost Structure and Supply Function and General Equilibrium of Markets in a Perfectly Competitive Economy are the main topics of this course.

Course Book:
- N. Gregory Mankiw, Mark P. Taylor, "Economics", Cengage Learning, 2014

ENF 329 Quality Management Systems (3+0+0) 3

Basic subjects of the course: Standardization of quality practices in businesses, the development and dissemination of the understanding of quality, the current Quality Systems and their applications.

Course Book:
- David L. Goetsch, Stanley Davıs, "Quality Management for Organizational Excellence: Introduction to Total Quality", ISBN-13: 978-0133791853.

ENF 330 Analytical Thinking and Problem Solving Techniques (3+0+0) 3

We all make decisions and solve problems continually. Business today requires everyone to effectively solve problems leading to appropriate and profitable decisions. Thinking skills may seem natural, but they are not necessarily intuitive, and they may not come naturally. A good foundation of thinking skills involves analytic thinking and problem solving, breaking problems down into their component parts. Effective problem solving involves deductive reasoning drawing conclusions from givens and applying judgments to reach conclusions from

a combination of collected evidence and assumptions. Course subjects: Making Decisions, Getting Real, The Problem-Solving Model, Case Study, The Problem-Solving Toolkit, Aspirinia, Swotting Up, Making Good Group Decisions, Analyzing and Selecting Solutions, Planning and Organizing

Course Book:
- Carl Patterson, "Critical Thinking And Problem Solving: Advanced Strategies and Reasoning Skills to Increase Your Decision Making. A Systematic Approach to Master Logic, Avoid Mistakes and Be a Creative Problem Solver", ISBN: 9781655221712, 2020.

IE 442 Ethics in Engineering and Science (3+0+0) 3

Engineering ethics is the set of ethical behaviours that engineers must comply with towards their profession, society, work, employers, and colleagues that are valid for engineering practices. The content of this course is closely related to topics such as philosophy of science as a scientific discipline, philosophy of engineering, and technology ethics.

Course Book:
- Charles E. Harris, Michael S. Pritchard, Ray W. James, Elaine E. Englehardt, Michael J. Rabins, "Concepts and Cases, Engineering Ethics", 6th Edition, Cengage, 2019.

IE 444 Innovation and Entrepreneurship (3+0+0) 3

Topics of the course: Basic Principles of Entrepreneurship, Characteristics of Entrepreneurs, Creativity and Innovation in Entrepreneurship, Enterprise Finance, Examples of Entrepreneurship from Various Sectors and Countries.

Course Book:
- Michael Schrage, "The Innovator's Hypothesis", Boston: MIT Press; 2014. ISBN: 978-0-262-02836-3.
- Westerman et al., "Leading Digita"l, Boston: Harvard Business School Press; 2014. ISBN 9781625272478.
- Bruce R. Barringer, Entrepreneurship: Successfully Launching New Ventures (6th Edition), Pearson, 2018

IE 453 Total Quality Management (3+0+0) 3

This course provides learners with an understanding of quality control and improvement systems. The course includes study of topics related to quality management approaches, design and implementation of quality-related procedures, and related technologies. The focus of the course is on enhancing goods, services, and the business environment.

Course Book:
- Sunil Luthra, Dixit Garg, Ashish Agarwal, Sachin K. Mangla, "Total Quality Management (TQM): Principles, Methods, and Applications", CRC Press, 2020.

VL 001 Volunteering Practices (3+0+0) 3

Within the scope of this course, activities are carried out in order to conduct social awareness studies.

Course Book:
- Lecture notes.

IE 213 Management and Organization (3+0+0) 3

The course is an introduction to business management information, and covers the historical development of business management and all functions related to business management in detail, and includes topics such as decision-making, leadership, communication and motivation necessary for the effective realization of these functions.

Course Book:
- Stewart R. Clegg, Tyrone S. Pitsis, Matthew Mount, "Managing and Organizations, An Introduction to Theory and Practice", Sage Pub., 2021

IE 312 Computer Integrated Manufacturing Systems (3+0+0) 3

Computer integrated way of manufacturing provides a myriad of benefits such as speed, flexibility, and better control. In this course, Computer Integrated Manufacturing (CIM) approaches are discussed. CAD/CAM tools and their within and between the production systems are presented along with appropriate case studies. Data storage and handling is also the need of contemporary manufacturing systems. This is also catered using software tools.

Course Book:
- Chang, T.C. and Wysk, R.A., 1997. Computer-aided manufacturing. Prentice Hall PTR.
- Xu, X., 2009. Integrating Advanced Computer-Aided Design, Manufacturing, and Numerical Control. Information Science Reference.
- Groover, M.P., 2007. Automation, production systems, and computer-integrated manufacturing. Prentice Hall Press.
- Weatherall, A., 2013. Computer integrated manufacturing: from fundamentals to implementation. Butterworth-Heinemann

IE 313 Production Planning and Control (3+0+0) 3

This course offers an in-depth understanding of the techniques, functions and applications of this important industrial field. You will study the tools used to ensure plans are well-scheduled and executed in time, allowing you to help plan proper production and manufacturing procedures.

Course Book:
- Stephen N. Chapman. "The Fundamentals of Production Planning and Control". Pearson, 2005.

IE 441 Industrial Psychology (3+0+0) 3

The aim of undergoing this course is to develop an awareness of the major perspectives underlying the field of Industrial Psychology and understanding for the potential Industrial Psychology has for society and organizations now and in the future.

Course Book:
- Gilmer, Industrial Psychology
- Ghiselli & Brown, Personnel and Industrial Psychology.

IE 443 Industrial 4.0

Industry 4.0 can be defined as the integration of intelligent digital technologies into manufacturing and industrial processes. This course encompasses a set of technologies that include industrial IoT networks, AI, Big Data, robotics, and automation.

Course Book:
- Ravi Kant, Hema Gurung, "Industry 4.0 Concepts, Processes and Systems", CRC Press, 2023.

IE 448 Scientific Research Methods (3+0+0) 3

The course aims to provide in-depth knowledge of research design and methodology and to train the student in writing a study plan and critically reviewing scientific literature.

Course Book:
- Hilary Glasman-Deal, "Science research writing for non-native speakers of English", Imperial College Press, 2010.
- Martyn Denscombe, "The good research guide: for small-scale social research projects", Open University Press, 2010.

IE 450 Enterprise Resource Planning (3+0+0) 3

The course provides an overview of Enterprise Resource Planning (ERP) software systems and their role within an organization. It introduces key concepts of integrated information systems and explains why such systems are valuable to businesses. In addition to the lecture, students will be guided through several hands-on activities of various business processes in SAP S/4HANA software products. The course will also provide a discussion of various business cases in which ERP concepts can be applied. An overview of Business Intelligence (BI) and analytics in the ERP context will also be addressed

Course Books:
- Manufacturing Resource Planning (MRP II) with Introduction to ERP; SCM; an CRM by Khalid Sheikh, Publisher: McGraw-Hill

- The Impact of Enterprise Systems on Corporate Performance: A study of ERP, SCM, and CRM System Implementations [An article from: Journal of Operations Management] by K.B. Hendricks; V.R. Singhal; and J.K. Stratman, Publisher: Elsevier

IE 452 Customer Relationship Management (3+0+0) 3

The course focuses on helping in recognizing the key elements need to be addressed and reflects the need to create an integrated cross-functional focus - one that emphasizes retaining as well as winning customers

Course Book:
- Francis Buttle, Stan Maklan, Customer Relationship Management: Concepts and Technologies, 3rd edition, Routledge Publishers, 2015
- Kumar, V., Reinartz, Werner Customer Relationship Management Concept, Strategy and Tools, 1st edition, Springer Texts, 2014

IE 476 Project Management (3+0+0) 3

This course provides students with an understanding of quality control and improvement systems. The course includes an examination of issues related to quality management approaches, the design and implementation of quality-related procedures, and related technologies. The focus of the course is on improving goods, services, and the business environment.

Course Book:
- Sunil Luthra, Dixit Garg, Ashish Agarwal, Sachin K. Mangla, "Total Quality Management (TQM): Principles, Methods, and Applications", CRC Press, 2020.

COMP 321 System Analysis and Design (3+0+0) 3

System functions and components, problem definition and solution principles, system development life cycle, analysis tools and techniques; modelling an existing or new information system with data flow schemes, data definition and information requirement in data dictionary, system design and implementation, computer inputs, outputs, controls, files; information system development stages and system analysis; data and information concepts; determining the information needs; system analysis tools; classification of information systems; computer aided software engineering tools; importance of software maintenance.

Course Book:
- Whitten, Bentley, Barlow, System Analysis & Design Methods, IRWIN, 2nd Edition, 1992.

Supplementary Books/References:
- John Sterman, Business Dynamics: Systems Thinking and Modeling for a Complex World, McGraw-Hill/Irwin, 2000.
- B.S. Blanchard and W.J. Fabrycky, Systems Engineering and Analysis, Prentice Hall, 1998.

COMP 323 Cyber Security (3+0+0) 3

Advanced knowledge of basic concepts related to cyber security, privacy, risk, legal regulations and corporate information systems. The application and effects of the concept of cyber security on organizations. Information Security Management, Standards. Regulations, statutory regulations and compliance. Ethics, security architecture and design. Security technologies; basic encryption and its applications. Physical and environmental security, network security, general security operations. Software development security. Forensic Informatics. Cyber risks. Attack detection and prevention.

Course Book:
- William Stallings and Lawrie Brown, "Computer Security: Principles and Practice", 4th edition Pearson, 2018.
- Cryptography and Network Security Principles and Practice, 7th edition, William Stallings, Pearson, 2017.
- D. Gollmann, Computer Security, Wiley, 2011.

Supplementary Books/References:
- Douglas W. Hubbard and Richard Seiersen, "How to Measure Anything in Cybersecurity Risk".
- Josiah Dykstra, "Essential Cybersecurity Science: Build, Test, and Evaluate Secure Systems".

COMP 431 Advanced Web Programming (3+0+0) 3

Web 2.0, XHTML, CSS, JavaScript, XML and RSS, Flash, Flex, Silverlight, Dreamweaver, Web Servers and Databases, PHP, Ruby, ASP.NET and ASP.NET Ajax, Java Server Faces, Web Services.

Course Book:
- Marty Hall, Larry Brown, "Core Web Programming", Prentice Hall Ptr Core Series.

Supplementary Books/References:
- Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, "Internet & World Wide Web" 5/e.

COMP 432 Advanced GUI Programming (3+0+0) 3

In-depth consideration of issues involved in designing and implementing graphical user interfaces, including standalone and distributed applications. It covers interactive, pointer-based, object-oriented, graphical techniques that make up the modern desktop interaction metaphor. Topics include: event-based programming; use of classes; graphics and text in windows; user interaction: mouse and keyboard; animation; user interface tools: menus, subwindow controls and widgets; multimedia; network communication; client/server model; worldwide web applications and services; database applications. Programming GUI applications using modern programming languages..

Course Book:
- John E. Grayson, "Graphical user interfaces for Python programs, Python and Tkinter Programming".
- http://www.pythonware.com/library/tkinter/introduction/
- https://nodered.org/

Supplementary Books/References:
- Course Notes.

COMP 433 Design and Analysis of GUI (3+0+0) 3

User interface basics, requirement gathering techniques, conducting user, task and environment analysis, conceptual design, interaction design, design principles, interaction methods, graphical interface design, web interface design, user interface evaluation process (testing), Front-end concepts.

Course Book:
- D. Stone, C.Jarrett,M.Woodroffe, S.Minocha, Morgan Kaufmann, "User Interface Design and Evaluation", 2005, ISBN:0-12-088436-4

COMP 434 Game Programming (3+0+0) 3

In this course, the emphasis is on software development and games for computer platforms. Programming and animating key elements of sensors and networking features and graphics that will develop interactive applications and can be used on a wide variety of platforms. Basics of installing Bitbucket and using Git. Source code versioning, difference, synchronizing repositories. Model-View-Controller paradigm. Event-based programming. Basic computer graphics (drawing lines, shapes, etc.), game physics (collisions, mock shooting, etc.), Animation Basics. Graphic asset management.

Course Book:
- Beginning Game Development with Python and Pygame: From Novice to Professional
- https://www.pygame.org/

COMP 435 Mobile Programming (3+0+0) 3

Web 2.0, XHTML, CSS, JavaScript, XML and RSS, Flash, Flex, Silverlight, Dreamweaver, Web Servers and Databases, PHP, Ruby, ASP.NET and ASP.NET Ajax, Java Server Faces, Web Services, Flutter and Android SDK and iOS app development, Objective C.

Course Book:
- Brian Fling, O'Reilly, "Mobile Design and Development", 2009.

COMP 436 Design Patterns (3+0+0) 3

In this course, design patterns in software engineering are explained. Creative, structural and behavioral patterns, which are classical design patterns, are conveyed. In addition to these, distributed programming, user interface and patterns in large-scale business applications are also mentioned. Key topics: creative, structural and behavioral patterns, distributed programming and user interface patterns, large workflow patterns, anti-patterns, agile software development processes.

Course Book:
- Erich Gamma, "Design Patterns: Elements of Reusable Object-Oriented Software".

Supplementary Books/References:
- https://www.dofactory.com/net/design-patterns

COMP 437 Introduction to Service Oriented Architecture (3+0+0) 3

SOA Fundamentals and Principles, Introduction to SOA Development LifeCycle, SOA Planning and Service Analysis and Identification, Definition of a logical context for designing

Information Systems through Pattern-Based Service Design, Pattern-Based Service Design - The provider perspective, Assessment of Challanges of SOA Development

Course Book:
- Tinny Ng, Jane Fung, Laura Chan, Vivian Mak, "Understanding IBM SOA Foundation Suite: Learning Visually with Examples".

Supplementary Books/References:
- Dynamic SOA and BPM: Best Practices for Business Process Management and SOA Agility By Marc Fiammante.

COMP 438 Compiler Design and Applications (3+0+0) 3

Compilation process, Optimization of CFAs, Regular expressions, Lexical analysis, Grammars, Syntax analysis, Abstract syntax trees, Semantic analysis, Middle code generation, Parsing (shift reduce), Recursive descent First, Follow, Code optimization, Dynamic memory management, Register assignment, Code Generation. Explaining the difference between compiler and interpreter with T-diagrams, virtual machine design with virtual machine, triples and quadruples. Review of the basic parts of the compiler (preprocessor, browser, syntax parser, semantic parsing, code generation or code interpretation). Simple one-pass compiler example, lexical analysis & syntax parsing techniques, syntax directed compiling, type checking, semantic analysis & programmed type conversions, operator overloading, run time environments for independently compiled partitions, intermediate code generation in triplets or quads.

Course Book:
- Alfred Aho, Ravi Sethi & Jeffrey D. Ullman, "Compilers: Principles, Techniques & Tools", 1986 Bell Labs or Addison wesley, corrected edition, ISBN 0-201-10088-6.
- M. Zargham, "Computer Architecture, Single and Parallel Systems", Prentice Hall.

COMP 439 Internet Technologies (3+0+0) 3

Within the scope of the course, 3 basic technologies used in the creation of all internet pages are explained. These technologies; HTML that enables the creation of the content of web pages, CSS that examines how the contents look and Javascript technologies for preparing dynamic web pages. As HTML technology, HTML 5.2, which was introduced in 2017, is described.

Course Book:
- **www.w3schools.com sitesi**

COMP 440 Parallel Programming (3+0+0) 3

Fundamentals of Parallel Computing, parallel architectures and scalability, system connections and communication, shared memory models, distributed memory model, algorithm design in distributed computational models; Comparison of parallel and distributed systems in terms of communication, synchronization, system requirements and advanced operating system issues.

Course Book:
- A. Grama, A. Gupta, G. Karypis, V. Kumar, "Introduction to Parallel Computing", 2nd ed., Pearson, 2003.

Supplementary Books/References:
- M. J. Quinn, "Parallel Computing, Theory and practice", 2nd ed., McGraw Hill, 1994.

COMP 450 Software Quality Assurance and Testing (3+0+0) 3

The main subject of this course is the location of the test within the scope of software quality, the management of the test and its principles. The test describes a series of activities before and after the software is run. In the course, test design techniques, test types, processes and the place of the test in the process will also be discussed.

Course Book:
- J. Tian, "Software Quality Engineering: Testing, Quality Assurance, and Quantifiable Improvement", Wiley, 2005.

COMP 451 Combinational Algorithms and Graph Theory (3+0+0) 3

Combinatorial algorithms, non-deterministic algorithms, p and np classes, np-hard and np-complete problems, fast combinatorial algorithm design, optimization problems, simplex algorithm, duality, primal-dual algorithm, flow algorithms, linear programming, paths and search, trees, networks, circuits, flatness, mapping and independence, connectivity, flow.

Course Book:
- Douglas B. West, "Introduction to graph theory", Pearson, 2002.

Supplementary Books/References:
- T. H. Cormen, C. E. Leiserson, R. L. Rivest, C. Stein, "Introduction to Algorithms", 3rd ed., MIT press, 2009.

COMP 452 Human Computer Interaction (3+0+0) 3

Introduction to human computer interaction; Human and interaction capacity, visual, auditory tactile perception, memory, learning ability; input output units and computers; task analysis

in interface design; general principles of interface design, features of superior interface; navigation principles; menu and feedback principles; data entry and data representation principles, principles of human computer interaction in web applications; mobile user interfaces; accessible design; interface evaluation; human technological device interaction; modern and future applications.

Course Book:
- Alan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale, "Human–Computer Interaction", Third Edition, 2004.

Supplementary Books/References:
- J. Preece, Y. Rogers, H. Sharp, D. Benyon, S. Holland, T. Carey, "Human Computer Interaction", Jenny Preece, Addison-Wesley Longman Ltd., 1994.

COMP 462 Computer Vision (3+0+0) 3

Basic Concepts, Digital image processing techniques, Perspective and Orthographic cameras, Line and curve detection, Camera Calibration, Stereo vision, Image segmentation, Optical flow, Visual motion analysis, Shape from Focus-Blur, Shape from Motion, Object Recognition and Detection

Course Book:
- Richard Szeliski, "Computer Vision: Algorithms and Applications", Prentice Hall.
- Trucco and Verri, "Introductory Techniques for 3-D Computer Vision", Prentice Hall.

COMP 463 Automatic Recognition Technologies (3+0+0) 3

Introducing technologies such as magnetic cards, barcodes, smart cards, RFID, fingerprints. Design and applications of industrial data acquisition systems based on these technologies.

Course Book:
- Z-N. Li, M.S. Drew, "Fundamentals of Multimedia", Pearson Prentice Hall Upper Saddle River, NJ, 2004.

Supplementary Books/References:
- David A. Forsyth, Jean Ponce, "Computer vision: A Modern Approach".
- Ramesh Jain, Rangachar Kasturi, Brian G. Schunck, "Machine Vision".

COMP 464 Introduction to Data Mining (3+0+0) 3

Data mining concept, data, information, and informatics concepts, olap and data warehouse concepts, association rules, classification and clustering methods and sample applications, data mining trends.

Course Book:
- Stanton A. Glantz. Primer of Biostatistics, 7ᵗʰ Edition, Mc Graw Hill, 2012.
- Ethem Alpaydın. Introduction to Machine Learning, 3ʳᵈ Edition, The MIT Press, 2014.
- Jiawei Han and Micheline Kamber, "Data Mining, Concepts and Techniques", 2nd Edition, The Morgan Kaufmann Series, ISBN: 978-1-55860-901-3, 2006.

Supplementary Books/References:
- David J. Hand, Heikki Mannila, and Padhraic Smyth "Principles of Data Mining", MIT Press. ISBN 026208290X, 2001.
- Pang-Ning Tan, Michael Steinbach, Vipin Kumar, "Introduction to Data Mining", Addison Wesley, ISBN: 0-321-32136-7, 2005.

COMP 465 Big Data and Business Analytics (3+0+0) 3

This course will cover big data analytics related technologies including NoSQL databases, data migration to Hadoop, real-time data analysis with HBase, and big data analytics tools such as Apache Hive and Pig.

Course Book:
- Bahga, A. and Madisetti, V., "Big Data Science & Analytics: A Hands-On Approach". 2016.

COMP 466 Introduction to Machine Learning (3+0+0) 3

Model Selection, Probabilistic Classifiers, Parametric and Non-Parametric Classifiers, Simple Sensors, Multilayer Sensors, Dimensional Shrinkage, Clustering, Decision Trees, Density Based Clustering, Agglomerative Clustering, Cluster Evaluation, Adhesion, Separation, Cluster Bias, Prototype Based Clustering, Fuzzy Clustering Optimal Partitioning of Sparse Similarities Using, Sprinkle, Metis, Chamelon, Jarvis-Patris Clustering Algorithm.

Course Book:
- Christopher M. Bishop, "Pattern Recognition and Machine Learning (Information Science and Statistics)".

Supplementary Books/References:
- Ethem Alpaydın. "Introduction to Machine Learning", 3rd Edition, The MIT Press, 2014.

COMP 467 Internet of Things (3+0+0) 3

Defining the Internet of Things concept, Defining the concept of Machine to Machine (M2M), Comparing M2M and IOT concepts, Examining the application areas of the Internet of Things, IOT architecture and its components, Defining Auxiliary Technologies to Improve IOT Application (RFID, NFC, BLE Beacon, WSN, GSM) IOT and security concept, GSM

and GPS Applications, IOT and Operating Systems (TinyOS, Google Brillo), IOT communication and messaging protocols, IOT and Cloud Platforms, IOT and Big Data.

Course Book:
- Mercedes Bunz & Graham Meikle, "The Internet of Things Digital Media and Society".

Supplementary Books/References:
- Dawid Borycki, "Programming for the Internet of Things Using Windows 10 IoT Core and Azure IoT Suite", Prentice Hall, 2017

COMP 468 Smart Manufacturing (3+0+0) 3

Smart factories (Industry 4.0) are the current trend for automation and data sharing in production technologies. It includes cyber-physical systems, internet of things, cloud technology. In smart factories, machines, systems and networks have the ability to independently share data to manage production processes independently. Topics covered in this course are: Cyber-physical structures, embedded systems, decentralized decision systems, flexible production systems, automation, worker machine systems, the role of human in smart systems (management).

Course Book:
- Industry 4.0: Entrepreneurship and Structural Change in the New Digital Landscape, Tessaleno Devezas, João Leitão, Askar Sarygulov Springer, Feb 28, 2017

Supplementary Books/References:
- Business Information Systems and Technology 4.0: New Trends in the Age of Digital Change, Springer 2018.

COMP 469 Agile Software Programming (3+0+0) 3

Main aim of this course are Developing mobile and web applications, using modern sustainable agile practices, such as backlogs, user stories, velocity charts, and test driven development, to deliver value as quickly as possible to end users, clients, developers, and the development organization.

Course Book:
- Robert C. Martin. "Agile Software Development, Principles, Patterns, and Practices", Pearson.

COMP 481 Biomedical Information Systems (3+0+0) 3

In this course, biomedical sensors, biosignal processing, medical imaging methods and medical image processing are covered. Main topics: Introduction to biomedical information

systems, biological and medical data, biomedical data storage, integration, query and evaluation, biological data paths.

Course Book:
- J. D. Enderle, S. M. Blanchard, J. D. Bronzıno, "Introduction to Biomedical Engineering", Elsevier Academic Press, 2005.

COMP 482 Cloud Computing (3+0+0) 3

Designing software using current applications, cloud computing models, techniques and architectures related to cloud computing.

Course Book:
- T. Erl, R. Puttini, Z. Mahmood, "Cloud Computing: Concepts, Technology & Architecture", 1st ed., Prentice Hall, 2013.

COMP 483 Introduction to Network Security and Cryptography (3+0+0) 3

Basic Concepts of Cryptography, Classical Cryptosystems, Replacement Ciphers, Review of Number Theory and Some Topics of Algebra, Public Key and Private Key Cryptosystems, RSA Crypto System, Diffie-Hellman Key Exchange, El-Gamal Crypto System, Digital Signature, Some Basic Cryptographic Protocols, Network security applications.

Course Book:
- William Stallings, "Network Security Essentials: Applications and Standards", 6th Edition, Pearson, 2017.

Supplementary Books/References:
- N. Koblitz, "A Course in Number Theory and Cryptography", 2nd ed., Springer-Verlag, 1994.

COMP 484 Computer Graphics (3+0+0) 3

Graphic systems and models, Graphic programming, Interaction and animation, Geometric objects and transformations, Displaying, Lighting and shading, Rasterization: from geometry to pixels, Modeling and hierarchy, Curves and surfaces, Advanced rendering.

Course Book:
- David Eck, Hobart and William Smith, "Introduction to Computer Graphics".

COMP 485 Computer Forensics (3+0+0) 3

Introduction to cyber crimes, Forensic technologies, Data recovery from disk and file systems, Evidence collection, ownership verification, data validation, storage and protection, identification and identification, Windows, Linux, Mac-OS architects, Analysis of file structures, network analysis, autonomous system analysis, Forensic informatics methodology, algorithm, protocol and tools, Current developments in forensic informatics.

Course Book:
- C. Altheide & H. Carvey, "Digital Forensics with Open Source Tools", Syngress, 2011. ISBN: 9781597495868.

ELK 442 Artificial Intelligence (3+0+0) 3

Non-information-based search methods; heuristic search methods; search in competitive environments; propositional logic; predicate logic; supervised learning techniques; unsupervised learning techniques; natural language processing. Necessary tools to formulate Artificial Intelligence problems. Tools and structures required to design smart agent systems. Solution tools of the problems depending on the nature of the problem and the search space.

Course Book:
- Russell, S., Norvig, P., "Artificial Intelligence: A Modern Approach", (3rd edition), 2009.
- Giarratano, J.C., Riley, G.D., "Expert Systems: Principles and Programming", (4th edition), 2004.

Supplementary Books/References:
- Nabiyev, V., "Yapay Zeka", (5.Baskı), 2016 ISBN 978-975-02-3727-0.

ELK 443 Control with Fuzzy Logic (3+0+0) 3

Multi-valued logic, fuzzy logic, comparison of classical logic and fuzzy logic, membership concept, fuzzy sets, membership function types, fuzzy propositions, fuzzy models, fuzzy values, fuzzy quantities, fuzzy conditional and bounded propositions, inferences, fuzzy level sets, fuzzy sets operations, fuzzy expanded sets, fuzzy numbers, fuzzy number operations, fuzzy set graphs, fuzzy equations, rule-based inference, blurring, inference mechanisms, rinsing, Mammadani and Sugeno fuzzy system models, fuzzy relations, fuzzy functions and their basic properties, artificial neural networks genetic algorithms, fuzzy logic and computer applications.

Course Book:
- J.-S.R. Jang, C.-T. Sun, E. Mizutani, "Neuro Fuzzy and Soft Computing", Prentice Hall, Upper Sllade River, NJ 07458, 1997.

Supplementary Books/References:
- L. A. Zadeh, Fuzzy Sets, "Fuzzy Logic, and Fuzzy Systems: Selected Papers" (Advances in Fuzzy Systems: Application and Theory), World Scientific Pub Co Inc., 1996.

- A. Çelikyılmaz, İ. B. Türkşen, "Modelling Uncertainity with Fuzzy Logic", Springer, 2009.
- İ. B. Türkşen, "An ontological and Epistemological Perspective of Fuzzy Set Theory", Elsevier, 2011.
- S. Haykin, "Neural Networks, A Comprehensive Foundation", Macmillan Publishing Company, Englewood Cliffs, NJ, 1994.

ELK 456 Embedded Systems (3+0+0) 3

Embedded systems. Introduction of 8051 embedded software development environment (Keil C compiler and hardware simulator). 8051 Embedded Microprocessors. Hardware Fundamentals & Computer Architecture Review. (Embedded systems terminology, gates, clocks, timing diagrams, memory, microprocessor clock, etc.). Study on reading and writing the input / output pins of an 8051 microprocessor. Hardware delays and interruptions. Embedded microprocessor input to MSP430, MSP430 board, digital input/output, display output. Interrupts and Timers. Embedded operating system software. Multistate system development. RS232 serial communication. RS232, SPI, I2C, CAN and wireless communication.

Course Book:
- Michael J. Pont, "Embedded C", Addison Wesley 2005.

ELK 457 Digital Image Processing (3+0+0) 3

Basic concepts and algorithms in image analysis. Topics: Image detection and image acquisition, image enhancement in spatial and frequency domain, image restoration: noise reduction, blur removal, color image processing, lossy and lossless compression, binary image processing, Morphological image processing, image segmentation, edge detection and regional segmentation, segmentation with watersheds, image representation and specification, object recognition.

Course Book:
- Gonzalez, R. C., and Woods, R. E., "Digital Image Processing", Prentice Hall, (3rd Edition), 2008.

Supplementary Books/References:
- Jain, K., "Fundamentals of Digital Image Processing", Prentice Hall, 1989.
- Gonzalez, R. C., and Woods, R. E., Eddins, S., "Digital Image Processing using MATLAB". Pearson, Prentice Hall, 2004.

ELK 458 Digital Video Processing (3+0+0) 3

Imaging models, sampling in space-time and transformation of sampling structures. 2D and 3D motion estimation techniques. Parametric and nonparametric motion estimation techniques. Frame-based and object-oriented video compression methods. Video transmission standards. Streaming video and IP compatible video transmission. Current

applications: Mobile media applications, object tracking, content-based video indexing, search and retrieval, video copy detection - video fingerprint removal, super resolution video.

Course Book:
- A. M. Tekalp, "Digital Video Processing", Prentice Hall, ISBN 0-13-190075-7, 1995.

Supplementary Books/References:
- Y. Wang, J. Ostermann, and Y. Zhang, "Video Processing and Communications, Prentice Hall, ISBN 0-13-017547-1, 2002.
- B. G. Haskell, A. Puri, and A.N. Netravali, "Digital Video: An Introduction to MPEG-2", Chapman&Hall, ISBN 0-412-08411-2, 1997.

ELK 493 Fundamentals of Signals and Systems (3+0+0) 3

Classification of signals, basic signals, classification and properties of systems, Classification of Linear Time Independent systems in time domain, Continuous-Time and Discrete-Time Fourier Series, Continuous-Time and Discrete-Time Fourier Transforms, Classification of Linear Time-Independent systems in frequency domain, Sampling: Laplace and z-transforms and their applications.

Course Book:
- Alan Oppenheim, Alan Willsky, "Signals and Systems", Prentice Hall, 1996.

ELK 494 Fundamentals of Digital Signal Processing (3+0+0) 3

Introduction to discrete time systems and digital signal processing: Discrete time linear systems, difference equations, z-transforms, discrete convolution, stability, discrete time Fourier transform, analog-digital and digital-analog transformations, sampling. The z-transform. Discrete Fourier transform. Fast Fourier Transform. Digital filter design and implementation will be demonstrated. Fundamentals of statistical signal processing are covered. Random processes and power spectral density. Wiener filter. Basics of adaptive filters. Steepest descent and LMS algorithms. Fundamentals of time-frequency analysis will be explained. Short-time Fourier transform. Spectrogram. Introduction to time-scale transformations and wavelet transformations.

Course Book:
- John G. Proakis, "Digital Signal Processing", (4th Edition).

ELK 495 Engineering Electromagnetics (3+0+0) 3

This course covers the fundamentals of electromagnetic waves with emphasis on physical concepts and applications in engineering systems. Maxwell's equations, time harmonic

fields, planar waves, polarization, standing waves, Smith diagram, impedance matching, orthogonal and angular incidence, delayed potentials, antenna radiation characteristics are studied. The main topics covered are: Maxwell's Equations for Time Varying Fields, Planar Wave Propagation, Transmission Lines, Wave Reflection and Transmission, Radiation and Antennas.

Course Book:
- Fawwaz T. Ulaby, Electromagnetics for Engineers, Prentice Hall, 2005 Upper Saddle River, and ISBN-10: 0131497243, ISBN-13: 9780131497245.

Supplementary Books/References:
- David K. Cheng, Field and Wave Electromagnetics, Pearson Education, 2014 ABD, ISBN-10: 9332535027, ISBN-13: 978-9332535022.

ELK 497 Telecommunication Systems (3+0+0) 3

This course aims to give the basic protocols / techniques used in Computer Networks. Information is given starting from the representation of data in a transmission medium to control protocols used in networks. Network topologies, routers, switches, routing algorithms, multicast are also studied. After giving basic information about communication protocols / techniques, Internet Protocol (IP) is studied in detail.

Course Book:
- Roger L. Freeman, "Telecommunication System Engineering", Fourth Edition.

ELK 499 Mechatronics and Robotics (3+0+0) 3

In this course, the fundamentals of Mechatronics, cybernetics and robotics applications are examined and detailed.

Course Book:
- Gregory Dudek and Michael Jenkin, "Computational Principles of Mobile Robotics", Cambridge University Press, 2nd ed., 2010.

Supplementary Books/References:
- Bruno Siciliano and Oussama Khatib, "Handbook of Robotics", Springer, 2008.

MEEN 455 Introduction to Mechatronic Engineering (3+0+0) 3

In this course, basic information is given about the fundamentals of Mechatronics, introductory concepts to Mechatronic engineering, scientific documentation, fundamentals of engineering design and methodology, introduction to computer-aided design and manufacturing, automotive technology, and basic information about automation technology.

Course Book:
- Biswanath Samanta, "Introduction to Mechatronics: An Integrated Approach", 2023.

MEEN 456 Mechatronic Design (3+0+0) 3

In this course, the design fundamentals and applications of Mechatronics are examined and detailed.

Course Book:
- J. Edward Carryer, Matthew Ohline, Thomas Kenny, "Introduction to Mechatronic Design", Cambridge University Press, 2nd ed., 2010.

ENF 401 Engineering Design (3+0+0) 3

This course involves interdisciplinary project work.

MATE 491 Abstract Mathematics (3+0+0) 3

Symbolic Logic: propositions, quantifiers, negativity, proof methods. Set Theory: set, set operations, relations, equivalence and order relations, functions, resultant and inverse functions, binary operations, lattices, Boolean algebra. Countability: finite and infinite sets, countability, Cantor's theorems. Ordered Sets: Order-Related Sets, Zorn's Diagram. Natural Numbers: Peano actions, principles of induction, Integers: construction of integers, ordering and divisibility, congruences.

Course Book:
- Robert J. Bond and William J. Keane, "An Introduction to Abstract Mathematics", Waveland Press.

Supplementary Books/References:
- William Dunham, "Journey through Genius: The Great Theorems of Mathematics", Penguin Books USA Inc.