Tarsus University
Institute of Graduate Studies
Computer Engineering

Link of the Page: Course Information Package

Course Content Report

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
LE 509	SCIENTIFIC RESEARCH TECHNIQUES AND PUBLICATION ETHICS	2	0	0	0.00	0.00	Compulsory

Course Content

Identifying priorities and conducting research studies on the subject. Research methods Concept of ethics and its applications. Designing, organizing and writing a research proposal. Critical research. Main principles of research, analysis, validity and reliability.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 500	MSC. THESİS	0	0	0	0.00	30.00	Compulsory

Course Content

Study for Master's thesis

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 801	SPECİALİZATİON FİELD COURSE	4	0	0	4.00	0.00	Compulsory

Course Content

Identifying the research topic and developing alternative suggestions for its solution Making a current literature review with the thesis topic To be able to express ideas and findings related to the research topic effectively orally and in writing. Preparing the infrastructure studies for the application of the thesis topic, determining the methods, conducting the thesis studies

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 802	SPECİALİZATİON FİELD COURSE	4	0	0	4.00	0.00	Compulsory

Course Content

Identifying the research topic and developing alternative suggestions for its solution Making a current literature review with the thesis topic To be able to express ideas and findings related to the research topic effectively orally and in writing. Preparing the infrastructure studies for the application of the thesis topic, determining the methods, conducting the thesis studies

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 501	MSC. SEMİNAR	0	0	0	0.00	7.50	Compulsory

Course Content

The content of this course consists of activities that include literature study, data collection, data collection and reporting the results by presenting the results for the subject that the student wants to work under the supervision of the lecturer.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 502	ARTİFİCİAL INTELLİGENCE	3	0	0	3.00	7.50	

Course Content

Introduction to artificial intelligence; heuristic problem-solving approach; artificial intelligence in game programming; learning methods; artificial neural networks; convolutional neural networks; recursive neural networks; deep belief networks; expert systems; artificial intelligence optimization algorithms.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 503	DATA SCİENCE AND ANALYSİS	3	0	0	3.00	7.50	

Course Content

Data science and big data analysis; relational databases and data modeling; data warehouse and integration; parallel databases; data visualization; machine learning, classification, regression, clustering; natural language processing; information access.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 504	DATA PREPROCESSİNG TECHNİQUES	3	0	0	3.00	7.50	

Course Content

Before using machine learning or data mining methods, some corrections made on the data set, completing missing data, removing duplicate data, transforming, integrating, cleaning, normalizing, dimension reduction, etc. transactions.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 505	MACHİNE LEARNİNG	3	0	0	3.00	7.50	

Course Content

Basic machine learning techniques and algorithms, learning concepts, decision trees, genetic algorithm, bayesian learning, artificial neural networks, support vector machine; evaluation and comparison of learning algorithms; unsupervised learning.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 506	DATA MİNİNG	3	0	0	3.00	7.50	

Course Content

In this course, information is given about the methods and algorithms used during the collection, storage and analysis of data. It contains detailed information about the methods used in the literature and their application areas. Within the scope of the algorithms described in the course, the project assignments requested and the effective use of the taught algorithms are measured.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 507	ARTİFİCİAL NEURAL NETWORKS	3	0	0	3.00	7.50	

Course Content

Basic building blocks of ANNs, terminologies, learning rules: perceptron, delta (LMS), Hebb net, single layer perceptrons, multi-layer perceptrons, backpropagation learning algorithm, applications of neural networks.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 508	DEEP LEARNİNG	3	0	0	3.00	7.50	

Course Content

History and therotical advanteges of the deep learning, basic learning algorithms and architectures for deep learning, regularization of distributed models, optimization techniques for training deep networks, convolutional networks, bacpropogating and recurrent networks, autoencoders and linear factor models, learning by demonstration, deep generative networks - Boltzman machines

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 509	NATURE-INSPİRED COMPUTİNG	3	0	0	3.00	7.50	

Course Content

Introduction to nature-inspired computing techniques; classical heuristic search and optimization approaches; annealing simulation; prohibited search; evolutionary algorithms; ant colony optimization; particle swarm optimization; artificial immune system; other nature-inspired computational techniques, Harmony search, bee algorithms, firefly algorithm; meta-heuristics; hybrid systems.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 510	EVOLUTİONARY COMPUTATİON	3	0	0	3.00	7.50	

Course Content

Overview of evolutionary algorithm approaches, genetic algorithms, genetic programming, evolutionary strategies, evolutionary programming, differential evolution, working with constraints; working with evolutionary algorithms, theoretical knowledge, experimental design, result in analysis; performance space structure analysis; parameter control; multi-objective evolutionary algorithms; use of evolutionary algorithms in dynamic and uncertain environments; performance function approximations; hybrid approaches; parallelization; interactive evolution; co-evolution; scope of application.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 511	COLLECTİVE LEARNİNG	3	0	0	3.00	7.50	

Course Content

Reasons of collective learning, its advantages over single learners, Bagging, Random sub-spaces, Random forests, Rotation Forests, Error correcting code-based methods, Factors affecting the success of collective learning, Collective learning practices in classification, clustering, regression areas, Methods of combining decisions in collective learning, Meta learning

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 512	BİG DATA ANALYTİCS	3	0	0	3.00	7.50	

Course Content

This course covers Hadoop Ecosystem Fundamentals, Hadoop architecture and HDFS, MapReduce Programming, Hadoop management, Apache Spark Programming and Rapid Data and Stream Processing with Spark with RDDs, NoSQL Databases and distributed data storage.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 513	STREAM DATA MİNİNG	3	0	0	3.00	7.50	

Course Content

Definition of flowing data, scope of flowing data problem, flowing data processing methods, streaming data processing platforms, streaming data evaluation metrics, application areas

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 514	WEB MİNİNG	3	0	0	3.00	7.50	

Course Content

Introduction, Internet and the Web Graph, Information Retrieval and Web Search, Link Analysis, Web Crawling, Web Usage Mining, Clustering approaches for Web Mining, Classification approaches for Web Mining

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 515	NATURAL LANGUAGE PROCESSİNG	3	0	0	3.00	7.50	

Course Content

Morphological analysis of the language;Different grammar structure; Clustering and Classification Algorithms;Information Retrieval; Question Answering, Collacation

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 516	SPEECH PROCESSİNG	3	0	0	3.00	7.50	

Course Content

Fundamentals of Digital Signal Processing ,Human hearing mechanism, Speech and audio perception, Speech and audio signals modelling, Short term analysis of speech, Time domain analysis, Short term Fourier analysis, Enhancement of speech and audio, Noise reduction, Feature extraction of Speech and audio signals, Linear Predictive Analysis of Speech Signals, Estimating Speech parameters: Pitch frequency and Formant estimation, Calculating Mel-frequency cepstral coefficients, Speech recognition Methods, Vector quantization algorithm, Automatic Speech Recognition, Hidden Markov Models, Speech coding and compression methods

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 517	BİOİNFORMATİCS	3	0	0	3.00	7.50	

Course Content

Bioinformatics is a rapidly growing field that integrates molecular biology, biophysics,statistics, and computer science. The course provdes broad overview of bioinformatics with a significant problem-solving component, including hands-on practice using computational tools to solve a variety of biological problems. Topics include: database searching, sequence alignment, gene prediction, RNA and protein structure prediction, construction of phylogenetic trees, comparative and functional genomics

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 518	IMAGE PROCESSİNG	3	0	0	3.00	7.50	

Course Content

Digital Image Fundamentals, Image Enhancement Techniques, Spatial Filtering, Color Image Processing, Image Segmentation, Morphological Image Processing, Texture Analysis, Image Representation and Description, Image Compression, Motion Analysis, Pattern Recognition, Deep Learning for Image Processing Applications

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 519	PATTERN RECOGNİTİON	3	0	0	3.00	7.50	

Course Content

Learning and adoption, Bayesian decision theory, discriminant functions, parametric techniques, maximum likelihood estimation, Bayesian estimation, sufficient statistics, non-parametric techniques, linear discriminants, algorithm independent machine learning, classifiers, unsupervised learning, clustering.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 520	COMPUTER VİSİON	3	0	0	3.00	7.50	

Course Content

Image Formation and Image Models, Image Processing, Edge Detection, Reflectence Map and Photometric stereo

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 521	BİOMEDİCAL SİGNAL ANALYSİS	3	0	0	3.00	7.50	

Course Content

Introduction to biomedical signal processing; biomedical device types; examples of biomedical signals (ECG, EEG, EMG), characteristics of signals; biomedical signal processing techniques; noise types and filtering methods in signals; analysis of time and frequency domain feature extraction techniques of biomedical signals; Wavelet analysis for ECG signals; supervised-unsupervised learning; biomedical signal classification application examples.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 522	STATİSTİCAL NATURAL LANGUAGE PROCESSİNG	3	0	0	3.00	7.50	

Course Content

Probabilistic language modeling; context-free grammars; probabilistic context-free grammars; part of speech tagging, Hidden Markov models; logging linear models; unsupervised learning; text categorization; semantics; neural networks; word embedding.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 523	FUZZY LOGİC AND ENGİNEERİNG APPLİCATİONS	3	0	0	3.00	7.50	

Course Content

Artificial Intelligence Definition and Purpose, Overview of Artificial Intelligence Algorithms, Definition of Fuzzy Logic, Comparison of Fuzzy Logic and Classical Logic, Basic Steps of Fuzzy Logic, Application Areas of Fuzzy Logic, Student Projects

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 524	AUTONOMOUS ROBOTİC	3	0	0	3.00	7.50	

Course Content

Introduction to autonomous robotics; motion patterns of a robot; measurement models of different types of sensors; filtering techniques; simultaneous localization; mapping method.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 525	ADVANCED OPERATİNG SYSTEMS	3	0	0	3.00	7.50	

Course Content

Protection in operating systems; security; memory management; core; file systems; synchronization; nomenclature; distributed system architecture.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 526	ADVANCED TOPİCS IN PROCESSOR ARCHİTECTURES	3	0	0	3.00	7.50	

Course Content

Pushing the limits of a single processor; instruction set design and its impact on computer performance; micro programming; addressing techniques; memory hierarchy; relational, virtual, cache; memory management; interrupts, DMA, and channels; comparative study of commercial computer architecture.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 527	COMPUTER SYSTEMS PERFORMANCE ANALYSİS	3	0	0	3.00	7.50	

Course Content

The nature of computer performance measurement and evaluation; task processing models; queue theory; simulation techniques; system analysis techniques; Predicting CPU performance; programmed measurement techniques; feasibility study; system selection process.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 528	COMPUTER NETWORKS ANALYSİS AND DESİGN	3	0	0	3.00	7.50	

Course Content

Introduction to computer networks analysis and design; measuring network performance; network traffic flow modeling; graph optimization problems and related graph algorithms; delay and loss models for networks; queue nets; static and dynamic routing algorithms; network reliability analysis and design.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 529	ADVANCED NETWORK PROGRAMMİNG	3	0	0	3.00	7.50	

Course Content

Overview of TCP/IP layers, transport layer API, network programming topics; socket programming, UNIX sockets, IPC problems, Winsock sockets; RPC programming; TLI programming; Web programming issues, HTML, forms, performance, and scalability; CGI, PERL, PHP, Java programming; case studies and programming projects.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 530	COMPUTER SYSTEMS AND NETWORK SECURİTY	3	0	0	3.00	7.50	

Course Content

Computer security techniques; traditional encryption; public key encryption system; key management; message validation; hash function and algorithms; digital signature; verification protocols; access control mechanisms; network security practice; TCP/IP security; Web security; SSL; denial-of-service attacks; intrusion detection; viruses.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 531	MOBİLE AND WİRELESS NETWORKİNG	3	0	0	3.00	7.50	

Course Content

• Mobile Systems and Technologies • Mobile Operating Systems • Context-Awareness • Wireless Communication • Sensor Networks/Applications and Their Interaction with Mobile Technologies • Mobile Computing • Crowdsourcing Techniques • Mobile Applications using the Sensor Data on Mobile Devices • Activity Recognition

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 532	ADVANCED COMPİLER DESİGN	3	0	0	3.00	7.50	

Course Content

Compilers and interpreters, frontend and backend, phases of a compiler, optimizationi, compiling and optimizing for parallel CPUs

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 533	PARALLEL AND DİSTRİBUTED COMPUTİNG	3	0	0	3.00	7.50	

Course Content

The course addresses architectures, languages, tools, environments, methods, techniques, and applications related to parallel and distributed computing.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 534	ADVANCED ALGORİTHM ANALYSİS AND DESİGN	3	0	0	3.00	7.50	

Course Content

Recurrences, Master Theorem, Greedy Algorithms, Dynamic Programming, Graph Algorithms, Geometric Algorithms, Complexity Classes and NP Problems, Cryptographic Algorithms

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 535	ADVANCED PROGRAMMİNG LANGUAGES	3	0	0	3.00	7.50	

Course Content

Introduction to Programming Languages, Evolution of the Well Known Programming Languages, Syntax and Semantics, Lexical and Syntax Analysis, Names, Bindings, and Scopes, Data Types, Expressions and Assignment Statements, Statement-Level Control Structures, Subprograms, Implementing Subprograms, Abstract Data Types and Encapsulation Constructs, Support for Object-Oriented Programming, Concurrency, Exception Handling and Event Handling, Functional Programming Languages, Logic Programming Languages

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 536	OBJECT ORİENTED DESİGN AND MODELİNG	3	0	0	3.00	7.50	

Course Content

Gang of Four design patterns, code smells, refactoring

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 537	ADVANCED DATABASE MANAGEMENT SYSTEMS	3	0	0	3.00	7.50	

Course Content

The Relational Model Of Data, Theoretical Concepts, Relational Model Conformity and Integrity, Relational Database Management Systems Implementation Techniques, Advanced Sql Programming, Query Optimization, Concurrency Control And Transaction Management, Database Performance Tuning, Distributed Relational Systems And Data Replication, Security Considerations, Emerging Database Management System Technologies, Introduction and application of recent DBMS(MS SQL, ORACLE, MY SQL), "Object Oriented, Deductive, Spatial, Temporal And Constraint Database Management Systems ", New Database Applications And Environments: E.G. Data Warehousing; Multimedia; Mobility; Multidatabases; Native Xml Databases (Nxd), Internet, Database Related Standards, Sql Standards, Sql 1999, Sql:2003, Object Data Management Group (Odmg) Version 3.0 Standard, Standards For Interoperability And Integration E.G. Web Services, Soap Xml Related Specifications, E.G. Xquery, Xpath.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 538	LOGİC AND DATABASES	3	0	0	3.00	7.50	

Course Content

SQL Server Management Studio, SQL Server Base Databases, Basic T-SQL syntax, T-SQL Scripts, Managing Tables, Select, Where statements and Filtering, NULL values, Formatting result sets, Functions, Grouping Functions, Working with grouped data, Rank, Crosstab queries, Join statements and combining tables, Join techniques, Join with if clauses, nested queries, Relational queries, Sub queries, Recursive Functions, Insert, Update, Delete Statements, Transaction, Basic Database objects, View, User defined functions, Stored procedure, Triggers, Advanced Query Techniques, XML Data, Querying XML data, Full Text Catalogues, Full text Search, Cursor, Dynamic SQL Statements, Data Conversion Techniques, Distributed Queries.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 539	SOFTWARE PROJECT MANAGEMENT	3	0	0	3.00	7.50	

Course Content

Understanding and Defining Software Project-Software Project Planning- Project Running - Project Closing; Software Metrics and Software Cost Estimation Techniques; Software Risk Management; Project Organizations and Responsibilities; Agile Software Project Management

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 540	SOFTWARE QUALİTY AND TEST TECHNİQUES	3	0	0	3.00	7.50	

Course Content

Software Ouality Models; Software Defect Prevention - Reduction - Fault Tolerance; Software Configuration Management; Formal Verification Methods; Coverage Testing Based on Checklists; Coverage Testing Based on Finite-State Machines and Markov Chains;Control Flow, Data Dependency Testing

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 541	ADVANCED COMPUTER GRAPHİCS	3	0	0	3.00	7.50	

Course Content

In this course, Topics covered include basic hardware and software of computer graphics, 2D, and 3D translation and modelling, projections, rendering, clipping and illumination and shading in computer graphics . Students will also learn how to use graphics software to create graphics.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 542	GAME TECHNOLOGİES	3	0	0	3.00	7.50	

Course Content

Understanding and development of computer games and industry recognition. Game types of learning. Learning needs of different hardware needed for games. Game design and implementation.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 543	3D GAME PROGRAMMİNG	3	0	0	3.00	7.50	

Course Content

Basic concepts of game programming. The algorithms used in game development, processes and technologies and Create simple animations and games using the game engine to develop

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 544	INFORMATİON SECURİTY AND CRYPTOLOGY	3	0	0	3.00	7.50	

Course Content

Data security and cryptography introduction; security requirement; operation of network systems, topology security; summarization functions; encryption methods up to date; secret key encryption methods; secret key, DES encryption method and application, TRIPLE DES encryption method, AES encryption method, and application; public key encryption methods; SMS encryption method and application; cryptanalysis methods.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 545	INTRODUCTİON TO CYBER SECURİTY	3	0	0	3.00	7.50	

Course Content

Cyber security basic concepts; cyber warfare; introduction to encryption; network security; firewalls; intrusion detection and stopping systems; operating system security; secure software development; security of web applications; penetration tests; malware analysis

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 546	STRATEGİC DESİGN AND GAME THEORY	3	0	0	3.00	7.50	

Course Content

Mixed strategies; Nash equilibrium; game tree concept; flat-form games; two-stage and recurring games; bargaining models; Nash equilibrium in subgames; cooperative games; apps.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 547	ADVANCED NUMERİCAL ANALYSİS	3	0	0	3.00	7.50	

Course Content

Summary of some topics of mathematical analysis; Taylor's theorem; error analysis; error propagation; numerical solution methods of nonlinear algebraic equations; numerical solution methods of linear equation systems; Gaussian elimination method; iterative Newton's method for solving nonlinear systems of equations; interpolation and approximation with polynomials; Lagrange and Newton polynomials; curve fitting using the least squares method; numerical differentiation; integrating

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 548	CODİNG THEORY	3	0	0	3.00	7.50	

Course Content

Linear codes; excellent codes; nonlinear codes; Hamming codes; Hadamard codes; binary codes and weight distribution; cyclic codes; BCH codes.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 549	INFORMATİON THEORY	3	0	0	3.00	7.50	

Course Content

Measure of information, Noiseless coding technique, Discrete channels, Channel capacity, Decoding techniques, Noisy coding theorem, Error correction coding, Structure of coding and decoding.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 550	GRAPH THEORY AND ALGORİTHMS	3	0	0	3.00	7.50	

Course Content

History of Graph Theory, Usage Areas of Graph Theory, Paths, Trees and Cycles, Shortest Path Problem, Connectivity, Eulerian Tours, Hamiltonian Cycles, Networks, Minimum and Maximum Network Flow Problems, Graph Decomposition, Combinatorial Applications.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 551	ADVANCED LİNEAR ALGEBRA AND OPTİMİZATİON	3	0	0	3.00	7.50	

Course Content

Solution of linear equations systems (Cramer, inverse matrix, reducing the normal form), matrix and determinant operations, eigenvalues and eigenvectors of the matrix, linear transformations in linear spaces.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 552	NUMERİCAL METHODS IN OPTİMİZATİON	3	0	0	3.00	7.50	

Course Content

Introduction and basic concepts. Unconstrained optimization. Analytic solution, Numerical methods and algorithms in unconstrained optimization. Constrained Optimization: Optimization with equality constraints, Optimization with equality and inequality constraints, Optimization with special constraints. Linear programming and applications.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 553	SYSTEM MODELİNG AND COMPUTER SİMULATİON	3	0	0	3.00	7.50	

Course Content

Dynamic simulation, user data types in simulation, operators and control structures, model generators, simulation programming, simulation problems.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 554	PROBABİLİTY THEORY AND RANDOM PROCESSES	3	0	0	3.00	7.50	

Course Content

This course focuses on limit theorems and discrete-time stochastic processes at the graduate level. Prior experience with probability at the undergraduate level is necessary This course is useful for any engineers, mathematician or scientist who wants to learn probability theory and see how it can be applied to solving models arising from the engineering and sciences. Firstly, this course gives an advanced introduction to probability and random variables. The topics about probability and random variables include the definition of probability, probability axioms, probability space, conditional probability, Bayes' theorem, independence, definition of random variables, probability density function, cumulative distribution function, special discrete and continuous distributions (uniform, Gaussian, exponential, Rayleigh, Rice, Nakagami, lognormal, Poisson, Bernoulli, binomial), functions of random variables, concept of transformation of random variables, Chebyshev and Markov inequalities, characteristic functions, moment generating function, two random variables, joint distribution and joint density, joint moments, joint characteristic function, joint moment generating functions, conditional probability, sums of random variables, sample mean and sample variance, laws of large numbers, central limit theorems for sums and products, hypothesis testing. Secondly, this course gives the introduction of stochastic processes and limit theorems. The topics include the definition of stochastic processes, statistics of stochastic processes, strict-sense stationary and wide-sense stationary stochastic processes, ergodic processes, discrete and continuous time processes, autocorrelation and cross-correlation functions, Wiener-Khinchin theorem, power spectral density, cross-power spectral density, linear time invariant systems with stochastic inputs, Wiener-Lee relation, white noise, system identification, matched filter.

Course Unit Code	Course Name	T	U	L	Credit	ECTS	Type
BM 555	STATİSTİCAL DATA ANALYSİS	3	0	0	3.00	7.50	

Course Content

The basic laws of probability and descriptive statistics, conditional probability, random variables, expectation, discrete and continuous probability models, joint and sampling distributions, hypothesis testing, point estimation, confidence intervals, contingency tables, logistic regression, linear and multiple regression.