KARABUK UNIVERSITY

GRADUATE EDUCATION INSTITUTE

DEPARTMENT OF COMPUTER ENGINEERING					
Computer Engineering Thesis Master's Degree (English) Program Course Contents					
COURSE CODE	**COURSE NAME AND CONTENTS**	**T**	**A**	**K**	**ECTS**
CME703	**Graph Theory and Algorithms**	3	0	3	8
Purpose and Content	Teaching students the basic concepts and algorithmic/computational background of the graph theory approach , which plays an important role in solving many problems in network structure . Basic concepts of graphs , Usage Areas of Graphs. Properties and Types of Graphs: Graph Topology, Graphs and Isomorphism. Bipartite graphs, Euler path, Hamilton tour. Representing Graphs with Matrices. Graph Visualization/Drawing Algorithms. Least Cost Path Algorithms; Dijkstra Algorithm, Modeling Shortest Path Tree in Database with Diskjtra Algorithm , Belman Ford Algorithm. Least Cost Spanning Tree, Kruskal Algorithm. Graph Coloring, Duality in Graphs , Welch Powell Coloring Algorithm. Maximum Matching Algorithm. Independent Set Problem, Paull-Unger Algorithm.				
CME711	**Information and Computer Security**	3	0	3	8
Purpose and Content	It educates students who can increase their knowledge on information and computer security and produce both theoretical and practical solutions to problems that may be encountered in these matters. Introduction to information security and computer security. Security engineering. Techniques to ensure security. Cryptography science, Symmetric and asymmetric algorithms. E-signature. Authentication and proof approaches. Public key infrastructure. Intrusion detection systems. Computer security models. Software security. Email and www security. Electronic trade. Firewalls. Risk determination. Information security standards. Research projects.				
CME714	**Digital Image Processing Applications**	3	0	3	8

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Purpose and Content	The aim of this course is to teach students the basic principles and algorithms used in image processing. It is aimed that students will be able to perform image analysis operations and discuss the results obtained through this course. Introduction to digital image processing and basic steps in digital image processing, image acquisition and digitization, basic concepts of image processing, intensity transformations and histogram processing, spatial filtering, filtering in the frequency domain, image restoration and reconstruction (image distortion and repair process model), image restoration and reconstruction (noise models and filtering), color fundamentals and models in color image processing, color transformations in color image processing, smoothing and sharpening, image compression and some basic compression methods, morphological image processing and some basic morphological algorithms, image segmentation (point, line and edge detection, thresholding), object recognition (patterns and pattern classes).				

CME717	**Data Mining**	**3**	**0**	**3**	**8**
Purpose and Content	Data warehousing and online analytical processing. Time series analysis. Pre-processing of data. Analysis of data mining tasks. Grouping. Association and rule extraction. Classification and prediction. Sequential analysis. Data mining applications.				

CME718	**Computer Networks Design and simulation**	**3**	**0**	**3**	**8**
Purpose and Content	The aim of the course is to evaluate a network situation , to identify the most important network aspects that need to be monitored oath analysed . modeling oath simulation techniques to describe the current network situation are covered . Classification of computers networks, network hardware devices , addressing structures , physical layer , media access protocols , routing protocols , queue management algorithms, network security , network simulators , wired oath wireless network simulations , large-scale network analysis .				

CME720	**Advanced Database Systems**	**3**	**0**	**3**	**8**
Purpose and Content	The aim of the course is to teach database management and DBMS data structure . relational database systems . New mechanisms for storage oath retrieval of data . Advanced concepts in database systems . Data models : hierarchical networks and relational data models . Database design oath management . Data warehousing systems . Data warehousing staging area . Data mining . xml related technologies . Xml schemas oath validation . postgresql database . Postgresql _ database advantages _ postgresql database performance analysis . graph databases . nosql database architecture . nosql types oath examples . nosql performance analysis . Discussion of advanced applications in the area .				

BSM723	**Project Management in Informatics**	**3**	**0**	**3**	**8**

Purpose and Content	The aim of the course is to teach students the concepts of scientific research, ethics and ethical theories, research and publication ethics, unethical behaviors and ethical violations in the research and publication process and methods to prevent them. The content of this course includes science, nature of science, development and scientific research; the concept of ethics and ethical theories; research and publication ethics; unethical behaviors and ethical violations in the research process; ethical problems related to authorship and copyright; biased publication, editing, refereeing and ethics; publication ethics and unethical behaviors in the publication process; legal legislation and committees related to research and publication ethics; ways to detect ethical violations; common research and publication ethics violations and methods to prevent them.

CME725	Management of Innovative projects	3	0	3	8
Purpose and Content	practical experience in management IT innovative projects . this The course is based on practical approach to project management based on British methodology PRINCE2. the semester will contain lectures oath seminars on by-weekly basis . Students are working in groups of 5-6 people . each group " events " a project in IT related field which has a business case oath potentially can " take " the place on the existing market and " compete " with existing products or solutions . the project is imaginary , no need to buy any equipment or develop any artifact . during work period students submit PRINCE2 templates for each stage of the project , explaining what and how they are going to do and " make " for this project . Templates will be available for free to download from the course page on the learning platform along the templates students also submit : -a short promo video, -a project page on social network of their choice , - individual report reflecting personal experience within the project time, -peer review form reflecting team members performance - power point presentation summarising the whole work .				

CME727	Internet of Things and Security	3	0	3	8
Purpose and Content	To have knowledge about the architecture, protocol, security and usage areas of the internet of things (IoT) and to develop IoT- based applications. Internet of things, Differences between machine-to-machine communication and internet of things, IoT communication technologies and applications, IoT communication protocols and applications, IoT and big data, IoT and Cyber Security, Project presentations				

CME728	Semantic Web	3	0	3	8

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Purpose and Content	Next generation web, making sense of data on the web, managing and using web information in a smarter and more efficient way, and supporting applications. Metadata standards, XML, RDF, DAML and metadata processing; ontologies, semantic web applications.				
BSM772	**Natural Language Processing**	**3**	**0**	**3**	**8**
Purpose and Content	Understanding the structure of natural languages, Being able to extract meaning from texts and classifying them, Using natural language as the interface between computers and people, Translating languages with computers. Morphological analysis of language ; word tagging, information retrieval, machine translation				
GEI701	**Scientific Research Techniques oath Scientific Ethics**	**3**	**0**	**3**	**8**
Purpose and Content	The course aims to provide information on how to conduct academic research, the scientific stages through which this research is completed, the methods and techniques to be used during this process, and the ethical principles that need to be followed.				
CME797	**MSc Seminar**	**0**	**2**	**0**	**6**
Purpose and Content	The seminar course is a practical class designed for graduate students under the supervision of a faculty member. It involves conducting comprehensive research on a certain topic related to their thesis area, compiling this research into a report, and presenting the findings orally.				
CME7098C	**Course Field of Specialization**	**4**	**0**	**0**	**4**
Purpose and Content	Course Field of Specialization course is a theoretical course that the faculty member proposes to be opened in order to transfer his/her knowledge, experience and experience in his/her own scientific field of study to the graduate students he/she supervises, to inform them about scientific ethics and to gain work discipline.				
CME7098T	**Thesis Field of Specialization**	**4**	**0**	**0**	**4**
Purpose and Content	Thesis Field of Specialization course is a theoretical course that the faculty member proposes to the graduate students to be opened in order to share the methods of conducting research in the current literature, following and evaluating the literature, and to establish and carry out the scientific foundations of the student's thesis / exhibition / project work.				
CME799	**MSc Thesis Research**	**0**	**1**	**0**	**26**

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Purpose and Content	The Thesis Course is a practical class designed for graduate students under the supervision of a faculty member. It includes guidance on various aspects of their thesis work, such as literature review, methodology, fieldwork, and laboratory research. This course provides the necessary information and direction for the students to prepare their theses following the "Graduate Thesis Writing Guidelines and Templates," as well as guidance on defending and submitting their theses.

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