

**ENGINEERING AND NATURAL SCIENCES FACULTY**  
**SOFTWARE ENGINEERING DEPARTMENT**  
**2025 - 2026 Syllabus**

<b>First Semester</b>						
<b>Course Code</b>	<b>Course Name</b>	<b>T</b>	<b>A</b>	<b>NC</b>	<b>ECTS</b>	<b>Prerequisite*</b>
PHYS101	PHYSICS I	3	0	0	4	
PHYS103	PHYSICS LABORATORY I	0	2	0	2	
TDL101	TÜRK DİLİ I	2	0	0	2	
TİT101	TÜRK İNKILAP TARİHİ I	2	0	0	2	
MATH101	CALCULUS I	4	0	0	6	
CHEM101	GENERAL CHEMISTRY	3	0	0	5	
ENG101	ACADEMIC ENGLISH I	3	0	0	2	
SENG113	COMPUTER PROGRAMMING I	3	2	0	5	
SENG101	INTRODUCTION TO SOFTWARE ENGINEERING	2	0	0	2	
<b>Total</b>					<b>30</b>	

<b>Second Semester</b>						
<b>Course Code</b>	<b>Course Name</b>	<b>T</b>	<b>A</b>	<b>NC</b>	<b>ECTS</b>	<b>Prerequisite*</b>
ENG102	ACADEMIC ENGLISH II	3	0	0	2	
PHYS102	PHYSICS II	3	0	0	4	
PHYS104	PHYSICS LABORATORY II	0	2	0	2	
MATH104	APPLIED LINEAR ALGEBRA	3	0	0	6	
MATH102	CALCULUS II	4	0	0	6	MATH101
TİT102	TÜRK İNKILAP TARİHİ II	2	0	0	2	
TDL102	TÜRK DİLİ II	2	0	0	2	
SENG114	COMPUTER PROGRAMMING II	3	2	0	6	SENG113
<b>Total</b>					<b>30</b>	

Third Semester						
Course Code	Course Name	T	A	NC	ECTS	Prerequisite*
SENG207	PROBABILITY AND STATISTICS	3	0	0	6	
SENG201	OBJECT ORIENTED PROGRAMMING	3	2	0	6	SENG114
ENGR201	DIFFERENTIAL EQUATIONS	4	0	0	6	
SENG209	SOFTWARE REQUIREMENTS ENGINEERING	3	0	0	6	
ENGR265	PRINCIPLES OF OCCUPATIONAL HEALTH AND SAFETY I	2	0	0	3	
SENG211	SOFTWARE PROJECT MANAGEMENT	3	0	0	6	
<b>Total</b>					<b>33</b>	

Fourth Semester						
Course Code	Course Name	T	A	NC	ECTS	Prerequisite*
ENGR202	DISCRETE MATHEMATICS	4	0	0	6	
SENG206	CONCEPTS OF PROGRAMMING LANGUAGES	3	0	0	6	SENG114
ENGR266	PRINCIPLES OF OCCUPATIONAL HEALTH AND SAFETY II	2	0	0	3	
SENG214	SOFTWARE TESTING AND QUALITY ASSURANCE	3	0	0	6	
ENGRXXX veya UEXXX	FACULTY ELECTIVE vey a UNIVERSITY ELECTIVE	2	0	0	3	
SENG204	DATA STRUCTURES	3	2	0	6	SENG201
<b>Total</b>					<b>30</b>	

Fifth Semester						
Course Code	Course Name	T	A	NC	ECTS	Prerequisite*
SENG303	DESIGN AND ANALYSIS OF ALGORITHMS	3	0	0	5	SENG204
SENG301	DATABASE MANAGEMENT SYSTEMS	3	2	0	5	SENG201
SENG319	SOFTWARE DESIGN PATTERNS	3	0	0	6	SENG201
SENG305	OPERATING SYSTEMS	3	0	0	6	SENG204
SENGXXX	DEPARTMENT ELECTIVE	3	0	0	5	
SENG300	INDUSTRIAL PRACTICE I	0	2	0	4	
<b>Total</b>					<b>31</b>	

Sixth Semester						
Course Code	Course Name	T	A	NC	ECTS	Prerequisite*
SENG304	COMPUTER NETWORKS	3	0	0	6	
SENG326	SOFTWARE ARCHITECTURE	3	0	0	6	
SENG302	SECURE SOFTWARE DEVELOPMENT	3	0	0	6	
SENGXXX	DEPARTMENT ELECTIVE	3	0	0	5	
SENG306	SCIENTIFIC COMPUTING	3	0	0	7	SENG113
<b>Total</b>					<b>30</b>	

Seventh Semester						
Course Code	Course Name	T	A	NC	ECTS	Prerequisite*
SENG401	GRADUATION PROJECT I	3	3	0	6	SENG204
SENG400	INDUSTRIAL PRACTICE II	0	2	0	4	
SENGXXX	DEPARTMENT ELECTIVE	3	0	0	5	
SENGXXX	DEPARTMENT ELECTIVE	3	0	0	5	
SENGXXX	DEPARTMENT ELECTIVE	3	0	0	5	
SENGXXX	DEPARTMENT ELECTIVE	3	0	0	5	
<b>Total</b>					<b>30</b>	

Eighth Semester						
Course Code	Course Name	T	A	NC	ECTS	Prerequisite*
SENG402	GRADUATION PROJECT II	3	3	0	7	SENG204
ENGRXXX or UEXXX	FACULTY ELECTIVE or UNIVERSITY ELECTIVE	2	0	0	3	
SENGXXX	DEPARTMENT ELECTIVE	3	0	0	5	
SENGXXX	DEPARTMENT ELECTIVE	3	0	0	5	
SENGXXX	DEPARTMENT ELECTIVE	3	0	0	5	
SENGXXX	DEPARTMENT ELECTIVE	3	0	0	5	
<b>Total</b>					<b>30</b>	

**T:** Theory      **A:** Application      **NC:** National Credit      **ECTS:** Europe Credit Transfer System

**\*Courses in the prerequisite column must be succeeded with at least DD grade.**

## ELECTIVE COURSES

Fall Semester						
Course Code	Course Name	T	A	NC	ECTS	Prerequisite*
SENG314	FORMAL LANGUAGES WITH ABSTRACT MACHINES	3	0	0	5	
SENG423	INTERNET OF THINGS	3	0	0	5	
SENG425	DATA SCIENCE	3	0	0	5	
SENG433	FUNDAMENTALS OF BLOCKCHAIN TECHNOLOGY	3	0	0	5	
SENG435	INTRODUCTION TO DIGITAL IMAGE PROCESSING	3	0	0	5	
SENG445	INTRODUCTION TO MACHINE LEARNING	3	0	0	5	
ENGR450	ENGINEERING APPLICATION ON SITE	5	0	0	15	

Spring Semester						
Course Code	Course Name	T	A	NC	ECTS	Prerequisite*
SENG324	ADVANCED DATABASES	3	0	0	5	
SENG434	GREEN SOFTWARE ENGINEERING	3	0	0	5	

## ELECTIVE COURSES THAT CAN BE TAKEN FROM OTHER DEPARTMENTS

Information Technology Courses		
Course Code	Course Name	Prerequisite*
CENG 311	Responsive Web Design	SENG201
CENG 314	Content Management Systems	-
CENG 411	Web Services	-
CENG 423	Web Application Development	-
CENG 425	Wireless and Mobile Devices	-
CENG 427	Mobile Application Development	-
CENG 429	Geographic Information Systems	-
CENG 433	Cloud Computing	-
CENG 406	Blockchain Fundamentals and Applications	-
CENG 416	Software Modelling and Analysis	-
CENG 420	Fundamentals of Distance Education	-
CENG 462	Game Development	-

CENG 465	Internet of Things and Its Applications	-
CENG 466	Management Information Systems	-

<b>Multimedia &amp; Imaging Courses</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Prerequisite*</b>
CENG 310	Human Computer Interaction	-
CENG 315	Computer Graphics	SENG201 & ENGR202
CENG316	Introduction to Virtual Reality	-
CENG407	Remote Sensing	-
CENG 415	Applications of Computer Graphics	CENG 315
CENG 422	Multimedia Systems	-
CENG 441	Digital Image Processing	-

<b>Hardware Courses</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Prerequisite*</b>
CENG 312	Introduction to Robotics	-
CENG 313	Computer Architecture	-
CENG 318	Microprocessor Systems	-
CENG 322	Embedded Systems Design	-
CENG 426	Embedded Computing	-
MCE 484	Aerial Robotics	-

<b>Network and Security Courses</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Prerequisite*</b>
CENG 321	Data Communication	-
CENG 325	Principles of Information Security and Privacy	-
CENG 421	Cryptology and Applications	-
CENG 451	Principles of Cyber Physical Systems	-
CENG 474	Communication and Network Security	-
CENG 417	Malware Analysis	-
CENG 419	Basic Cyber Forensics	-

**Scientific & Parallel Computing Courses**

<b>Course Code</b>	<b>Course Name</b>	<b>Prerequisite*</b>
CENG409	Numerical Optimization	-
CENG 424	Computer Simulation and Modelling	-
CENG 430	Distributed Systems and Collaborative Computing	-
CENG 342	Parallel Programming I	-
CENG 443	Parallel Programming II	-
CENG 470	Introduction to Cognitive Computing	-

**Artificial Intelligence Courses**

<b>Course Code</b>	<b>Course Name</b>	<b>Prerequisite*</b>
CENG 317	Principles of Artificial Intelligence	-
CENG329	Mathematics for Machine Learning	-
CENG 408	Machine Learning Engineering	-
CENG 410	Data Mining	SENG301
CENG412	Reinforcement Learning	-
CENG413	Data Engineering	-
CENG414	Recommender Systems	-
CENG 418	Fuzzy Systems	-
CENG 428	Neural Networks	-
CENG 432	Pattern Recognition	-
CENG 440	Information Retrieval	SENG301
CENG 442	Natural Language Processing	-
CENG 463	Machine Learning	-
CENG 472	Big Data Analytics	-

**Other Courses**

<b>Course Code</b>	<b>Course Name</b>	<b>Prerequisite*</b>
CENG 319	Compiler Design	-
CENG 403	Special Topics in CENG I	-
CENG 404	Special Topics in CENG II	-

ENGR 450	Engineering Application on Site	-
CENG 460	Bioinformatics	-

<b>Mathematics Courses</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Prerequisite*</b>
MATH426	Introduction To Cryptography	-