

**ABDULLAH GÜL UNIVERSITY  
GRADUATE SCHOOL OF ENGINEERING & SCIENCE  
ELECTRONICS AND COMPUTER ENGINEERING PROGRAM  
COURSE DESCRIPTION AND SYLLABUS**

Course Title	Code	Semester	T+L Hours	Credit	ECTS
SECURE SYSTEMS	ECE-631	FALL	3 + 0	3	10

**Prerequisite Courses** None

<b>Type</b>	Selective
<b>Language</b>	English
<b>Coordinator</b>	Assist. Prof. Ismail Butun
<b>Instructor</b>	Assist. Prof. Ismail Butun
<b>Adjunt</b>	none
<b>Aim</b>	Learning the principles of computer systems and components and also learning the ways of increasing security levels in computer systems.
<b>Learning Outcomes</b>	<ul style="list-style-type: none"> <li>• Learning fundamentals of computer and system security</li> <li>• Learning main threats and attack types against information security</li> <li>• Students will understand the role of management in enforcing security policies, standards and practices.</li> <li>• Students will be able to identify the major techniques, approaches and tools used to discover network and system vulnerabilities.</li> <li>• Learning various intrusion detection and prevention methods.</li> </ul>
<b>Course Content</b>	<ul style="list-style-type: none"> <li>• The concentration will be on the security of computer systems.</li> </ul>

**WEEKLY TOPICS AND PRELIMINARY STUDY**

Week	Topic	Preliminary Study
1	Introduction to security; an overview of application, operating system and network security.	The relevant articles from the literature
2	Bugs coming out of wrong configured applications. Applications that have the access right to overwrite authorization levels.	The relevant articles from the literature
3	"Buffer-overflow" attacks, detection of overflows in RAM, preventing these overflows. Main principles in generating secure applications and tools that can be used through this process.	The relevant articles from the literature
4	Evaluation of "legacy" applications, introduction to "Sandboxing" technique.	The relevant articles from the literature
5	Attacks against web sites and also to the application programs running on them. Prevention mechanisms regarding these.	The relevant articles from the literature
6	Increasing security by using cryptography in devising applications.	The relevant articles from the literature
7	Access control mechanisms in operating systems, providing security for file systems.	The relevant articles from the literature
8	Providing security for remotely accessed file systems (NFS, SMB, SFS). Introduction to user authentication methods (simple password protection, Kerberos, LDAP, smartcard etc.).	The relevant articles from the literature
9	Detection of intrusions that are happening because of the security vulnerabilities existing in the system; and prevention mechanisms.	The relevant articles from the literature
10	Midterm	
11	Security vulnerabilities in existing network protocols (especially TCP/IP) and precautions that can be taken in order to avoid those vulnerabilities.	The relevant articles from the literature
12	Security protocols (IPsec, DNSsec, SBGP, etc.).	The relevant articles from the literature
13	Gateways in between internet and intranet that limit the network access rights (eg. firewalls).	The relevant articles from the literature
14	Attacks like DoS (Denial of Service) and prevention mechanisms.	The relevant articles from the literature
15	Pre-Cautions that need to be taken in order to attain Secure Systems.	The relevant articles from the literature
16	Final Exam	

**SOURCES**

<b>Lecture Notes</b>	Lecture slides
<b>Other Sources</b>	<p><b>Course Textbook:</b> Cryptography and Network Security: Principles and Practice, Stallings, William, Prentice-Hall, 4th Edition.</p> <p><b>Additional Materials:</b></p> <ol style="list-style-type: none"> <li>1. B. Forouzan, "Cryptography and Network Security," McGraw-Hill, 1st edition, 2008.</li> <li>"Fundamentals of Photonics", Bahaa E. A. Saleh, Malvin Carl Teich, 2nd Edition, Wiley</li> </ol>

<b>COURSE MATERIALS SHARING</b>	
<b>Documents</b>	Lecture notes, slides and molecular model set
<b>Homeworks</b>	Students will be given one homework every three (3) weeks
<b>Exams</b>	1 Midterm and 1 Final Exam

<b>EVALUATION SYSTEM</b>		
<b>SEMESTER STUDY</b>	<b>NUMBER</b>	<b>CONTRIBUTION</b>
Midterm	1	20
Homework	4	25
Quiz	7	25
<b>SUB-TOTAL</b>		70
<b>Contribution of Semester Study</b>		70
<b>Contribution of Final Exam</b>	1	30
<b>TOTAL</b>		100

<b>Course Category</b>		
Sciences and Mathematics		0%
Engineering		100%
Social Sciences		0%

<b>RELATIONSHIPS BETWEEN LEARNING OUTCOMES AND PROGRAM QUALIFICATIONS</b>												
						Contribution Level						
No Program Qualifications						1	2	3	4	5		
1	Ability to use math, science and engineering knowledge in advanced research											X
2	Ability to design, realize and analyze a novel system to solve engineering problems								X			
3	To be able to use modern measurement equipment, hardware and software for expertise area research											X
4	Ability to plan and do detailed independent research											X
5	Ability to do literature search, technical presentation, and prepare scientific manuscript								X			
6	Be able to do critical and creative thinking and finding innovative methods											X

\*Increasing from 1 to 5.

<b>ECTS / WORK LOAD TABLE</b>			
Activities	Number	Duration (Hours)	Total Work Load
Course Length (includes exam weeks: 16x total course hours)	16	3	48
Out-of-class Study Time (Pre-study, practice)	16	5	90
Internet search, library work, literature search	16	4	64
Presentation	1	21	21
Homework	4	16	64
Midterm	1	15	15
Final Exam	1	20	20
<b>Total Work Load</b>			322
<b>Total Work Load / 30</b>			322/30
<b>Course ECTS Credit</b>			10