**OSTIM TECHNICAL UNIVERSITY**
**FACULTY OF ENGINEERING**
**SOFTWARE ENGINEERING**
**UNDERGRADUATE COURSE**

**COURSE SYLLABUS FORM**
**2021-2022 FALL**

| YZL 403 Cyber security | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Name** | **Course Code** | **Term** | **Hour** | **Practice** | **Lab** | **Credit** | **ECTS** |
| Cyber security | YZL 403 | 7 | 3 | 0 | 0 | 3 | 4 |

| | |
|---|---|
| **Language of the Course** | English |
| **Type of Course** | Mandatory |
| **Course Level** | Undergraduate |
| **Method of Teaching** | Face-to-face |
| **Course Learning and Teaching Techniques** | Lecture, Q/A, Homework |

## Purpose of the Course

The aim of this course is to provide students with information about reliable operating system principles, programming analysis and methods of providing secure services.

## Learning Outcomes

Students who successfully complete this course;

- Understand the principles of reliable operating system,
- Define the methods of providing secure services,
- Able to perform secure programming analysis,
- identify the malware.

## Course Content

This course covers methods of providing secure services, secure programming analysis, and malware.

| Weekly Plan and Related Preparation Studies | |
|---|---|
| **Week** | **Subjects** |
| 1 | Network Architecture Security and Design, Anonymization and Privacy |
| 2 | Spam, Worms, Evaluation of Network Defense |
| 3 | Viruses, DNS Security, Routing Protocol Security, Wireless Network Security, Authentication, Security Analysis, Next Generation Attacks |
| 4 | Information security and Cyber Security |
| 5 | Security Policies, Risk Analysis, Code of Ethics |
| 6 | Physical Threats and Controls, Information Technology Security Frameworks, Security of Computer Programs and Data (copyright, patents), Authentication |
| 7 | Secure Design Principles, Relevant Laws, Practices, Standards, Privacy in Information Systems, Computer Crimes, Case Studies, Human Impact in Cyber Security. |
| **8** | Midterm Exam |
| 9 | Secure Programming, Security verification and testing, Code interpretation using static analysis tools, Shell and operating environment, Numeric value overflow problems and attacks, Padspace overflow problems and attacks, Formatted string problems and attacks, Input validation problems and attacks |
| 10 | Web application security, session management, XSS attacks, Links and Race conditions, Standard form conversion and directory traversal errors, Temporary storage and randomness. |
| 11 | Malware Analysis: Tools and Techniques, Malware Classification and Malware Characteristics. |
| 12 | System Security, Introduction to OS security, User: UNIX/windows users and groups, Simple system security commands: UNIX, Windows, File management system security: UNIX file permission binaries, Windows ACL lists, UNIX service security: mail, nfs, nis, http, imap, pop3, rlogin, Windows service security: File sharing services, MS IIS, MS Exchange, Windows specific services |
| 13 | Windows domain management, Manual Services: OpenLDAP, Microsoft Active Manual, System log management: UNIX/Windows logs, Windows Registry |
| 14 | Encryption algorithms (DES, Diffie-Hellman, RSA, HASH, MD5, AES, SHA-1, HMAC). |
| 15 | Symmetric and Asymmetric Key Encryption, Symmetric Key Algorithms and AES, Asymmetric Key Algorithms and RSA |
| **16** | Final Exam |

| Resources (Textbook and supplementary book) |
|---|
| 1. Cybersecurity Essentials, by Donald Short, Christopher Grow, Philip Craig, Charles J. Brooks (Wiley) |

| Evaluation System | | |
|---|---|---|
| **Studies** | **Number** | **Contribution** |
| Attendance | | |
| Lab | | |
| Application | | |
| Field Study | | |
| Course Specific Internship (if applicable) | | |
| Quizzes/Studio/Critical | | |
| Homework | | |
| Presentation | | |
| Projects | | |
| Report | | |
| Seminar | | |
| Midterm Exams/Midterm Jury | 1 | 40% |
| General Exam/Final Jury | 1 | 60% |
| | **Total** | **100%** |
| **Contribution of Mid-Semester Studies to Success Grade** | | 50% |
| **Contribution of End of Semester Studies to Success Grade** | | 50% |
| | **Total** | **100%** |

| Course Category | |
|---|---|
| Basic Vocational Courses | |
| Specialization/Field Courses | x |
| Support Lessons | |
| Communication and Management Skills Lessons | |
| Transferable Skills Lessons | |

| Course Learning Outcomes and Program Qualifications | | | | | | | |
|---|---|---|---|---|---|---|---|
| **No** | **Program Qualifications / Outcomes** | **Contribution Level** | | | | | |
| | | **1** | **2** | **3** | **4** | **5** |
| **1** | Ability to apply mathematics, science and engineering | | | | x | |
| **2** | Ability to design and conduct experiments and to analyze and interpret experimental results. | | | | | |
| **3** | Ability to design a system, component, and process and according to specified requirements. | | | | x | |
| **4** | Ability to work in an interdisciplinary team. | | | | x | |
| **5** | Ability to identify, formulate and apply engineering problems. | | | | | x |
| **6** | Identifies, defines, formulates, solves complex Software Engineering problems and chooses and applies analysis and modelling methods suitable for this purpose. | | | | x | |
| **7** | Develops, selects, uses modern techniques and tools necessary for the analysis and solution of complex problems encountered in Software Engineering applications and uses information technologies effectively. | | | | x | |

| ECTS/Workload Table | | | |
|---|---|---|---|
| **Activities** | **Count** | **Duration (Hour)** | **Total Workload** |
| Lesson hours (Including the exam week: 16 x total lesson hours) | 16 | 3 | 48 |
| Lab | | | |
| Application | | | |
| Course Specific Internship | | | |
| Field Study | | | |
| Out of Class Study Time | | | |
| Presentation/Seminar Preparation | | | |
| Projects | | | |
| Reports | | | |
| Homework | | | |
| Quizzes/Studio Critic | | | |
| Preparation Time for Midterm Exams/Midterm Jury | 1 | 20 | 30 |
| Preparation Time for the General Exam/General Jury | 1 | 32 | 42 |
| **Total Workload** | **(ECTS 120/30 = 4)** | | **120** |