COURSE OUTLINE

GENERAL

SCHOOL  ENGINEERING

ACADEMIC UNIT  CEID

LEVEL OF STUDIES  UNDERGRADUATED

COURSE CODE  CEID_NE  SEMESTER  fall

COURSE TITLE  Modern topics in Network Security

INDEPENDENT TEACHING ACTIVITIES

If credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits

<table>
<thead>
<tr>
<th>WEEKLY TEACHING HOURS</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(I), 0(le), 3(le)</td>
<td>5</td>
</tr>
</tbody>
</table>

Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).

COURSE TYPE

Specialized general knowledge
Skills development

PREREQUISITE COURSES:
None

LANGUAGE OF INSTRUCTION and EXAMINATIONS:
Greek

IS THE COURSE OFFERED TO ERASMUS STUDENTS:
No

COURSE WEBSITE (URL)
https://eclass.upatras.gr/courses/CEID1199/

LEARNING OUTCOMES

Learning outcomes
The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

Upon completion of the course, students will be able to:

- Determine the potential threats / risks of network devices that may affect the operation, efficiency, effectiveness and privacy of a network system.
- Use tools and security protocols that meet well-defined requirements and protect against specific threats.
- To evaluate the effectiveness and efficiency of a network security architecture by recognizing the possible weaknesses and limitations.
- To know the current trends of malicious actions in servers.

General Competences
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an international environment
- Working in an interdisciplinary environment
- Production of new research ideas

- Project planning and management
- Respect for difference and multiculturalism
- Respect for the natural environment
- Showing social, professional and ethical responsibility and sensitivity to gender issues
- Criticism and self-criticism
- Production of free, creative and inductive thinking
- Others...

Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas

SYLLABUS

- Introduction to network security, Attacks on network security, attacks aimed at obstructing the services provided. Description of basic security services and mechanisms.
- DNS and DNS Cache Poisoning attacks.
- Public key cryptography and the RSA algorithm
- Network Attack Protection: Packet Filtering (Linux) and Proxy-Server Firewalls.
- PGP, IPSec, SSL/TLS, and Tor protocols
- Malware: Viruses and Worms
- Port scanning and vulnerability scanning, Packet Sniffing, Intrusions detection and Penetration testing on online systems.
- Attacks on Domain Name System (DNS) and Address Resolution Protocol (ARP)
- Bots, Botnets, DDoS Attacks, and DDoS Attack Mitigation technologies.
- Presentation and analysis of malicious software found on the Internet.
- Attacks of denial of Internet services and ways to deal with.

TEACHING and LEARNING METHODS - EVALUATION

<table>
<thead>
<tr>
<th>DELIVERY</th>
<th>Face-to-face, Distance learning, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td>
<td>Use of ICT in teaching, laboratory education, communication with students</td>
</tr>
<tr>
<td></td>
<td>Wide use of ICT and more specifically :</td>
</tr>
<tr>
<td></td>
<td>The course is backed up by a web page providing all course material. This page is duly updated.</td>
</tr>
<tr>
<td></td>
<td>Homeworks are announced electronically through this page, submitted also through this page and marking for them is also announced electronically</td>
</tr>
<tr>
<td></td>
<td>The preferred communication method with the students is email.</td>
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</tbody>
</table>

TEACHING METHODS

The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student’s study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS

<table>
<thead>
<tr>
<th>Activity</th>
<th>Semester workload</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>26 hours</td>
</tr>
<tr>
<td>Laboratory exercises</td>
<td>39 hours</td>
</tr>
<tr>
<td>Laboratory exercises preparation</td>
<td>35 hours</td>
</tr>
<tr>
<td>Lab report preparation</td>
<td>15 hours</td>
</tr>
<tr>
<td>Study – problem solving</td>
<td>15 hours</td>
</tr>
<tr>
<td>Theory exams</td>
<td>3 hours</td>
</tr>
<tr>
<td>Laboratory exams</td>
<td>1 hour</td>
</tr>
<tr>
<td>Course total</td>
<td>134 hours</td>
</tr>
</tbody>
</table>

STUDENT PERFORMANCE EVALUATION

ATTACHED BIBLIOGRAPHY

Bibliography: