COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
DEPARTMENT	Electrical and Computer Engineering		
LEVEL OF STUDY	Undergraduate		
COURSE UNIT CODE	7.022	**SEMESTER**	7th
COURSE TITLE	Advanced Programming TechniquesI		

COURSEWORK BREAKDOWN	**TEACHING WEEKLY HOURS**	**ECTS Credits**
Theory (Lectures)	3	2
Tutorial/Exercises	1	1
Applied Exerises	1	1
TOTAL	**5**	**4**

COURSE UNIT TYPE	Specialized knowledge/Core
PREREQUISITES	
LANGUAGE OF INSTRUCTION/EXAMS	Greek
COURSE DELIVERED TO ERASMUS STUDENTS	No
WEB PAGE (URL)	https://eclass.hmu.gr/courses/ECE203/

(2) LEARNING OUTCOMES

Learning Outcomes

The course "Advanced Programming Techniques" aims to provide students with the necessary knowledge in medium and large-scale programming, and to deepen their understanding of the C programming language, by examining specific language topics. Special functions of the language will be examined, a brief review of C memory management techniques will be provided, extensive reference to files will be made, and specific topics of compilation, linking multiple files, and elements of multithreaded programming will be discussed.

Upon successful completion of the course, the student will be able to:

1. Create and compile multi-file programs.
2. Implement and manipulate complex data structures.
3. Practice using files in computer storage peripheral units.
4. Develop parallel processing programs using multithreaded programming.

General Skills

- Searching, analyzing, and synthesizing data and information using the necessary technologies.
- Adaptation to new situations.
- Autonomous work.
- Teamwork.
- Generating new research ideas.

(3) SYLLABUS

Units of Theoretical Lectures

- C preprocessor (directives, macros).

- Special operators and types (bit operators, enumerated types).
- Pointers and functions (pointers to arrays, arrays of pointers, pointers to pointers, pointers to functions, functions with variable number of arguments, recursion).
- Dynamic memory allocation and applications (functions, dynamic arrays, lists, trees, graphs).
- Special compilation topics (command line parameters, programs with multiple files, error handling).
- Input-output, files (streams, accessing text and binary files).
- C libraries (string, time, stdlib, etc.).
- Multithreaded programming (thread creation and usage, mutex, semaphores, etc.).

Laboratory Exercises

Exercises using the C programming language and Dev C++ software and Linux (gcc).

(4) TEACHING METHODS - ASSESSMENT

<table>
<tr><td><b>MODE OF DELIVERY</b></td><td>In-Class Face-to-Face</td></tr>
<tr><td><b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</b></td><td>• Use of ICT in teaching
• Use of ICT in laboratory training
• Use of ICT in communication with students via the e-class electronic platform</td></tr>
<tr><td><b>TEACHING ORGANIZATION</b></td><td>
<table>
<tr><th>Method description/Activity</th><th>Activity Semester</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Laboratory</td><td>13</td></tr>
<tr><td>Non-guided personal study</td><td>40</td></tr>
<tr><td>Group workshop activities</td><td>8</td></tr>
<tr><td>Weekly homework exercises</td><td>7</td></tr>
<tr><td><b>Total Course</b></td><td><b>120</b></td></tr>
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<tr><td><b>METHODS</b></td><td><b>Language of Assessment:</b> Greek
<b>Assessment methods:</b>
• Written final exam with problem solving (75%)
• Group laboratory work (report and oral examination) (15%)
• Weekly homework exercises (10%) Assessment criteria are announced to students at the beginning of the semester and are posted on the course website on eClass.</td></tr>
</table>

(5) RECOMMENDED BIBLIOGRAPHY

- “C: From Theory to Implementation”, G. S. Tselikis and N. D. Tselikas, ISBN: 978-960-93-1961-4.
- "C Programming in Depth" by N. M. Chatzigiannakis, Klidarithmos Publications, ISBN 978-960-461-715-9. (In Greek)
- ”Teach Yourself C Programming in 21 Days” by P. Aitken & B. L. Jones, Sams Publications, ISBN 978-067-230-736-2.
- • "Introduction to Data Structures and Algorithms. Implementation in C" by I. Papoutsis, Ath. Stamoulis Publications, ISBN 978-960-351-832-7. (In Greek)