

## COURSE OUTLINE

### (1) GENERAL

|   |  |                              |                |
|---|--|------------------------------|----------------|
| <b>SCHOOL</b>   | ENGINEERING  |                              |                |
| <b>ACADEMIC UNIT</b>  | ELECTRICAL AND COMPUTER ENGINEERING DEPT.  |                              |                |
| <b>LEVEL OF STUDIES</b>   | Undergraduate  |                              |                |
| <b>COURSE CODE</b>  | <b>ECE_INF930</b>  | <b>SEMESTER</b>              | <b>9</b>       |
| <b>COURSE TITLE</b>   | Software Development in Portable Devices   |                              |                |
| <b>INDEPENDENT TEACHING ACTIVITIES</b><br><i>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</i> |  | <b>WEEKLY TEACHING HOURS</b> | <b>CREDITS</b> |
| Lectures  |  | 2                            |                |
| Seminars / Practice exercises   |  | 1                            |                |
| Laboratory  |  | 1                            |                |
| <i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (4).</i>  |  | 4                            | 5              |
| <b>COURSE TYPE</b><br><i>general background, special background, specialised, general knowledge, skills development</i>   | Specialised, Skills development  |                              |                |
| <b>PREREQUISITE COURSES:</b>  | No. Students are advised to have already attended the courses: Object-Oriented Design and Programming (ECE_K430) and Interaction Design (ECE_K730) |                              |                |
| <b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>  | Greek  |                              |                |
| <b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>  | Yes.   |                              |                |
| <b>COURSE WEBSITE (URL)</b>   | <a href="https://www.ece.uop.gr/">https://www.ece.uop.gr/</a>  |                              |                |

### (2) LEARNING OUTCOMES

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|---|
| <p><b>Learning outcomes</b></p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul> |
| <p>The main aim of the course is to introduce the basic concepts and techniques for the development of native and web-based applications for mobile devices and especially for modern mobile phones (smartphones). The main application development framework to be studied is Android.</p> <p><u>Keywords:</u> native application, interaction design on mobile devices, Android, Android Studio, Activities, Services, UI Layouts, UI Controls, Event Handling, Java.</p> <p><b>Learning outcomes</b></p>   |

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

At the Knowledge level:

- Know the basic features of the dominant mobile devices platforms: Android and iPhone.
- Distinguish the differences in the architecture and the development method of the diverse mobile application categories: native, web-based, hybrid
- Recognize and distinguish the 4 distinct components of Android applications: Activities, Services, Broadcast receivers, Content providers.
- Know and apply the basic principles of graphical user interface design on mobile devices.

At the Skills level:

- Know and apply the basic principles of design and development of web-based applications, in order to be mobile-friendly and adaptable to mobile devices.
- Know and apply the basic principles of developing native applications on Android.
- Know and efficiently use the Android Studio integrated development environment.
- Design and develop the graphical user interface for Android applications, by using existing libraries for UI Layouts, UI Controls, Event Handling, etc.
- Design and develop Android applications with advanced capabilities such as: use of files and DB, camera, sensors for location and context awareness, interconnection with servers and web services, etc.

At the level of Abilities:

- Understand the structure and function of Java code for Android Studio that she has not programmed, and adapt it to her needs.
- Select and combine the appropriate tools / libraries, to design and develop a quality and efficient smartphone application from the description of the problem.

**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...*  
*.....*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Production of new research ideas
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

The course deals with the introduction of students in mobile application development techniques and especially for the Android development platform.

The course is developed in the following 13 lectures:

- i. Introduction to Mobile Application Platforms (Android, iPhone)

|       |   |
|-------|---|
| ii.   | Application architecture and categories: Native, web-based, hybrid. Comparative assessment.   |
| iii.  | Design and development of web-based mobile-friendly and adaptable applications. Integrated development environments and development frameworks (such as JQuery Mobile). |
| iv.   | Android structure. Structural elements of native Android applications.  |
| v.    | Introduction to software tools for the development of native mobile applications (Android Studio and XCode)   |
| vi.   | Design of the User's Graphical Interface  |
| vii.  | Creating code and connecting to graphical elements of the application interface.  |
| viii. | Data management & user profiles   |
| ix.   | Multimedia management, notifications and intents.   |
| x.    | Connectivity and networking. Use of web services.   |
| xi.   | Device sensors and application development with location and context awareness.   |
| xii.  | Development of multithreaded applications.  |
| xiii. | Completion of Mobile Android Applications. Standardization and commercial exploitation.   |

#### (4) TEACHING and LEARNING METHODS - EVALUATION

| <p style="text-align: center;"><b>DELIVERY</b></p> <p style="text-align: center;"><i>Face-to-face, Distance learning, etc.</i></p>   | <p>Face to face in class and laboratory.<br/>Distance learning support via e-Class system.</p>  |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |
|--|---|-----------------|--------------------------|-----------------|----|----------|----|-------------------------------------|----|---------------------|----|--|----|--|--|--|--|--|--|---------------------|-------------------------------|
| <p style="text-align: center;"><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b></p> <p style="text-align: center;"><i>Use of ICT in teaching, laboratory education, communication with students</i></p>   | <ul style="list-style-type: none"> <li>Supporting the learning process through the e-Class platform (for notification of the course regulations, for distribution of slides, projects, supplementary material, announcements, links, bibliography, etc.).</li> <li>During the lectures of the theoretical part, a projector and presentations in electronic form are used, which are also posted on the eclass from the beginning of the semester.</li> <li>During the lectures and seminars, a computer is used to write and execute code.</li> <li>Use of specialized software tools for mobile application development, like Android Studio.</li> </ul>  |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |
| <p style="text-align: center;"><b>TEACHING METHODS</b></p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>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.</i></p> <p><i>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</i></p> | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><b>Activity</b></th> <th style="text-align: center;"><b>Semester workload</b></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Theory Lectures</td> <td style="text-align: center;">26</td> </tr> <tr> <td style="text-align: center;">Seminars</td> <td style="text-align: center;">13</td> </tr> <tr> <td style="text-align: center;">Preparation of laboratory exercises</td> <td style="text-align: center;">13</td> </tr> <tr> <td style="text-align: center;">Project elaboration</td> <td style="text-align: center;">35</td> </tr> <tr> <td style="text-align: center;">Independent study of lectures and bibliography</td> <td style="text-align: center;">38</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td style="text-align: center;"><b>Course Total</b></td> <td style="text-align: center;"><b>125 hours<br/>(5 ECTS)</b></td> </tr> </tbody> </table> | <b>Activity</b> | <b>Semester workload</b> | Theory Lectures | 26 | Seminars | 13 | Preparation of laboratory exercises | 13 | Project elaboration | 35 | Independent study of lectures and bibliography | 38 |  |  |  |  |  |  | <b>Course Total</b> | <b>125 hours<br/>(5 ECTS)</b> |
| <b>Activity</b>  | <b>Semester workload</b>  |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |
| Theory Lectures  | 26  |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |
| Seminars   | 13  |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |
| Preparation of laboratory exercises  | 13  |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |
| Project elaboration  | 35  |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |
| Independent study of lectures and bibliography   | 38  |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |
|  |   |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |
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|  |   |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |
| <b>Course Total</b>  | <b>125 hours<br/>(5 ECTS)</b>   |                 |                          |                 |    |          |    |                                     |    |                     |    |  |    |  |  |  |  |  |  |                     |                               |

| STUDENT PERFORMANCE<br>EVALUATION   |   |
|---|---|
| <p><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p> | <p>A. Written final exam that includes:</p> <ul style="list-style-type: none"> <li>• Exercises to solve</li> <li>• Multiple choice questions</li> <li>• Short answer questions</li> </ul> <p>B. Project elaboration.</p> <p><u>Remarks:</u></p> <ul style="list-style-type: none"> <li>• The final grade results from the weighting of the theory and project grades with coefficients determined at the beginning of the semester and announced to the students via e-class. Indicatively it will be about 30% - 70%</li> <li>• Projects are submitted electronically and students are asked to take an oral exam on them.</li> <li>• The exam material and the evaluation process are communicated to the students in the lecture hall and in the e-class.</li> </ul> |

## (5) ATTACHED BIBLIOGRAPHY

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| <p>- <i>Suggested bibliography:</i></p> <ul style="list-style-type: none"> <li>• Paul Deitel, Harvey Deitel, Abbey Deitel, «Android Προγραμματισμός (2<sup>η</sup> έκδοση)», Εκδόσεις Χ. Γκιούρδα &amp; ΣΙΑ ΕΕ, ISBN 978-960-512-6780, 2014.</li> <li>• Δαμιανός Γαβαλάς, Βλάσης Κασαπάκης, Θωμάς Χατζηδημήτρης. «Κινητές Τεχνολογίες (έκδοση 1<sup>η</sup>)». Εκδόσεις Νέων Τεχνολογιών, ISBN: 978-960-578-007-4.</li> <li>• Shane Conder, Lauren Darcey, «Ανάπτυξη εφαρμογών με το Android (2<sup>η</sup> έκδοση)», Εκδόσεις Χ. Γκιούρδα &amp; ΣΙΑ ΕΕ, ISBN: 978-960-512-6254, 2011.</li> </ul> <p>- <i>Related academic journals:</i></p> <ul style="list-style-type: none"> <li>• IEEE Transactions on Mobile Computing</li> <li>• Mobile Computing and Communications Review (MC2R)</li> <li>• Elsevier Pervasive and Mobile Computing</li> </ul> |
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