



Course Syllabus

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|-------------------------|------------------------------------------|--------------------------------|
| Course Code | Course Title | ECTS Credits |
| COMP-285 | Mobile Computing Application Development | 6 |
| Prerequisites | Department | Semester |
| COMP-212 | Computer Science | Fall, Spring |
| Type of Course | Field | Language of Instruction |
| Elective | Computer Science | English |
| Level of Course | Lecturer(s) | Year of Study |
| 1 st Cycle | Dr. Constandinos Mavromoustakis | 4 th |
| Mode of Delivery | Work Placement | Corequisites |
| Face-to-face | N/A | None |

Course Objectives:

The main objectives of the course are to:

- explore the basic concepts of the Wireless Technologies and Mobile Computing, Wearable Computing, Mobility, Computation, Services and Protocols in Mobile environments
- provide students with deep knowledge for Mobility management and computation, and Client/Server structures, N-tier architecture and Middleware of the mobile computing and thoroughly discuss the potential of on-the-move applications with the utilized protocols
- explore the basic Mobile Platforms and related Technologies and explore the basic concepts of the development process for mobile applications hosted on different mobile devices
- make students aware of the mobile implementation of the Mobile TCP/IP stack and protocols for mobility support (Mobile-IP, Mobile-TCP) and application interface for Mobile Networks and the existing related Architectures for Mobile and Wearable Computing
- critically assess and acquire the knowledge for Mobile Applications development process and the context requirements for this development
- experiment with mobile computing technology (e.g. phones or sensors) and synthesize novel application solutions for certain areas of mobile computing design and develop applications using specifications by utilizing local and global abstraction features of the mobile platform
- critically assess the limitations throughout developing mobile applications and applying software optimization methodologies for a certain case-application

- build, test, and deploy mobile solutions using appropriate technologies and collaborate in a group-based mobile development project

Learning Outcomes:

After completion of the course students are expected to be able to:

1. characterize the Mobile Computing technology and the underlying protocols that are supported by the Mobile Computing, Services and Protocols
2. provide students with deep knowledge of the different types of application models/architectures used to develop mobile software and context applications
3. acquire deep knowledge of the components and structure of a mobile development frameworks and design and develop reusable user interface elements on a mobile device using the model-view-controller design pattern
4. cover in detail and gain experience of the Mobile Computing Programming principles and the technologies currently being used for programming in Mobile Environments
5. design and develop applications with special features (local and global dependencies i.e. location-aware diversities, Cloud-oriented platform-dependent processes etc.) and apply the different types of application models/architectures used to develop native and non-native Object-Oriented libraries
6. design and develop device-specific, native software and middleware mechanisms using specifications by utilizing local and global abstraction features of the mobile platform
7. collaborate in a group for the development of a Mobile Application project

Course Content:

1. Nature of the Mobility. Supported Services and Protocols. Devices and Mobility (e.g. Wearable, active and passive devices). Mobile Computing technology and applications.
2. Mobile access to the World-Wide-WEB in the mobility Era. Review of Mobility Support Paradigms for the Internet-Mobile IP and its enhancement(s), MIPv4 and MIPv6 Architectures and performance requirements for Internet Mobility implementation scenarios.
3. Software models for Mobile Computing. Mobile platforms, their properties and execution environments (AppFurnace, Application Craft, appMobi, iOS, Android, HTML5 Web Apps, HTML5 Hybrid Apps, BlackBerry Dev., Convertigo mob., etc.).
4. Different Mobile application life-cycles and source code management (Git/SDK). Source code migration and outsourcing capabilities. Compatibility issues.
5. Architectural Reference Model for Mobile and Wireless Access Networks.
6. Location Management and provision of services according to Location (Location-based services).

7. Manipulating software design principles with PhoneGap, mobile apps design with the HTML 5 container.
8. PhoneGap Applications and the related compatibility issues.
9. Next generation platforms/open source and open-module cross-platforms paradigms/ Trade-off between paradigms for different scenarios using the existing platforms.
10. Supportive cross platform APIs, Managing and Accessing Local and Remote Databases, Leveraging Java and C# Libraries, Communicating via the Internet.
11. Model-View-Controller design patterns, Handling Activity Lifecycle Events, Handling user generated actions and passive ones. Threads' handling and Rooting mobile devices.
12. Hardware module-based interactions, context-related app development for *Mobile/Tablet* or related integrated project.

* Including Emulation/Simulation experiments for certain scenarios using Core packages by Oracle, NS-3 and other integrated packages and open license frameworks

Learning Activities and Teaching Methods:

Lectures, Lab Presentations, Lab Tutorials, Theoretical Exercises and Assignments.

Assessment Methods:

Tests/Quizzes, Design project, Homework, Project, Mid-Term, Final Exam.

Required Textbooks / Readings:

| Title | Author(s) | Publisher | Year | ISBN |
|------------------------------------------------------------------|--------------------------------------------|-----------------------------|-------------|-------------------------------------------------------|
| Android™ 6 for programmers an app-driven approach | Paul Deitel, Harvey Deitel, Alexander Wald | Addison-Wesley Professional | 2016 | ISBN-13: 978-0-13-428936-6, ISBN-10: 0-13-428936-6 |
| PhoneGap Essentials: Building Cross-Platform Mobile Applications | John M. Wargo | Addison-Wesley Professional | 2014 | ISBN-10: 0321814290, ISBN-13: 9780321814296 |

Recommended Textbooks / Readings:

| Title | Author(s) | Publisher | Year | ISBN |
|------------------------------------------------------------------|---------------------------------------------------------|---------------------------------|-------------|------------------------------------------------------------|
| Mobile Computing (2nd Edition) | Devi Kamal, Raj Kamal | Oxford University Press, USA | 2014 | ISBN-10: 0198068913, ISBN-13: 978- 0198068914 |
| Professional Cross-Platform Mobile Development in C# | Scott Olson, John Hunter, Ben Horgen, Kenny Goers | Wiley | 2015 | ISBN: 978-1- 1181-5770-1 |

Note: Half of the assigned hours for this course will be taking place in a laboratory.