UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
COMP-525	Mobile Computing	10
Prerequisites	**Department**	**Semester**
COMP 513	Computer Science	Fall, Spring
Type of Course	**Field**	**Language of Instruction**
Required for the Mobile Systems concentration	Computer Science	English
Level of Course	**Lecturer(s)**	**Year of Study**
2nd Cycle	Prof. Constandinos Mavromoustakis	2nd
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 and computation and 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
- determine and demonstrate the Protocols and Algorithms for Ad Hoc Systems (e.g. Wearable, Sensor-based passive and active devices) and demonstrate and analyze the basic conceptual models for configuration
- make students aware of the mobile implementation of the 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
- discuss and provide students with deep knowledge of the architecture and structure according to certain requirements of the on-the-move access to the World Wide Web, and explore and extrapolate the social context through application specific scenarios (e.g. Foursquare-like etc.)
- critically assess and acquire the knowledge for passive and active client-site caching control, mobile proxies and Mobile Web caching

- provide students with deep knowledge for concepts about the Mobile caching and Mobile Cloud migration and extrapolate the current state-of-the-art used in research
- discuss and provide students with deep knowledge for Mobile Computing Models and High Amplitude Platforms (HAP) and related Mobile Computing technologies and determine and demonstrate the contribution in reliable resource sharing
- experiment with mobile computing technology (e.g. phones or sensors) and synthesize novel solutions for certain areas of mobile computing

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. review of the m-TCP/IP and Mobile application interface and critically compare and evaluate the existing Mobile and Wireless Access Network and the provision of services according to Location (Location-based services)
3. introduce state-of-the art research in the area of Mobile Computing and Mobile Cloud Computing
4. cover in detail and gain experience of the Mobile Computing Programming and the technologies currently being used for programming in Mobile Environments
5. provide students with deep knowledge of concepts for developing Protocols and Algorithms for Ad Hoc and wearable systems
6. recognize the Power limitations in Mobile Computing and make students aware of the different Power Management Techniques in Mobile Computing Operating Systems
7. make students aware of the technical requirements of data diffusion process in order to effectively construct basic professional skills and develop advanced knowledge for the data dissemination, the localized broadcasting
8. introduce state-of-the art research in the area of Mobile Computing Technologies including Mobile Peer-to-Peer systems (MP2P) regarding the Semantic and Non-semantic data dissemination in Mobile environments

Course Content:

1. Introduction into Mobile Environments and Systems

2. Review of the Mobile TCP/IP and Mobile application interface. Devices and Mobility (e.g. Wearable, active and passive Sensor devices). 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. Supported Platforms for the Mobile Computing Systems and Software models
4. Architectural Reference Model for Mobile and Wireless Access Networks and Location Management
5. Location-defining Systems: RSS-based indoor localization and RSS-based smartphone indoor localization
6. Multi-dimensional Location Management
7. High-Altitude Platforms (HAPs), UAVs and novel supporting technologies
8. Context-aware Computing
9. Fog and Cloud Computing in Mobile Environments
10. Mobile Cloud Computing and Mobile Edge Computing
11. Big Data in Mobile Computing (MC) using Software Defined Networking (SDN): How 'big' Big Data might become
12. Vehicular Systems and Vehicular Edge Computing as a novel paradigm. Survey of current research on the Mobile Computing and Mobile caching, Mobile Peer-to-Peer systems and mobile Proxies and Peers. Hands-on experience in Mobile Computing scenarios using Object Oriented Java/C# Core packages.

Learning Activities and Teaching Methods:

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

Assessment Methods:

Mid-term and Final Examinations
Projects (Programming Individual and Simulation or Emulation Individual)
Assignments, Quizzes

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Mobile Computing (2nd edition)	Devi Kamal, Raj Kamal	Oxford University Press, USA	2015	ISBN-10: 0198068913

				ISBN-13: 978-0198068914
Adaptive Mobile Computing (1st edition)	Mauro Migliardi, Alessio Merlo, and Sherenaz Al-HajBaddar	Elsevier, Publisher	2017	ISBN: 9780128046036
Resource Management in Mobile Computing Environments	Constandinos X. Mavromoustakis, George Mastorakis, Evangelos Pallis	Springer International Publishing AG, series in Modeling and Optimization in Science and Technologies	2016	ISBN-10: 3319067036 ISBN-13: 978-3319067032

Recommended Textbooks / Readings:

Title	**Author(s)**	**Publisher**	**Year**	**ISBN**
Crowd-Powered Mobile Computing and Smart Things	Loke, Seng	Springer International Publishing AG	2017	ISBN 978-3-319-54436-6
Ambient Assisted Living and Enhanced Living Environments: Principles, Technologies and Control	Ciprian Dobre Constandinos Mavromoustakis Nuno Garcia Rossitza Goleva George Mastorakis	Elsevier, Publisher	2017	eBook ISBN: 9780128052822 Paperback ISBN: 9780128051955
Internet of Things and Smart Environments	Seyed Shahrestani	Springer International Publishing AG	2017	ISBN-10: 3319601636 ISBN-13: 978-3319601632

Note: Published articles from leading Journals and Conference Proceedings will also be considered as a part of the required reading material.