The University of Jordan
School of Engineering
Department of Computer Engineering
Summer Term – A.Y. 2022-2023

Course:

Mobile Computing (0907547) – 3 Credit Hours.

Catalog Data:

This course introduces students to mobile computing and mobile application development. Students will be first provided with an introduction to mobility, wireless technologies and coverage mobile systems which include cellular networks (2G, 2.5G, 3G, 3G+, and 4G), mobile satellite communication networks, mobile IP, mobile TCP, digital audio-video broadcasting, and mobile TV. The mobile device architecture will be overviewed including processors and their instruction set architectures, bus and memory architectures, and I/O architectures. Students will be introduced to mobile device platforms including mobile OS, J2ME, mobile databases, client-server computing agents, application servers, and security protocols. User interface and user experience will be discussed and various application development guidelines will be discussed. Moreover, students will learn about common important topics in mobile computing such as energy management, mobility management, and location-based services.

Prerequisites by Course:

CPE 1902223.

Prerequisites by Topic:

Students are assumed to have basic general knowledge in computer networks and database systems. Better – but not necessary – to have some knowledge about data communication systems.

Textbook:

“Mobile Communications”, by Jochen Schiller, published by Addison-Wesley, 2003.

References:

1) “Mobile Computing”, 3rd Edition, by Raj Kamal, published by Oxford University Press, 2019.

2) “Mobile Computing Theory and Practice”, by Kumkum Garg, published by Pearson Education, Inc, 2010.

3) “Fundamentals of Mobile Computing”, by Prasant Kumar and Rajib Mall, 2012.

4) “ Android 6 for Programmers: An App-Driven Approach”, 3rd Edition, by Deitel and Deitel, published by Pearson

Education, Inc, 2016.

5) “Data Communications and Networking”, 4th Edition, by Behrouz A. Forouzan, published by McGraw-Hill, 2007. Chapter 12, Section 12.3 and Chapter 16.

Website:

MS Teams and e-Learning website.

Schedule & Duration:

8 Weeks, 40 lectures, 75 minutes each (including exams).

Minimum Student Material:

Text book, class handouts, instructor keynotes, calculator, access to a personal computer with Android Studio and/or Flutter or equivalent development environment and a connection to the Internet.

Minimum College Facilities:

E-Learning platform, classroom with whiteboard and projection display facilities, library and computational facilities.

Course Objectives:

1) Learn about mobile computing and networks: types of systems such as cellular networks (2G, 2.5G, 3G, 3G+, and 4G), satellites, MANETs and WSNs. Protocols, such as Mobile IP, Mobile TCP and routing protocols.

2) Learn about common important topics in mobile computing such as energy management, mobility management, and location-based services.

3) Acquire skills in mobile application development.

Course Outcomes (ILOs):

1) ability to understand the concept of mobile computing, distinguish between mobile computing and wireless networking and understand the basic operation of mobile networks.

2) ability to solve problems related to the design of mobile networks.

3) ability to understand mobile network protocols (e.g., M-IP, M-TCP) and acquire basic skills in mobile application development.

Course Topics:

1) Introduction:

* use-cases, applications,
* definition of terms,
* challenges, history.

2) Wireless Transmission:

* frequencies & regulations signals, antennas and signal propagation,
* multiplexing, modulation, spread spectrum.

3) Media Access:

* motivation,

* SDMA, FDMA, TDMA , CDMA.

4) Wireless Telecommunication Systems (cellular networks):

* AMPS, GSM, UMTS and IMT-2000.

5) Satellite Systems:

* GEO, LEO and MEO including GPS.

6) Mobile Protocols:

* Mobile IP,

* Mobile TCP,

* Transport Protocols (Reliable transmission Flow control) and Quality of Service.

7) Support for Mobility:

* File systems, WWW, WAP, i-mode, J2ME, …

8) Mobile Database.

9) Mobile Operating Systems and Mobile Application Development.

Computer Usage:

An introductory-mobile-application development project is required as part of course work. This requires Android Studio and/or Flutter development environments.

Assessments:

Coursework and Exams.

Grading policy:

Course Work	20%.
Midterm Exam	30%.
Final Exam	50%.

Instructors:

Dr Talal A. Edwan,

Office hours:

Sun. – Thu., 12:15 PM – 01:15 PM,

Room CE 414.

Class Time and Location:

Sun. – Thu., 11:00 AM – 12:15 PM,

Room CE 102.