

**Course Title: Mobile Cloud Computing**  
**Date: Spring 2016**



### **Suggested Bulletin Course Description**

Introduction to the basic concepts of mobile cloud computing, including: 1. The mobile computing technology used in modern smart phones; 2. The cloud computing technologies used in existing data centers; 3. The synergy of mobile and cloud computing and its applications; 4. Programming on smart phone utilizing data center services. Students will gain knowledge of: the fundamental principles of mobile cloud computing, the major technologies that support mobile cloud computing, the current challenges and primary areas of research within the field of mobile cloud computing, and a basic understanding of the role of mobile cloud computing in the context of the everyday living.

**Prerequisites:** ESE 224 or CSE230 or CSE 214 or ISE 208.

Spring 2015

Stony Brook University

Department of Electrical & Computer Engineering

College of Engineering and Applied Sciences

Course Title: Mobile Cloud Computing

Course Instructor: Prof. Shan Lin

### **Instructor and Office Hours**

Instructor: Shan Lin

Email: [shan.x.lin@stonybrook.edu](mailto:shan.x.lin@stonybrook.edu)

Office Location: Light Eng. 249

Office Phone: 631-632-8398

Office Hours: 2-4PM Tue & Thu

Location: Library E4310

Time: Monday 7-10PM

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## LEARNING OBJECTIVES

At the end of this course, students will:

1. Understand the evolution of computing paradigms in the past decade
2. Understand the basic architecture of modern smart phone platform
3. Know how to program smart phones to utilize its computing resources
4. Understand the basic cloud computing technologies
5. Understand the distinct and complementary features of the mobile and cloud computing
6. Know how to design, simulate, and program mobile cloud applications

## COURSE REQUIREMENTS

### *Attendance and Make Up Policy*

Late work will not be accepted. Attendance at all exams is mandatory. In the case of 1) verifiable illness, 2) verifiable family emergency, 3) University-sanctioned religious holiday, or 4) participation in official University-sponsored events (for documented student athletes only), excuse must be documented on official letterhead (as appropriate) and will be verified by the instructor.

### **Textbook and Reading**

Raj Kamal. Mobile Computing. Oxford University Press. 2007.

Frank H. P. Fitzek, Marcos D. Katz . Mobile Clouds: Exploiting Distributed Resources in Wireless, Mobile and Social Networks. Wiley Press. 2013.

Other readings for this course will be in the form of research papers, which will be distributed to students online.

## Topics and semester schedule

Week	Topics
Week 1 Lecture 1	1. What is the trend of computing paradigms? 2. Why mobile cloud computing? 3. Overview of the mobile cloud computing technologies

Week 1 Lecture 2	Mobile cloud computing platforms
Week 2 Lecture 1	Applications and System specifications 1
Week 2, Lec 2	Applications and System specifications 2
Week 3, lec 1	Mobile computing principles Platforms and challenges to existing systems
Week 3 Lecture 2	Android programming and simulation
Week 4 Lecture 1	Mobile computing multi-core architecture 1
Week 4, Lec 2	Mobile computing multi-core architecture 2
Week 5, Lec 1	Cloud computing principles Existing data center systems
Week 5, Lec 2	Virtualization of computing resources
Week 6, Lec 1	File systems and operating systems for data center
Week 6, Lec 2	Cloud computing services
Week 7 Lecture 1	Cloud computing programming
Week 7, Lec 2	Real-time virtualization for cloud computing
Week 8, Lec 1	Synergy of mobile and cloud computing
Week 8, Lec 2	Midterm Exam
Week 9 Lecture 1	Underlying Technologies: heterogeneous wireless communication and its impact on mobile cloud computing paradigm
Week 9 Lecture 2	Underlying Technologies: localization and location based cloud services
Week 10 Lecture 1	Underlying Technologies: sensing and activity recognition with mobile cloud
Week 10 Lecture 2	Underlying Technologies: real-time scheduling

Week 11 Lecture 1	Programming with sensing and location services
Week 11 Lecture 2	Energy and traffic management for mobile cloud computing I
Week 12 Lecture 1	Energy and traffic management for mobile cloud computing II
Week 12 Lecture 2	Human in the loop control with mobile cloud computing I
Week 13 Lecture 1	Human in the loop control with mobile cloud computing II
Week 13 Lecture 2	Privacy and Security
Week 14 Lecture 1	Data processing and knowledge creation
Week 14 Lecture 2	Review of mobile cloud computing technologies, economic impact and technological issues
Week 15	Final project presentation

## Grading

Your grade will be based on attendance, paper reviews (written and oral), programming assignments, a midterm exam, and the final project.

Attendance and participation	10%
Paper reviews	15%
Programmings assignments	15%
Midterm exam	20%
Final project	40%

Undergrad and graduate will be evaluated with different standards on midterm exam, lab assignment, and final project. For graduate, there will be 2-3 extra questions in midterm exam, and one extra task in each programming assignment. As to the final project, graduate student needs to complete a system with both mobile and cloud computing elements and demonstrate their interactions. Undergrads don't need to design specifically for the mobile and cloud computing tradeoffs.

## **Disability**

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, 128 ECC Building (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following web site: <http://www.ehs.sunysb.edu> and search Fire Safety and Evacuation and Disabilities.

## **Honor Policy**

- All exams, homework, and project assignments are subject to this Honor policy. This means that placing your name on an exam or an assignment implicitly pledges that you abided by the terms of this policy.
- The homework assignments are to be done alone. Any malpractice (e.g., reporting fraudulent data, copying another student's solution, plagiarism) will be treated as an Honor Code violation.
- For the project, collaboration with other people or groups is allowed, but collaboration does not mean copying each others' solutions. Such collaboration should be limited to discussing concepts. You must understand the project that you turn in and be able to explain and defend it.

Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>