City University of Hong Kong
Course Syllabus

offered by Department of Computer Science
with effect from Semester B 2017/18

Part I   Course Overview

Course Title: Mobile Computing

Course Code: CS5284

Course Duration: One semester

Credit Units: 3 credits

Level: P5

Medium of
Instruction: English

Medium of
Assessment: English

Prerequisites: CS5222 Computer Networks and Internets or
(Course Code and Title)   EE5412 Telecommunication Networks or equivalent

Precursors:
(Course Code and Title)   Nil

Equivalent Courses:
(Course Code and Title)   Nil

Exclusive Courses:
(Course Code and Title)   Nil

Part II　　Course Details

1.　Abstract

This course studies basics and emerging topics in mobile computing, including basic communication theory of wireless mobile networks as well as the software development for mobile devices. Newly-emerging areas of mobile computing involving machine intelligence and Bot will also be studied in depth. Basics of mathematical theories and algorithms for communications will be introduced for various systems such as Internet, mobile cellular networks, wireless LAN, GPS global positioning systems. Advanced topics such as machine intelligence for mobile devices will be explored. Software development tools for mobile apps and Bot technologies in mobile devices such as smartphones and tablets will be introduced. A basic project-based learning related to the software development of mobile apps or Bot will be conducted.

2.　Course Intended Learning Outcomes (CILOs)
(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Describe the issues and problems in current trends of mobile computing.		✓		
2.	Create novel applications for supporting mobile computing and communications in mobile device technologies like smartphones and tablets.		✓	✓	✓
3.	Explain the basics and fundamentals of communication theories and algorithms in mobile wireless networks.		✓		
4.	Use basic software development tools to create a mobile app to solve a problem.		✓		
5.	Analyze the performance of different resource allocation algorithms and optimization of wireless cellular networks.		✓		
6.	Explore sensor technologies in mobile devices for computing applications.		✓	✓	✓
7.	Explore emerging software paradigms such as Bot in supporting mobile services with machine intelligence.		✓		
8.	Develop an attitude to solve mobile computing problems with analytical solution and software programming development for mobile devices using mobile apps or Bots.		✓	✓	✓
		100%			

A1:　Attitude
　　　Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.
A2:　Ability
　　　Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.
A3:　Accomplishments
　　　Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

Teaching pattern:
Suggested lecture/tutorial/laboratory mix: 2 hrs. lecture; 1 hr. tutorial.

TLA	Brief Description	CILO No.								Hours/week (if applicable)
		1	2	3	4	5	6	7	8	
Lecture	Regular lecture on theories and algorithms of mobile computing	✓	✓	✓		✓				
Homework Assignments	Two homework based on theories and algorithms related to mobile computing	✓		✓	✓		✓	✓		
Course Project	Project-based learning that consists of a final report submission and demo of mobile computing project	✓	✓	✓	✓	✓	✓	✓	✓	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.								Weighting	Remarks
	1	2	3	4	5	6	7	8		
Continuous Assessment: <u>40%</u>										
Homework assignment	✓		✓	✓		✓	✓		10%	
Course project	✓	✓	✓	✓	✓	✓	✓	✓	15%	
Midterm examination	✓	✓	✓	✓					15%	
Examination^: <u>60%</u> (duration: 2 hours)	✓	✓	✓	✓	✓	✓	✓	✓		
									100%	

^ For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Course project	Able to provide novel ideas and working demo	If a working demo is shown in class	If final report writing has some good ideas and attempt	If weak attempt in final report writing	If feeble attempt in final report writing	If no attempt in final report writing
Homework assignment	Able to solve math problems	If a solution with complete workings including program is shown	If final solution is correct with correct workings	If weak attempt	If feeble attempt	If no attempt
Midterm examination	Able to solve math problems	If final solution is correct with correct workings	If final solution is correct with correct workings	If weak attempt	If feeble attempt	If no attempt
Examination	Able to solve math problems	If final solution is correct with correct workings	If final solution is correct with correct workings	If weak attempt	If feeble attempt	If no attempt

Part III   Other Information (more details can be provided separately in the teaching plan)

1.   **Keyword Syllabus**
     (An indication of the key topics of the course.)

Mobile computing.   Wireless communications and networks.   Mobile Cellular networks.   Wireless LAN. Medium access control.   Wireless network power control algorithms.   Augmented reality and QR code applications.   Software development tools for mobile devices.   Software programming of mobile apps and Bots.

1.   Basic issues in mobile computing: Fundamentals of computing and communications.   Mathematical analysis of communications theory.   Latest development and current trends of mobile computing.

2.   Networking technologies: The Internet. Mobile/wireless TCP.   Wireless LAN.   IEEE 802.11 protocol and algorithms.

3.   Mobile communications: Wireless communication theories. Multiple Access such as FDMA, CDMA and TDMA.   Wireless cellular network optimization.   Cell design and area planning for cellular networks. Sensor technologies on mobile computing devices.

4.   Mobile computing: Clocks in mobile applications.   GPS global positioning systems.   QR Code applications.   Augmented-reality applications.

5.   Machine intelligence in computing: Basics of machine intelligence.   Bots in mobile devices.   Data analytics for online social networks.

6.   Mobile computing: Mobile app software programming. Software development tools and devices.   Bot software programming.   Mobile software development for project-based learning.

2.   **Reading List**
2.1 **Compulsory Readings**
     (Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Mischa Schwartz, <u>Mobile Wireless Communications</u> 1st Edition, Cambridge University Press, 2005

2.2 **Additional Readings**
     (Additional references for students to learn to expand their knowledge about the subject.)

1.	William Stallings, <u>Wireless Communications & Networks</u>, 2nd Edition, Pearson