SMT203: Smart City Systems and Management (SCSM)

Instructor(s)	Hwee-Xian TAN Michelle KAN
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Consultation Hours	By appointment only

COURSE SYNOPSIS

There is an increasing worldwide trend to leverage the use of information and communication technologies (ICT) to develop smart cities. This course exposes students to smart city systems and its enabling technologies – such as the Internet of Things (IoT), as well as mobile and wireless infrastructure. Students can expect to understand the impact of technologies on the lives of the people living in the smart city. In addition, the course provides students with the practical and management considerations of developing and managing such smart city systems. They will also understand the challenges and opportunities associated with the design, implementation and management of such smart city systems, through project implementation.

PRE-REQUISITES/ CO-REQUISITES/ MUTUALLY EXCLUSIVE COURSES

The pre-requisites are:

- IS111 Introduction to Programming **OR** SMT111 Programming for Smart City Solutions, **OR** equivalent
- IS112 Data Management

Note: This course will use the Python programming language for project implementation.

COURSE AREAS

- Advanced Business Technology Major
- Smart-City Management & Technology Major
- Technology & Entrepreneurship
- Business Options
- Econ Major Rel/Econ Options
- IS Depth Electives/IS Option
- Social Sciences/PLE Major-rel

LEARNING OBJECTIVES

Upon completion of the course, students will be able to:

- Gain awareness of enabling technologies of smart cities.
- Understand the opportunities and challenges associated with smart cities, and its impact on stakeholders.
- Design, implement and manage a smart city solution, as part of a system of systems of smart city solutions.

COMPETENCIES

- Identify the opportunities associated with smart cities, and the impact on its people.
- Explain the concepts and principles of enabling technologies for smart city solutions.
- Design, develop and deploy an end-to-end smart city solution.
- Design and develop tools to manage the smart city solution.
- Appreciate the importance of building an interoperable system of systems as part of a smart city.
- Obtain good understanding of constraints and limitations of operationalizing smart city solutions.

INSTRUCTIONAL METHODS AND EXPECTATIONS

Attendance is compulsory, unless with valid reasons (e.g., MC).

All materials will be provided online, via eLearn.

COURSE ASSESSMENTS

Individual Assessment (50%)	Class Participation	10%
	Programming Assignments (x2)	20%
	Quizzes (x2)	20%
Team Project Assessment (50%)	Ideas Pitching	10%
	API Design & Documentation	10%
	Poster & Video	10%
	Final Demo	20%

COURSE ASSESSMENT DETAILS

Class Participation

This component includes physical attendance, participation in class and discussion forums, etc.

Programming Assignments

These are a total of two programming assignments that are based on Python.

Quizzes

There are a total of two quizzes, to be done during class-time. These comprise multiple-choice questions, as well as structured questions. The quizzes will test the students on the concepts that have been covered in class, as well as on the application of enabling technologies for smart city systems and management.

Project

The students will design, develop and deploy a smart city solution, as part of a system of systems. In particular, they have to ensure that their solution is interoperable with external systems and/or teams in the class.

**Peer evaluation will form a major component of the project assessment.

LESSON PLAN

Classes on held on Tuesdays, 1200 hrs to 1515 hrs.

Week	Theme	Topic	Assessment
1	Overview and enabling technologies	Smart Cities – Overview, Opportunities and Challenges	
2		Data Management in Smart Cities Invited talk by URA Digital Planning Lab	
3	REST Framework and APIs	RESTful APIs I	
4		RESTful APIs II	Assignment I
5		eLearning week + Project Discussions	
6		Ideas Pitching	Ideas pitching presentation
7		RESTful APIs III	Quiz I
8		**RECESS WEEK**	
9	Systems Management	Systems Management I	API design & specification
10		Systems Management II	
11		Systems Management III	Assignment II
12		Management of Smart Urban Infrastructures	
13	-	Review	Quiz II
14		**STUDY WEEK**	Poster & Video Demo Day

*subject to minor amendments

RESOURCES

1. Site Reliability Engineering: How Google Runs Production Systems
   This book is available for online reading.
2. Flask web framework.
3. Windows Subsystem for Linux (only for Windows users).
4. GitHub (free for students; sign up for the GitHub education pack).

OTHER IMPORTANT INFORMATION

Academic Integrity

All acts of academic dishonesty (including, but not limited to, plagiarism, cheating, fabrication, facilitation of acts of academic dishonesty by others, unauthorized possession of exam questions, or tampering with the academic work of other students) are serious offences. All work (whether oral or written) submitted for purposes of assessment must be the student's own work. Penalties for violation of the policy range from zero marks for the component assessment to expulsion, depending on the nature of the offense. When in doubt, students should consult the instructors of the course. Details on the SMU Code of Academic Integrity may be accessed at http://www.smuscd.org/resources.html.

Accessibility and Accommodations

SMU strives to make learning experiences accessible for all. If you anticipate or experience physical or academic barriers due to disability, please let the instructor know immediately. You are also welcome to contact the university's disability support team if you have questions or concerns about academic accommodations: included@smu.edu.sg.

Please be aware that the accessible tables in our seminar room should remain available for students who require them.

Emergency Preparedness for Teaching and Learning (EPTL)

As part of emergency preparedness, Instructors may conduct lessons online via the WebEx platform during the term, to prepare students for online learning. During an actual emergency, students will be notified to access the WebEx platform for their online lessons. The class schedule will mirror the current face-to-face class timetable unless otherwise stated.

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