GLOBAL SUMMER PROGRAMME 2023

COR-MGMT2207 INNOVATIONS FOR ASIA'S SMART CITIES

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A. COURSE DESCRIPTION

The world is rapidly urbanizing. More and more cities in Asia and around the world are becoming increasingly popular as economic powerhouses and magnets for rural migrants. All big cities in both First and Third World countries such as New York, London, Tokyo, Paris, Shanghai, Hong Kong, Singapore, New Delhi, Jakarta etc. must cope with high population density and serious challenges such as air pollution, traffic congestion or waste management. How do we pack more people into big cities and yet continue to achieve a high quality of life? How do we create and manage 'good cities' which are safe, spacious, green, connected, fair and resilient? How can cities create economic wealth while still fulfilling the CSR responsibilities of sustaining a "Green Planet"? What are the best practice designs and technical 'smart city' solutions which could be leveraged to tackle these challenges and how can they be successfully commercialised? This course will provide answers to these questions with special emphasis on the managerial and commercial aspects of smart city concepts.

The key lies in creating and effectively managing innovative and sustainable ("smart") cities able to leverage on new technologies such as smart grids or sensor networks to create a place where people can live, play, and work well. Starting from the stakeholder requirements of citizens and planners of innovative cities, the course will introduce students to urban design concepts as well as commercialization, management challenges and implementation issues of the smart city model. There will also be a focus on how good governance and enabling technologies such as IoT (Internet of Things) can facilitate the creation, management, and sustainability of 'good' cities in Asia and beyond.

With the help of case studies and resource persons such as industry leaders, innovative city designers and tech experts from relevant Singapore-based organisations, students will be familiarized with the opportunities and challenges of the 'smart city businesses' with special reference to Singapore's 'Smart Nation' strategy.

B.   LEARNING OBJECTIVES

The overall objective of this module is to equip students with core knowledge of appreciating what it takes to plan, design, build and sustain cities that are innovative and sustainable and to know the challenges of successfully 'selling' new smart city concepts amidst increasing competition in this field.

By the end of this course, students will be able to appreciate the following 4 areas:

Taxonomy of Innovative & Sustainable Cities
- Describe the core characteristics of a Smart City and respective concepts
- Explain the unique characteristics of each component and how it adds value to innovative and sustainable (smart) cities

Design of Innovative & Sustainable Cities
- Understand the planning and design principles of Innovative & Sustainable Cities
- Explain the workings of each component of Innovative & Sustainable Cities

In-depth study of selected (Mega) Cities
- Be familiar with the challenges of selected mega cities around the globe and understand how the smart city concept can add value in terms of livability

Commercialisation of the Smart City Concept
- Appreciate the challenges in successfully commercializing smart city concepts and applications based on local and international (good practice) examples
- Know some of the key players in the Singapore context which are involved in this service sector and establish network contacts

C.   PRE-REQUISITES / REQUIREMENTS / MUTUALLY EXCLUSIVE COURSES (IF ANY)

This course does not require any pre-requisite.

D.   ASSESSMENT METHODS / GRADING DETAILS

Cumulative assessment (CA) constitutes 100% of the final grade, consisting of:

1. Individual Assessment: 50% of total, consisting of	
Class Participation	20%
Term Paper	30%
2. Group Assessment: 50% of total, consisting of	
Group Project	50%
Total	100%

E.   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.

F. ACCESSIBILITY

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

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

G. INSTRUCTIONAL METHODS AND EXPECTATIONS

The course approach is based on both analytical rigor and the practical utilisation of Smart City principles and concepts. During the course, a variety of teaching and learning techniques will be employed to enable students to think critically and imaginatively about the various implications of the topic.

Individual Assessments

Class Participation: Students are encouraged to ask questions and offer your opinions in class. Active and well-thought-through discussions are expected from all students. The Rubrics for class participation can be found in Annex A.

Term Paper: Each student will be assigned one smart city topic. You must do thorough research on the topic and produce a paper of between 1800 and 2000 words. If you are unsure how to structure the term paper, as a guide, you can use the Who, What, When, Where, Why, and How format to organize your term paper. Citations are to be in APA format. The Rubrics for the term paper can be found in Annex A.

Please refer to a separate file in eLearn for the allocation of Term Paper topics on Week 1.

Group Projects

Students will work on one group project related to SC applications and related challenges aimed at solving specific urban problems. Each project group will comprise 5-6 students; you can form your own groups. Each group will be assigned one of the following topics to do research on:

1. Carbon footprint
2. Measure air quality (SMU)
3. Data analytics (using Tableau or equivalent software)
4. Open air carpark availability
5. Tech-enabled recycling
6. Building a Cycling City
7. Bridging the Digital Divide (in a chosen city)
8. Roll-out of Electric Cars (in a chosen city)
9. Intelligent CCTV to check social distancing (spare topic)

All groups are encouraged to study the allocated topic with special reference to smart city concepts such as the EU Smart Cities framework: www.smart-cities.eu/model.html

No report is required. Each team is required to do a 20-minute presentation in class during Session 12. Softcopy of PowerPoint slides is to be submitted via eLearn before the presentation. The Rubrics for the group project can be found in Annex A.

H.   CLASSROOM POLICIES

The course is taught in three 3-hour sessions per week; total of 12 sessions.

A high level of student participation is required both in the classroom and in the assignments. Students are required to read widely and to participate actively in projects, presentations, team discussions and in-class discussions. A key assumption is that knowledge is constructed by learners and not merely absorbed from textbooks and people with more experience.

I.   IMPORTANT ASSIGNMENT DATES

1. Term Paper: Lesson 9
2. Group Project: Lesson 12

J.   CONSULTATIONS

Consultations hours with the instructor(s) will be via appointment to be made via email.
Please contact co-Instructor, Kan Siew Ning, if you have questions.

K.   RECOMMENDED TEXT / READING LIST / CASE STUDIES LIST

Main Textbook:
- Menkhoff, T., Kan, S.N., Evers, H.-D., and Chay, Y.W. (2018). Living in Smart Cities: Innovation and Sustainability. World Scientific.

Introductory Readings:
- Menkhoff, T. et al. (2018). Introduction: What Makes a City "Smart"? In: Living in Smart Cities: Innovation and Sustainability. World Scientific, pp. 1-60.

Additional Readings:
Additional readings from various sources will be assigned for each class session.

Useful Links
The following links may be useful to students doing research for this module.
- http://cities.media.mit.edu/
- http://www.ibm.com/smarterplanet/us/en/smarter_cities/overview/
- http://www.eu-smartcities.eu/
- http://www.smart-cities.eu/

LESSON PLAN		
LESSONS	**TOPICS**	**REMARKS**
LESSON 1 Tuesday 27 June	**INTRODUCTION: SINGAPORE THEN AND NOW** • Course introduction: Welcome to Singapore (A "Good" City) • What Makes a City 'Smart'? • Prosperity through Good (Knowledge) Governance and Challenges Ahead • Course Outline Specifics and Deliverables Textbook Chapter: Introduction (pp. 1 - 60) and Textbook Chapter 15: Singapore – From Knowledge City to Start-up Hub	Thomas Siew Ning
LESSON 2 Wednesday 28 June	**TAXONOMY OF INNOVATIVE & SUSTAINABLE CITIES** • What is a Smart City? Mega City vs. Smart City • Smart City frameworks and rankings of smart cities **URBAN PLANNING 101** • What is urban planning and why is it important? • Components of urban planning • Examples of good urban planning and tools used • The role of urban planning in smart city governance Textbook Chapters 1-3: Singapore's Vision of a Smart Nation — Thinking Big, Starting Small and Scaling Fast by Foo See Liang and Gary Pan; Towards a Smart Nation — It's About People, Ultimately by Poon King Wang and Lim Wee Kiat; Country 2.0 — Upgrading Cities with Smart Technologies by Steven Miller	Siew Ning

LESSON 3
 	
Thursday
 	
29 June
	SINGAPORE'S WATERSTORY
	• Singapore's water needs, PUB and the role of Marina Barrage (a dam built across the 350-metre wide Marina Channel to keep out seawater)
	• WaterHub Singapore
	• The Sustainable Singapore Blueprint: Singapore's national vision and plans for a more liveable and sustainable city:
	   o A Liveable and Endearing Home
	   o A Vibrant and Sustainable City
	   o An Active and Gracious Community
	
	Textbook Chapter 9: A Case Study of DTSS
		Thomas

LESSON 4 Tuesday 4 July	**SINGAPORE: SMART ECONOMY COMPONENTS** • Smart urban leadership, governance, and innovation • Role of knowledge clusters and knowledge hubs • Case study: Offshore Marine Cluster • Commercialising innovative smart city concepts Textbook Chapter 8: Knowledge Cluster Development through Connectivity: Examples from Southeast Asia by Hans-Dieter Evers, Solvay Gerke and Thomas Menkhoff	Thomas
LESSON 5 Wednesday 5 July	**SMART R&D MANAGEMENT** • Tech Clusters, Science & technology parks • Players in the R&D ecosystems • Examples: Silicon Valley (USA), Tel Aviv (Israel) **SMART PRISONS** • People, Process, Technology Textbook Chapter 19: Implementation of Smart Prisons by Kan Siew Ning	Siew Ning
LESSON 6 Thursday 6 July	**FIELD TRIP**: Sustainable Sentosa	Thomas Siew Ning
LESSON 7 Tuesday 11 July	**SENSORS ALONE DON'T MAKE US SMART – PEOPLE DO!** • The 'burden' of creating sustainable and liveable urban spaces • 'Smart' cities should not make us 'dumber' – Lessons learned in Singapore, Berlin and Barcelona • Air pollution matters in Singapore • How to commercialise ideas in support of innovative ('smart') city concepts? Textbook Chapter 5: What Makes a "Smart" City Liveable? By Linda Low	Thomas

LESSON 8 Wednesday 12 July	**SUSTAINABILITY MATTERS IN A SMART CITY** • The evolution of the sustainability movement • Sustainable development defined • Sustainable development goals • Climate change matters • What needs to be done? • 'Smart uses' in smart-enabled HDB homes **Case Study Diamond Developers** Videos to be watched: o Transforming cities with technology (by the Economist) https://www.youtube.com/watch?v=hRY-ZUlJXY0&feature=youtu.be o Smart Cities (Knowledge at Wharton) https://www.youtube.com/watch?v=TGiBfw3I2zw o Building a Smart City: Lessons from Barcelona https://cacm.acm.org/magazines/2018/4/226370-building-a-smart-city/abstract Textbook Chapter 5: What Makes A "Smart" City Liveable? By Linda Low Textbook Chapter 4: Making Sustainable Creative/Cultural Space in Shanghai and Singapore by Lily Kong	Thomas
LESSON 9 Thursday 13 July	TERM PAPER DUE Group Project Discussions GUEST SPEAKER: (to be confirmed)	Thomas Siew Ning
LESSON 10 Tuesday 18 July	**SMART MOBILITY – OVERVIEW & LAND TRANSPORT** • Teleworking: role of ICT as enabler of smart mobility • Categories of land transportation • Policy issues related to public transport • Driverless cars • Road planning & design • Road traffic management Textbook Chapter 17: Alleviating Urban Traffic Congestion in Smart Cities by Sock-Yong Phang – selected pages	Siew Ning

LESSON 11 Wednesday 19 July	**SMART LIVING: INTELLIGENT BUILDINGS** • What makes a building "smart"? • Residential buildings • Commercial office buildings • Underground buildings • How can buildings become more intelligent? Textbook Chapter 6: Technologies for Ageing-in-Place: The Singapore Context by Nadee Goonawardene et al.	Siew Ning
LESSON 12 Thursday 20 July	**ALL GROUPS PRESENTATION** (20 minutes per presentation) GROUP PROJECT DUE	Thomas Siew Ning

ANNEX A: RUBRICS

- **RUBRIC FOR CLASS PARTICIPATION**

A grade	B grade	C grade
Actively participates at appropriate times Fully prepared at almost every session Comments are relevant and reflect good understanding and insight of the teaching materials and topic being discussed	Sometimes participates but at other times is "tuned out" Fully prepared for more than half of the sessions Comments are sometimes relevant; partial understanding of topic being discussed	Seldom participates and is generally not engaged in discussions Prepared less than half of the time Comments are seldom relevant; does not show understanding of topic being discussed

Note: Nodding your head and/or saying "I agree" are not considered as class participation.

- **RUBRIC FOR INDIVIDUAL TERM PAPER**

A grade	B grade	C grade
Extensive research work done Very clear understanding of the subject matter and scope. Excellent, thorough analysis Insightful comments & recommendations Style of writing is very clear and engaging	Sufficient research work done – using mainly Internet sources Reasonably clear understanding of the subject matter and scope Good analysis Comments & recommendations are above average Style of writing is quite clear and manages to get the message across	Partial research work done Subject matter is not fully understood. Scope is incomplete (*) Analysis is average Gaps in comments & recommendations Style of writing is unclear at least half the time

(*) Note: On scope completeness, take this example. If you are doing a topic on "A nation's supply of drinking water" and you left out desalination, that would make your scope incomplete.

- **RUBRIC FOR MAJOR GROUP PROJECT**

A grade	B grade	C grade
Excellent research work that covers all major and minor smart features of the city. Presentation materials are insightful and highlighted almost 100% of the smart features of the allocated city. Excellent presentation style and method. Audience is constantly captivated.	Research work is good and covers all the key smart features and some minor features of the city. Presentation materials highlighted more than 80% of the features of the allocated city. Presentation style and method is good. Engages the audience most of the time.	Research work is partially done – it covers only basic information of the city and its smart features. Presentation materials highlighted less than 75% of the features of the allocated city. Presentation style and method is average. Audience loses attention after a while.