EMIA 4500B – Introduction to Smart City Development

School:	**Academy of Interdisciplinary Studies**
Subject Area:	**Emerging Interdisciplinary Areas**
Course Credit:	**3**
Instructor:	**CHUN Daniel**
Pre-requisite/co-requisite:	**Nil**

Notes:

- The syllabi provided here is for reference only and may be subject to changes and adjustments as determined by the course instructors.

EMIA 4500B Syllabus

Course code: EMIA4500B (3 credits)
Course title: Introduction to Smart City Development
Abbreviated title: Smart City Development
Course instructor: Dr. Daniel Chun
Target students: UG Year 1-4 students, PG students

Class quota: **40**
Classroom: **Rm 4579 (Lift 27-28)**

Grading requirement: Letter grades

Course description:

This introductory course offers students foundational knowledge in smart city development and explores various global initiatives. By the end of this summer course, students will be equipped to analyze, evaluate, and apply innovative technologies to tackle urban challenges, while also demonstrating empathy and understanding in the context of smart city development. Industry professionals from the smart city and start-up sectors will be invited to share insights through project presentations and case studies. Assessment methods will include online quizzes, participation in discussions, a reflective report, and a final group project proposing solutions to urban issues. The curriculum covers six essential areas of smart city development as outlined in the Smart City Wheel (Cohen, 2013):

- **Smart Economy**: Focuses on economic competitiveness, innovation, and entrepreneurship.
- **Smart Environment**: Emphasizes sustainable resource management and pollution reduction.
- **Smart Governance**: Involves transparent and participatory governance practices.
- **Smart Living**: Aims to enhance quality of life through improved health, safety, and housing.
- **Smart Mobility**: Addresses efficient and sustainable transportation systems.
- **Smart People**: Encourages education, inclusivity, and the development of human capital.

Teaching and learning activities:

This course comprises 13 weeks of face-to-face lectures supported by guest lectures from industry professionals sharing their involvement in smart city initiatives. A special workshop by Geospatial Lab will be arranged. The use of case studies and projects in teaching is drawn from local and global smart city development initiatives which may include some of those conceived and published by HKUST's faculty and the Greater Smart City Institute of HKUST.

Planned Assessment & Weightings:

The course grade consists of quizzes, class discussions, a reflection report as mid-term assessment, a final written essay and a group presentation. Students' grade will be determined based on their attendance and contribution to class discussions, ability to demonstrate high order thinking through a reflection report, a group project presentation and final proposal in essay format.

Attendance	13%
Participation in-class and online discussions	13%
Quiz # 1 (Smart People, Smart Economy, Smart Environment)	10%
Mid-Term Assessment (Individual reflection report of about 700-800 words)	8%
Quiz # 2 (Smart Government, Smart Living, Smart Mobility)	8%
Group project presentation	18%
Individual essay (of about 2,500-3,000 words)	30%

EMIA4500B Introduction to Smart City Development (3 credits) Summer 2024/2025

Full description of the course and rationale of introducing this course

The course begins with an introduction to smart city development and then delves into the six key areas advocated by Dr. Boyd Cohen: Smart People, Smart Economy, Smart Environment, Smart Governance, Smart Living, and Smart Mobility. For each area, lectures will be enhanced by insights from industry professionals, protagonists, or start-up entrepreneurs who will share their involvement and use cases in smart city development as guest speakers. A workshop on utilizing open data and common spatial data infrastructure (CSDI) will also be included to develop various smart city innovations and applications. Assessment will consist of formative evaluations, critical reflections, participation in active discussions, and group project work.

Rationale

Smart city development has emerged as a significant focus in academic research, technological advancements, innovations, and public policy in recent years (Chun et al., 2019). This course aims to provide students with a strong foundation in this multidisciplinary field. Students will have the opportunity to apply their learning to real-world problems with an emphasis on utilizing emerging technologies and open data. The course seeks to develop socially responsible graduates who possess a vision for sustainable development and can apply technology for strategic planning and design. Students will explore case studies demonstrating how key technologies—such as IoT, AI, big data, and cloud/edge computing—impact various aspects of society, including transportation, healthcare, environment, and accessibility. They will also examine related policies and critically evaluate potential barriers to adopting smart city concepts from an interdisciplinary perspective. Additionally, trending topics such as sustainability, diversity, and equality will be introduced to provide a comprehensive understanding of their significance in sustainability and smart city contexts. This course augments students' core disciplines while engaging them in a case-based learning environment.

Course Intended Learning Outcomes

On successful completion of the course, **students will be able to**:

CILO 1	To acquire foundational knowledge in smart city development, including public policy, technological innovations, and the challenges faced by urban areas.
CILO 2	To demonstrate a comprehensive understanding of the six areas of smart city development.
CILO 3	To apply open data and emerging technologies to propose innovative and sustainable solutions for urban challenges.
CILO 4	To critically evaluate the adoption of technology in smart city initiatives, considering both opportunities and challenges.
CILO 5	To identify and discuss future trends in the use of open data and geospatial data in smart city development and assess their potential impact on urban environments.
CILO 6	To adopt an interdisciplinary approach to address complex real-world problems related to smart city development.
CILO 7	To actively participate in group activities that promote social improvement and community engagement.

Planned teaching activities and assessment weightings

This course comprises both face-to-face lectures, a series of speaker's seminars with industry professionals and entrepreneurs from start-up companies directly involved in smart city projects. A special training workshop by the Geospatial Lab will be arranged. The use of case studies in teaching are drawn from global smart city development initiatives and specifically around Hong Kong and Greater Bay Area. Some relevant teaching content may be referenced from the Great Smart Cities Institute of HKUST. Students are also directed to complete a series reading and review of literature of published articles related to public policy, technology adoption and leadership in smart city development and active discussions on Canvas and during class are encouraged.

Total Hours (13 weeks of 3 hours)

11 sessions of classroom lectures (with discussion) of 3-hours (Week 1 -4, Week 6-12)
1-session of workshop at the Geospatial Lab by HKSAR Lands Department (Week 5)
1-session of 3-hours for group presentation from students on their proposal (Week 13)

Instructor and contact details

Dr. Daniel Chun, Instructor djychun@ust.hk , Rm 4374 Ext 2950

Course Outline

Lecture	Topics	Briefly outline what this topic will cover *(Include reading assignments if available)*	Indicate which course ILOs this topic is related to *(Write CILO-1, CILO-2, etc.)*
1	Introduction to Smart City Development (Jun 16, Mon, 2-5)	- Overview of smart city development, and its societal and economic impact. - Introduction to the Dr. Boyd Cohen Smart City Wheel theory and its six disciplines - Introduction to the Smart City Blueprint in Hong Kong and comparative review for other economies.	CILO 1, CILO 2, CILO 3, CILO 6,
2	Smart People: Citizen Engagement and Community Development (Jun 18, Wed, 2-5)	- Overview of the Smart People - Case studies showcasing citizen engagement and community-driven initiatives in smart city projects - Explore topics in leadership and talent development in R&D, urban innovations, and adoption.	CILO 2, CILO3, CILO 6
3	Smart Economy: Entrepreneurship and Economic Development (Jun 20, Fri, 2-5)	- Overview of the Smart Economy - Exploration of entrepreneurial opportunities and economic development in smart city projects - Explore various strategic concepts of cluster, hub ecosystem development	CILO 2, CILO3, CILO 6
4	Smart Environment: Sustainability and Energy Efficiency (Jun 23, Mon, 2-5)	- Overview of the Smart Environment - Highlighting sustainable practices and energy-efficient solutions with Internet of Things (IoT) technologies - Explore and discuss various challenges and dilemmas in achieving net-zero and Sustainability Goals - ESG, SDG	CILO 2, CILO3, CILO 6
5	Spatial data workshop by Geospatial Lab (Jun 25, Wed, 2-5)	- Exploration of spatial data and CSDI - Hands on learning about CSDI and GIS data for supporting the use of various applications. This will be a visit to the Geo-Spatial Lab in Kwun Tong. If this date is not possible, we will swap with Lecture 4 or 6.	CILO 2, CILO3, CILO 4
6	Smart Government: Governance and Policy Innovations (Jun 27, Fri, 2-5)	- Overview of the Smart Government - Examining governance models and policy innovations in Hong Kong vis-à-vis other cities - review of specific implemented cases of improvements in smart government.	CILO 2, CILO3, CILO 6
7	Smart Living: Technology and Quality of Life (Jun 30 Mon, 2-5)	- Overview of the Smart Living - Exploring technology-driven solutions for enhancing the quality of life in smart cities and discuss the issue of our ageing society around the world.	CILO 2, CILO3, CILO 6
8	Smart Mobility: Transportation and Infrastructure (Jul 2, Wed, 2-5)	- Overview of the Smart Mobility - Discussing innovative mobility solutions and transportation infrastructure in smart cities and walkability projects	CILO 2, CILO3, CILO 6
9	Design Thinking for Smart City Challenges / project briefing	- A design thinking primer for team collaboration / empathy - Application of design thinking to address smart city challenges and problems - Importance of design thinking in fostering innovation and user-centered solutions	CILO 1, CILO 3, CILO 7

	(Jul 4, Fri 9-12)		
10	Applications in Smart City Development (Jul 4, Fri, 2-5)	- Examining technology applications within each discipline of the Smart City Wheel - Case studies showcasing different technology solutions in smart city projects - Introduction of different vertical industry and platform innovations	CILO 2, CILO 4, CILO 5
11	Future Technology Trends in Smart Cities (Jul 7, Mon, 2-5)	- Discussion on emerging trends and advancements in the integration of open data and AI for smart city development - Explore the potential impact of ethical use of future technologies on urban environments	CILO 4, CILO 5
12	Realizing the Smart City Vision: Challenges and Opportunities (Jul 9, Wed, 2-5)	- Addressing challenges in implementing smart city projects - Identify challenges and opportunities for changes in government's public policy and citizen engagement in smart city development	CILO 1, CILO 3, CILO 5, CILO 7
13	Final Projects and Wrap-up (Jul 11, Fri, 9-12)	- Presentation and discussion of final projects related to a proposal in the chosen smart city development project. - Recap of key concepts and takeaways from the course - Reflection on the future of smart city development	CILO 4, CILO 5, CILO 7

Text Book available from HKUST Library

Yigitcanlar, T. (2023). *Smart City Blueprint: Framework, Technology, Platform*. CRC Press.

Yigitcanlar, T. (2023). *Smart City Blueprint: Policy, Community, Futures*. CRC Press.

References

Allam, Z., & Takun, Y. R. (2022). *Rethinking Smart Cities*. Edward Elgar Publishing.

Chun, D., Wahid, N. A., & Tan, C. L. (2020). Why smart leaders are important in smart city development – A conceptual framework. *International Journal of Industrial Management*, *5*, 1-9. *(Available online from open access at https://journal.ump.edu.my/ijim/article/view/5617)*

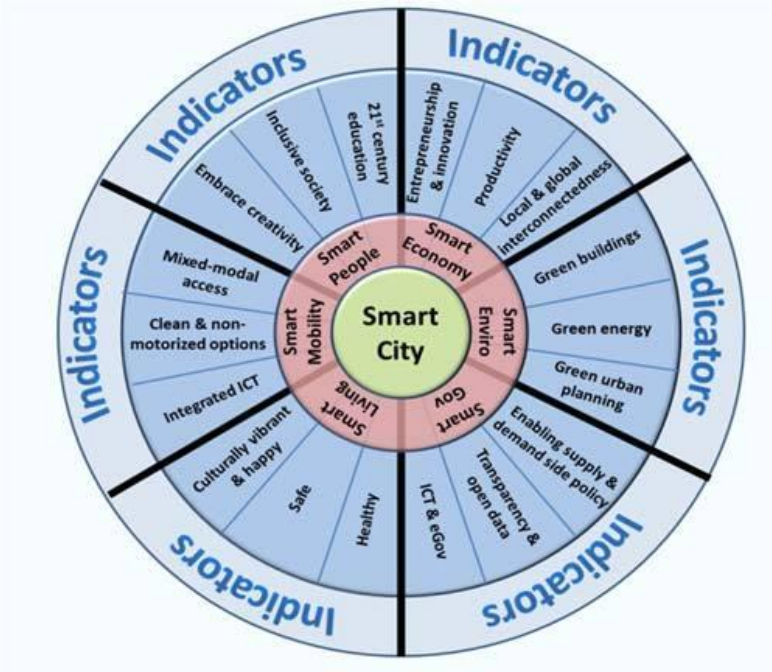
Chun, D. J. Y., Nabsiah, W. A., & Tan, C. L. (2022). Successful collaboration between smart city consortium and Hong Kong Government in Covid-19 dashboard: the case of leadership in practice. *International Journal of Organizational Analysis*, *30*(5), 1172-1187.

Cohen, B. (2013). The smart city wheel. *Smart Circle*.

Govada, S. S., Spruijt, W., & Rodgers, T. (2017). Smart city concept and framework. *Smart Economy in Smart Cities: International Collaborative Research: Ottawa, St. Louis, Stuttgart, Bologna, Cape Town, Nairobi, Dakar, Lagos, New Delhi, Varanasi, Vijayawada, Kozhikode, Hong Kong*, 187-198.

Student learning resources / Additional Information

The following diagram illustrate the smart city wheel concept used by Dr. Boyd Cohen (Cohen, 2013) for depicting the six areas of smart city development. These six dimensions was first conceived by a team compiling a report of ranking of European cities by Giffinger et al. (2007).



Credit: Smart City Wheel concept (Cohen, 2013)