Course Detail

Course Title : Master of Science Program in Smart City Management and Digital Innovation

Master Degree : **Master of Science (Smart City Management and Digital Innovation) /**
M.S. (Smart City Management and Digital Innovation)

Credit Requirement: Plan A Type A 2
Total Credit not less than 36 credits

Structure of the Program

Plan A Type A 2

No.	Requirements	Plan A Type A 2	
		Higher Education Curriculum Standards, 2022	Revised Curriculum 2025
1	Coursework not less than		18
	1.1 Core Courses	-	9
	1.2 Electives not less than	-	9
2	Thesis not less than	12	18
3	Independent Study	-	-
4	Required Non-Credit Courses	-	5
Total not less than		**36**	**36**

Plan A Type A 2

Coursework	**Not less than**	**18 Credits**
Core Courses		**9 Credits**
854501	Infrastructure and Smart City Management	3(2-3-5)
854502	Data Science and Machine Learning for Smart City	3(2-3-5)
854503	Innovation Management for Low Carbon Society	3(2-3-5)

Electives	**Not less than**	**9 Credits**

Students can select courses of their interest, totaling no less than 9 credits, under the guidance of their academic advisor.

854511	Feasibility Study and Business Plan for Smart City	3(2-3-5)
854512	Smart Energy System	3(3-0-6)
854513	Sustainable Community Energy Management for Smart City	3(3-0-6)
854514	Optimization for Low Carbon Energy System	3(2-3-5)
854515	Community Design and Urban Development for Smart City	3(3-0-6)
854516	Design of Innovation Platform for Smart City	3(2-3-5)
854517	Artificial Intelligence Tools and Applications for Smart City	3(2-3-5)
854518	Big Data Analytic and Utilization for Smart City	3(2-3-5)
854519	Special Topics in Smart City Management and Digital Innovation	3(3-0-6)

Thesis		**18 Credits**
854591	Thesis 1, Type A 2	3 Credits
854592	Thesis 2, Type A 2	6 Credits
854593	Thesis 3, Type A 2	9 Credits

Required Non-Credit Courses		**5 Credits**
854571	Research Methodology in Science and Technology	3(3-0-6)
854581	Seminar 1	1(0-2-1)
854582	Seminar 2	1(0-2-1)

Study Plan
Plan A Type A 2

The First Year
First Semester

854571	Research Methodology in Science and Technology (Non-credit)	3(3-0-6)
854501	Infrastructure and Smart City Management	3(2-3-5)
854502	Data Science and Machine Learning for Smart City	3(2-3-5
854503	Innovation Management for Low Carbon Society	3(2-3-5)
	Total	**9 Credits**

The First Year
Second Semester

854xxx	Elective Course	3(x-x-x)
854xxx	Elective Course	3(x-x-x)
854xxx	Elective Course	3(x-x-x)
854572	Seminar 1 (Non-credit)	1(0-3-1)
854591	Thesis 1, Type A 2	3 Credits
	Total	**12 Credits**

The Second Year
First Semester

854582	Seminar 2 (Non-credit)	1(0-2-1)
854592	Thesis 2, Type A 2	6 Credits
		Total 6 Credits

The Second Year
Second Semester

854593	Thesis 3, Type A 2	9 Credits
		Total 9 Credits

Course Content/Study Topic:

854501 Infrastructure and Smart City Management **3(3-0-6)**

Concepts and components of smart cities; dimensions and city operating systems; Infrastructure and public service subsystems; management and planning for growth, essential information and communication technology infrastructure; relevant laws and policies; benefits, evaluation indicators, and global examples of smart cities

854502 Science and Machine Learning for Smart City **3(2-3-5)**

Fundamentals of data science; exploratory data analysis; introduction to machine learning; deep learning; advanced machine learning techniques; big data technologies for smart cities; Internet of Things (IoT) and sensor networks in smart city; data integration and management; smart city applications

854503 Innovation Management for Low Carbon Society **3(2-3-5)**

Technology disruption to smart city and digital innovations; policy and strategy for smart city; creative thinking and digital innovation development for smart city; innovation management techniques; valuation of innovation; concepts of sustainability and expected characteristics of architecture according to sustainability

and low carbon society concepts; ideas and practices of efficient use of energy, renewable energy, and other available resources; creation of sustainability through professional practice

854511 Feasibility Study and Business Plan for Smart City 3(2-3-5)

Concept and technique of business strategic planning; business planning component; feasibility study for smart city projects; foresight analysis; implement the business plan; research for digital marketing; related tools; risk and sensitivity analysis; evaluation of economic, societal, and environmental impacts of the projects; case studies of success and failed business models

854512 Smart Energy System 3(3-0-6)

Smart energy in smart city context; smart energy technology; smart grid technology; microgrid system; distributed energy resources; demand response; virtual power plant and net zero energy

854513 Sustainable Community Energy Management for Smart City 3(3-0-6)

Problem and opportunity of community energy; community energy technology; digital technology for community; application of digital technology for community management; evaluating the cost-effectiveness of technology usage

854514 Optimization for Low Carbon Energy System 3(2-3-5)

Basics and principles of low carbon electric power and thermal systems; design principles and optimization techniques; optimization algorithms using mathematical optimization; metaheuristic optimization and hybrid optimization; computer programing; machine learning; application of optimization techniques for solving energy system problems and reduce carbon dioxide emissions; case study on using optimization technique for designing low carbon energy system

854515 Community Design and Urban Development for Smart City 3(3-0-6)

Meaning of community; characteristics of community and elements of the city; concept of urban design; urban structure; urban information; problem situations and challenges of urban development; urban management system; establishing linkages between community and city; process of community and stakeholder participation; space management for all groups of people

854516 Design of Innovation Platform for Smart City **3(2-3-5)**

System analysis and design conceptualization; data modeling; standardization and data integration; innovation platform in smart city; enabling tools and technologies for platform development; designing the platform in smart energy; business model canvas analysis; case studies of innovation platform in smart city

854517 Artificial Intelligence Tools and Applications for Smart City **3(2-3-5)**

Concept of artificial intelligence; machine learning fundamentals; linear classification; neural networks and deep learning; data collection and management; computer vision in smart city; natural language processing; optimization with artificial intelligence; public safety and security; ethics and privacy in artificial intelligence

854518 Big Data Analytic and Utilization for Smart City **3(2-3-5)**

Big data conceptualization; big data analytic; big data analytics tools and technologies; open data and the challenges; designing the big data infrastructure; evaluate the big data technologies for implementation in smart city; big data utilization for business value in smart city; case studies on applying big data for smart city

854519 Special Topics in Smart City Management and Digital Innovation **3(3-0-6)**

New knowledge in smart city management and digital innovation based on current interest such as foresight, various crises, artificial intelligence, smart energy, smart environment

854571 Research Methodology in Science and Technology **3(3-0-6)**

Research definition, characteristic, and research goals; types and research processes; research problem determination; variables and hypothesis; data collection; data analysis; proposal and research report writing; research evaluation; research application; ethics of researcher; proper techniques of research methodology in science and technology

854581 Seminar 1 **1(0-2-1)**

Emphasize on encouraging students to learn how to search, criticize the articles and published papers; practice the oral presentation with precise content on related topics of current research or thesis in smart city management and digital innovation

854582 Seminar 2 **1(0-2-1)**

Presentation and discussion of current research topics related to smart city management and digital innovation with precise topic and content

854591 Thesis 1, Type A 2 **3 Credits**

Studying the components of a thesis or of samples of thesis studies in related fields; determining the thesis topic/title; developing a concept paper; and preparing a review of related literature and research studies

854592 Thesis 2, Type A 2 **6 Credits**

Design and develop data collection tools; research methodology and preparing a thesis proposal and to be presented to the thesis committee; obtain approval for thesis proposal to conduct research

854593 Thesis 3, Type A 2 **9 Credits**

Collecting data; analyzing data; preparing a progress report to be presented to the thesis advisor(s); preparing a complete thesis and publishing a research article according to the graduation criteria and defending thesis examination; submit the final version of the thesis

Requirements to Graduate in Master Degree

Requirements	Plan A Type A 2
1. Having completed the duration of study as specified by the course	✓
2. Having registered all courses as required by the course	✓
3. Having completed all courses and passed all conditions as specified in the course	✓
4. Having a grade point average of not less than 3.00	✓
5. Having passed the English proficiency test as announced by the University 5.1 Internet-based TOEFL : 35 5.2 International English Language Testing System (IELTS) : 5.0 5.3 CU-TEP : 54 5.4 Cambridge Placement Test (CEPT) : B1 (37) 5.5 Test of English for International Communication (TOEIC) : 601 5.6 TEC-W Score : 76 5.7 English Proficiency Enhancement for Graduates (EPE) : EPE Intermediate	✓
6. Having proposed the thesis defense and passed the final oral thesis defense	✓
7. The thesis or part of the thesis must be published or at least have been accepted for **publication in the form of articles, creative works, innovations, inventions, or other academic works** that can be searched in accordance with the university announcement along with the university council's approval.	✓

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