MOBILITY (GRADUATE CERTIFICATE)

People require mobility, because it empowers them to conquer the distance that separates their homes from the locations where they study, work, shop, seek medical treatment, do business, or visit friends. In the meanwhile, Wayne State University is demonstrating a commitment to improve quality of life for individuals and communities through excellence in mobility-related research, teaching, and service. This certificate program is the first of its kind in Michigan, focusing on mechanisms known as mobility, which is the ability to meet the needs of society to move freely, gain access, communicate, commute, and establish connectivity with the advanced mobility technologies today or in the future.

Admission Requirements

Admission to this program is contingent upon admission to the Graduate School (http://bulletins.wayne.edu/graduate/general-information/admission/). A student needs to hold a bachelor's degree in a discipline of engineering from an accredited institution. The program is also open to students who are currently enrolled in a graduate degree program in the College of Engineering at Wayne State University.

Program Requirements

Students must complete CSC 5280/ECE 5280: Introduction to Cyber-Physical Systems (CPS) or CSC 5100: Introduction to Mobility as well as two-intermediate-level courses and one advanced course in one of the Mobility tracks: Sensing, Computer and Networking, Control and Robotics, Smart Transportation, Smart Grid, Connected Autonomous Vehicles, or Smart Health.

A maximum of nine credits taken in the Mobility Graduate Certificate Program may be applied toward a graduate degree subject to approval of the relevant academic unit and Graduate Office. All requirements must be completed within three years with a minimum 3.0 GPA required in the certificate coursework. All course work must be completed in accordance with the regulations of the Graduate School (http://bulletins.wayne.edu/graduate/general-information/academic-regulations/) and the College of Engineering (http://bulletins.wayne.edu/graduate/college-engineering/academic-regulations/).

Sensing Track

Code	Title	Credits
Introductory course (select one)		**3**
CSC 5100	Introduction to Mobility	
CSC/ECE 5280	Introduction to Cyber-Physical Systems (Or)	
Intermediate level courses (select two):		**6**
ECE 5575	Introduction to Micro and Nano Electro Mechanical Systems (MEMS/NEMS)	
ECE 6570	Smart Sensor Technology I: Design	
CSC 5825	Introduction to Machine Learning and Applications	
CSC 6860	Digital Image Processing and Analysis	
CSC 5870	Computer Graphics I	
CSC 6870	Computer Graphics II	
CSC 6991	Topics in Computer Science	
Advanced level course (select one):		**3**
ECE 7570	Smart Sensor Technology II: Characterization and Fabrication	
CSC 7825	Machine Learning	
CSC 7991	Advanced Topics in Computer Science	
Total Credits		**12**

Connected Autonomous Vehicles Track

Code	Title	Credits
Introductory course (select one):		**3**
CSC 5100	Introduction to Mobility	
CSC/ECE 5280	Introduction to Cyber-Physical Systems (Or)	
Intermediate level courses (select two):		**6-7**
CSC 5800	Intelligent Systems: Algorithms and Tools	
CSC 6280	Real-Time and Embedded Operating Systems	
CSC 6290	Data Communication and Computer Networks	
ECE 5440	Traditional and Machine Learning-Based Computer-Controlled Systems	
Advanced level course (select one):		**3**
CSC 7991	Advanced Topics in Computer Science (Connected Autonomous Vehicles)	
CSC 8260	Seminar in Networking, Distributed Systems and Parallel Systems	
Total Credits		**12-13**

Computing and Networking Track

Code	Title	Credits
Introductory course (select one):		**3**
CSC 5100	Introduction to Mobility	
CSC/ECE 5280	Introduction to Cyber-Physical Systems (Or)	
Intermediate level courses (select two):		**6**
ECE 5620	Embedded System Design	
CSC 5825	Introduction to Machine Learning and Applications	
CSC 6280	Real-Time and Embedded Operating Systems	
ECE 5650	Computer Networking and Network Programming	
ECE 5995	Special Topics in Electrical and Computer Engineering I	
EET 5720	Computer Networking Applications	
CSC 6290	Data Communication and Computer Networks	
CSC 6991	Topics in Computer Science	
CSC 5270	Computer Systems Security	
CSC 5830	Computational Modeling of Complex Systems	
Advanced level course (select one):		**3**
CSC 7991	Advanced Topics in Computer Science	
CSC 8260	Seminar in Networking, Distributed Systems and Parallel Systems	
ECE 7995	Special Topics in Electrical and Computer Engineering II	
CSC 7825	Machine Learning	
CSC 7270	Advanced Computer Security	
Total Credits		**12**

Control and Robotics Track

Code	Title	Credits
Introductory course (select one):		**3**
CSC 5100	Introduction to Mobility	
CSC/ECE 5280	Introduction to Cyber-Physical Systems (Or)	
Intermediate level courses (select two):		**8**
ECE 5425	Robotic Systems I	

ECE 5440	Traditional and Machine Learning-Based Computer-Controlled Systems	
ECE 5470	Control Systems II	
Advanced level course (select one):		**4**
ECE 7420/ ME 7590	Nonlinear Control Systems	
ECE 7430	Discrete Event Systems with Machine Learning	
ECE 7440	Optimal Control with Machine Learning and Applications	
Total Credits		**15**

Smart Transportation Track

Code	Title	Credits
Introductory course (select one):		**3**
CSC 5100	Introduction to Mobility	
CSC/ECE 5280	Introduction to Cyber-Physical Systems (Or)	
Intermediate level courses (select two):		**6-7**
CE 5995	Special Topics in Civil Engineering I	
CE 7995	Special Topics in Civil Engineering II	
CSC 5825	Introduction to Machine Learning and Applications	
Advanced level course (select one):		**3-4**
ECE 7440	Optimal Control with Machine Learning and Applications	
CSC 7825	Machine Learning	
CSC 7991	Advanced Topics in Computer Science	
Total Credits		**12-14**

Smart Grid Track

Code	Title	Credits
Introductory course (select one):		**3**
CSC 5100	Introduction to Mobility	
CSC/ECE 5280	Introduction to Cyber-Physical Systems (Or)	
Intermediate level courses (select two):		**7-8**
ECE 5430	Electric Energy Systems Engineering	
ECE 5330	Modeling and Control of Power Electronics and Electric Vehicle Powertrains	
CSC 5825	Introduction to Machine Learning and Applications	
Advanced level course (select one):		**3-4**
ECE 7440	Optimal Control with Machine Learning and Applications	
CSC 7825	Machine Learning	
ECE 7860	Operation and Control of Modern Power Systems	
Total Credits		**13-15**

Smart Health Track

Code	Title	Credits
Introductory course (select one):		**3**
CSC 5100	Introduction to Mobility	
CSC/ECE 5280	Introduction to Cyber-Physical Systems (Or)	
Intermediate level courses (select two):		**7-8**
ECE 5575	Introduction to Micro and Nano Electro Mechanical Systems (MEMS/NEMS)	
CSC 5825	Introduction to Machine Learning and Applications	
ECE 6570	Smart Sensor Technology I: Design	
ECE 7570	Smart Sensor Technology II: Characterization and Fabrication	
Advanced level course:		**3**
CSC 7825	Machine Learning	
Total Credits		**13-14**