

# MASTER OF ENGINEERING IN ARTIFICIAL INTELLIGENCE FOR COMPUTER VISION AND CONTROL

AI has become a valuable and important catalyst for other technologies such as the Internet of Things and Cyber Physical Systems. AI is also considered as the engine that powers several truly ground-breaking Computer Vision, Control and Cybernetic applications such as autonomous cars, robotic personal assistants and automated manufacturing. The Master of Engineering in Artificial Intelligence, Computer Vision and Control degree is intended to provide interested students maximum exposure towards the very fast evolving AI technologies, machine learning, and methods while particularly targeting Electrical and Computer Engineering topics such as computer vision, medical image diagnosis, power system distribution, robotics and automation. Today, all major new technology products inherit a layer of artificial intelligence unit for self-learning and adaptability. Depending on the application or platform, this AI component can be used for speech recognition, face recognition or context-aware human-device interactions. The wide use of these AI technologies resulted in a major spike in the demand for engineers who are trained in this dynamic and fast-growing exciting field. Through the Master of Engineering in Artificial Intelligence, Computer Vision and Control students will be ready to overcome challenges in the field of core AI framework, signal & image processing and computer vision, control systems, embedded systems, integrated circuits and VLSI including neuromorphic computing, network, communication and information systems, power systems and robotics.

Requirement	Credits
Minimum Credits Required	30
Maximum 400-Level Credit	12
Minimum 500-Level+ Credit	18
Maximum 700-Level Credit	4
Maximum Transfer Credit	9

Code	Title	Credit Hours
<b>Required Courses (15)</b>		
Select minimum 5 courses from the following: 15		
ECE 437 or ECE 569	Digital Signal Processing I Digital Signal Processing II	3
ECE 438 or ECE 533	Control Systems Robust Control	3
ECE 501	Artificial Intelligence and Edge Computing	3
ECE 510	Internet of Things and Cyber Physical Systems	3
ECE 563	Artificial Intelligence in Smart Grid	3
ECE 565	Computer Vision and Image Processing (required)	3
ECE 566	Machine and Deep Learning (required)	3
ECE 572	Secure Machine Learning Design and Applications	3
ECE 573	Cloud Computing and Cloud Native Systems	3

ECE 574	Data Science for Engineers	3
ECE 590	Object-Oriented Programming and Machine Learning (required)	3
ECE 597	Special Problems (Artificial Intelligence, Computer Vision and Control)	1-3

## Signal and Image Processing Elective (3)

Select a minimum 1 course from the following: 3

ECE 437	Digital Signal Processing I	3
ECE 481	Image Processing	3
ECE 508	Video Communications	3
ECE 511	Analysis of Random Signals	3
ECE 563	Artificial Intelligence in Smart Grid	3
ECE 565	Computer Vision and Image Processing	3
ECE 566	Machine and Deep Learning	3
ECE 567	Statistical Signal Processing	3
ECE 568	Digital Speech Processing	3
ECE 569	Digital Signal Processing II	3
ECE 572	Secure Machine Learning Design and Applications	3

## Computer Engineering Elective (3)

Select a minimum 1 course from the following: 3

ECE 408	Introduction to Computer Networks	3
ECE 441	Smart and Connected Embedded System Design	4
ECE 501	Artificial Intelligence and Edge Computing	3
ECE 510	Internet of Things and Cyber Physical Systems	3
ECE 517	Modern Wireless Network Protocols and Standards	3
ECE 518	Computer Cyber Security	3
ECE 520	Information Theory and Applications	3
ECE 528	Application Software Design	3
ECE 541	Communications Networks Performance Analysis	3
ECE 543	Computer Network Security	3
ECE 545	Modern Internet Technologies	3
ECE 573	Cloud Computing and Cloud Native Systems	3
ECE 574	Data Science for Engineers	3
ECE 585	Computer Organization and Design	3
ECE 586	Hardware Security and Advanced Computer Architectures	3
ECE 587	Hardware/Software Codesign	3
ECE 590	Object-Oriented Programming and Machine Learning	3

## Power and Control Engineering Elective (3)

Select a minimum 1 course from the following: 3

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ECE 411	Power Electronics	4
ECE 438	Control Systems	3
ECE 505	Applied Optimization for Engineers	3
ECE 512	Hybrid Electric Vehicle Drives	3
ECE 533	Robust Control	3
ECE 537	Next Generation Smart Grid	3
ECE 549	Motion Control Systems Dynamics	3
ECE 550	Power Electronic Dynamics and Control	3
ECE 551	Advanced Power Electronics	3
ECE 552	Adjustable Speed Drives	3
ECE 555	Power Market Operations	3
ECE 557	Fault-Tolerant Power Systems	3
ECE 558	Power System Reliability	3
ECE 560	Power Systems Dynamics and Stability	3
ECE 564	Control and Operation of Electric Power Systems	3
ECE 579	Operations and Planning and Distributed Power Grid	3
ECE 580	Elements of Sustainable Energy	3
ECE 581	Elements of Smart Grid	3
ECE 582	Microgrid Design and Operation	3
<b>Elective Courses</b>		<b>(6)</b>
The remaining elective courses may be chosen from any of the listed core or elective options, provided that those courses were not already used to satisfy another degree requirement.		6
<b>Total Credit Hours</b>		<b>30</b>