

## Expected Course Offerings

### Electrical and Computer Engineering

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Course #	Course Name	Pre-Req*	Summer	Fall	Spring
<b>Prerequisite Courses</b>					
525.201	Circuits, Devices, and Fields		O	O	O
525.202	Signals and Systems		O	O	O
Course #	Course Name	Pre-Req*	Summer	Fall	Spring
<b>AI and Autonomous Systems Focus Area</b>					
520.633	Introduction to Robust Control				
520.640	Machine Intelligence on Embedded Systems				
520.659	Machine Learning for Medical Applications				
520.680	Speech and Auditory Processing by Humans and Machines				
520.698	Networks Meet Machine Learning: Methods and Applications				
525.609	Continuous Control Systems			O	O
525.610	Microprocessors for Robotic Systems			TBD	
525.614	Probability & Stochastic Processes for Engineers		O	O, 8VL	O, 8VL
525.619	Introduction to Digital Image and Video Processing	525.627	8VL		
525.627	Digital Signal Processing		O	O, 8VL	O
525.629	Discrete-Time Control Systems		O	O	
525.637	Foundations of Reinforcement Learning			O	
525.648	Introduction to Radar Systems	525.614 & 525.627	O	O	
525.650	Introduction to EO/IR Systems			O	
525.655	Audio Signal Processing			3VL	3VL
525.665	Machine Perception			O	O
525.670	Machine Learning for Signal Processing	525.614 & 525.627		O	O
525.671	Deep Learning and Generative Artificial Intelligence			*TBD* in development	
525.674	Image Processing & Analysis				O
525.681	AI and Autonomous Systems			*TBD* in development	
525.724	Introduction to Pattern Recognition	525.614		8VL	
525.733	Deep Learning for Computer Vision				8VL
525.745	Applied Kalman Filtering	525.614 & 525.666			8VL
525.747	Speech Processing	525.614 & 525.627			3VL
525.756	Optical Propagation, Sensing, and Backgrounds				3VL
525.759	Image Compression, Packet Video, and Video Processing	525.627		O	
525.764	Nonlinear Controls	525.666		3VL	
525.770	Intelligent Algorithms			O	O
525.786	Human Robotics Interactions				APL
535.645	Digital Control and Systems Applications				
605.613	Introduction to Robotics				
605.645	Artificial Intelligence				
605.647	Neural Networks				
605.649	Principles and Methods in Machine Learning				
605.716	Modeling and Simulation of Complex Systems				
605.742	Deep Neural Networks				
605.743	Advanced Artificial Intelligence				
605.745	Reasoning Under Uncertainty				
605.746	Advanced Machine Learning				
605.747	Evolutionary and Swarm Intelligence				
695.637	Introduction to Assured AI and Autonomy				
705.605	Introduction to Generative AI				
705.643	Deep Learning Developments with PyTorch				
705.741	Reinforcement Learning				
Course #	Course Name	Pre-Req*	Summer	Fall	Spring
<b>Communications and Networking Focus Area</b>					
525.605	Intermediate Electromagnetics		O	O	
525.608	Next Generation Telecommunications	525.616		3VL	
525.614	Probability & Stochastic Processes for Engineers		O	O, 8VL	O, 8VL
525.616	Communication Systems Engineering		O	O, 8VL	O, 8VL
525.617	Computation for Engineers			O	O
525.618	Antenna Systems	525.605 or 615.642		O	O
525.620	Electromagnetic Transmission Systems	525.605		8VL (even yrs)	
525.627	Digital Signal Processing		O	O, 8VL	O
525.628	Compressed Sensing and Sparse Recovery			O	O
525.638	Introduction to Wireless Technology			O	

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Course #	Course Name	Pre-Req*	Summer	Fall	Spring
525.640	Satellite Communications Systems			O	O
525.641	Computer and Data Communication Networks I	525.614 & 525.616			8VL
525.654	Communications Circuits Lab	525.616			O
525.656	Antenna Designs for Space Systems				8VL
525.678	Next Generation Mobile Networks and Security with 5G			8VL	
525.707	Error Control Coding	525.614, 525.616 & 625.609			8VL
525.708	Iterative Methods in Communications Systems	525.614, 525.616 & 625.609		8VL	
525.722	Wireless and Mobile Cellular Communications	525.614 & 525.616		O	O
525.735	MIMO Wireless Communications	525.614 & 525.616			O
525.738	Advanced Antenna Systems	525.618	O		
525.747	Speech Processing	525.614 & 525.627			3VL
525.751	Software Radio for Wireless Communications	525.616 or 525.638 and 525.627		O	O
525.752	Digital Receiver Synchronization Techniques	525.627			3VL
525.754	Wireless Communication Circuits	525.616 or 525.624 or 525.654	*TBD* in development		
525.759	Image Compression, Packet Video, and Video Processing	525.627		O	
525.761	Wireless and Wireline Network Integration	525.608 or 525.616	8VL		
525.768	Wireless Networks	525.641 or 605.671	*TBD* in development		
525.771	Propagation of Radio Waves in the Atmosphere			3VL	
525.772	Fiber-Optic Communication Systems			8VL	
525.776	Information Theory	525.614			O
525.783	Spread Spectrum Communications	525.616	O	O	
525.789	Advanced Satellite Communications	525.616 & 525.640			8VL
525.791	Microwave Communications Lab	525.774	APL		
525.793	Advanced Communications Systems	525.614 & 525.616			O
<b>Computer Engineering Focus Area</b>					
525.610	Microprocessors for Robotic Systems		*TBD* in development		
525.612	Computer Architecture	525.642			O
525.615	Embedded Microprocessor Systems			O	O
525.617	Computation for Engineers			O	O
525.634	High Speed Digital Design			8VL	8VL
525.642	FPGA Design Using VHDL		O	O	O
525.674	Image Processing & Analysis				O
525.677	Hardware Architectures for DSP Algorithms		*TBD* in development		
525.712	Advanced Computer Architecture	525.612		O	
525.742	System-on-a-Chip FPGA Design Laboratory	525.642		O	O
525.743	Embedded Systems Development Lab	525.612		8VL	8VL
525.778	Design for Reliability, Testability, and Quality Assurance	525.614	1		
525.786	Human Robotics Interaction				APL
<b>Electronics and the Solid State Focus Area</b>					
525.606	Electronic Materials				8VL (even yrs)
525.607	Intro to Electronic Packaging		8VL		
525.617	Computation for Engineers			O	O
525.621	Introduction to Electronics and the Solid State		*TBD* in development		
525.623	Principles of RF and Microwave Circuits			O	O
525.624	Analog Electronic Circuit Design		O	O	O
525.651	Introduction to Electric Power Systems			O	
525.654	Communications Circuits Lab	525.616			O
525.657	Measurement and Instrumentation		*TBD* in development		
525.658	Digital VLSI System Design			O	
525.659	Mixed-Mode VLSI Circuit Design				O
525.725	Power Electronics	525.624		O	O
525.726	Applications of Power Electronics Design	525.725		O	O
525.727	Advanced Power Electronics	525.725		O	O
525.732	Advanced Analog Electronic Circuit Design	525.624		O	O
525.754	Wireless Communication Circuits	525.616 or 525.624 or 525.654	*TBD* in development		
525.774	RF & Microwave Circuits I	525.620 or 525.623	3VL	3VL	3VL
525.775	RF & Microwave Circuits II	525.620 or 525.623	3VL		3VL
525.779	RF Integrated Circuits	525.774			APL (even yrs)
525.787	Microwave Monolithic Integrated Circuit (MMIC) Design	525.775		8VL	
525.788	Power Microwave Monolithic Integrated Circuit (MMIC) Design				8VL (odd yrs)

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Course #	Course Name	Pre-Req*	Summer	Fall	Spring
525.790	RF Power Amplifier Design Techniques	525.620 or 525.623		O	
525.791	Microwave Communications Lab	525.774	APL		
<b>Optics and Photonics Focus Area</b>					
525.603	Advanced Topics in Optical Medical Imaging			O	
525.604	Introduction to Optical Instruments			O	
525.613	Fourier Techniques in Optics			O	
525.617	Computation for Engineers			O	O
525.625	Laser Fundamentals	525.605		O	
525.636	Optics & Photonics Lab	525.605		8VL	
525.650	Introduction to EO/IR Systems			O	
525.691	Fundamentals of Photonics				O
525.753	Laser Systems and Applications	525.625		*TBD*	
525.756	Optical Propagation, Sensing, and Backgrounds				3VL
525.772	Fiber-Optic Communication Systems			8VL	
525.796	Introduction to High-Speed Optoelectronics		8VL		
525.797	Advanced Fiber Optic Laboratory	525.691 or 615.751	APL (Start SU26)		
<b>RF and Microwave Engineering Focus Area</b>					
525.605	Intermediate Electromagnetics		O	O	
525.617	Computation for Engineers			O	O
525.618	Antenna Systems	525.605 or 615.642		O	O
525.620	Electromagnetic Transmission Systems	525.605		8VL (even yrs)	
525.623	Principles of RF and Microwave Circuits			O	O
525.628	Compressed Sensing and Sparse Recovery			O	O
525.648	Introduction to Radar Systems	525.614 & 525.627	O	O	
525.654	Communications Circuits Lab	525.616			O
525.656	Antenna Designs for Space Systems				8VL
525.684	Microwave Systems & Receiver Design			8VL	O
525.738	Advanced Antenna Systems	525.618	O		
525.754	Wireless Communication Circuits	525.616 or 525.624 or 525.654	*TBD* in development		
525.771	Propagation of Radio Waves in the Atmosphere			3VL	
525.774	RF & Microwave Circuits I	525.620 or 525.623	3VL	3VL	3VL
525.775	RF & Microwave Circuits II	525.620 or 525.623	3VL		3VL
525.779	RF Integrated Circuits	525.774	TBD		
525.787	Microwave Monolithic Integrated Circuit (MMIC) Design	525.775		8VL	
525.788	Power Microwave Monolithic Integrated Circuit (MMIC) Design				8VL (odd yrs)
525.790	RF Power Amplifier Design Techniques	525.620 or 525.623		O	
525.791	Microwave Communications Lab	525.774	APL		
615.642	Electromagnetics		<a href="#">See Applied Physics Course Offering page for schedule</a>		
<b>Signal Processing Focus Area</b>					
525.611	Modern Convex Optimization			O	
525.614	Probability & Stochastic Processes for Engineers		O	O, 8VL	O, 8VL
525.617	Computation for Engineers			O	O
525.619	Introduction to Digital Image and Video Processing	525.627	8VL		
525.627	Digital Signal Processing		O	O, 8VL	O
525.628	Compressed Sensing and Sparse Recovery			O	O
525.630	Digital Signal Processing Lab	525.627		O	
525.631	Adaptive Signal Processing	525.627			O
525.638	Introduction to Wireless Technology			O	
525.646	DSP Hardware Lab	525.627	8VL		
525.648	Introduction to Radar Systems	525.614 & 525.627	O	O	
525.655	Audio Signal Processing			3VL	3VL
525.665	Machine Perception			O	O
525.670	Machine Learning for Signal Processing	525.614 & 525.627		O	O
525.674	Image Processing & Analysis				O
525.677	Hardware Architectures for DSP Algorithms		*TBD* in development		
525.718	Multirate Signal Processing	525.627		O	O
525.721	Advanced Digital Signal Processing	525.614 & 525.627			O

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Course #	Course Name	Pre-Req*	Summer	Fall	Spring
525.724	Introduction to Pattern Recognition	525.614		8VL	
525.728	Detection & Estimation Theory	525.614		O	O
525.733	Deep Learning for Computer Vision				8VL
525.735	MIMO Wireless Communications	525.614 & 525.616			O
525.736	Radar Signal Processing		*TBD* in development		
525.744	Passive Emitter Geo-Location	525.614		8VL	8VL
525.745	Applied Kalman Filtering	525.614 & 525.666			8VL
525.746	Image Engineering	525.627	O	O	O
525.747	Speech Processing	525.614 & 525.627			3VL
525.748	Synthetic Aperture Radar	525.648		O	
525.751	Software Radio for Wireless Communications	525.616 or 525.638 and 525.627		O	O
525.759	Image Compression, Packet Video, and Video Processing	525.627		O	
525.762	Introduction to Wavelets			O	
525.763	Advanced Linear and Nonlinear Estimation		*TBD* in development		
525.780	Multidimensional Digital Signal Processing	525.627			3VL

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Course #	Course Name	Pre-Req*	Summer	Fall	Spring
625.603	Statistical Methods and Data Analysis				
625.609	Matrix Theory				
625.620	Mathematical Methods for Signal Processing				
625.710	Fourier Analysis with Applications to Signal Processing and Differential				
<b>Systems and Controls Focus Area</b>					
520.633	Introduction to Robust Control		See JHU Course Catalog for schedule		
525.609	Continuous Control Systems			O	O
525.611	Modern Convex Optimization			O	
525.614	Probability & Stochastic Processes for Engineers		O	O, 8VL	O, 8VL
525.617	Computation for Engineers			O	O
525.626	Feedback Control in Biological Signaling Pathways			O	
525.628	Compressed Sensing and Sparse Recovery			O	O
525.629	Discrete-Time Control Systems		O		O
525.637	Foundations of Reinforcement Learning			O	
525.644	Optimal Control and Estimation: Theory and Applications		*TBD* in development		
525.645	Modern Navigation Systems			O	O
525.652	Electric Machines and Control for Electrification			O	8VL
525.661	UAV Systems and Control	525.609		O	O
525.665	Machine Perception			O	O
525.666	Linear System Theory				3VL
525.744	Passive Emitter Geo-Location	525.614		8VL	8VL
525.745	Applied Kalman Filtering	525.614 & 525.666			8VL
525.764	Nonlinear Controls	525.666		O	
525.770	Intelligent Algorithms			O	O
525.777	Control System Design Methods	525.609 & 525.666	O		O
535.645	Digital Control and Systems Applications		See Mechanical Engineering Course Offering page for schedule		
605.613	Introduction to Robotics		See Computer Science Course Offering page for schedule		
605.716	Modeling and Simulation of Complex Systems		See Applied and Computational Mathematics Course Offering page for schedule		
625.615	Introduction to Optimization		See Applied and Computational Mathematics Course Offering page for schedule		
625.695	Time Series Analysis		See Applied and Computational Mathematics Course Offering page for schedule		
625.714	Introductory Stochastic Differential Equations with Applications		See Applied and Computational Mathematics Course Offering page for schedule		
625.743	Stochastic Optimization & Control		See Applied and Computational Mathematics Course Offering page for schedule		
695.615	Cyber Physical Systems Security		See Applied and Computational Mathematics Course Offering page for schedule		
<b>Special Project/Thesis Courses</b>					
525.801	Special Project I	Project proposal approved by program chair in advance	O	O	O
525.802	Special Project II		O	O	O
525.803	Electrical and Computer Engineering Thesis	Completion of all other courses & program chair approval	O	O	O
525.804	Electrical and Computer Engineering Thesis		O	O	O
<b>Concentration: Communications and Networking</b>					
<b>Select five of the following:</b>					
525.608	Next Generation Telecommunications	525.616		3VL	
525.614	Probability & Stochastic Processes for Engineers		O	O, 8VL	O, 8VL
525.616	Communication Systems Engineering		O	O, 8VL	O, 8VL
525.618	Antenna Systems	525.605 or 615.642		O	O
525.620	Electromagnetic Transmission Systems	525.605		8VL (even yrs)	
525.638	Introduction to Modern Wireless and Optical Communication Systems			O	
525.640	Satellite Communications Systems			O	O
525.641	Computer and Data Communication Networks I	525.614 & 525.616			8VL
525.654	Communications Circuits Lab	525.616			O
525.678	Next Generation Mobile Networks and Security with 5G			8VL	
525.707	Error Control Coding	525.614, 525.616 & 625.609			8VL
525.708	Iterative Methods in Communications Systems	525.614, 525.616 & 625.609		8VL	
525.722	Wireless and Mobile Cellular Communications	525.614 & 525.616		O	O
525.735	MIMO Wireless Communications	525.614 & 525.616			O
525.738	Advanced Antenna Systems	525.618	O		
525.747	Speech Processing	525.614 & 525.627			3VL
525.751	Software Radio for Wireless Communications	525.616 or 525.638 and 525.627		O	O
525.754	Wireless Communication Circuits	525.616 or 525.624 or 525.654	*TBD* in development		

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525.759	Image Compression, Packet Video, and Video Processing	525.627		O	
525.761	Wireless and Wireline Network Integration	525.608 or 525.616	8VL		
525.768	Wireless Networks	525.641 or 605.671		TBD	
525.771	Propagation of Radio Waves in the Atmosphere			3VL	
525.772	Fiber-Optic Communication Systems			8VL	
525.776	Information Theory	525.614			O
525.783	Spread Spectrum Communications	525.616	O	O	
525.789	Advanced Satellite Communications	525.616 & 525.640			8VL
525.791	Microwave Measurement Theory and Techniques	525.774	APL		
525.793	Advanced Communications Systems	525.614 & 525.616			O
<b>Select two of the following:</b>					
605.671	Principles of Data Communication Networks				
605.674	Network Programming				
605.675	Protocol Design				
605.677	Internetworking with TCP/IP I				

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