Ph.D. in Engineering

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Degree Codes: ES PhD ENGR **Concentration:** Engineering Physics

Course Category	Number	Course Name		SCH
Core Courses	PHYS 510 or ENGR 641	Mathematical Methods for Scientists and Engineers (Fall)	3	9
	STAT 620	Theory of Probability (Fall)	3	
	MATH 574	Numerical Solutions to PDEs (Spring)	3	
Concentration Courses[1]	PHYS 511	Electromagnetic Theory (Spring)	3	15
	PHYS 512	Solid State Physics (Fall)	3	
	PHYS 521 or MEEN 571	Theoretical Mechanics (Winter)	3	
	PHYS 522	Quantum Mechanics (Spring)	3	
	PHYS 533	Statistical Mechanics (Winter)	3	
Qualifying Examinations[2]	ENGR 685	Written Qualifying Exam	0	
	ENGR 686	Oral Comprehensive Exam	0	
Doctoral Seminar	ENGR 611	Dissertation Enhancement Seminar (taken three times)	1	3
Electives[3]	Select seven (21 semester hours) from electives list or others approved by advisory committee			21
Research and Dissertation[4]	ENGR 651	Pre-Candidacy Doctoral Research	1-9	9
	ENGR 751	Post-Candidacy Dissertation Research	1-9	9
				Total 66

1 The concentration courses for the concentration in Engineering Physics.

[2] The qualifying examinations are managed by the Chair of the Advisory Committee. ENGR 685 consists of a written exam and the submission of a preliminary dissertation proposal. In addition to preliminary dissertation proposal, for a student to pass ENGR 685, they must pass three or more concentration courses. ENGR 686 involves a presentation focused on the student's proposed doctoral research and may include questions from deficient sections of the written Qualifying Exam. The student is strongly urged to contact the Program Contact in the quarter before attempting ENGR 685.

[3] Students can take up to two Doctoral level Special Topics courses – either PHYS 557 or ENGR 657 for a total of 6 SCH.

[4] Complete 9 SCH of ENGR 651 prior to ENGR 686. After successful passing ENGR 686, complete 9 SCH of ENGR 751. Registration in any quarter is for 1 to 3 semester hours or multiples thereof, up to a maximum of 9 semester hours per quarter.

*Students are expected to have published one or more peer reviewed journal publications or conference proceedings by the time they graduate.

Suggested Electives

BIEN 557	Special Topics: BioMEMS	MSE 501	Microsystem Principles
BIEN 557	Special Topics: Protein Engineering	MSE 502	Microfabrication Principles
CHEM 523	Nanofabrication by Self-Assembly	MSE 503	Microfabrication Applications and Device Fabrication
CHEM 502	Selected Topics in Organic Chemistry: Principles of Polymers	MSE 504	Advanced Materials for Micro/Nano Devices and Systems
ENGR 566	Quality in Engineering	MSE 505	Nanotechnology Principles
ENGR 592	Engineering Computational Methods	MSE 506	Micro/Nano Scale Mater., Measure., and Analysis
ELEN 533	Optoelectronics	PHYS 515	Detectors for Particle & Nuclear Physics
ELEN 535	Advanced Topics in Microelectronics	PHYS 523	Classical Theory of Fields
MATH 655	Mathematical Modeling	PHYS 524	Quantum Theory of Fields
MEEN 549	Computational Fluid Dynamics	PHYS 531	Theories of Physics I
MEMT 508	Finite Element Methods	PHYS 532	Theories of Physics II
MEMT 511	Modern Engineering Materials	PHYS 540	Comput. Methods in Phys. Modeling and Sim. I
MEMT 565	Continuum Mechanics	PHYS 541	Comput. Methods in Phys. Modeling and Sim. II

Plan of Study Important Information: When entering information in the plan of study, it is important to note that only core courses and all core courses need to be put in section 1.1, while all others are put in section 1.2 (i.e. special topics, seminar, and research courses). See http://coes.latech.edu/grad-programs/plan-of-study-instructions.pdf for plan of study instructions.

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