

Ph. D. in Engineering Engineering Physics Concentration

Recommended Curriculum¹ (03/2016)

Degree Codes: ES PhD ENGR

Contact: Prof. Neven Simicevic

General Core Courses

Take all three of the following: (9 SCH)

PHYS 510/ENGR 641	Mathematical Methods for Scientists and Engineers (<i>Fall</i>)
STAT 505	Statistics for Engineering and Science (<i>Winter</i>)
MATH 574	Numerical Solutions to PDEs (<i>Spring</i>)

Disciplinary (Physics) Core Courses

Take all five of the following: (15 SCH)

PHYS 511	Electromagnetic Theory (<i>Spring</i>)
PHYS 512	Solid State Physics (<i>Fall</i>)
PHYS 521/MEEN 571	Theoretical Mechanics (<i>Winter</i>)
PHYS 522:	Quantum Mechanics (<i>Spring</i>)
PHYS 533	Statistical Mechanics (<i>Winter</i>)

Qualifying Examinations (No credit)

- ENGR 685 Written Qualifying Examination
- ENGR 686 Oral Comprehensive Examination

In order to take ENGR 685, a PhD student may contact the PhD program coordinator in the quarter before attempting the examination

Doctoral Seminars: 3 SCH

Students should take three Doctoral Seminar courses (ENGR 611 – Section 3) with 1 SCH for each course, for a total of 3 SCH counted towards the degree.

Recommended Elective Courses²

Students can take up to two Doctoral level Special Topics courses - either PHYS 557 or ENGR 657, or courses approved by Advisory Committee - as part of the elective course work for the degree, for a total of 6 SCH.

Choose up to seven of the following: (up to 21 SCH)

BIEN 557	Special Topics – BioMEMS
BIEN 557	Special Topics – Protein Engineering
CHEM 502	Selected Topics in Organic Chemistry – Principles of Polymers

¹ Required for students admitted to the program for Spring 2015-16 quarter or after. Optional for students admitted to the program for Winter 2015-16 quarter or before.

² Courses not listed are also acceptable, provided they are approved by the Advisory Committee.

CHEM 523	Nanofabrication by Self-Assembly
ENGR 566	Quality in Engineering
ENGR 592	Engineering Computational Methods
ELEN 533	Optoelectronics
ELEN 535	Advanced Topics in Microelectronics
MATH 655	Mathematical Modeling
MEEN 549	Computational Fluid Dynamics
MEMT 508	Finite Element Methods
MEMT 511	Modern Engineering Materials
MEMT 565	Continuum Mechanics
MSE 501	Microsystem Principles
MSE 502	Microfabrication Principles
MSE 503	Microfabrication Applications and Device Fabrication
MSE 504	Advanced Materials For Micro/Nano Devices And Systems
MSE 505	Nanotechnology Principles
MSE 506	Micro/Nano Scale Materials, Measurements, and Analysis
PHYS 515	Detectors for Particle & Nuclear Physics (proposed)
PHYS 523	Classical Theory of Fields
PHYS 524	Quantum Theory of Fields
PHYS 531	Theories of Physics I
PHYS 532	Theories of Physics II
PHYS 540	Computational Methods in Physics Modeling and Simulation I
PHYS 541	Computational Methods in Physics Modeling and Simulation II

Research and Dissertation	18 SCH of research and dissertation
ENGR 651	Pre-candidacy Doctoral Research
ENGR 751	Post-candidacy Dissertation Research

Complete 9 SCH of ENGR 651 prior to ENGR 686. After successful completion of ENGR 686, the student will become a PhD Candidate and will complete at least 9 SCH of ENGR 751. For ENGR 651 or 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.

Total: 45 SCH of coursework + 3 SCH of doctoral seminar courses + 9 SCH of Pre-candidacy Doctoral Research + 9 SCH of Post-candidacy Dissertation Research = 66 SCH