Graduate Courses in Different Concentration Areas for Ph.D. and MS in Electrical Engineering

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The research activities and graduate course offerings in the Department can be broadly divided into five major areas. Within each major area, there may be several sub-areas. Students in the Ph.D. and MS programs are recommended to choose their courses to focus on one or two concentration areas, to gain sufficient depth in the selected areas. This document provides a list of courses related to each area. Under each area, the fundamental courses in that area are highlighted in bold and students are recommended to take those courses first, unless they have had equivalent courses in their prior education.

To see the catalog description and prerequisites of all ECE graduate courses, in the following link, select “EL-GY” as prefix, and click on “filter”:
http://bulletin.engineering.nyu.edu/content.php?catoid=9&navoid=864

Typical semesters that a course is offered (Fall or Spring or both semesters) are listed in the ECE graduate student manual. Tentative course scheduling for the coming semesters are posted at
http://engineering.nyu.edu/academics/departments/electrical/graduate-resources

- **Communication, Networking, and Signal Processing**

*Communications*

**EL-GY 6303 Probability and Stochastic Processes**
**EL-GY 6013 Digital Communications**
**EL-GY 6023 Wireless Communications**
**EL-GY 6083 Information Theory**
**EL-GY 6333 Detection and Estimation**
**EL-GY 90x3 Selected topics in Communications**

*Networking*

**EL-GY 5373 Internet Architecture and Protocols**
**EL-GY 6303 Probability and Stochastic Processes**
**EL-GY 6383 High-Speed Networks**
**EL-GY 7353 Network Modeling and Analysis**
**EL-GY 7363 Network Design and Algorithms**
**EL-GY 7373 High Performance Switches and Routers**
**EL-GY 6233 System Optimization Methods**
**EL-GY 9333 Selected Topics: Data Center and Cloud Computing**
**EL-GY 93x3 Selected topics in networking**

*Signal Processing*

**EL-GY 6113 Digital Signal Processing I**
**EL-GY 6303 Probability and Stochastic Processes**
**EL-GY 6123 Image and Video Processing**
**EL-GY 6183 Digital signal processing laboratory**
**EL-GY 5253 Applied Matrix Theory**
**EL-GY 6233 System Optimization Methods**
**EL-GY 6333 Detection and Estimation**
**EL-GY 7133 Digital Signal Processing II**
**EL-GY 6813 Medical Imaging**
EL-GY 5813 Biomedical instrumentation
EL-GY 9173 Selected topics in signal processing: audio content analysis
EL-GY 91x3 Selected topics in signal processing
EL-GY 9xx3 Selected topics in Machine Learning

- **Computer Engineering and Microelectronics**

  *Computer Architecture and Digital Circuits Design*

  EL-GY 6463 Advanced Hardware Design
  EL-GY 6473 Introduction to VLSI System Design
  EL-GY 6483 Realtime embedded system design
  CS-GY 6133 Computer architecture 1
  EL-GY 6443 VLSI System and Architecture Design
  EL-GY 6453 Advances in Reconfigurable Systems
  EL-GY 6493 Design and Test of Digital Systems
  EL-GY 9423 Selected topics: Design of trust worthy hardware
  EL-GY 94x3 Selected topics in computer engineering
  EL-GY 6813 Biomedical instrumentation
  CS-GY 6143 Computer architecture 2

  (Note that course numbering with prefix EL-GY 64x3 does not indicate the suggested sequencing of courses.)

- **Microelectronic Devices & Circuits Design**

  EL-GY 6513 Solid State Electronic Devices
  EL-GY 6523 Nanoelectronic devices
  EL-GY 6403 Analog integrated circuit design

- **Electromagnetics and Analog/RF Circuits**

  *Electromagnetics*

  EL-GY 6713 Electromagnetic Theory and Applications
  EL-GY 6723 Electromagnetic Radiation and Antennas
  EL-GY 5753 Introduction to Plasma Engineering
  EL-GY 6583 Fiber communication systems
  EL-GY 97x3 Selected topics in Electrophysics

  *Analog/RF Circuits*

  EL-GY 6403 Analog integrated circuit design
  EL-GY 5463 Introduction to RF/Microwave Integrated Circuits
  EL-GY 5733 RF and Microwave Systems Engineering

- **Energy Systems and Power Electronics**

  EL-GY 5613 Introduction to Electric Power Systems
  EL-GY 6603 Power Electronics
  EL-GY 5623 Finite Elements for Electrical Engineering
  EL-GY 5663 Physics of Alternative Energy (colisted PH-GY 5663)
  EL-GY 5673 Electronic Power Supplies
  EL-GY 6613 Electrical Transmission & Distribution Systems
EL-GY 6623 Power Systems Economics and Planning
EL-GY 6633 Transients, Surges and Faults in Power Systems
EL-GY 6653 Power System Stability
EL-GY 6663 Distributed Generation Systems
EL-GY 6673 Resonant Power Converters
EL-GY 6683 Electric Drives
EL-GY 96x3 Selected topics in power engineering

- **Systems, Controls, and Robotics**

*Controls and Robotics*

**EL-GY 6243 System Theory and Feedback Control**
**EL-GY 6253 Linear Systems**
EL-GY 5223 Sensor Based Robotics
EL-GY 5253 Applied Matrix Theory
EL-GY 6233 System Optimization Methods
EL-GY 7253 State Space Design for Linear Control Systems
EL-GY 8223 Applied Nonlinear Control
EL-GY 8233 Optimal Control Theory
EL-GY 8253 Large-Scale Systems and Decentralized Control
EL-GY 9213 Selected Topics: Game Theory for Multi-Agent Systems
EL-GY 9223 Selected Topics: Reinforcement Learning for Complex Systems
EL-GY 92x3 Selected Topics in Control Systems

*System Engineering:*

**EL-GY 5213 Introduction to Systems Engineering**
EL-GY 6213 System Modeling, Analysis and Design