Computer Engineering Majors

Transition Meeting

March 21, 2012

- Computer Engineering Undergraduate Program Administration at NYU-Poly
  - Computer Science and Engineering (CSE) and Electrical and Computer Engineering (ECE) departments administer the undergraduate Computer Engineering program at NYU-Poly
    - CSE Department Chair: Keith Ross: 10.094 2 MTC (2 MetroTech Center) ; ross@poly.edu
    - ECE Department Chair: Jonathan Chao: 10.005 2 MTC ; chao@poly.edu

- Computer Engineering Undergraduate Steering Committee
  - The undergraduate Computer Engineering Steering committee sets the goals and objectives of the program and coordinates its evolution. The steering committee members are from the CSE and ECE departments. The committee has two chairs:
    - Peter Voltz (ECE): 10.084 2 MTC ; voltz@poly.edu ; (718) 260-3659
    - Haldun Hadimioglu (CSE): 10.009 2 MTC ; haldun@photon.poly.edu, (718) 260-3101

- Computer Engineering Undergraduate Program Directors
  - The program directors oversee the program, such as they make sure that ABET accreditation standards are met, instructors teach what is needed, suggest new courses and respond to students. There are two directors:
    - Haldun Hadimioglu (CSE): 10.009 2 MTC ; haldun@photon.poly.edu, (718) 260-3101
    - Ramesh Karri (ECE): LC254 ; rkarri@poly.edu, (718) 260-3596

- Computer Engineering Undergraduate Advisor
  - Ellen Daniels (ECE): L10.020 2 MTC ; edaniels@poly.edu, (718) 260-3595

- Computer Engineering Undergraduate Advisor for BS/MS students
  - Matthew Campisi (ECE): 10.083 2 MTC ; mcampisi@poly.edu, (718) 260-3893

- Computer Engineering Goals and Objectives at NYU-Poly
  - Gain a basic understanding of the fundamental technical subject areas associated with computer engineering
  - Develop technical depth in at least one area of specialization, with supplemental electives in such commercially viable areas as high-speed networks, image processing, security and databases
  - Hone your problem-solving skills through digital modeling, analysis, design, and simulation tools
  - Achieve a broad educational base that pairs technical knowledge with a multidisciplinary background in the humanities and social sciences
**What Computer Engineering Students Benefit from CSE and ECE**

- Faculty are active in research and patent generation
- Flow of ideas from research keeps courses and curriculum up-to-date
- Seniors can work on cutting edge projects
- **Summer Research Program**
  - The Office of the Dean of Undergraduate Academics offers summer research opportunities to students who have at least 32 credits. Student work full time for 10 weeks to gain experience in advanced research. The announcement about it will be sent to students soon.
- **Wide range of specializations**
  - Computer Security; Computer Networks; VLSI; Embedded Controllers; Software Engineering; Web Search Engines; Image Processing; Telecommunication Networks; Digital Signal Processing; Video Processing; Power Conversion; Wireless; Controls and Robotics; Computer Games; Computer Architecture
- **Support for invention, innovation, and entrepreneurship, I²E**
  - NYU-Poly’s new way of approaching academics and research
  - By arming faculty & students with tools, resources & inspiration
  - To turn their research into applications, products, and services that take flight as faculty- and student-owned companies
    - The NYU web site is: [nyu.edu/entrepreneur](http://nyu.edu/entrepreneur)
    - An expert on invention/innovation: Dr. James Kowalick: [kowalick.com](http://kowalick.com)
- **Modern Laboratories**
  - Wireless Information Systems; Information Systems and Internet Security; High-Speed Networking; Control/Robotics Research; Power Electronics/Machinery; Fields and Waves; VLSI/Nanoelectronics; Peer-to-Peer Networking; Web Search; Visualization; Software Engineering; Digital Logic
- **Drop in tutoring for Computer Engineering Students from the ECE Department**
  - Students may come in without an appointment, at any time during the scheduled office hours. Tutors are available to answer questions. Tutors can go over material that students are not clear on, either from class or from the textbook.

**Hints for More Success**

- **Take charge !**
- Do **not** be afraid of learning more !
  - The more you learn, the better !
  - Do not think about taking and passing a course !
- Life is **not** all technical !
  - Focus on the **non-technical** side as well!
    - Communication skills and more !
    - Network with people !

**Advisement and Registration Procedures for Summer/ Fall Semester**

- Advisement will start on Monday, April 9, 2012 for **sophomores**
- Advisement will start on Tuesday, March 27, 2012 for juniors, seniors, athletes and BS/MS students
- Students will sign up for an appointment with Ms. Ellen Daniels in the ECE Undergraduate Office, LC 249
- The sign up sheets will be posted on Friday, March 23, 2012
- The advisement will continue until all students receive advise
  - Students should make an appointment with Ms. Daniels as early as they can
- Registration for the fall semester will start on Monday, April 16, 2012
# The Undergraduate Computer Engineering Curriculum

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall Semester</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 1024</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>CS 1114</td>
<td>Introduction to Programming &amp; Problem Solving²</td>
<td>4</td>
</tr>
<tr>
<td>EG 1003</td>
<td>Introduction to Engineering &amp; Design⁴</td>
<td>3</td>
</tr>
<tr>
<td>EG 1001</td>
<td>Engineering and Technology Forum⁴</td>
<td>1</td>
</tr>
<tr>
<td>EN 1013W</td>
<td>College Writing Workshop</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA 2012</td>
<td>Elements of Linear Algebra I</td>
<td>2</td>
</tr>
<tr>
<td>MA 2132</td>
<td>Ordinary Differential Equations</td>
<td>2</td>
</tr>
<tr>
<td>PH 2023</td>
<td>Electricity, Magnetism and Fluids</td>
<td>3</td>
</tr>
<tr>
<td>PH 2021</td>
<td>Introductory Physics Laboratory I</td>
<td>0.5</td>
</tr>
<tr>
<td>CS 2134</td>
<td>Data Structures and Algorithms²</td>
<td>4</td>
</tr>
<tr>
<td>EE 2013</td>
<td>Fundamentals of Electric Circuits I²</td>
<td>3</td>
</tr>
<tr>
<td>HuSS</td>
<td>HuSS Elective Course¹</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA 2212</td>
<td>Data Analysis I</td>
<td>2</td>
</tr>
<tr>
<td>MA 2222</td>
<td>Data Analysis II</td>
<td>2</td>
</tr>
<tr>
<td>EE 3114</td>
<td>Fundamentals of Electronics I</td>
<td>4</td>
</tr>
<tr>
<td>CS 2214</td>
<td>Computer Architecture &amp; Organization</td>
<td>4</td>
</tr>
<tr>
<td>HuSS</td>
<td>HuSS Elective Course¹</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 4144</td>
<td>Introduction to Embedded System Design</td>
<td>4</td>
</tr>
<tr>
<td>EE/CS 4XX3</td>
<td>Design Project I</td>
<td>3</td>
</tr>
<tr>
<td>EE/CS/EL</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>EE 4001</td>
<td>ECE Professional Development &amp; Presentation</td>
<td>1</td>
</tr>
<tr>
<td>----</td>
<td>“Special” Elective³</td>
<td>3</td>
</tr>
<tr>
<td>HuSS</td>
<td>HuSS Elective Course¹</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Spring Semester</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 1124</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PH 1013</td>
<td>Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CS 1124</td>
<td>Object Oriented Programming²</td>
<td>4</td>
</tr>
<tr>
<td>EE/CS 1012</td>
<td>Introduction to Computer Engineering⁴</td>
<td>2</td>
</tr>
<tr>
<td>Hu/CS 1023W</td>
<td>First-Year Writing Seminar</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA 2112</td>
<td>Multivariable Calculus A</td>
<td>2</td>
</tr>
<tr>
<td>MA 2312</td>
<td>Discrete Mathematics I</td>
<td>2</td>
</tr>
<tr>
<td>PH 2033</td>
<td>Waves, Optics and Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>PH 2031</td>
<td>Introductory Physics Laboratory II</td>
<td>0.5</td>
</tr>
<tr>
<td>CS 2204</td>
<td>Digital Logic &amp; State Machine Design²</td>
<td>4</td>
</tr>
<tr>
<td>EE 2024</td>
<td>Fundamentals of Electric Circuits II²</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 3224</td>
<td>Operating Systems</td>
<td>4</td>
</tr>
<tr>
<td>EE 136</td>
<td>Communication Networks</td>
<td>3</td>
</tr>
<tr>
<td>EE 3193</td>
<td>Introduction to Very Large Scale Integrated Circuits</td>
<td>3</td>
</tr>
<tr>
<td>CM 1004</td>
<td>General Chemistry for Engineers</td>
<td>4</td>
</tr>
<tr>
<td>HuSS</td>
<td>HuSS Elective Course¹</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE/CS 4XX3</td>
<td>Design Project II</td>
<td>3</td>
</tr>
<tr>
<td>EE/CS/EL</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>HuSS</td>
<td>HuSS Elective Course¹</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

**Total Credits required for graduation**: 128

**Notes:**

1) Choice of HuSS electives must conform to the established requirements of the Humanities and Social Sciences Department. After the first-year writing courses, students will need **one writing intensive elective course (W)**.

2) Grades of at least C- are required in CS 1114, CS 1124, CS2134, CS 2204, EE 2013, and EE 2024. C if repeated twice.

3) “Special” elective is any course that a student has the pre-requisites for and cannot be used to satisfy HuSS requirements. For example, it can be a course in natural science, mathematics, engineering, management, finance, digital media, etc.

4) For transfer students and students changing major, “Introduction to Computer Engineering” is not required. “Engineering & Technology Forum” and “Introduction to Engineering and Design” may also be excused depending upon transfer credits.
The Required CS/EE Courses and Their Prerequisites

**Sophomore Year Courses**
- The first sophomore semester seven courses/lab are taken, totaling to 17.5 credits
- The second sophomore semester six courses/lab are taken, totaling to 15.5 credits
- The distribution of the sophomore year courses is as follows:
<table>
<thead>
<tr>
<th>Course</th>
<th>Sophomore Fall Semester</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 2012 Elements of Linear Algebra I</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>MA 2132 Ordinary Differential Equations</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>PH 2023 Electricity, Magnetism and Fluids</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PH 2021 Introductory Physics Laboratory I</td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>CS 2134 Data Structures and Algorithms</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>EE 2013 Fundamentals of Electric Circuits I</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>HuSS Elective Course 1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>17.5</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Sophomore Spring Semesters</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 2112 Multivariable Calculus A</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>MA 2312 Discrete Mathematics I</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>PH 2033 Waves, Optics and Thermodynamics</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PH 2031 Introductory Physics Laboratory II</td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>CS 2204 Digital Logic &amp; State machine Design</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>EE 2024 Fundamentals of Electric Circuits II</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>15.5</strong></td>
</tr>
</tbody>
</table>

**MA 2012 Elements of Linear Algebra I (4:0:0:2)**
This course introduces vector concepts. Linear transformations. Matrices and Determinants. Characteristic roots and eigenfunctions. Prerequisite: MA 1124 or equivalent.

**MA 2132 Ordinary Differential Equations (4:0:0:2)**

**PH 2023 Electricity, Magnetism and Fluids (3:0:1:3)**
This is the second course of a three-semester lecture sequence in general physics for science and engineering students. Fluids at rest and in motion. An introduction to electric and magnetic forces and fields. Electric charge density. Electric fields from simple charge distributions. Electric potential. Capacitance. Magnetic forces. Magnetic field from a current loop. Inductance. Magnetism in matter. Current and resistance. (This class meets four hours per week for lectures and recitation.) Prerequisites: PH 1013 and MA 1124 or an approved equivalent. Co-requisite: PH 2021 Introductory Physics Laboratory I.

**PH 2021 Introductory Physics Laboratory I (0:1.5:0:0.5)**
This course is the first of a two-semester sequence. Introduction to the science of measurement and data analysis. Accompanies PH2023. Experiments cover topics from PH1013 and PH2023. Prerequisites: PH 1013 and MA 1124 or an approved equivalent. Co-requisites: PH 2023.

**CS 2134 Data Structures and Algorithms (4:0:0:4)**
This course covers abstract data types and the implementation and use of standard data structures. Topics: Fundamental algorithms and the basics of algorithm analysis. A grade of C- or better is required of undergraduate computer science and computer-engineering majors. Prerequisites: CS 1124 (C- or better).

**EE 2013 Fundamentals of Electric Circuits I (3:0:1:3)**
This course covers Passive DC circuit elements, Kirchhoff’s aws, electric power calculations, analysis of DC circuits, Nodal and Loop analysis techniques, voltage and current division, Thevenin’s and Norton’s theorems, and source-free and forced responses of RL, RC and RLC circuits. A minimum of C- is required to take other EE courses. Co-requisites: MA 2012, MA 2132 and PH 2023.

**HuSS Elective Course 1 (3 credits)**
Choice of HuSS courses must conform to university requirements, such as students must take one writing intensive course after the freshman year.

**MA 2212 Multivariable Calculus A (4:0:0:2)**
This course introduces Multivariable Calculus. Analysis of functions of several variables, vector valued functions, partial derivatives, optimization techniques. Prerequisite: MA 2012.

**MA 2312 Discrete Mathematics I (4:0:0:2)**
This course covers logic and induction. Sets and functions. Recursive definitions. Counting techniques. Inclusion-exclusion principle. Prerequisite: MA 1124 or equivalent.

**PH 2033 Waves, Optics and Thermodynamics (3:0:1:3)**
This is the third course of a three-semester lecture sequence in general physics for science and engineering students. Water, sound and electromagnetic waves. Reflection, scattering and absorption. Standing waves and spectra. Superposition, diffraction and beats. Geometrical optics. Introduction to thermodynamics; temperature, heat, and entropy. (This class meets four hours per week for lectures and recitation.). Prerequisites: PH 2021 and PH 2023. Co-requisites: PH 2031.

**PH 2031 Introductory Physics Laboratory II (0:1.5:0:0.5)**
This is the second course of a two-semester sequence. Continuation of the introduction to the science of measurement and data analysis. The course accompanies PH2023. Experiments cover topics from PH2023 and PH2033. Prerequisites: PH 2021 and PH 2023. Co-requisites: PH 2033.

**CS 2204 Digital Logic & State machine Design (3:3:0:4)**
This course covers combinational and sequential digital circuits. Topics: Introduction to digital systems. Number systems and binary arithmetic. Switching algebra and logic design. Error detection and correction. Combinational integrated circuits, including adders. Timing hazards. Sequential circuits, flipflops, state diagrams and synchronous machine synthesis. Programmable Logic Devices, PLA, PAL and FPGA. Finite-state machine design. Memory elements. A grade of C or better is required of undergraduate computer-engineering majors. Prerequisite: CS 1114 (C- or better) or CS 1133(C- or better).

The course continues EE2013 and focuses on sinusoidal steady-state response; complex voltage and current and the phasor concept; impedance and admittance; average, apparent and reactive power; polyphase circuits; node and mesh analysis for AC circuits; use of Matlab for solving circuit equations; frequency response; parallel and series resonances; and operational amplifier circuits. A laboratory meets on alternate weeks. A minimum of C- is required to take other EE courses. Prerequisites: EE2013 with C or better grade.
Graduation Requirements

- Students need 128 credits and a 2.0 GPA in all courses to graduate.
- Students must have a grade of "C-" or better (a "C" grade if repeated twice) in:
  - CS 1114 Intro to Programming & Problem Solving, CS1124 Object Oriented Programming,
- A technical GPA of 2.0 based on all courses prefixed EE, CS, or EL
- Seniors may elect graduate courses labeled EL 5XX3, but not CS 5XX3
  - To enroll in other graduate courses, students must meet required department GPA standards and adviser approval
- For transfer students and students changing major, “Introduction to Computer Engineering" is not required. “Engineering & Technology Forum” and “Introduction to Engineering and Design” may also be excused depending upon transfer credits.
- Students are expected to meet the degree requirements in effect at the time students first enroll in a NYU-Poly program
- Those requirements apply as long as students remain in good standing and less than 8 years have elapsed since you entered the program
- The period for unchanged requirements is proportionately less for a transfer student
- Students can enroll in a NYU-Poly program

BS/MS Accelerated Program

- Exceptional undergraduate students may do advanced study in the BS/MS Program, which requires students to complete the MS option of the MS degree.
  - Incoming freshmen with superior admissions qualifications are invited to participate in the Accelerated BS/MS Program
    - Later admission may be considered after students complete no more than 1 year at Polytechnic
  - Students can have their BS and MS degrees in the following fields:
    - Electrical Engineering, Computer Engineering, Computer Science, Telecommunication Networks
- Participation in this program leads to the simultaneous awarding of a bachelor’s and master’s degree
  - Depending on your preparation and objectives, both degrees may be completed in 4 years
  - Acceleration is achieved through summer course work, extra course loads, careful course sequencing, or credit by examination. Students also may achieve acceleration through advanced placement credit in such courses as calculus, computer science, or physics
    - Students must complete 16 to 20 credits each semester and maintain 3.5 technical average, particularly in key courses, and display a record free of course repetitions and withdrawals
    - Students in the BS/MS program are advised to take Circuits I and Circuits II (EE 2013, EE 2024) during the summer after their freshman year
- Students must maintain a 3.5 GPA
- Required courses for the 2 degrees include all courses mandated by the individual BS and MS degrees, except for the senior Design Project II; all curriculum footnotes apply
  - Student in this program must complete a Master’s Thesis (6 credits), which is generally optional for other MS students
- The departmental BS/MS Program adviser works to allow varied transfer and AP credits, co-op program participation, professional summer jobs, and other goals consistent with the program
  - BS/MS departmental advisor: Matthew Campisi (ECE): 10.083 2 MTC; mcampisi@poly.edu, (718) 260-3893
**Elective Courses**

- **The CSE Department**
  - Undergraduate courses
    - CS308 Introduction to Databases
    - CS391 Java and Web Design
    - CS392 Computer Security
    - CS393 Network Security
    - CS394 Game Programming
    - CS3233 Game Development Studio I
    - CS3313 Game Programming
    - CS3314 Design & Implementation of Programming Languages
    - CS3413 Design and Analysis of Algorithms
    - CS3513 Software Engineering I
    - CS 3254 Introduction to Parallel and Distributed Systems
    - CS3714 Secure Information Systems Engineering I
    - CS3734 Scientific and Engineering Computing I
    - CS4724 Secure Information Systems Engineering II
    - CS4744 Scientific and Engineering Computing II
  - Graduate courses
    - CS6173 Software Engineering II
    - CS6093 Advanced Database Systems
    - CS 6143 Computer Architecture II
    - CS 6253 Distributed Operating Systems
    - CS6413 Compiler Design and Construction
    - CS6533 Interactive Computer Graphics
    - CS6613 Artificial Intelligence I
    - CS6643 Computer Vision and Scene Analysis
    - CS6673 Neural Network Computing
    - CS6803 Information Systems Security Engineering & Management
    - CS6823 Network Security
    - CS6843 Computer Networking
    - CS6903 Modern Cryptography
    - CS 6913 Web Search Engines
    - CS6923 Machine Learning
    - CS6963 Digital Forensics
    - CS9013 UNIX and PERL
    - CS9023 Applied Electronic Commerce
    - CS9053 Introduction to Java
    - CS9073 Human Computer Interaction
    - CS9093 Biometrics
    - CS9163 Application Security
    - CS9223 Selected Topics in CS :
      - ♦ Cloud Computing
      - ♦ Human-Computer Interaction
      - ♦ Visualization
      - ♦ Psychology and Security

- **The ECE Department**
  - Undergraduate courses
    - EE107 Control System Design
    - EE116 Communication Electronics
    - EE3054 Signals and Systems
• EE3064 Feedback Control
• EE3124 Fundamentals of Electronics II
• EE 3404 Fundamentals of Communication Theory
• EE3414 Multimedia Communication Systems I
• EE3604 Electromagnetic Waves
• EE3824 Electric Energy Conversion Systems
• EE4113 Controls & Robotics
• EE4143 Integrated Circuit Design
• EE4153 Multimedia
• EE4163 Signal and Image Processing
• EE4183 Wireless Communications
• EE4414 Multimedia Communication Systems II
• EE4823 Electric and Hybrid Vehicles

- Graduate courses
  • EL 5013 Wireless Personal Communication Systems
  • EL 5123 Image Processing
  • EL 5143 Multimedia Laboratory
  • EL 5213 Introduction to Systems Engineering
  • EL 5223 Sensor Based Robotics
  • EL 5363 Principles of Communication Networks
  • EL 5373 Internet Architecture & Protocols
  • EL 5463 Introduction to RF/Microwave Integrated Circuits
  • EL 5473 Introduction to VLSI System Design
  • EL 5483 Real Time Embedded Systems
  • EL 5493 Advanced Hardware Design
  • EL 5533 Physics of Nanoelectronics
  • EL 5553 Physics of Quantum Computing
  • EL 5613 Introduction to Electric Power Systems
  • EL 5663 Physics of Alternative Energy
  • EL 5673 Electronic Power Supplies
  • EL 5753 Introduction to Plasma Engineering
  • EL 5813 Biomedical Instrumentation
  • EL 5823 Medical Imaging I
  • EL6123 Video Processing
  • EL6373 Local and Metropolitan Networks
  • EL6383 High Speed Networks
  • EL6393 Advanced Network Security
  • EL6413 Analog & High Frequency Amplifier Design
  • EL6443 VLSI System & Architecture Design
  • EL7133 Digital Signal Processing
  • EL7373 High Performance Switches and Routers
  • EL9113 Brain-Computer Interface
  • EL9423 Design of Trustworthy Hardware

- These lists include courses offered by the CSE and ECE department and are not exhaustive. They may also not reflect all the courses in a semester. Note that the CSE and ECE departments offer new courses every year. Note also that some courses do not run every year.
- Registration for graduate courses is strictly controlled by the CSE and ECE advisors and is not automatic. For example, there is a 2.75 GPA university-wide requirement. In addition departments have their own and higher GPA requirements.
- Students are advised to plan ahead about their Design Project courses in the senior year so that they take the prerequisite courses in advance. This is important since some elective courses run only once a year.
- Therefore, students are advised to speak with the Computer Engineering Undergraduate advisor Ms. Ellen Daniels to learn about the latest list of electives from CSE and ECE departments and other departments and to plan ahead.
Faculty Teaching at Brooklyn in CSE and ECE Departments

CSE Department
- Boris Aronov: Computational and Combinatorial Geometry
- Justin Cappos: Security, cloud computing, virtualization
- Yi-Jen Chiang: Computer Graphics and Visualization
- Robert Flynn: Computer Architecture, Operating Systems
- Phyllis Frankl: Software analysis and testing
- Juliana Freire: Provenance, databases, management of large data
- Evan Gallagher: Programming, Software
- Haldun Hadimioglu: Computer architecture, Parallel processing
- Lisa Hellerstein: Computational learning theory, Machine learning,
- John Iacono: Data Structures, Computational Geometry, Algorithms
- Katherine Isbister: Human computer interface, Computer games
- Daniel Katz-Braunschweig: Programming, Software
- Kok-Ming Leung: Scientific Computing, Nonlinear Optimization
- Nasir Memon: Digital Forensics, Computer and Network Security
- Keith W. Ross: P2P networking, Computer networking
- Claudio Silva: Analysis and visualization of large data, computational geometry
- Stuart Steele: Software engineering and management
- John Sterling: Programming, Game development
- Fred Strauss: Software Engineering, Distributed Systems
- Torsten Suel: Web search engines, Retrieval Databases
- Edward K. Wong: Image Processing, Computer Vision, Graphics

ECE Department
- N. Sertac Artan: Network intrusion detection
- Matthew Campisi: Signal processing, Communications and system control and automation
- Jonathan Chao: Network Security High Performance Routers
- Dariusz Czarkowski: Intelligent Power Supply in Wireless Sensors
- Nirod K Das: Electromagnetics, Antennas, Microwave, Circuits
- Elza Erkip: Wireless communications, Information theory
- Zhong-Ping Jiang: Nonlinear Control Systems
- Ramesh Karri: High-speed encryption, Fault-tolerant VLSI systems
- Farshad Khorrami: Nonlinear Control Systems, Robotics
- Michael Edward Knox: Wireless Communications, Analog Circuit Design
- Spencer Szu-pin Kuo: Plasma, Plasmas for Industrial Applications
- Hai (Helen) Li: Novel memories, Nano-scale emerging devices
- Yong Liu: Communication Networks Modeling
- I-Tai Lu: Wireless Communication, Acoustics, Electromagnetics
- Shivendra Panwar: Communication networks
- Unnikrishna Pillai: Signal Processing
- Sundeep Rangan: Wireless Communications, Signal Processing and Estimation
- Ted Rappaport: Wireless communications, on-chip antennas in CMOS
- Ivan W Selesnick: Digital Signal Processing Wavelet Analysis
- Jonathan Viventi: Brain-computer interface, flexible electronics
- Peter Voltz: Communications and Signal Processing
- Yao Wang: Image and Video Processing, Medical Imaging
- Kang Xi: Network Resilience, High Speed Networks
- Zivan Zabar: Power Systems, Electromagnetic launchers

These lists are not permanent. Both department hire new faculty and so the faculty listings change.
Students are encouraged to interact with the faculty members.
The Research Focus in the CSE and ECE departments

The CSE Department

- Internet and Web Research: Keith W. Ross, Juliana Freire, Torsten Suel
  - Peer-to-Peer Networking; Cloud Services and Networking; Web Search, Web Mining and Social Networks; Multiplayer Games and Online Virtual Worlds
- Cybersecurity: Nasir Memon, Justin Cappos, Marco Pistoia, Keith W. Ross, Phyllis Frankl
  - Vulnerability Analysis; Peer-to-Peer Security; Multimedia Forensics; Biometrics; Watermarking and Digital Rights Management; Wireless Security; Steganography; Fault-Tolerant Distributed Cryptography; Usable Security
- Graphics, Visualization, Vision and Image Processing: Claudio Silva, Yi-Jen Chiang, Nasir Memon, Edward K. Wong
  - Computer Graphics and Visualization, Computer Vision, Image Processing
- Theoretical Computer Science: Boris Aronov, Lisa Hellerstein, John Iacono
  - Data Structures, Computational Geometry, Computational Learning Theory, Combinatorial Optimization and Approximation Algorithms
- Computer Games: Katherine Isbister, John Sterling
  - Human computer interface, emotion and social connection in digital experience

The ECE Department

- Fields and Waves: Spencer S. Kuo
  - Wave-Plasma Interactions of the Ionosphere and Magnetosphere by Powerful Radio Waves
- Systems, Control and Signal Processing
  - Cooperative Control of Multi-Agent Systems: Z. P. Jiang
  - Analysis and Control of Communication Networks: Z. P. Chiang, Shivendra Panwar
  - Robust Adaptive Nonlinear Control System Designs: Farshad Khorrami
  - Hardware/Software Architecture for Autonomous Unmanned Vehicles: Farshad Khorrami
  - Nonlinear Control of Electric Motors: Farshad Khorrami
  - Ultra-Accurate High-Speed Six DOF Manipulator and Other Robotic Systems: Farshad Khorrami
  - Decentralized Control of Nonlinear Large-Scale Interconnected Systems: Farshad Khorrami
- Telecommunications and Wireless
  - On-chip antennas in CMOS: Ted Rappaport
  - 60 GHz Radio wave propagation in and around buildings: Ted Rappaport
  - Cooperative Source and Channel Coding: Elza Erkip, Yao Wang
  - Cooperative Regions and Partner Choice in Coded Cooperative Systems: Elza Erkip
  - Power Efficient Multimedia Wireless Communications: Elza Erkip, Yao Wang
  - Peer-to-Peer Video Streaming Systems: Yong Liu, Shivendra Panwar, Yao Wang
  - Sensor Management: I-Tai Liu
  - Unlocking Capacity for Wireless Access Networks through Robust Cooperative Cross-Layer Design: Shivendra Panwar, Elza Erkip
  - Cooperative Networks: Implementation of Cooperative MAC Protocols for Wireless LANs: Shivendra Panwar
  - Designing Medium Access Control for Cooperative Networks: Shivendra Panwar
  - High-Speed Network Intrusion Detection and Prevention: Jonathan Chao, N. Sertac Artan
  - Lightwall: A Light-Weight Distributed Enforcement Architecture for Centralized Network Control Policy: Jonathan Chao
  - Data Center Networks: Jonathan Chao, Kang Xi

- VLSI, Electronics and Power
  - Power Electronics for Wireless Devices: Dariusz Czarkowski
- Analysis of Secondary Networks Having Distributed Generation Systems: Dariusz Czarkowski, Francisco De L. G. Maqueo, Zivan Zabar
- Mitigation of Voltage Disturbances Caused by Nonlinear Electrical Massive Loads: Zivan Zabar, Dariusz Czarkowski
- Mitigation Techniques to Reduce Inrush Currents of Network Transformers: Zivan Zabar
- Brain-computer interface: Jonathan Viventi
- Secure Built-In Self-Test (BIST) Architecture: Ramesh Karri
- Fault Tolerant Nanoscale Systems: Ramesh Karri
- Network-on-Chip (NoC): Jonathan Chao, Kang Xi, N. Sertac Artan
- Devices and Algorithms for Medical Implants: Jonathan Chao, N. Sertac Artan
- Nano-scale Emerging Devices: Helen Li
- Robust Embedded Memories: Helen Li

➢ These research areas are not permanent.
➢ The faculty changes their research profile and so students are advised to speak with the faculty to learn about their latest research areas

❖ Professional Affiliations

➢ Institute of Electrical and Electronics Engineers (IEEE)
  ▪ The professional society of Electrical and Computer and Engineers: ieee.org
➢ Association for Computing Machinery (ACM)
  ▪ The professional society of Computer Science and Engineers: acm.org
➢ Eta Kappa Nu: Electrical and Computer and Engineers Honors’ Society
➢ Upsilon Pi Epsilon: Computing and Information Science Honors’ Society

❖ Clubs

➢ PolyRadio
➢ Cyber Security
➢ Engineers without Borders
➢ PolyBOTS
➢ Society of Women Engineers (SWE)
➢ National Society of Black Engineers (NSBE)
➢ Society of Hispanic Professional Engineers (SHPE)

❖ Conferences and Web Sites

➢ Professional organizations and societies, such as IEEE, ACM, SWE, etc. organize numerous conferences that you can check and follow
  ▪ In addition these organizations maintain web sites that have information related to Computer Engineering
  ▪ There are many technical web sites that one can check regularly to learn about technical advances, such as the ACM TechNews web site: http://technews.acm.org.
  ▪ The best way to learn about conferences and web sites is by interacting with fellow classmates, upper class students and professors.

❖ Computer Engineering Undergraduate Advisor for BS/MS students

➢ Matthew Campisi (ECE): 10.083; mcampisi@poly.edu, (718) 260-3893
Computer Engineering Undergraduate Advisor
- Ellen Daniels (ECE) : 10.020 2 MTC ; edaniels@poly.edu, (718) 260-3595

Electrical and Computer Engineering Office
- 10.016 2 MTC
- (718) 260-3480
- Fax : (718) 260-3906
- http://www.poly.edu/academics/departments/electrical

Computer Science and Engineering Office
- 10.016
- (718) 260-3440
- Fax : (718) 260-3609
- http://www.poly.edu/academics/departments/computer

NYU Poly Contact Information
- (800) POLY-FYI
- Six MetroTech Center, Brooklyn, New York 11201

Student Resources at NYU-Poly
- Students should not hesitate to contact the staff of the Student Development Office for any matter
  - Judith Simonsen, Coordinator of Student Advocacy and Compliance : JB 158B ; jsimonse@poly.edu, (718) 260-3046
  - Counseling : 358 JB, counseling@poly.edu, (718) 260-3456
  - Polytechnic Tutoring Center : 373 JAB

Advisement and Registration Procedures for Summer/ Fall Semester
- Advisement will start on Monday, April 9, 2012 for sophomores
- Advisement will start on Tuesday, March 27, 2012 for juniors, seniors, athletes and BS/MS students
- Students will sign up for an appointment with Ms. Ellen Daniels in the ECE Undergraduate Office, LC 249, starting Friday, March 23, 2012
- Registration for the fall semester will start on Monday, April 16, 2012

Sophomore Year Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Sophomore Fall Semester</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 2012</td>
<td>Elements of Linear Algebra I</td>
<td>2</td>
</tr>
<tr>
<td>MA 2132</td>
<td>Ordinary Differential Equations</td>
<td>2</td>
</tr>
<tr>
<td>PH 2023</td>
<td>Electricity, Magnetism and Fluids</td>
<td>3</td>
</tr>
<tr>
<td>PH 2021</td>
<td>Introductory Physics Laboratory I</td>
<td>0.5</td>
</tr>
<tr>
<td>CS 2134</td>
<td>Data Structures and Algorithms²</td>
<td>4</td>
</tr>
<tr>
<td>EE 2013</td>
<td>Fundamentals of Electric Circuits I²</td>
<td>3</td>
</tr>
<tr>
<td>HuSS</td>
<td>HuSS Elective Course¹</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Sophomore Spring Semesters</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 2112</td>
<td>Multivariable Calculus A</td>
<td>2</td>
</tr>
<tr>
<td>MA 2312</td>
<td>Discrete Mathematics I</td>
<td>2</td>
</tr>
<tr>
<td>PH 2033</td>
<td>Waves, Optics and Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>PH 2031</td>
<td>Introductory Physics Laboratory II</td>
<td>0.5</td>
</tr>
<tr>
<td>CS 2204</td>
<td>Digital Logic &amp; State machine Design²</td>
<td>4</td>
</tr>
<tr>
<td>EE 2024</td>
<td>Fundamentals of Electric Circuits II²</td>
<td>4</td>
</tr>
</tbody>
</table>

17.5 15.5

Notes :
1) Choice of HuSS electives must conform to the established requirements of the Humanities and Social Sciences Department. After the first-year writing courses, students will need one writing intensive elective course (W).

2) Grades of at least C- are required in CS 1114, CS 1124, CS2134, CS 2204, EE 2013, and EE 2024. C if repeated twice.