Pre-engineering program at Queens College

Queens College does not have an engineering program of its own, but it does have one of the finest pre-engineering programs in the country. The program is administered by the Physics Department. The basis of the pre-engineering program is the formal articulation agreements it has with the Columbia University engineering school.

Queens College has a well-streamlined articulated transfer plan with Columbia. The Columbia Plan is a 3-2 plan. In this program, the student takes additional liberal arts courses and spends three years at Queens and two at the Columbia engineering school. You are automatically transferred to the engineering school at Columbia University, provided that you have satisfied the articulated course requirements and have maintained at least a 3.30 GPA while at Queens. You then spend two years at Columbia to complete the engineering program of your choice. At the end of this five-year program you will earn an engineering B.S. degree from Columbia and a B.A. degree in any one of the disciplines from Queens College. Most students opt for majoring in Physics at Queens College due to the considerable overlap between the B.A. Applied Physics option and the Pre-Engineering requirements. The plan can also be completed as a 4-2 plan. In this case, you spend the first four years at Queens College and the last two years at Columbia. This may be a better option for you if, for any reason, you need more time to complete degree requirements here at Queens College.

Specific requirements to be satisfied to guarantee admission to Columbia are discussed in the links below. Please note that you may still get accepted to Columbia even if you do not meet the GPA requirements, but acceptance is not guaranteed. We have had several students who have not been accepted in their first year, and reapplied successfully. Others have been accepted and later chosen to defer to a Master's or PhD program elsewhere. The curriculum requirements for pre-engineering satisfy a range of future careers and provide a smart student cohort at Queens College.

Yet the advantages for this route to an engineering degree from Columbia are cost and location. The tuition at Queens College is a fraction of that at Columbia, so the cost of your engineering degree will be significantly less than if you enter Columbia as a freshman. Furthermore, most of our Columbia Plan students live in Queens or Nassau County, so the cost and time of commuting are greatly reduced.

Students with questions regarding the Pre-engineering program and the Combined Columbia Plan should contact the liaison for the program at Queens College (Prof. So Takei) to setup an appointment. Prior to the meeting, you should have your transfer credit already evaluated, either by the college, or by the physics transfer credit advisor. If you are planning to major in physics and need the “declaration of major” form signed, you should see the department major advisor (Prof. Lev Murokh), who will provide further information about department-specific activities.

Admission criteria and information

A guaranteed admission into Combined Plan Program is offered to applicants who have met all of the following requirements:

1. Full-time enrollment at Queens College for at least the past two years.
2. Minimum overall GPA of 3.30, as calculated by Columbia.
3. Minimum pre-engineering GPA of 3.30, as calculated by Columbia.
4. A minimum grade of B (GPA of 3.0) must be obtained on the first attempt for each pre-engineering science or mathematics prerequisite course.
5. Successful completion of the specific prerequisite courses for your intended major (as listed below) by the end of the spring semester of application.
6. Successful completion of the major and degree requirements prescribed by Queens College for graduation before entering Columbia.

7. Three favorable recommendations: one each from the Combined Plan liaison, a science instructor and a math instructor at Queens College.

8. Demonstration of English language proficiency (as listed below).

Applicants who do not meet the above criteria are welcome to apply as part of our competitive review process, where admission is not guaranteed.

All prerequisite coursework must appear on the Queens College transcript. **Columbia requires all official transcripts, and the liaison must approve all coursework not taken at Queens College.**

The **overall GPA** is calculated using all postsecondary courses for which a student has received credit on the Queens College transcript. The **pre-engineering GPA** is calculated using all of the prerequisite coursework listed, with the exception of the courses fulfilling the lab requirement and humanities and social science requirements.

**Advanced Placement, International Baccalaureate, and other standardized exams for placement** are accepted if the credit or exam clearly appears on the Queens College’s transcript and is approved by the liaison.

All prerequisite coursework **must be completed by the spring semester of application** to qualify for guaranteed admission. As indicated in the list below, some courses are excluded from this requirement and can be taken once at Columbia.

**Noteworthy dates & deadlines:**
- **December 1, 2015:** Application available online
- **February 15, 2016:** Deadline to submit application materials
- **March 1, 2016:** Deadline to submit financial aid materials
- **April 2016:** Admissions decisions are released to candidates

Students should consult [http://undergrad.admissions.columbia.edu/apply/combined-plan](http://undergrad.admissions.columbia.edu/apply/combined-plan) (and the Pre-Combined Plan Curriculum Guide) for further information on the Program. The website also contains information on:
- English proficiency requirements;
- Financial aid policies;
- Housing at Columbia.

**Course requirements**

**NB:** Please note that these course requirements are not yet official and there may be minor changes. They are nevertheless a very good guideline for what is required.

Most students opt for majoring in Physics at Queens College due to the considerable overlap between the B.A. Applied Physics option and the Pre-Engineering requirements.

**FOUNDATION COURSES REQUIRED OF ALL MAJORS:**

**MATHEMATICS**
- Three calculus courses (Math 151, 152, 201); (alternative: Math 141, 142, 143, 201)

**PHYSICS**
• Mechanics and Thermodynamics (Phys 145.4)
• Electricity, Magnetism and Optics (Phys 146.4)

CHEMISTRY
• General Chemistry I (Chem 113.4)

PHYSICS/CHEMISTRY LAB [choose one of the following]
• Physics Lab I (Phys 145.1)
• Physics Lab II (Phys 146.1)
• Chemistry Lab (Chem 113.1)

COMPUTER SCIENCE
• Introduction to computer science and programming (CSCI 111) [Students interested in majors requiring Java later on may prefer to take CSCI 112 instead of CSCI 111.]

HUMANITIES AND SOCIAL SCIENCES
• Principles of Economics (ECON 101).
• English Composition (ENGL 110).
• 27 non-technical credit hours required, including courses that fulfill Economics and English Composition. *Non-technical requirement is satisfied by the course work taken for the bachelor’s degree awarded by the home institution. Also, the writing requirements for QC should be met.*

MAJOR-SPECIFIC COURSEWORK REQUIRED:
In addition to the above courses required for all engineering majors, the following are a list of additional courses that are required for specific engineering programs along with the QC course numbers.

APPLIED MATHEMATICS OR APPLIED PHYSICS

MATHEMATICS
• Advanced Calculus (Math 202)
• Ordinary Differential Equations (Math 223 or Phys 233)

PHYSICS
• Classical and Quantum Waves (Phys 260)
• Physics Lab (Phys 235)

CHEMISTRY/BIOLOGY [choose one of the following. Chemistry/Biology labs are not required.]
• General Chemistry I (Chem 113.4)
• Physiology and Cell Biology (Biol 105)

BIOMEDICAL ENGINEERING

MATHEMATICS
• Advanced Calculus (Math 202)
• Ordinary Differential Equations (Math 223 or Phys233)
• Linear Algebra (Math 231/237).

PHYSICS
• Classical and Quantum Waves (Phys 260)

CHEMISTRY
• General Chemistry II (Chem 114.4)
• General Chemistry Lab (Chem 114.1)

BIOLOGY
• Introduction to biology I (Biol 105)
• Introduction to biology II (Biol 106)

ELECTRICAL ENGINEERING
• Introduction to Electrical Engineering [this course is not offered at QC but may be taken while at Columbia (the course at Columbia: ELEN 1201).]

COMPUTER SCIENCE
• Introduction to Computer Science and Programming in Python (CSCI 112)

CHEMICAL ENGINEERING

MATHEMATICS
• Advanced Calculus (Math 202)
• Ordinary Differential Equations (Math 223 or Phys233)
• Linear Algebra (Math 231/237)

PHYSICS
• Physics Lab (Phys 235)

CHEMISTRY
• General Chemistry II (Chem 114.4)
• General Chemistry Lab (Chem 114.1)
• Organic Chemistry I (Chem 251.4)
• Organic Chemistry Lab (Chem 251.1) [may be taken the summer before entering or while at Columbia (the equivalent course at Columbia: C3543).]

COMPUTER SCIENCE
• Introduction to Computer Science and Programming in Python (CSCI 112)

CIVIL ENGINEERING

MATHEMATICS
• Ordinary Differential Equations (Math 223 or Phys233)
• Linear Algebra (Math 231/237)

GEOLOGY
• Earth: Origin, Evolution, Processes Future (Geol 101)

ENGINEERING MECHANICS
• Mechanics (Phys 237) [may be taken the summer before entering or while at Columbia (the equivalent course at Columbia: ENME E3105).]

COMPUTER ENGINEERING

MATHEMATICS
• Advanced Calculus (Math 202)
• Ordinary Differential Equations (Math 223 or Phys 233)
• Linear Algebra (Math 231/237).
• Discrete Math (Math 220)

COMPUTER SCIENCE
• Introduction to Computer Science and Programming in Java (CSCI 212)

ELECTRICAL ENGINEERING
• Introduction to Electrical Engineering [this course is not offered at QC but may be taken while at Columbia (the course at Columbia: ELEN 1201).]

**COMPUTER SCIENCE**

**MATHEMATICS**
- Discrete Math (Math 220)

**COMPUTER SCIENCE**
- Introduction to Computer Science and Programming in Java (CSCI 212)
- Discrete Structures (CSCI 220)

**EARTH AND ENVIRONMENTAL ENGINEERING**

**MATHEMATICS**
- Ordinary Differential Equations (Math 223 or Phys233)
- Linear Algebra (Math 231/237).

**PROBABILITY AND STATISTICS**
- Introduction to Probability and Statistics (Math 241) [may be taken the summer before entering or while at Columbia (the equivalent course at Columbia: W3600).]

**CHEMISTRY**
- General Chemistry II (Chem 114.4)
- General Chemistry Lab (Chem 114.1)

**ADDITIONAL SCIENCE ELECTIVE** [choose one of the following]
- Organic Chemistry (Chem 251.4)
- Classical and Quantum Waves (PHYS 260)
- Physiology and Cell Biology (Biol 105)

**ADDITIONAL COURSES** [all to be taken at Columbia.]
- Advanced General Geology (the course at Columbia: EESC W4001)
- The Climate System (the course at Columbia: EESC V2100)
- The Solid Earth System (the course at Columbia: EESC V2200)
- Better Planet By Design (the course at Columbia: EAEE E2100)

**ELECTRICAL ENGINEERING**

**MATHEMATICS**
- Advanced Calculus (Math 202)
- Ordinary Differential Equations (Math 223 or Phys 233)
- Linear Algebra (Math 231/237)

**PHYSICS**
- Classical and Quantum Waves (Phys 260)

**COMPUTER SCIENCE** [choose one of the following. Both have CSCI 111 as the prerequisite.]
- Object-oriented programming (CSCI 211)
- Object-oriented programming (CSCI 212)

**ELECTRICAL ENGINEERING**
- Introduction to Electrical Engineering [this course is not offered at QC but may be taken while at Columbia (the course at Columbia: ELEN 1201).]

**ENGINEERING MECHANICS**
MATHEMATICS
• Ordinary Differential Equations (Math 223 or Phys 233)

PHYSICS/CHEMISTRY [choose one of the following.]
• Physics Lab (Phys 235)
• General Chemistry Lab (Chem 114.1)

ENGINEERING MECHANICS
• Mechanics (Phys 237) [may be taken the summer before entering or while at Columbia (the equivalent course at Columbia: ENME E3105).]

IEOR: INDUSTRIAL ENGINEERING, ENGINEERING MANAGEMENT SYSTEMS OR OPERATIONS RESEARCH
MATHEMATICS
• Linear Algebra (MATH 231/237)

PROBABILITY AND STATISTICS
• Introduction to Probability and Statistics (Math 241)

PHYSICS/CHEMISTRY [choose one of the following.]
• Physics Lab (Phys 235)
• General Chemistry Lab (Chem 114.1)

COMPUTER SCIENCE
• Object-oriented Programming in Java (CSCI 212)
• Data Structures (CSCI313) [this course has CSCI 211, CSCI 212 and CSCI 220 as prerequisites.]

ECONOMICS
• Introduction to Accounting and Finance (Acct 100) [may be taken the summer before entering or while at Columbia (the equivalent course at Columbia: E2261).] This course must be taken prior to Columbia for any student with interests in the Financial Engineering major. Students cannot apply to this major until they are already enrolled at Columbia (after the first semester in Columbia Engineering).

MATERIALS SCIENCE AND ENGINEERING
MATHEMATICS
• Advanced Calculus (Math 202)
• Ordinary Differential Equations (Math 223 or Phys 233)

PHYSICS
• Classical and Quantum Waves (Phys 260)
• Physics Lab (Phys 235)

CHEMISTRY
• General Chemistry II (Chem 114)
• General Chemistry Lab (Chem 114.1)

MECHANICAL ENGINEERING
MATHEMATICS
• Advanced Calculus (Math 202)
• Ordinary Differential Equations (Math 223 or Phys 233)
• Linear Algebra (Math 231).
PHYSICS/BIOLOGY [choose one of the following]
  • Classical and Quantum Waves (Phys 260)
  • Physiology and Cell Biology (Biol 105)

PHYSICS/CHEMISTRY [choose one of the following]
  • Physics Lab (Phys 235)
  • General Chemistry Lab (Chem 114.1)

ENGINEERING MECHANICS
  • Mechanics (Phys 237) [may be taken the summer before entering or while at Columbia (the equivalent course at Columbia: ENME E3105).]

ELECTRICAL ENGINEERING
  • Introduction to Electrical Engineering [this course is not offered at QC but may be taken while at Columbia (the course at Columbia: ELEN 1201).]