QUEENS COLLEGE

THE CITY UNIVERSITY OF NEW YORK

DEPARTMENT OF PHYSICS
65-30 KISSENA BOULEVARD
FLUSHING, NEW YORK 11367-1597
TEL.: (718) 997-3147
FAX: (718) 997-3349
E-MAIL: vmenon@qc.cuny.edu

VINOD M. MENON
Assistant Professor &
Member CUNY Photonics Initiative

November 10, 2009

Subject: ***Pre-Engineering Program***

Dear Prospective Engineering Student,

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.

The **Columbia** plan is a 3-2 plan. After spending three years as a physics major at Queens College you get an automatic transfer to the engineering school at Columbia University, provided that you have satisfied the articulated course requirements and have maintained at least a 3.0 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 physics from Queens College.

The advantages of opting for this route to an engineering degree from Columbia are cost and location. The tuition at Queens College is a fraction of the tuition at Columbia, so the cost of your engineering degree will be significantly less than if you enter Columbia as a freshman. Further, most of our 3-2 Columbia plan students live in Queens or Nassau County, therefore the cost and time of commuting are greatly reduced.

For more information about the **Pre-Engineering Program at Queens College** please see our web site at http://www.physics.qc.edu/

Pre-engineering Program

Queens College does not offer a degree in engineering, but, like many liberal arts colleges in the United States, it has a collection of courses that are the equivalent of the majority of those taken in the first years of an engineering curriculum. In addition to these traditional offerings, Queens College offers a number of more specialized courses designed primarily for engineering students. Thus, by choosing a proper selection of courses, Queens College students can usually transfer into third or fourth semester of most engineering programs in the United States.

Articulated transfer agreement has been worked out with Columbia University, one of the leading engineering schools in the country so that Queens College students, after completing three years of course work at the College, can transfer to Columbia with minimum difficulty.

Students who might wish to transfer to an engineering school with which Queens College does not have an articulated transfer plan should consult the catalog of that school when planning their academic programs at Queens. In any case, it is important for you to begin considering different engineering schools and start collecting their catalogs early in your career at Queens College. You should also plan to visit any institution you think you might want to transfer to.

Currently Queens College has a well streamlined articulated transfer plan with Columbia University. 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. At the completion of the program, the student receives two degrees: a bachelor's degree in engineering from Columbia, and the B.A. degree in Physics from Queens College. **Most students opt for majoring in Physics at QC due to the considerable overlap between the BA Applied Physics option and the Pre-Engineering requirements. In addition to the pre-engineering course requirements, the student should complete the major degree course requirements towards his/her Queens degree while at QC.**

Due to the increase in applicants to the program, Columbia has started implementing all the rules on the agreement to be guaranteed admission. Here are the rules:

Guaranteed admission into The Fu Foundation School of Engineering and Applied Science's undergraduate Combined Plan Program will now be offered to applicants who have met the following requirements.

1. Applicants must have been enrolled at QC as a full-time student for at least the past 2 years.

2. Applicants must receive an overall GPA ***and*** a pre-engineering GPA of 3.0 or higher as calculated by Columbia.

3. Applicants must receive 3 favorable recommendations: from the Combined Plan liaison and one each from a science and math instructor at QC.

4. Applicants must have successfully completed, by the end of the 2010 spring semester, **all prerequisite courses listed in the Pre-Combined Plan Curriculum** for one's intended major.

5. Applicants must have successfully finished the **major and distribution requirements** prescribed by QC for graduation before entering Columbia.

GPA Calculation Policy: The pre-engineering GPA will be calculated on a 4.0 scale using the foundational and major-specific courses listed in the Pre-Combined Plan Curriculum Guide (not including the non-technical requirements besides English composition and economics). Students must receive a C- or higher in order to fulfill the requirements and receive credit for a course. If a course is retaken to improve one's performance, both grades will be used in calculating the pre-engineering GPA.

Use of Advanced Placement, International Baccalaureate, and other standardized exams for placement: Students using Advanced Placement, International Baccalaureate or other standardized exam results for credits for pre-engineering required courses must either (a) take further coursework in that subject to fulfill the requirement or (b) submit the test results to Columbia for evaluation just as other Columbia students must do. Please refer to the SEAS Bulletin for credit policies. Courses waived by your affiliated school will be evaluated by the Combined Plan Admissions Committee and applicants will not necessarily satisfy the prerequisites.

Pre-Combined Plan required courses not taken at the home institution: Any pre-Combined Plan foundational and major-specific courses taken at a non-affiliated college/university must be approved and granted credit by the applicant's affiliate school. All courses taken at non-affiliate schools must be taken at an American-style college/university.

Application Deadline: The preferred application deadline is February 15, 2010. It is HIGHLY RECOMMENDED by the Admissions Committee that applicants submit materials by the preferred deadline; however, application materials will be accepted until March 15, 2010.

More information about the program can be found at:

http://www.studentaffairs.columbia.edu/admissions/sites/admissions/files/webfm/combined_plan_pre_curriculum_guide.pdf

Requirements for the Applied Physics Option at QC are given in the Physics Department website: http://www.physics.qc.edu/undergraduateprogram.htm

Please meet with the Program Liaison (Prof. Vinod Menon) to set up a schedule of classes.

FOUNDATION COURSES REQUIRED OF ALL MAJORS:

i. MATHEMATICS

- The full sequence of Calculus (Math 151, 152, 201, 202). Alternatively you could do (Math 141,142,143, 201 and 202).

ii. PHYSICS

- Mechanics and Thermodynamics (Phys 145)
- Electricity, Magnetism, and Optics (Phys 146)

iii. CHEMISTRY

- General Chemistry I (Chem 113.4 and 113.1)

Please see individual programs below for details. Some programs require an additional second semester of General Chemistry (C114) or have possible substitutions.

iv. LAB REQUIREMENT

Either one-semester physics lab or one-semester chemistry lab is generally required. Please see individual programs below for more details.

v. COMPUTER SCIENCE

- Introduction to computer science and programming (CS111). *Some majors require a specific programming language.* C++ (CS211), Java (CS212)

vi. HUMANITIES AND SOCIAL SCIENCES

- Twenty-seven-(27)-point nontechnical requirement is satisfied by the course work taken for the bachelor's degree awarded by the home institution. Among those courses the students must include:
  - Principles of Economics (ECON 101)
  - English Composition (ENGL 110).

The Economics 101 and English 110 count toward the 27. Also, the writing requirements for QC should be met.

In addition to these required courses 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.

REQUIRED FOR MAJORS IN:

(Notes in *italics* clarify requirements.)

APPLIED MATHEMATICS or **APPLIED PHYSICS**

MATHEMATICS

- Ordinary Differential Equations (Math 223 or Phys 233*)[1]
  Note: The Physics 233 requirement meets both the ordinary differential equations requirement for the pre-combined program as well as the Applied Physics BA requirement at QC

PHYSICS

- Classical and Quantum Waves (Phys 260)
- Physics Lab (Phys 235)

CHEMISTRY / BIOLOGY (choose one course listed below. Chemistry/Biology labs not required.)

- General Chemistry I (Chem 113.4)

BIOMEDICAL ENGINEERING

ALL TRACKS

MATHEMATICS

- Ordinary Differential Equations (Math 223 or Phys 233*)
- Linear Algebra (Math 231/237).

PHYSICS

- Classical and Quantum Waves (Phys 260 – Modern Physics)

CHEMISTRY

- General Chemistry II (Chem 114.4)
- General Chemistry Lab (Chem 114.1)
- Organic Chemistry I (251.4 and 251.1)

ELECTRICAL ENGINEERING

- Introduction to Electrical Engineering (ELEN E1201) *[may be taken the summer before entering or while at Columbia]*

ENGINEERING MECHANICS

- Mechanics (Phys 237) *[this course may also be taken the summer before entering or while at Columbia]*

[1] Note: The Physics 233 requirement meets both the ordinary differential equations requirement for the pre-combined program as well as the Applied Physics BA requirement at QC

COMPUTER SCIENCE
Introduction to Computer Science and Programming in MATLAB (NOT OFFERED AT QC – MAY BE TAKEN AT COLUMBIA)

CHEMICAL ENGINEERING

MATHEMATICS
- Ordinary Differential Equations (Math 223 or Phys 233)

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)

CIVIL ENGINEERING

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

PHYSICS LAB
- Physics Lab (Phys 235)

ENGINEERING MECHANICS
- Mechanics (Phys 237) *[this course may also be taken the summer before entering or while at Columbia]*

COMPUTER SCIENCE
Introduction to Computer Science and Programming in MATLAB (NOT OFFERED AT QC – MAY BE TAKEN AT COLUMBIA)

COMPUTER ENGINEERING

MATHEMATICS
- Ordinary Differential Equations (Math 223 or Phys233)
- Linear Algebra (Math 231/237).
- Discrete Math (Math 220)

PHYSICS LAB
- Physics Lab (Phys 235)

COMPUTER SCIENCE
- Programming in Java (CS 212)

ELECTRICAL ENGINEERING
- Introduction to Electrical Engineering. – *[Not offered at QC may be taken the summer before entering or while at Columbia]*

COMPUTER SCIENCE

PHYSICS LAB
- Physics Lab (Phys 235)

MATHEMATICS
- Discrete Math (Math 220)

COMPUTER SCIENCE
- Programming in Java (CS 212)
- Data Structures and Algorithms (CS 313)
- Scientific Computation *[Not offered at QC may be taken the summer before entering or while at Columbia]*

EARTH AND ENVIRONMENTAL ENGINEERING

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

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

OTHER SCIENCE ELECTIVE *(choose one course listed below)*
- Organic Chemistry (251.4)
- Classical & quantum waves (PHYS 260 – Modern Physics)

EARTH AND ENVIRONMENTAL SCIENCES *(choose one course listed below)*
- Advanced General Geology *[may be taken while at Columbia.]*
- The Climate System *[may be taken while at Columbia.]*
- The Solid Earth System *[may be taken while at Columbia.]*

EARTH AND ENVIRONMENTAL ENGINEERING
- Alternative Energy Resources *[may be taken at Columbia]*

ELECTRICAL ENGINEERING

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

PHYSICS
- Classical and Quantum Waves (Phys 260 – Modern Physics)
- Physics Lab (Phys 235)

COMPUTER SCIENCE
- Programming in Java (CS 212)

ELECTRICAL ENGINEERING
- Introduction to Electrical Engineering (ELEN E1201) *[may be taken the summer before entering or while at Columbia]*

IEOR: ENGINEERING MANAGEMENT SYSTEMS

MATHEMATICS
- Linear Algebra (MATH 231/237)

PHYSICS LAB
- Physics Lab (Phys 235)

COMPUTER SCIENCE
- Programming in JAVA (CS 212)
- Data Structures (CS313) **(NOTE: This course has the following pre-requisites: CS-211 (C++), CS-212 (Java), CS-220 (Discrete Structures))**.

ECONOMICS
- Introduction to Accounting and Finance (Acct 100)

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

IEOR: FINANCIAL ENGINEERING

Students cannot apply directly to IEOR: Financial Engineering because this concentration in Operations Research requires an application after one semester of study at Columbia. Students interested in this concentration must adhere to the following pre-requisite requirements:

MATHEMATICS *(choose one course listed below)*
- Linear Algebra (MATH 231/237)
- Ordinary Differential Equations (MATH 223 or Phys 233)

PHYSICS LAB
- Physics Lab (Phys 235)

COMPUTER SCIENCE
- Programming in JAVA (CS 212)
- Data Structures (CS313) **(NOTE: This course has the following pre-requisites: CS-211 (C++), CS-212 (Java), CS-220 (Discrete Structures))**.

ECONOMICS
- Introduction to Accounting and Finance (ACCT 100)

PROBABILITY AND STATISTICS
- Probability (Math 241)
- Statistical Inference (NOT OFFERED AT QC – may be taken while at Columbia)

IEOR: INDUSTRIAL ENGINEERING

MATHEMATICS
- Linear Algebra (MATH 231/237)

PHYSICS
- Physics Lab (Phys 235)

COMPUTER SCIENCE
- Programming in JAVA (CS 212)
- Data Structures (CS313) **(NOTE: This course has the following pre-requisites: CS-211 (C++), CS-212 (Java), CS-220 (Discrete Structures))**.

ECONOMICS
- Introduction to Accounting and Finance (ACCT 100)

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

IEOR: OPERATIONS RESEARCH

MATHEMATICS
- Linear Algebra (MATH 231/237)

PHYSICS/CHEMISTRY LAB *(choose one course listed below)*
- Physics Lab (PHYS 235)

COMPUTER SCIENCE *(choose one set of courses below)*

- Computer Programming in JAVA (CS212)
- Data Structures in JAVA (CS313)

(NOTE: This course has the following pre-requisites: CS-211 (C++), CS-212 (Java), CS-220 (Discrete Structures)).

ECONOMICS

- Introduction to Accounting and Finance (ACCT 100)

PROBABILITY AND STATISTICS

- Introduction to Probability and Statistics (Math 241)

ENGINEERING MECHANICS

MATHEMATICS

- Ordinary Differential Equations (Phys 233 or Math 223)

PHYSICS LAB *(choose one course listed below)*

- Physics Lab (Phys 235

ENGINEERING MECHANICS

- Mechanics (Phys 237) *May be taken the summer before entering or while at Columbia]*

MATERIALS SCIENCE AND ENGINEERING

MATHEMATICS

- Ordinary Differential Equations (Phys 233 or Math 223)

PHYSICS

- Classical and Quantum Waves (Phys 260 – Modern Physics)
- Physics Lab (Phys 235)

CHEMISTRY

- General Chemistry II (Chem 114)

MECHANICAL ENGINEERING

MATHEMATICS

- Ordinary Differential Equations (Phys 233 or Math 2223)
- Linear Algebra (Math 231).

PHYSICS

- Classical and Quantum Waves (Phys 260 – Modern Physics)

PHYSICS LAB

- Physics Lab (Phys 235)

ENGINEERING MECHANICS

- Mechanics (Phys 237) [*may be taken while at Columbia]*

ELECTRICAL ENGINEERING

- Intro. to Electrical Engineering or equivalent [*may be taken while at Columbia*]
