

Muhlenberg College
PRE - COMBINED PLAN CURRICULUM GUIDE

Updated January 5, 2016

FOUNDATION COURSES REQUIRED OF ALL MAJORS:

i. MATHEMATICS

- The full sequence of Calculus I, II, III (MTH 121, MTH 122, MTH 223)

ii. PHYSICS

- General Physics I (PHY 121)
- General Physics II (PHY 122)
- Thermal and Statistical Physics (PHY 241 or PHY 242)

iii. CHEMISTRY

- General Chemistry I (CHM 103)

iv. COMPUTER SCIENCE

- Computer Science II (CSI 111),

v. HUMANITIES AND SOCIAL SCIENCES

- All of Muhlenberg's General Academic Requirements, including
- Principles of Macroeconomics (ECN 101) OR Principles of Microeconomics (ECN 102) AND
- First Year Seminar (FYS XYZ)

ECN 101 or ECN 102 and the First Year Seminar may be included in the General Academic Requirements

MAJOR-SPECIFIC COURSE WORK:

(Notes in *italics* clarify requirements.)

APPLIED MATHEMATICS or APPLIED PHYSICS

MATHEMATICS

- Differential Equations (MTH 227)

PHYSICS

- Modern Physics (PHY 213)

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

- Principles of Biology III (Bio 152)
- General Chemistry I (CHM 103)

BIOMEDICAL ENGINEERING

ALL TRACKS

MATHEMATICS

- Differential Equations (MTH 227)
- Linear Algebra (MTH 226)

PHYSICS

- Modern Physics (PHY 213)

CHEMISTRY

- General Chemistry II (CHM 104)

ADDITIONAL

- **Principles of Biology II (BIO 151) and Principles of Biology III (BIO 152)**
- Analog and Digital Circuits (PHY 216) *{may be taken the summer before entering or while at Columbia}*
- Computer Science: Python Language is required. The only course that meets this requirement is CSI 106 Computer Science I: Introduction to Multimedia Computing.

CHEMICAL ENGINEERING

MATHEMATICS

- Differential Equations (MTH 227)
- Linear Algebra (MTH 226)

CHEMISTRY

- General Chemistry II (CHM 104)
- Organic Chemistry I (CHM 201 or CHM 203)
- Computer Science: Python Language is required. The only course that meets this requirement is CSI 106 Computer Science I: Introduction to Multimedia Computing.

CIVIL ENGINEERING

MATHEMATICS

- Differential Equations (MTH 227)
- Linear Algebra (MTH 226).

GEOLOGY

- Environmental Geology (ESC 201)

ADDITIONAL

- Analytical Mechanics (PHY 319) *{may be taken the summer before entering or while at Columbia}*
- Computer Science: MATLAB Programming Language is preferred.*

COMPUTER ENGINEERING

MATHEMATICS

- Differential Equations (MTH 227)
- Linear Algebra (MTH 226)

COMPUTER SCIENCE

- *Computer Programming in JAVA (CSI 111) is required.*
- Transition to Abstract Mathematics (MTH 210)
- Combinatorics and Graph Theory (MTH 345)

ADDITIONAL

- Analog and Digital Circuits (PHY 216) *Students who do not take PHY 216 before entering Columbia must take an additional technical elective course while at Columbia*

COMPUTER SCIENCE

COMPUTER SCIENCE

- *Computer Programming in JAVA(CSI 111) is required.*
- Data Structures and Algorithms (CSI 220)

MATHEMATICS

- Transitions to Abstract Mathematics (MTH 240)
- Combinatorics and Graph Theory (MTH 345)

EARTH AND ENVIRONMENTAL ENGINEERING

MATHEMATICS

- Differential Equations (MTH 226)
- Linear Algebra (MTH 226)
- Mathematical Statistics I (MTH 331) and Mathematical Statistics II (MTH 332)

CHEMISTRY

- General Chemistry II (CHM 104)

OTHER SCIENCE ELECTIVE (choose one course listed below)

- Organic Chemistry (CHM 201 or CHM 203)
- Modern Physics (PHY 213)
- Principles of Biology III (BIO 152)

Additional

- Environmental Geology (ESC 201) *At Muhlenberg*
- The Climate System (EESC V2100) OR
- The Solid Earth System (EESC V2200) OR
- Better Planet by Design (EAEE E2100) *At Columbia*

ELECTRICAL ENGINEERING

MATHEMATICS

- Differential Equations (MTH 227)
- Linear Algebra (MTH 226)

PHYSICS

- Modern Physics (PHY 213)

ADDITIONAL

- Analog and Digital Circuits (PHY 216) [*may be taken the summer before entering or while at Columbia*]
- *Sufficient knowledge of computer programming is needed in order to take Data Structures (COMS W3134 or W3136) at Columbia*

ENGINEERING MECHANICS

MATHEMATICS

- Differential Equations (MTH 227)

ADDITIONAL

- Analytical Mechanics (PHY 319) [*may be taken the summer before entering or while at Columbia*]

IEOR: INDUSTRIAL ENGINEERING, ENGINEERING MANAGEMENT SYSTEMS or OPERATIONS RESEARCH

MATHEMATICS

- Linear Algebra (MTH 226)
- Mathematical Statistics I (MTH 331)
- Mathematical Statistics II (MTH 332)

COMPUTER SCIENCE

- Computer Science II (CSI 111)

- Data Structures and Algorithms (CSI 220)
The Department strongly advises JAVA over C.

ACCOUNTING

- Financial Accounting (ACT 101) – *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). If you are not interested in Financial Engineering you may take this course at Columbia.*

MATERIALS SCIENCE AND ENGINEERING

MATHEMATICS

- Differential Equations (MTH 227)

PHYSICS

- Modern Physics (PHY 213)

CHEMISTRY

- General Chemistry II (CHM 104)

MECHANICAL ENGINEERING

MATHEMATICS

- Differential Equations (MTH 227)
- Linear Algebra (MTH 226).

PHYSICS/ BIOLOGY (*choose one course listed below*)

- Modern Physics (PHY 213)
- Principals of Biology III (Bio 152)

ADDITIONAL

- Analytical Mechanics (PHY 319) [*may be taken while at Columbia*]
- Analog and Digital Circuits (PHY 216) [*may be taken while at Columbia*]