The Master of Science Program in Pharmaceutical Bioprocessing

The Otto H. York Department of Chemical, Biological and Pharmaceutical Engineering
New Jersey Institute of Technology

WHY PURSUE AN MS DEGREE IN PHARMACEUTICAL BIOPROCESSING?
New Jersey is considered a “hot bed” for pharmaceutical and bioscience companies, and has more than 30 public biotech companies that generated approximately $3.2 billion in revenue in 2007. Spurred by an explosion in new medical knowledge and an aging population, the biopharmaceutical/bioprocessing industry is one of the strongest and most exciting sectors of the economy. Engineers working on pharmaceutical bioprocessing play a vital role in the design, scale up and operation of biopharmaceutical and biotechnology facilities where new biotechnology-based drugs are developed and eventually manufactured under stringent conditions. NJIT’s MS in Pharmaceutical Bioprocessing, one of only a handful of similar programs in the United States, provides the foundation needed to work within the rigorous technological requirements of this highly regulated work environment.

WHY STUDY PHARMACEUTICAL BIOPROCESSING AT NJIT?
New Jersey is geographically at the heart of the nation’s pharmaceutical and biotechnology industry and home to more of the world’s leading pharmaceutical and biopharmaceutical companies than any other state, and NJIT is at the national epicenter of this concentration of industrial pharmaceutical and bioprocessing research and development. As the State’s science and technology university, NJIT has strong ties with the pharmaceutical and biopharmaceutical industry and works directly with industry advisors to ensure that the curriculum is relevant to industry needs.

WHO SHOULD ENROLL IN THE MS DEGREE IN PHARMACEUTICAL BIOPROCESSING?
Students who wish to specialize in pharmaceutical bioprocessing and biomanufacturing, as well as professionals working in the pharmaceutical and biotechnology industry or related fields.

IS PART-TIME STUDY AVAILABLE?
- The program can be pursued on a full- or part-time basis.
- Evening and late afternoon classes accommodate working professionals.

WHO TEACHES THE COURSES?
Distinguished faculty from the Otto H. York Department of Chemical, Biological and Pharmaceutical Engineering as well as industry experts from New Jersey-based pharmaceutical companies teach all courses.

SUMMARY OF ADMISSIONS REQUIREMENTS
BS in chemical engineering from an accredited undergraduate program (degrees in science or other engineering disciplines may require a bridge program. Typically, those with a science background are required to take three bridge courses to fill their engineering gap.)
- GPA of 3.0 on a 4.0 scale required
- GRE for applicants whose prior degree is from an institution outside the US
- TOEFL score of 550 (paper exam) or 213 (computer-based) for international students
PROGRAM SUMMARY

- **Program Objective:** To educate professionals and provide them with the knowledge required to understand and apply sound engineering principles to the industrial production of therapeutics by means of biological processes, so as to enable them to work in the biopharmaceutical/bioprocessing field, with particular emphasis on the engineering aspects of biotechnology-based drug manufacturing, and pharmaceutical bioprocessing development, production, and operations.

- **Degree Awarded:** Master of Science in Pharmaceutical Bioprocessing

- **Credits Required:** 30 (additional course credits may be required for those that need to take bridge courses, as described below)

COURSE REQUIREMENTS

**Bridge Courses** (9 Credits; typically required for non-engineering applicants only. Bridge courses do not count toward the 30 credits required to complete the PhB program):
- PhEn 500 — Pharmaceutical Engineering Fundamentals I
- PhEn 501 — Pharmaceutical Engineering Fundamentals II
- PhEn 502 — Pharmaceutical Engineering Fundamentals III

**Foundation Core Course** (3 Credits; required for engineering applicants with no biology background, but not required for biology or pharmacy applicants. This course counts toward the 30 credits required to complete the PhB program):
- PhB 505 — Principles of Pharmaceutical Microbiology and Biochemistry

**Core Courses** (21 Credits):
- PhB 610 — Biotechnology/Biopharmaceutical Processes and Products
- PhB 615 — Bioseparation Processes
- PhB 630 — Pharmaceutical Bioprocess Engineering
- PhEn 601 — Introduction to Pharmaceutical Engineering
- PhEn 603 — Pharmaceutical Unit Operations: Processing of Liquid and Dispersed-Phase Systems
- PhEn 604 — Validation and Regulatory Issues in the Pharmaceutical Industry
- PhEn 618 — Principles of Pharmacokinetics and Drug Delivery

**Electives** (as many as needed to achieve the 30 credits required by the program; typically 6 to 9 credits): Students are encouraged to choose electives from a variety of offering departments. In general, all engineering, science, and/or management courses that are relevant to the program and are offered by NJIT can be selected, subject to the approval of the Program Advisor.

**Thesis** (optional): Students who choose to do a thesis take 6 credits of PhEn 701 (Master’s Thesis) in lieu of 6 credits of elective courses.

OPPORTUNITIES FOR RESEARCH

By doing a Master’s Thesis, students may work with faculty members on research projects and gain valuable research experience. Qualified students may continue on to a Ph.D. in chemical engineering or related disciplines. The NJIT-Industry Collaborative Ph.D. program allows students to pursue a Ph.D. while working full-time in industry.

FOR FURTHER INFORMATION, CONTACT:

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FOR AN APPLICATION

Graduate Admissions
(973) 596-3300
http://www.njit.edu/admissions/graduate/index.php