

A Hiring Guide for Science and Engineering Majors

Please review the information in this packet to learn more about our undergraduate co-op students. We look forward to developing a strong partnership with your organization.

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Please note that Chemistry and Physics students only participate in the spring/summer co-op cycles.

Drexel Overview

Drexel is a private, nonsectarian, coeducational university located in historic Philadelphia, Pennsylvania. It was founded in 1891 by financier and philanthropist, Anthony J. Drexel, as the Drexel Institute of Art, Science and Industry with the simple goal to provide educational opportunities in the “practical arts and sciences” for women and men of all backgrounds. The university’s mission today has evolved to serve our students and society through comprehensive integrated academic offerings enhanced by technology, co-operative education, and clinical practice in an urban setting, with global outreach, embracing research, scholarly activities, and community initiatives.

Drexel University offers 73 full-time undergraduate programs, 78 master’s programs, and 32 doctoral programs through its colleges and schools including the Earle Mack School of Law and the College of Medicine, formerly MCP Hahnemann University. Classes are offered at three campuses in Philadelphia and two auxiliary sites: Drexel at Burlington County College in Mt. Laurel, New Jersey and the recently opened Center for Graduate Studies in Sacramento, California.

Drexel Highlights:

- Named by *U.S. News & World Report* as one of the nation’s top four “Up and Coming Schools.” (2008)
- Ranked in the top 100 in the U.S. News list of “Best National Universities”, placing Drexel among the top 50 private universities in the country.
- Over 23,000 students currently attend Drexel. More than 12,000 are enrolled in undergraduate programs. Drexel undergraduate students come from 48 U. S. states and 95 foreign countries.
- More than 90 percent of the full-time undergraduates participate in the cooperative education program, one of the largest in the United States.
- Generated more than \$104 million in research expenditures. (2008)
- Graduated over 150 PhDs. (2008)
- Honored alumnus Chris Ferguson, commander of NASA’s STS-126 mission to the International Space Station in 2008, as the 2009 Engineer of the Year.
- Received a “green rating” of 98/99 in *The Princeton Review’s 2009 Guide to the Best 368 Colleges*. This rating recognizes the University’s commitment to environmental awareness.



Co-op Overview

The Drexel Co-op, a renowned experiential program, is one of the largest and most respected co-op programs in the world. Co-op students alternate periods of full-time professional employment with periods of classroom study, while employers gain valuable contributions from energetic young professionals. Over 1,500 employers across the U.S. and in 23 foreign countries partner with Drexel's Steinbright Career Development Center (SCDC) for co-op. Each year more than 4,400 undergraduate and graduate students are placed in co-op work experiences.

Co-op promotes student learning in the areas of personal and social responsibility, civic knowledge and engagement, intercultural awareness, and most importantly, practical application of academic concepts in real-world, professional settings. For employers, co-op provides the opportunity to develop and evaluate new workforce talent. The university's robust and expanding research enterprise features an array of use-inspired, applied research programs making Drexel students forward thinking and valued contributors in the work place. Drexel's programs are ranked by *U.S. News & World Report* among the best in business, education, and engineering, with co-op as a cornerstone of the academic curriculum.

Co-op Highlights:

- One of the world's oldest and largest Co-op / Work Integrated Learning Programs.
- Over 90 percent of Drexel undergraduates are enrolled in a co-op program; 77 percent of these students are enrolled in a 5 year program which allows for up to 18 months of degree related work experience through 3 separate 6-month work experiences.
- The Steinbright Career Development Center provides stipends for student co-op experiences in China, Greece, India, Ireland, Israel, Italy, and Japan.
- Approximately 16 percent of co-op students took their co-op outside of the Philadelphia region in the 2008-9 academic year. Students worked in Boston, New York City, Los Angeles, Hong Kong, Beijing, Berlin, Cairo, Calcutta, London, and Dublin, among other cities.
- Bottom Line Impact: an effective way for employers to develop high quality future hires and keep recruiting costs down.
- A smooth transition: Co-op students gain on-the-job skills and knowledge during their work periods. When hired full time they often begin at a higher level of responsibility and productivity than inexperienced graduates.
- A source of innovation and energy: Drexel's high quality education prepares co-op students to bring fresh perspectives and suggestions to the workplace that lead to significant contributions.
- Continuous staffing: Co-op cycles operate 12 months of the year, allowing employers to fill positions year-round.
- Gratifying: Co-op employers have the opportunity to become involved in the educational process, helping students along their career paths.



Biology

A Program Overview

The biological sciences encompass many areas of study. Biologists study the structure and functions of living organisms from the individual cell to the full organism, and collectively to the community level. Discoveries in the biological sciences influence many aspects of our daily lives and have become the foundation of most new developments of the new century. In the past two decades, advances in molecular biology and genetics have been rapid, opening many new, exciting career opportunities in the fields of biotechnology and genetic engineering. Biologists can pursue a variety of options including careers in medicine, dentistry, veterinary medicine or other health-related. Not only can biologists work in areas in research or commercial laboratories but also a variety of private settings, government agencies, and in teaching. In fact, more than 100 different occupations have been listed for biologists.

The biological sciences reside in the Department of Biology. Students earn a bachelor's degree in the biological sciences and are prepared for technical careers in research or commercial laboratories, or for professional schools or graduate study. Graduates in the biological sciences are in demand and enjoy a high placement rate with competitive salaries. Graduates with a degree in the biological sciences work for pharmaceutical companies, medical research laboratories, or biotechnology companies, or in government laboratories.

The course requirements identify required support courses in chemistry, physics, mathematics, humanities, and science and human affairs. With proper selection of electives, students can meet teacher certification requirements or complete a minor in another field. Students are encouraged to consult frequently with their academic adviser for curriculum planning.

Biology Department website: <http://www.drexel.edu/biology/>

Biology

General Plan of Study

Freshman Year (Terms 1, 2, 3)

Physiology and Nutrition
General Chemistry I
Expository Writing and Reading
The Drexel Experience
Calculus I or Introduction to Math Analysis I

Cells and Genetics
General Chemistry II
Persuasive Writing and Reading
The Drexel Experience
Calculus II or Introduction to Math Analysis II

Organismal Diversity and Ecology
General Chemistry III
Analytical Writing and Reading
Mathematics for the Life Sciences or Calculus III

Sophomore Year (Terms 4 & 5)

Principles of Molecular Biology
Techniques in Molecular Biology
Organic Chemistry I
General Ecology
Introductory Physics I

Principles of Cell Biology
Techniques in Cell Biology
Organic Chemistry II
Organic Chemistry Laboratory I
Introductory Physics II

Pre-junior Year (Terms 6 & 7)

Human Physiology I
Organic Chemistry III
Organic Chemistry Laboratory II
Introductory Physics III
Humanities/Social Science elective

Pre-junior Year (Terms 6 & 7) continued

Human Physiology II
Ethics
Biology laboratory requirement course
Bioscience elective
Free elective

Junior Year (Terms 8 & 9)

Development Biology
Metabolism
Techniques of Speaking
Biology laboratory requirement course
Humanities/Social Science elective

Technical Communication
Science, Technology and Human Affairs elective
Two biology laboratory requirement courses
Bioscience elective
Free elective

Senior Year (Terms 10, 11, 12)

Evolution
Seminar in Biological Science
Scientific Data Analysis I
Bioscience electives

Seminar in Biological Science
Scientific Data Analysis II
Bioscience electives
Free elective

Seminar in Bioscience
Bioscience electives
Free electives

Biology

Sample Job Descriptions

Research Technician -Philadelphia

Job Description:

XXXX, a biotech company specializing in the development of biomedical research technologies, has a coop position open for a motivated student who is interested in a career in biomedical research, biotechnology, or pharmaceuticals. The position will primarily involve laboratory experiments, conducted with a dedicated group of scientists commercializing a new technology for drug discovery. Technical work will involve protein analysis, cell culture, virology, and microarray experiments. XXXX is a small biotechnology company, so students may also have the opportunity to be involved with other aspects of the commercialization and business process. Qualifications: Qualified candidates should have at least two years of biology coursework, including some laboratory work. Candidates should be majoring in biology, chemistry, or a directly related field. Candidates must have a demonstrated ability to learn quickly and must be well organized.

Brain Injury Therapy Co-op

Job Description:

The majority of the co-op's duties are in the clinical setting, performing administrative duties to support the program, as well as evaluating and treating patients with traumatic brain injury under the supervision of the transdisciplinary outpatient team. The position includes the opportunity to participate in chart rounds as well as team and family conferences in which treatment goals and plans are developed. You will learn proper documentation for treatment and are required to submit all notes in a timely manner each week. Documentation of activities is required on a weekly basis, and in timely completion of treatment reports. There are also opportunities to participate in a variety of educational activities and presentations with the staff. Qualifications: The candidate considering this position should possess excellent skills in the following areas: communication skills (both written and verbal), organizational skills, observational skills, problem solving, and initiation skills. The individual should be mature and should be able to act professionally with people from diverse educational and cultural backgrounds. The successful candidate will be detail oriented, flexible, and capable of working in a fast paced environment. The co-op should be knowledgeable in all Microsoft Office programs and PC hardware, as it is the co-op's responsibility to maintain various types of documentation, both physically and electronically, for department use. The co-op will be responsible for data entry and analysis of information used in treatment planning and program evaluation activities.

BIO Pharmaceutical Development Co-op

Job Description:

The co-op will support the BIO Pharmaceutical Development (PD) group within XXXX. The BIO PD organization is responsible for the development of technology used in the large-scale manufacture of monoclonal antibodies, therapeutic proteins, and other biologics. PD is also responsible for the manufacture of toxicology supplies and clinical supplies intended for phase 1 and phase 2 studies. Five specific areas comprise the BIO PD group: Upstream Drug Substance Development & Technology Management, Downstream Bulk Drug Substance Development, Analytical Development, Drug Product Development, and Clinical Supply & Technical Support. Opportunities for co-ops exist within all of these areas. Learn about all aspects of bio-pharmaceutical manufacturing including fermentation/cell culture, purification, drug product formulation, clinical supply manufacture, manufactured product technical support. A co-op assigned to one of the development areas will participate in the planning, execution, and analysis of a wide variety of experiments, with guidance from an experienced scientist. He/she will assist in the development and implementation of biological manufacturing processes, scale-up procedures, and testing relevant to the processing, formulation, and evaluation of monoclonal antibodies and other biologics. A co-op assigned to our clinical manufacturing area will assist with various aspects of clinical production such as: equipment preparation; preparation of standard operating procedure (SOP) documents; participation in technical cGMP training for pilot plant personnel; participation in technical transfer activities from other groups. A co-op working in this area may also assist in investigation of non-conformance events or participate in technology development studies. All assignments offer the opportunity to work with cross-functional teams to implement projects involving capacity improvements, cost savings, process improvements. Requirements/Qualifications • Completion of a minimum of two years towards a B.S. in Chemical or Biochemical Engineering; Chemistry/Analytical Chemistry; Biology or Microbiology. • Previous co-op or internship experience preferred. • Extensive PC based skills, including Microsoft Excel, Word, Project and PowerPoint • U.S. Citizenship or Permanent Residency Required • Minimum 3.2 GPA preferred • Strong interpersonal, analytical, and leadership skills • Local travel may be required.

Biomedical Engineering

A Program Overview

Biomedical engineering is an innovative Bachelor of Science degree program developed and delivered in collaboration with the College of Engineering, the College of Arts and Sciences and the College of Information Science and Technology. It prepares students to conceive, design, and develop devices and systems that improve human health and quality of life. Biomedical engineering is the convergence of life sciences with engineering. From child car seats and football helmets to drug-delivery systems, minimally invasive surgery, and noninvasive imaging technology, the work of the biomedical engineer makes a difference in everyone's life.

Biomedical Engineering Program Outcomes

Graduates of the Biomedical Engineering program will attain the following skills:

- an understanding of advanced mathematics, physical science, biology and physiology
- the ability to apply knowledge of mathematics, science and engineering to solve problems at the interface of engineering and biology
- the ability to design and conduct experiments as well as to analyze and interpret data using statistical, computational or mathematical methods
- the ability to make measurements on, and interpret data from, living systems addressing the problems associated with the interactions between living and non-living materials and systems
- the ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, entrepreneurial, environmental, intellectual property rights, social, political, health and safety, manufacturability and sustainability
- the ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibilities
- the ability to communicate effectively and function on multi-disciplinary teams
- the ability to understand the impact of engineering solutions in global, economic, environmental and societal contexts
- a recognition of the need for, and ability to engage in, life-long learning
- knowledge of contemporary issues
- the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- knowledge of interdisciplinary concepts within a biomedical perspective

The program provides innovative experiences in hands-on experimentation and engineering design as well as opportunities for personal growth and development of leadership and communication skills.

Working with a faculty advisor, students can select their core and elective courses from the curricula offered by the School of Biomedical Engineering, Science, and Health Systems and the Departments of Bioscience and Biotechnology, Chemistry, Physics, Mathematics, Computer Science, Chemical Engineering, Mechanical Engineering, Materials Engineering, Electrical and Computer Engineering, and the College of Information Science and Technology.

For more information, visit the School of Biomedical Engineering, Science, and Health Systems' web site at <http://www.biomed.drexel.edu>.

Biomedical Engineering

Areas of Concentration

The undergraduate biomedical engineering curriculum is designed to strike a balance between academic breadth in biomedical engineering and specialization in an area of concentration:

- **Biomaterials and Tissue Engineering** – The Biomaterials and Tissue Engineering concentration focuses on the fundamental knowledge of natural and synthetic biomaterials and cellular biology to educate students in the emerging fields of cellular tissue engineering and regenerative medicine. This concentration is a combination of materials science, chemical and mechanical engineering, cell and molecular biology and physiology.
- **Biomechanics and Human Performance Engineering** – The Biomechanics and Human Performance Engineering concentration applies engineering principles to study the interactions between humans and various machine systems in both working and living environments. It provides students with the background and skills needed to improve human health and enhance performance. This concentration is a combination of mechanical engineering, psychology and physiology.
- **Biomedical Informatics** – Biomedical Informatics is an emerging field of science concerned with the management, analysis and interpretation of the flood of data being generated in many areas of biology and medicine. The field of bioinformatics enables information at the gene, protein, cell, tissue, organ, and systems level to be integrated and interpreted for early detection, accurate diagnosis, and effective treatment of complex diseases such as cancer. This concentration is a combination of computer science, information systems technology, cell and molecular biology, genomics and proteomics.
- **Biomedical Systems and Imaging** – The Biomedical Systems and Imaging concentration focuses on the theoretical and practical issues related to machine vision, image processing and analysis, and signal processing associated with such medical applications as ultrasound, optics, magnetic resonance, and autoradiographic imaging. This concentration is a combination of electrical engineering, chemical engineering, physics and physiology.
- **Neuroengineering** – The Neuroengineering concentration focuses on the theory of neural signaling, as well as addressing issues that have a neuroscientific basis, such as locomotion and pattern generation, central control of movement, and the processing of sensory information. This concentration is a combination of electrical engineering and neuroscience.

Details about each concentration's specific plan of study can be found here:

<http://www.drexel.edu/catalog/ug/biomed/biomedeng-index.htm>

Biomedical Engineering

General Plan of Study

Freshman Year (Terms 1, 2, 3)

Chemical and Biological Foundations of Engineering I (3 Credits)
University Seminar (1 Credits)
Engineering Design and Laboratory I (4 Credits)
Mathematical Foundations of Engineering (3 Credits)
Physical Foundations of Engineering I (3 Credits)
Humanities and Communication I (3 Credits)

Chemical and Biological Foundations of Engineering II (3 Credits)
Engineering Design and Laboratory II (3 Credits)
Mathematical Foundations of Engineering II (3 Credits)
Physical Foundations of Engineering II (3 Credits)
Humanities and Communication II (3 Credits)
University Seminar (1 Credits)

Chemical and Biological Foundations of Engineering III (3 Credits)
Engineering Design and Laboratory III (3 Credits)
Mathematical Foundations of Engineering III (3 Credits)
Physical Foundations of Engineering III (3 Credits)
Humanities and Communication III (3 Credits)
Introduction to Biomedical Engineering (2 Credits)

Sophomore Year (Terms 4 & 5)

Engineering Principles of Physiology I (3 Credits)
Materials I (3 Credits)
Systems I (3 Credits)
Energy I (3 Credits)
Evaluation and Presentation of Experimental Data I (4 Credits)

Engineering Principles of Physiology II (3 Credits)
Materials II (3 Credits)
Systems II (3 Credits)
Energy II (3 Credits)
Evaluation and Presentation of Experimental Data II (3 Credits)

Pre-Junior and Junior Years (Terms 6-9)

Interdisciplinary Courses* (4 required, 3-4 Credits Ea.)
BME Core Courses* (8 Required, 3-4 Credits Ea.)
BME Laboratories (4 Required, 2 Credits Ea.)
Liberal Studies Electives (3 Credits)
Biomedical Ethics & Law (3 Credits)

Senior Year (Terms 10, 11, 12)

Senior Project Design (8 Credits Total)
BME Core Electives* (3 Required, 3 Credits Ea.)
BME Professional Electives* (2 Required, 3 Credits Ea.)
Liberal Studies Electives (3 Required, 3 Credits Ea.)
Free Electives (6 Credits)

Biomedical Engineering

Sample Job Descriptions

Research Co-op

Job Description:

Job Description: Co-ops will work with a multidisciplinary team on the discovery of potent and selective inhibitors of ubiquitin pathway targets using innovative assays in high throughput screening. The best compounds from screening will be progressed to preclinical drug development against a variety of diseases, including cancer, diabetes, cardiovascular disease, osteoporosis, and inflammation-related disease. Experience will be gained in both laboratory work and various aspects of the operation of a small business. Reports to: a senior researcher who has the responsibility of mentoring and supervision. All XXXX senior staff have experience in working with student co-ops/interns. Duties and Responsibilities may include: 1. Establish and maintain prokaryotic and eukaryotic cell cultures for assay development and compound evaluation 2. Contribute as a team member in the development and validation of high throughput biochemical screening assay technology; clone, express, and purify assay components, and configure and validate in vitro and cell-based assays 3. Conduct screening assays and identify lead compounds; maintain results in databases 4. Conduct experiments to establish profiles of lead compounds 5. Present results at lab meetings; assist in writing research articles and patents 6. Sit in on various business meetings, conference calls, etc 7. Perform other duties related to general lab operation, to be shared with team members (e.g. supply ordering, laboratory maintenance). Qualifications and Requirements: 1. Major in life sciences, or a major in another scientific area with a desire to learn and practice biochemistry and/or molecular biology 2. Data entry and analysis skills 3. Good communication skills (verbal and written) 4. Some lab experience (students are supervised closely initially with respect to lab work, and subsequently gain independence at their own pace) Hours: The expectation is a standard 40 hr week with paid company holidays.

Biomaterials Engineering Co-op

Job Description:

The Biomaterials Engineering Co-op will perform experiments to support the development of novel biomaterials based medical devices, under the supervision of an experienced engineer/project manager. Our co-ops will work with scientists and engineers to fabricate prototype instruments and implants, perform mechanical testing to standard protocols on novel material formulations, perform materials testing by chemical methods or analytical equipment, compile test data and write reports, and assist with testing to support manufacturing process validation and technology transfer. Qualifications: Major in Biomedical Engineering, Chemical Engineering Materials Engineering or Mechanical Engineering required. Should have completed a solid base of course work in chemistry or materials science. Excellent communication skills a must. The successful candidate will be innovative, analytical, versatile and energetic, with the ability to function at all organizational levels. You will be required to participate in and coordinate multiple projects. You should have broad-based interests, with the desire to participate in a hands-on, fast entrepreneurial environment.

Product Development Co-op Extremity Reconstruction

Job Description:

ESSENTIAL DUTIES AND RESPONSIBILITIES •Provide hands-on support for product development and exploratory projects. This will include operating lab-scale lab equipment to create prototype devices •Provide support for testing and characterization of prototype products, including physical and chemical tests •Provide support for testing and characterization of competitive devices and materials •Complete other tasks as designated by Regenerative Technologies Product Development Management •Complete other tasks as designated by Extremity Reconstruction/Regenerative Technologies Product Development Management

Chemical Engineering

A Program Overview

Chemical engineers are concerned primarily with process engineering, the conversion of raw materials into valuable products. The products can include pharmaceuticals, specialized plastics, petrochemicals, materials for biomedical applications, and energy. The processes, which usually start out at a small laboratory scale, must be developed for production at a large chemical plant scale. The large change in scale requires careful engineering to minimize environmental contamination and to insure public safety.

The Department of Chemical and Biological Engineering is responsible for equipping our graduates with the broad technical knowledge and teamwork skills required for them to make substantial contributions to society.

Program Objectives:

The Chemical Engineering major has four goals for its students:

- Provide students with a strong foundation of scientific principles, teamwork methods, and communication skills for the identification and solution of chemical engineering problems.
- Instill in our students the capacity for self and group-study and experience self-assessment so that they possess the attributes necessary to continue life-long learning.
- Apply elements of public health and safety, concern for the environment, and ethics in the course of studies.
- Familiarize our students with research methodologies.

To help students reach these goals, the curriculum is structured so that they progress through sequences in the fundamental physical sciences, humanities, engineering sciences, and design.

Since chemical engineers have the responsibility for translating the results of chemical research into products for the marketplace, and for preventing the wastes generated by industry from contaminating the environment, the physical sciences sequence includes a strong emphasis on chemistry, with courses in analytical, inorganic, organic, and physical chemistry. All the courses emphasize modern theories of chemistry and are designed to help students gain a clearer understanding of their eventual assignments in engineering science and design.

As students progress to courses in engineering science and design, problems of a textbook nature give way to real-world examples. By senior year, students are involved in comprehensive design projects.

Senior Design Projects

A special feature of the major is senior design. A student — or group of students — works with a faculty advisor to develop a significant design project. Some recent examples include:

- Design of a process to make petrochemical intermediates
- Plastics recycling design
- Process design for antibiotic products

Chemical Engineering

General Plan of Study

Freshman Year (Terms 1, 2, and 3)

General Chemistry I
Career Management/Professional Development
Computation Lab I
Expository Writing and Reading
Beginning CAD for Design
Engineering Design Laboratory I
Calculus I
The Drexel Experience

General Chemistry II
Computation Lab II
Persuasive Writing and Reading
Engineering Design Laboratory II
Calculus II
Fundamentals of Physics I
The Drexel Experience

Essential Biology
Computation Lab III
Analytical Writing and Reading
Engineering Design Laboratory III
Multivariate Calculus
Fundamentals of Physics II
The Drexel Experience

Sophomore Year (Terms 4 & 5)

Process Material Balances
Evaluation & Presentation of Experimental Data I
Fundamentals of Materials
Linear Engineering Systems
Fundamentals of Physics III

Process Energy Balances
Basic Chemical Engineering Thermodynamics
Evaluation & Presentation of Experimental Data II
Dynamic Engineering Systems
Sophomore engineering elective

Pre-junior Year (Terms 6 & 7)

Process Thermodynamics
Process Modeling I
Organic Chemistry I
Physical Chemistry Lab
Technology in Historical Perspective

Process Fluid Mechanics
Chemical Engineering Laboratory
Statistics and Design of Experiments
Organic Chemistry II
Engineering Ethics

Junior Year (Terms 8 & 9)

Process Heat Transfer
Process Separations
Chemical Engineering Laboratory II
Physical Chemistry and Applications II
General education elective

Process Mass Transfer
Process Modeling II
Chemical Engineering Laboratory III
Physical Chemistry and Applications III
General education elective

Senior Year (Terms 10, 11, 12)

Process Systems Engineering
Chemical Kinetics and Reactor Design
Process Design I
General education elective

Process Design II
CHE concentration electives
Free elective
General education elective

Process Design III
CHE concentration electives
General education elective

Chemical Engineering

Sample Job Descriptions

Chemical Process Modeling Intern

Job Description:

The successful candidate will work in a Process Modeling Team at XXXX. The position will be of interest to a Chemical Engineering junior or senior, with or without a modeling background, who definitely has an interest in applying models to solve industrial chemical process problems. We use any number of commercial modeling packages. Prospective interns will be matched with work that fit well with their experience base and interest while contributing to our team's programs that serve manufacturing plants and support research activity. The ideal candidate should be comfortable working in the Windows XP operating system environment but may also have occasion to work on a Linux platform. Familiarity with Microsoft EXCEL will be a distinct advantage. The start and duration of the successful candidate's internship can be flexibly arranged to match the candidate's schedule.

Co-op Engineer

Job Description:

Product Development-The co-op engineer conduct research in a specific lubricant area, with the objective of contributing to the development of new or improved lubricants. Computer and laboratory work are essential parts of the job. The student engineer will plan, conduct and analyze experiments and present results in a technical engineering report, as well as a formal oral presentation. Qualifications: Must have GPA 3.0 or higher and have completed basic calculus, chemistry, thermodynamics and computer classes. Location: Paulsboro, New Jersey. Other jobs are available with XXXX in other locations (Fairfax Virginia, Texas, Baton Rouge). These include refinery and chemical plant assignments or process assignments and development positions.

CHEMICAL ENGINEERING CO-OP

Job Description:

Co-op Education for Students: If you are a student looking for a challenging work experience, consider the cooperative education and internship programs we offer at XXXX. You will not only have the chance to gain experience in your chosen career field, but also gain an invaluable overview of our career opportunities and diversified product lines. Plus you will have an opportunity to learn the business fundamentals of a Fortune 500 company and, in turn, contribute a fresh, new perspective to us. Flexibility is the best way to describe what our successful co-op and intern programs provide. We'll do our best to match available positions with your interests and goals. XXXX has participated in various university cooperative education programs since the early 1960s. In addition to practical work experience, our programs include seminars, tours and various social activities - all intended to enhance your personal and professional development. The Program: Generally, undergraduate students selected for the co-op program and internships have completed their freshman year. Those earning advanced degrees are candidates for both programs when they complete the first year of their degree program. We want candidates who are highly motivated and have above-average interpersonal skills, recognized leadership experience and outstanding academic records in chemical engineering. Co-op education assignments, which are available throughout the year, usually run from three to eight months. Fall internships can begin as early as August and extend through December/January. Resumes are accepted year-round. Assignment Locations: Work locations vary, but about 80% of the XXX co-op students and interns work at our worldwide headquarters in Pennsylvania's Lehigh Valley, which is about 50 miles north of Philadelphia. There also are positions at several other sites such as Los Angeles, California; New Orleans, Louisiana; Hometown, Pennsylvania; LaPorte and Pasadena, Texas. Qualifications: Pursuing BS/MS in Chemical Engineering We thank all applicants in advance for their interest; however, only those applicants who are being considered for an interview will be contacted. XXXX is an equal opportunity employer (M/F/D/V) where diversity matters.

Chemistry

A Program Overview

Drexel's Department of Chemistry offers a BS degree certified by the American Chemical Society Committee on Professional Training and a BA degree for those interested in following their undergraduate educations in chemistry with professional school, such as law or medicine.

Each student plans a course of study and selects electives in consultation with an advisor in the Chemistry Department. Students who show initiative and laboratory ability are encouraged to select a research problem and/or other advanced courses in chemistry during the junior and senior years. Most graduate courses in chemistry are open to qualified seniors. Prerequisites and descriptions of available graduate courses appear in the graduate catalog.

Both a five year co-op degree and a four-year non-co-op degree are offered.

Facilities

There are seven undergraduate learning laboratory environments in the department: three freshman Chemistry labs, an advanced Organic Chemistry lab, a Physical Chemistry lab, an instrumentation laboratory and a combined Analytical/Inorganic Chemistry lab. The freshman and Organic labs were recently renovated to be state-of-the-art facilities.

Mass Spectrometry Laboratory

Finnigan LCQ LC-MS mass spectrometer equipped with an electrospray ionization source, a Waters Autospec M high resolution mass spectrometer, and a Bruker Autoflex LRF MALDI mass spectrometer.

Magnetic Resonance Laboratory

Varian INNOVA 300 MHz superconducting FT-NMR spectrometer, Varian INNOVA 500 MHz superconducting FT-NMR spectrometer, and a Varian X-band 12" EPR spectrometer.

Analytical Instrumentation Laboratory

The newly renovated and open-access departmental Analytical Instrumentation Laboratory includes two Perkin-Elmer (PE) Spectrum One Fourier-transform infrared absorption spectrometers each with a universal diamond ATR accessory, a PE Lambda-35 UV/visible spectrometer, a PE Lambda-950 UV/visible/NIR spectrometer with a 60-mm-diameter diffuse reflectance integrating sphere, a PE model 343 polarimeter, a PE LS55B luminescence spectrometer, a PE Clarus 500 capillary-column GC with dual FID detectors, a Clarus 500 capillary-column GC/MS system (with electron impact capability), a PE Series 200 Quaternary HPLC development system with UV/visible photodiode array detector, a PE Series 200 binary HPLC system equipped with a Sciex 2000 triple quadrupole MS detector, a PE Series 2000 binary gel permeation chromatography system with refractive index detector, and a Varian AA240FS flame atomic absorption spectrometer equipped with a GTA 120 graphite furnace accessory.

Chemistry

General Plan of Study

Freshman Year (Terms 1, 2, and 3)

General Chemistry I
Expository Writing and Reading
History of Science II
Calculus I
The Drexel Experience

General Chemistry II
Persuasive Writing and Reading
Calculus II
Fundamentals of Physics I
The Drexel Experience

General Chemistry III
Analytical Writing and Reading
Calculus III
Fundamentals of Physics II

Sophomore Year (Terms 4 & 5)

Quantitative Analysis
Quantitative Analysis Lab
Organic Chemistry I
Calculus IV
Fundamentals of Physics III

Cells and Genetics
Organic Chemistry II
Organic Chemistry Lab I
Physical Chemistry I
Differential Equations
Linear Algebra

Pre-junior Year (Terms 6 & 7)

Principles of Cell Biology
Organic Chemistry III
Organic Chemistry Lab II
Physical Chemistry Lab I
Free electives

Pre-junior Year (Terms 6 & 7) continued

Physical Chemistry & Applications III
Physical Chemistry Lab II
Free electives
Technical elective

Junior Year (Terms 8 & 9)

Chemical Information Retrieval
Inorganic Chemistry I
Analytical Chemistry I
Introduction to Scientific Computing
Free elective

Molecular Symmetry and Group Theory-Chemistry
Analytical Chemistry II
Free electives
Technical elective

Senior Year (Terms 10, 11, 12)

Qualitative Organic Lab
Senior Research Project
Structure and Function of Biomolecules
Metabolism
Free elective

Senior Research Project
Computational Biochemistry Lab
Biochemistry Laboratory
Free electives
Liberal studies elective

Physical Chemistry IV
Inorganic Chemistry II
Inorganic Chemistry Lab
Senior Research Project
Free elective

Chemistry

Sample Job Descriptions

Polymer Synthesis and Applications Chemist

Job Description:

XXXX is looking to hire a coop for next term to work in our laboratory. The position will require a student that has at least completed Organic Chemistry. The student will be involved in the synthesis and testing of polymers used in various coatings, packaging ink, and adhesive applications. The candidate will be required to be a self-starter who can, with a minimum of instruction, carry out laboratory experiments. The candidate will be part of a team completing technical projects that will include the development, testing, scale-up, and troubleshooting of new polymeric systems. The student will learn about the synthesis, scale-up, manufacturing, application testing, customer use, and analytical testing of polyurethane and polyamide resins used in industry.

Chemist - HPC Lab

Job Description:

Objective of the co-op: To work in the Home and Personal Care applications group to test new chemistries and technologies relevant to this market. The candidate will be trained within the Home and Personal care group and will be involved in formulations development and performance testing. Typical formulations in this segment will include shampoos, body washes, conditioners, hard surface cleaners and laundry detergents. Performance testing will be done to establish and understand the underlying structure-property relationships, impact of rheological properties and surfactant phase behavior of these systems.

Quality Control Technician

Job Description:

QC Lab - testing of inbound materials and production for conformity to standards. Organization of standardized library
Qualifications: Basic chemistry background. Knowledge/exposure to spectrophotometer. Desire to work in plant and lab. (This is a manufacturing lab position not a research lab assignment). Basic computer knowledge.

Special Application Instructions:

Chemical testing of incoming raw materials, in process testing, and finished goods testing. FDA current Good Manufacturing Practice for manufacture of API and USP products.

Physics

A Program Overview

The physics undergraduate bachelors degree provides a sound basis either for entering graduate school or for pursuing a variety of industrial careers. The Department of Physics exposes students to both traditional and cutting-edge areas of physics: astrophysics and general relativity; atomic physics; biological physics; condensed-matter physics, including superconductivity and nanotechnology; laser physics and quantum optics; nonlinear physics and chaos; nuclear physics; nuclear astrophysics; and particle and cosmic ray physics.

Virtually every course in the physics major has an associated computational component designed to extend the students' ability to handle real-world problems solved by state-of-the-art techniques. An important feature of the program is the large number of electives, which allow a student to pursue topics of special interest. There are elective sequences in biology for those preparing to enter biophysics or medicine and advanced topics for those interested in atomic, nuclear, solid-state, theoretical, or atmospheric physics. Students can also choose electives to meet teacher certification requirements.

The Laboratory for High-Performance Computational Physics is now in place, and courses allow students to become proficient in numerical techniques, parallel processing, electronic communication, and the basic computer languages and software relevant to advanced studies and research in physics and atmospheric science.

The Department of Physics conducts a broad array of outreach activities including the Kaczmarczik Lecture Series, public observing nights at the Lynch Observatory, and demonstrations in grade school performed by the Drexel Chapter of the Society of Physics Students (SPS).

Physics

General Plan of Study

Freshman Year (Terms 1, 2, 3)

Expository Writing and Reading
Calculus I
Contemporary Physics I
Introduction to Scientific Computing
The Drexel Experience

Computer Programming I
Persuasive Writing and Reading
Calculus II
Contemporary Physics II
The Drexel Experience

Analytical Writing and Reading
Calculus III
Computational Physics I
Contemporary Physics III

Sophomore Year (Terms 4 & 5)

General Chemistry I
Multivariate Calculus
Linear Algebra
Thermodynamics

General Chemistry II
Differential Equations
Modern Physics Laboratory
Computational Physics II
Topics in Mathematical Physics

Pre-Junior Year (Terms 6 & 7)

Classical Mechanics I
Electromagnetic Fields I
General Chemistry III
or Cells and Genetics
Liberal Studies Elective

Pre-Junior Year (Terms 6 & 7) continued

Classical Mechanics II
Electromagnetic Fields II
Advanced Laboratory
Business Elective
Physics Lab Requirement

Junior Year (Terms 8 & 9)

Instrumentation for Scientists I
Quantum Mechanics I
Free Elective
Liberal Studies Elective
Physics Lab Requirement
Topical Physics Course

Statistical Mechanics
Quantum Mechanics II
Liberal Studies Elective
Physics Lab Requirement
Topical Physics Course

Senior Year (10, 11 & 12)

Physics Seminar
Quantum Mechanics III
Senior Research I
Technical Elective
Topical Physics Course

Physics Seminar
Senior Research II
Free Elective
Technical Elective
Topical Physics Course

Physics Seminar
Senior Research III
Business Elective
Free Elective

Physics

Sample Job Descriptions

Java Programmer

Job Description:

Develop Java client and servlet programs as web service interface to fusion codes. Add new scientific graphics and display capabilities to Java programs such as w3.pppl.gov/elvis. Work with lead developer. Java source code is stored in CVS repository and is accessible through integrated development environment.

Research Coop

Job Description:

We are looking for science, engineering or computer science majors to participate in our research and analysis. We provide a flexible work environment. Duties will include: analysis using mathematics software, spreadsheets and company developed software, modeling and simulation of sensor systems, software development, database development and data reduction. Qualifications: Desire a strong mathematics and physical science background. A familiarity with programming will be very useful in performing the functions of the job.

Research & Development Engineer

Job Description:

This is a thought-provoking engineering co-op position located in physical chemistry research and development lab. Our work is to better understand mechanical behavior of polymeric coating materials. Here in the laboratory we use sensitive computer-controlled apparatuses to measure the mechanical properties of various developmental materials. Most of the equipment used by the co-op is one of a kind. This hands-on position allows a co-op to work on two precision instruments for nano-indentation and nano-scratch measurements, a particle impact gun, an atomic force microscope, video capture equipment and many other sophisticated pieces of computer equipment. The co-op employee will work closely with X to learn the relevant theories, design specialized equipment and to carry out precise experiments. We are using LabView program to control numerous pieces of equipment and to operate data collection circuitry. Such programs like, LabView, Excel, and Sigma Plot are used on a daily basis to perform experiments and to prepare experimental data. Also, a finite element computation program, called Abacus, will be used to create mathematical models of various materials. The co-op employee will also have an opportunity to meet and discuss their work with seminar speakers and consultants from major universities around the world. Qualifications: Positions are highly challenging technically and provide good opportunities for independent work and learning. Because of this, students should meet the following qualifications. 1. Minimum GPA of 3.0 is desired. 2. Must be interested in and responsible for carrying out technical and experimental work. 3. Expected to be motivated to assist and learn from colleagues. 4. Some programming experience a plus (any language; a basic understanding of programming concepts is more important than knowing a particular language).