Fiber Science

Build on foundations in the natural, life, and physical sciences, engineering, and mathematics to develop and control fiberous materials to positively impact society.

Students learn how the principles of fiber science influence the design and fabrication of traditional and innovative products, from clothing and textiles to green composites and life-saving medical implants, by studying the physical, chemical, biomedical, and engineering properties of fibrous materials, advanced engineering composites, geotextiles, nanofibers, and textiles.

Fiber science majors study the science and application of materials. The relationship between the chemistry, physics, and assembly of materials and how they perform in systems ranging from clothing to medical and built environments is established early in the curriculum.

The depth in the natural sciences and engineering can be meaningfully complemented by an aesthetic perspective for those who are also interested in creative pursuits in the fashion and textile industry and beyond.

The foundation in a liberal arts-based and highly interdisciplinary curriculum that includes the social sciences and humanities enables students to consider the human component and societal impact of the engineering and technological advances being developed.

Students receive individual attention and develop close connections with faculty. Each student has the opportunity to customize their plan of study with half of their course credits chosen from broad engineering or science categories or as electives.

The major is versatile and allows students flexibility to explore their individual interests without feeling constrained by a specific track. A student can focus on the development of new high-performance fibers for highway construction, reinforced composite materials for aircraft or sports gear, electronic circuit boards, artificial membranes, arterial grafts for medicine, or smart and protective clothing for industry and the military.

Graduates of the Fiber Science major are well educated in their chosen interests, and seek
Requirements in the Major

• Fiber and Yarn Analysis Laboratory
• Fiber Science
• Fibers, Fabrics, and Finishes
• Fiber Chemistry
• Introduction to Computer Programming or Introduction to Computer-Aided Design
• Structural Fabric Design
• Textiles, Apparel, and Innovation
• Product Quality Assessment

Any one of the following:

• Biomedical Materials and Devices for Human Body Repair
• Chemistry of Textile Finishes and Dyeing
• Rheology of Solids
• Fiber Formation: Theory and Practice
• Mechanics of Fibrous Assemblies
• Physical Properties of Fiber Forming Polymers and Fibers

Additional courses

• Calculus
• Chemistry
• Organic Chemistry
• Physics
• Communications or Foreign Language
• Ethics
• Introduction to Statistics
• Economics
• Humanities and Social Sciences

Choose a concentration in

• Biology
• Materials Science
• Ergonomics
• Chemistry

Faculty Research Interests

• Athletic products and performance
• Development of fully degradable, fully sustainable, environment-friendly “green” composites
• Electrospun controlled absorption, timed-release fabrics (controlled absorption and release of chemicals)
• Interfacing fiber science and nanotechnology
• Rapidly renewable polymers as engineering materials
• Smart clothing
• Synthesis of biodegradable polymers and hydrogels having biologic functions for wound closure, drug control/release and tissue engineering use
• Textile nanotechnology and smart fibers: functional nanolayers
• Thermal comfort and mobility of clothing
• Use of personal protective equipment to reduce human exposure to pesticides

Curriculum

The curriculum provides great flexibility for students to focus on their interests within Fiber Science, the college, and across the University.

Fiber Science majors complete college requirements in the natural and social sciences, humanities, writing, statistics and calculus to provide context to their major course work.

Courses ranging from Fiber and Yarn Analysis and Fiber Chemistry to Computer Aided Design and Biomedical Materials and Devices for Human Body Repair, provide students with tools that focus on the impact of Fiber Science on contemporary human issues.

Special Opportunities

Beyond formal course work, research, studying abroad, and field experiences add a significant experiential component to the course of study, providing valuable practical knowledge while testing students’ academic and career interests.

Undergraduate research can be pursued with a faculty mentor and through special projects with student teams. Students can also apply to the Honors Program to pursue an independent research inquiry under the guidance of a faculty member.

Opportunities for community outreach focused on increasing STEM participation among underrepresented groups, or on engaging senior citizens in collaborative learning experiences are also available. Additional opportunities are available through organizations on campus and in the Ithaca/Tompkins County area.

Many students choose to study abroad or participate in the college’s Urban Semester program in New York City, or in an international exchange program, such as through the Hong Kong Polytechnic University, among others.

Students take advantage of summer internships with companies in technical apparel, personal care, and semiconductors, as well as military and testing labs. Additional field experiences include summer research positions, medical internships, or National Science Foundation funded Research Experience for Undergraduate programs at other universities.

Careers

Recent graduates of the Fiber Science program have begun careers in the fiber, textile, and chemical industries, as well as with government agencies developing and evaluating new products, conducting research, providing technical services, helping to ensure product safety, and coordinating consumer information programs.

This major provides excellent preparation for advanced study in many fields, including medicine, fiber and polymer science, materials science, textile science, textile technology, engineering, and other areas of applied science. Students in the program have also gone on to business, law, and other graduate and professional programs.

Selected Graduates

Pediatrician, Boston Medical Center
Physical scientist, The North Face
Ph.D. Materials Science, Drexel University and Haute Tech Lab
Director of Product Design & Development, Kent Wool
Laboratory Technician/Protective Clothing, Intertek Laboratories
Textile Technology Patent Examiner, USPTO
Director of Materials Management, Wolverine International
Manager Quality Assurance, Bed Bath & Beyond
Semi-conductor Process Engineer, IBM
MBA, Director CRM & Analytics, Kiehls
Ph.D. History, Anthropology, Science, Technology and Society, Post-doc Singapore University of Technology & Design
MS, Medical Devices & Diagnostics, Project Manager, Tandem Diabetes Care
MS Materials Science, Energy Efficiency Engineer, Air Force
Senior Innovation Designer, Nike
Textile Product Analyst, Good Housekeeping

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