Textile Materials Science (TMS)

TMS 211 Introduction to Fiber Science (3 credit hours)
Properties of fibers are related to their classification, chemical structure, type and origin- which helps with their identification and classification. Covered in this course are principles of fiber formation and the physical behaviors of fibers (including their mechanical, thermal, optical, frictional, electrical, and moisture management properties), and methods of measuring the physical properties of fibers. Relationships between polymer structure, fiber properties and utilization are explored. Also, students are introduced to tools that will help them reflect on how problems related to fiber science are solved.

Prerequisite: MT 105 or TT 105 or PCC 101; Corequisite: MA 131 or MA 141
GEP Natural Sciences
Typically offered in Fall, Spring, and Summer

TMS 212 Yarn and Fabric Formation and Properties (2 credit hours)
The development of products from textile and fibrous materials is a critical component of new products development in many industries, including textiles, retail, plastics, composites, transportation, medical and architecture. This course provides the technical information required for scientists to understand how textile and fiber-based products are manufactured, with a practical view to combining the new knowledge with a molecular-level understanding of fibers for unique new product development.

Prerequisite: TMS 211 or TE 201
Typically offered in Fall only

TMS 214 Yarn and Fabric Formation and Properties Lab (1 credit hours)
The development of products from textiles and fibrous materials is a critical component of new product development in many industry. This laboratory course provides hands-on exercises and demonstrations of key textile and fiber-based products are manufactured.

Prerequisite: TMS 212
Typically offered in Fall only

TMS 492 Special Topics in Textile Materials Science (1-3 credit hours)
Presentation of material not normally available in regular course offerings or offering of new courses on a trial basis. Credits and content determined by faculty member in consultation with the Department Head.

Typically offered in Fall and Spring

TMS 500 Fiber and Polymer Microscopy (3 credit hours)
Art and science of light and electron microscopy; theoretical and practical aspects of visibility, resolution and contrast. Laboratory practice in assembling, testing and using various microscopes and accessories in analyzing, describing and identifying unoriented and oriented crystalline or amorphous materials. Laboratory emphasis on study of fibers and polymers through transmission microscopy with polarized light.

Prerequisite: MA 242, PY 208, TC 203
Typically offered in Fall only

TMS 521/TT 521 Filament Yarn Production Processing and Properties (3 credit hours)
Structure, properties and processes for manufacturing and treating continuous filament yarns. Response of fibers to elevated temperatures, twist, false twist and various bulking processes. Yarn structures and properties required for stretch and molded fabrics. Independent laboratory and critical literature review in general area of filament yarn processing, properties and test methods. credit not allowed for both TT 521 and TT 425

Prerequisite: Graduate standing or PBS status
Typically offered in Fall only

TMS 565/TE 565 Textile Composites (3 credit hours)
Fiber architecture of textiles used for composites. Manufacturing processes and geometric quantification. Basic analysis for predicting elastic properties. Interrelationship of elastic properties and geometric quantities. Failure criteria for these materials.

Prerequisite: MA 341, MAE 206
Typically offered in Spring only

TMS 589/TC 589/TE 589 Special Studies In Textile Engineering and Science (1-4 credit hours)
New or special course on developments in textile engineering and science. Specific topics and prerequisites identified vary. Generally used for first offering of a new course.

Prerequisite: Senior standing or Graduate standing
Typically offered in Fall, Spring, and Summer

TMS 676 Special Projects (1-3 credit hours)

TMS 685 Master's Supervised Teaching (1-3 credit hours)
Teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student upon completion of the assignment.

Prerequisite: Master's student
Typically offered in Fall and Spring

TMS 690 Master's Exam (1-9 credit hours)
For students in non thesis master's programs who have completed all other requirements of the degree except preparing for and taking the final master's exam.

Prerequisite: Master's student
Typically offered in Fall and Spring

TMS 693 Master's Supervised Research (1-9 credit hours)
Instruction in research and research under the mentorship of a member of the Graduate Faculty.

Prerequisite: Master's student
Typically offered in Fall and Spring

TMS 695 Master's Thesis Research (1-9 credit hours)
Thesis research

Prerequisite: Master's student
Typically offered in Fall and Spring

TMS 696 Summer Thesis Research (1 credit hours)
For graduate students whose programs of work specify no formal course work during a summer session and who will be devoting full time to thesis research.

Prerequisite: Master's student
Typically offered in Summer only

TMS 699 Master's Thesis Preparation (1-9 credit hours)
For students who have completed all credit hour requirements and full-time enrollment for the master's degree and are writing and defending their theses.

Prerequisite: Master's student
Typically offered in Fall and Spring

TMS 761 Mechanical and Rheological Properties Of Fibrous Material (3 credit hours)
In-depth study of the stress-strain, bending, torsional, dynamic and rheological behavior of natural and man-made fibers. Presentation and discussion of theoretical relations and advanced techniques.

Prerequisite: MA 301
Typically offered in Spring only

TMS 762 Physical Properties Of Fiber Forming Polymers, Fibers and Fibrous Structures (3 credit hours)
Experimental results and theoretical considerations of physical properties of fibers and fiber-forming polymers. Electrical, thermal, optical, frictional and moisture properties of these materials. Influence of chemical and molecular fine structure on these properties.

Prerequisite: PY 208
Typically offered in Spring only
This course is offered alternate years

TMS 763/MSE 763 Characterization Of Structure Of Fiber Forming Polymers (3 credit hours)
Theories, experimental evidence and characterization methods of the molecular fine structure of fiber forming polymers in the solid state. Characterization methods include X-ray diffraction, microscopy, infrared, thermal and magnetic resonance.

Prerequisite: Graduate standing
Typically offered in Fall only