Textile Engineering (BS): Product Engineering Concentration

To see more about what you will learn in this program, visit the Learning Outcomes website (https://apps.oirp.ncsu.edu/pgas/)!

The B.S. in Textile Engineering (administered jointly by the Wilson College of Textiles and the College of Engineering) is an interdisciplinary curriculum drawing on diverse science and engineering principles. Textile engineering students develop a unique background, through the curriculum, undergraduate research opportunities, summer internship experiences, and design projects ranging from the development of artificial arteries to the design of novel high-tech sporting and personal protective equipment. Textile engineers also design computer information systems that can integrate a worldwide distribution program eliminating a company's reliance on regional stockpiles or streamline an industrial process using Six Sigma quality which can result in saving millions of dollars. The program offers small class sizes with personal attention from faculty. With the focus on interdisciplinary research, the opportunities for textile engineers have never been brighter. Students in this degree program will participate in the TE/TT Capstone Design Program (https://textiles.ncsu.edu/tecs/student-experience/senior-design/), where projects are sponsored by industry partners and government agencies.

The Textile Engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. The TE program: Product Engineering concentration focuses on the design of new and innovative products and is the most multi-disciplinary and flexible. Students may concentrate on specific areas of interest including bio-medical materials, sports textiles, and composites. Some students in this concentration choose to double major in Biomedical Engineering while others minor in Material Science.

- Minors in associated engineering fields (e.g., Computer Science, Industrial Engineering, and Materials Science) as well as foreign language minors are strongly encouraged as part of the academic plan.
- For exceptional students, dual degree programs with Chemical and Biomolecular Engineering, Biomedical Engineering, and Materials Science and Engineering provide a bachelor degree in two engineering majors with one additional semester of course work.
- Our courses deal with the application of scientific and engineering principles to the design and control of all aspects of fiber, textile, and apparel processes, products, and machinery

For more details about the program, see description under the College of Engineering (http://catalog.ncsu.edu/undergraduate/engineering/textile-program/) and the TECS TE website (https://textiles.ncsu.edu/tecs/undergraduate/textile-engineering/).

Contact

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Plan Requirements

Code	Title	Hours	Counts towards
Orientation			
E 101	Introduction to Engineering & Problem Solving [1]	1	
E 115	Introduction to Computing Environments	1	
T 101	Strategies for Success in the Wilson College of Textiles	1	
Mathematical & Physical Science			
MA 141	Calculus I [1]	4	
MA 241	Calculus II [1]	4	
MA 242	Calculus III	4	
MA 341	Applied Differential Equations I	3	
CH 101	Chemistry - A Molecular Science [1]	3	
CH 102	General Chemistry Laboratory [1]	1	
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory [1]	4	
PY 208 & PY 209	Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory	4	
Major Requirements			
E 102	Engineering in the 21st Century	2	
TE 105	Textile Engineering: Materials and Systems	2	
TE 110	Computer-Based Modeling for Engineers [1]	3	
TE 200	Introduction to Polymer Science and Engineering	3	
TE 201	Fiber Science	4	

TE 205	Analog and Digital Circuits	4
TE 301	Engineering Textile Structures I: Linear Assemblies	3
TE 302	Textile Manufacturing Processes and Systems II	4
TE 303	Thermodynamics for Textile Engineers	3
TE 401	Textile Engineering Design I	4
TE 402	Textile Engineering Design II	4
TE 404	Textile Engineering Quality Improvement	3
TE 424	Textile Engineering Quality Improvement Laboratory	1
ST 370	Probability and Statistics for Engineers	3
PCC 301 & PCC 304	Technology of Dyeing and Finishing and Technology of Dyeing & Finishing Laboratory	4
GC 120	Foundations of Graphics	3
MAE 206	Engineering Statics	3
or CE 214	Engineering Mechanics-Statics	
Select one of the following:		3
ARE 201	Introduction to Agricultural & Resource Economics	
EC 201	Principles of Microeconomics	
EC 205	Fundamentals of Economics	
Concentration Requirements		
MSE 201	Structure and Properties of Engineering Materials	3
MAE 214	Solid Mechanics	3
or CE 225	Mechanics of Solids	
TE 463	Polymer Engineering	3
Concentration Elective (p. 3)		9
GEP Courses		
Acad Writing Research (p. 5) [1]		4
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		6
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		2
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/) (Humanities/Social Sciences/Visual and Performing Arts)		3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		3
GEP U.S. Diversity (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/) (verify requirement)		
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)		
Foreign Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/) (verify requirement)		
Total Hours		**125**

[1] C- or better

Concentration Electives

Code	Title	Hours	Counts towards
Machine Design (Min: 9 Units)			
MAE 208, TE/CHE 435, and one other elective with an MAE or TE prefix (selected with the approval of advisor). In addition, students wishing to pursue the machine design focus area should take MAE 206 for their Statics requirement and MAE 214 for their Solids requirement.			
CE 282	Hydraulics	3	
CHE 435	Process Systems Analysis and Control	3	
ECE 482	Engineering Entrepreneurship and New Product Development I	3	
ECE 483	Engineering Entrepreneurship and New Product Development II	3	
MAE 200	Introduction to Mechanical Engineering Design	1	
MAE 208	Engineering Dynamics	3	
MAE 250	Introduction to Aerospace Engineering	1	
MAE 361	Dynamics & Controls	3	
MAE 420	Dynamic Analysis of Human Movement	3	
MAE 421	Design of Solar Energy Systems	3	
MAE 426	Fundamentals of Product Design	3	
MAE 430	Applied Finite Element Analysis	3	
OR 562	Simulation Modeling	3	
TC 589	Special Studies In Textile Engineering and Science	1-4	
TE 435	Process Systems Analysis and Control	3	
TE 440	Textile Information Systems Design	4	
TE 466	Polymeric Biomaterials Engineering	3	
TE 467	Mechanics of Tissues & Implants Requirements	3	
TE 492	Special Topics in Textile Engineering	1-3	
TE 505	Textile Systems and Control	3	
TE 540	Textile Information Systems Design	4	
TE 550	Clothing Comfort and Personal Protection Science	3	
TE 561	Human Physiology for Clothing and Wearables	3	
TE 562	Simulation Modeling	3	
TE 565	Textile Composites	3	
TE 566	Polymeric Biomaterials Engineering	3	
TE 570	Polymer Physics	3	
Medical Textiles (Min: 9 Units)			
Choose three from the following list. Students pursuing this track should also complete BIO 183.			
BME 418	Wearable Biosensors and Microsystems	3	
BME 425	Bioelectricity	3	
BME 444	Orthopaedic Biomechanics	3	
BME 484	Fundamentals of Tissue Engineering	3	
BME 540	Nanobiotechnolog Processing, Characterization, and Applications	3	
TE 466	Polymeric Biomaterials Engineering	3	
TE 467	Mechanics of Tissues & Implants Requirements	3	

TE 561	Human Physiology for Clothing and Wearables	3
TE 565	Textile Composites	3
TE 566	Polymeric Biomaterials Engineering	3
MSE 485	Biomaterials	3
Materials & Sci Engineering (Min: 9 Units)		
MSE 300 & 455, and one other elective with an MSE or TE prefix (selected with the approval of advisor). In addition, students wishing to pursue the materials science and engineering focus area may take MSE 301 instead of TE 303.		
MSE 255	Experimental Methods for Structural Analysis of Materials	2
MSE 260	Mathematical Methods for Materials Engineers	3
MSE 300	Structure of Materials at the Nanoscale	3
MSE 301	Introduction to Thermodynamics of Materials	3
MSE 335	Experimental Methods for Analysis of Material Properties	2
MSE 355	Electrical, Magnetic and Optical Properties of Materials	3
MSE 360	Kinetic Processes in Materials	3
MSE 380	Microstructure of Organic Materials	3
MSE 420	Mechanical Properties of Materials	3
MSE 455	Polymer Technology and Engineering	3
MSE 456	Composite Materials	3
MSE 460	Microelectronic Materials	3
MSE 465	Introduction to Nanomaterials	3
MSE 480	Materials Forensics and Degradation	3
MSE 485	Biomaterials	3
MSE 489	Solid State Solar and Thermal Energy Harvesting	3
TE 435	Process Systems Analysis and Control	3
TE 440	Textile Information Systems Design	4
TE 466	Polymeric Biomaterials Engineering	3
TE 467	Mechanics of Tissues & Implants Requirements	3
TE 492	Special Topics in Textile Engineering	1-3
TE 540	Textile Information Systems Design	4
TE 550	Clothing Comfort and Personal Protection Science	3
TE 561	Human Physiology for Clothing and Wearables	3
TE 562	Simulation Modeling	3
TE 565	Textile Composites	3
TE 566	Polymeric Biomaterials Engineering	3
TE 570	Polymer Physics	3
TE 589	Special Studies In Textile Engineering and Science	1-4
Protective Textiles (Min: 9 Units)		
Choose three courses from the following list		
TE 550	Clothing Comfort and Personal Protection Science	3

TE 466	Polymeric Biomaterials Engineering	3
TE 566	Polymeric Biomaterials Engineering	3
TE 565	Textile Composites	3
TE 589	Special Studies In Textile Engineering and Science	1-4
TE 561	Human Physiology for Clothing and Wearables	3

Acad Writing Research

Code	Title	Hours	Counts towards
Acad Writing Research			
ENG 101	Academic Writing and Research	4	
FLE 101	Academic Writing and Research	4	
Transfer Sequence			
ENG 1GEP	100 Level English Composition	3	
ENG 202	Disciplinary Perspectives in Writing	3	

Semester Sequence

This is a sample.

First Year		
Fall Semester		**Hours**
CH 101	Chemistry - A Molecular Science [1]	3
CH 102	General Chemistry Laboratory [1]	1
E 101	Introduction to Engineering & Problem Solving [1]	1
E 115	Introduction to Computing Environments	1
ENG 101	Academic Writing and Research [1]	4
MA 141	Calculus I [1]	4
T 101	Strategies for Success in the Wilson College of Textiles	1
	Hours	**15**
Spring Semester		
TE 105	Textile Engineering: Materials and Systems [1]	2
MA 241	Calculus II [1]	4
PY 205	Physics for Engineers and Scientists I [1]	3
PY 206	Physics for Engineers and Scientists I Laboratory	1
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
E 102	Engineering in the 21st Century (GEP Req)	2
EC 201 or EC 205 or ARE 201	Principles of Microeconomics or Fundamentals of Economics or Introduction to Agricultural & Resource Economics	3
	Hours	**16**
Second Year		
Fall Semester		
MA 242	Calculus III	4
PY 208	Physics for Engineers and Scientists II	3
PY 209	Physics for Engineers and Scientists II Laboratory	1
TE 110	Computer-Based Modeling for Engineers	3
TE 200	Introduction to Polymer Science and Engineering	3
GC 120	Foundations of Graphics	3
	Hours	**17**
Spring Semester		
MA 341	Applied Differential Equations I	3
MSE 201	Structure and Properties of Engineering Materials	3
TE 201	Fiber Science	4
TE 205	Analog and Digital Circuits	4
MAE 206 or CE 214	Engineering Statics or Engineering Mechanics-Statics	3
	Hours	**17**
Third Year		
Fall Semester		
TE 301	Engineering Textile Structures I: Linear Assemblies	3
TE 303	Thermodynamics for Textile Engineers	3
MAE 214 or CE 225	Solid Mechanics or Mechanics of Solids	3
ST 370	Probability and Statistics for Engineers	3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
	Hours	**15**
Spring Semester		
TE 302	Textile Manufacturing Processes and Systems II	4
TE 404	Textile Engineering Quality Improvement	3
TE 424	Textile Engineering Quality Improvement Laboratory	1
PCC 301 & PCC 304	Technology of Dyeing and Finishing and Technology of Dyeing & Finishing Laboratory	4
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
	Hours	**16**
Fourth Year		
Fall Semester		
TE 401	Textile Engineering Design I	4

TE 463	Polymer Engineering	3
Engineering Elective (p. 3)		3
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		3
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)		3
	Hours	**16**
Spring Semester		
TE 402	Textile Engineering Design II	4
Select two Engineering Elective courses (p. 3)		6
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		3
	Hours	**13**
	Total Hours	**125**

[1] Must be completed with grade of C-or higher for matriculation.

[2] Must be completed with grade of C-or higher for major requirements.