

# Textile Engineering (BS): Chemical Processing Concentration

If you've ever relied on a tent to keep you warm and dry, put on a bandage or driven a car, you've benefited from the work of a textile engineer.

Textiles are everywhere, and a B.S. in Textile Engineering (<https://textiles.ncsu.edu/academics/undergraduate/textile-engineering/>) trains you to combine an engineering perspective with knowledge of fiber science, product development, dye chemistry and more. You'll wrap up your college career by working with textile technology students and industry partners on a year-long Senior Design project.

Our bachelor's degree in textile engineering is a joint degree between the Wilson College of Textiles and the College of Engineering.

The Chemical Processing concentration (<https://textiles.ncsu.edu/academics/undergraduate/textile-engineering/chemical-processing/>) is one of three concentrations students in textile engineering can choose from. You'll learn how to combine textile and chemical engineering to develop chemical process improvement engineers for industries dealing with fibers and polymers. Students in this concentration often minor or double major in chemical engineering.

The textile engineering program is accredited by the Engineering Accreditation Commission of ABET (<https://www.abet.org>).

## Contact

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## Plan Requirements

Code	Title	Hours	Counts towards
<b>Orientation</b>			
T 101	Strategies for Success in the Wilson College of Textiles	1	
E 101	Introduction to Engineering & Problem Solving <sup>2</sup>	1	
E 115	Introduction to Computing Environments	1	
<b>Mathematical &amp; Physical Science</b>			
MA 141	Calculus I <sup>1</sup>	4	
MA 241	Calculus II <sup>1</sup>	4	
MA 242	Calculus III	4	

MA 341	Applied Differential Equations I	3
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory <sup>1</sup>	4
CH 201 & CH 202	Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory	4
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory <sup>1</sup>	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 110	Computer-Based Modeling for Engineers <sup>2</sup>	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
or CHE 315	Chemical Process Thermodynamics	
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
PCC 301 & PCC 304	Technology of Dyeing and Finishing and Technology of Dyeing & Finishing Laboratory	4
ST 370	Probability and Statistics for Engineers	3
MAE 206	Engineering Statics	3
or CE 214	Engineering Mechanics-Statics	
GC 120	Foundations of Graphics	3
Economics - Select one of the following:		3
ARE 201	Introduction to Agricultural & Resource Economics	
EC 201	Principles of Microeconomics	
EC 205	Fundamentals of Economics	
<b>Concentration Requirements</b>		
CHE 205	Chemical Process Principles	4
CHE 225	Introduction to Chemical Engineering Analysis	3
CHE 311	Transport Processes I	3
CHE 435	Process Systems Analysis and Control	3
<b>Concentration Elective</b>		<b>3</b>
Choose from one of the following		
TE 463	Polymer Engineering	
TE 467	Mechanics of Tissues & Implants Requirements	
TE 466	Polymeric Biomaterials Engineering	

TE 550	Clothing Comfort and Personal Protection Science
TE 561	Human Physiology for Clothing and Wearables
TE 565	Textile Composites
TE 566	Polymeric Biomaterials Engineering
TE 570	Polymer Physics
TE 589	Special Studies In Textile Engineering and Science
TE 440	Textile Information Systems Design
CHE 312	Transport Processes II
CHE 316	Thermodynamics of Chemical and Phase Equilibria
CHE 330	Chemical Engineering Lab I
CHE 460	Chemical Processing of Electronic Materials

**GEP Courses**

Acad Writing Research (p. 3) <sup>2</sup>	4
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	6
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )	3
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	2
GEP Elective ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )	3
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )	3

GEP Global Knowledge (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/>) (verify requirement)

World Language Proficiency (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/>) (verify requirement)

**Total Hours** 125

<sup>1</sup> C or better

<sup>2</sup> C- or better

## Concentration Elective

Code	Title	Hours	Counts towards
BME 466	Polymeric Biomaterials Engineering	3	
BME 566	Polymeric Biomaterials Engineering	3	
CHE 312	Transport Processes II	3	
CHE 475	Advances in Pollution Prevention: Environmental Management for the Future	3	
CHE 575	Advances in Pollution Prevention: Environmental Management for the Future	3	
TE 440	Textile Information Systems Design	4	
TE 463	Polymer Engineering	3	
TE 466	Polymeric Biomaterials Engineering	3	
TE 540	Textile Information Systems Design	4	
TE 565	Textile Composites	3	
TE 566	Polymeric Biomaterials Engineering	3	
TMS 565	Textile Composites	3	

## Acad Writing Research

Code	Title	Hours	Counts towards
<b>Acad Writing Research</b>			
ENG 101	Academic Writing and Research	4	
WLEN 101	Academic Writing and Research	4	
<b>Transfer Sequence</b>			
ENG 1GEP		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 <sup>1</sup>	3
CH 102 General Chemistry Laboratory <sup>1</sup>	1
E 101 Introduction to Engineering & Problem Solving <sup>2</sup>	1
E 115 Introduction to Computing Environments	1
ENG 101 Academic Writing and Research <sup>2</sup>	4
MA 141 Calculus I <sup>1</sup>	4
T 101 Strategies for Success in the Wilson College of Textiles	1
<b>Hours</b>	<b>15</b>

### Spring Semester

CH 201 Chemistry - A Quantitative Science	3
CH 202 Quantitative Chemistry Laboratory	1
MA 241 Calculus II <sup>1</sup>	4
PY 205 Physics for Engineers and Scientists I <sup>1</sup>	3
PY 206 Physics for Engineers and Scientists I Laboratory <sup>1</sup>	1
TE 200 Introduction to Polymer Science and Engineering	3
E 102 Engineering in the 21st Century	2
<b>Hours</b>	<b>17</b>

### Second Year

Fall Semester	Hours
CHE 205 Chemical Process Principles <sup>2</sup>	4
TE 110 Computer-Based Modeling for Engineers <sup>2</sup>	3
PY 208 Physics for Engineers and Scientists II	3
PY 209 Physics for Engineers and Scientists II Laboratory	1
MA 242 Calculus III	4
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	3
<b>Hours</b>	<b>18</b>

### Spring Semester

TE 201 Fiber Science	4
MAE 206 Engineering Statics or CE 214 or Engineering Mechanics-Statics	3

CHE 225	Introduction to Chemical Engineering Analysis <sup>2</sup>	3
MA 341	Applied Differential Equations I	3
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )		3
<b>Hours</b>		<b>16</b>

**Third Year****Fall Semester**

ST 370	Probability and Statistics for Engineers	3
CHE 311	Transport Processes I <sup>2</sup>	3
TE 301	Engineering Textile Structures I: Linear Assemblies	3
TE 303 or CHE 315	Thermodynamics for Textile Engineers or Chemical Process Thermodynamics	3
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )		3
<b>Hours</b>		<b>15</b>

**Spring Semester**

TE 205	Analog and Digital Circuits	4
TE 302	Textile Manufacturing Processes and Systems II	4
TE 404	Textile Engineering Quality Improvement	3
TE 424	Textile Engineering Quality Improvement Laboratory	1
GC 120	Foundations of Graphics	3
<b>Hours</b>		<b>15</b>

**Fourth Year****Fall Semester**

TE 401	Textile Engineering Design I	4
PCC 301	Technology of Dyeing and Finishing	3
PCC 304	Technology of Dyeing & Finishing Laboratory	1
Concentration Elective		3
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )		1
GEP Elective ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )		3
<b>Hours</b>		<b>15</b>

**Spring Semester**

TE 402	Textile Engineering Design II	4
Select one of the following:		3
EC 205	Fundamentals of Economics	
EC 201	Principles of Microeconomics	
ARE 201	Introduction to Agricultural & Resource Economics	
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )		3
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )		1

CHE 435	Process Systems Analysis and Control	3
<b>Hours</b>		<b>14</b>
<b>Total Hours</b>		<b>125</b>

<sup>1</sup> Must be completed with grade of C or higher.

<sup>2</sup> Must be completed with grade of C- or higher.

## Career Opportunities

The interdisciplinary nature of textiles means that textile engineers are needed everywhere. As the only ABET accredited textile engineering program, our graduates have unmatched expertise. The result? Top employers in just about every industry recruit our alumni to help them solve problems and make a difference. These are just a few of the places our graduates go:

- Government Agencies/National Defense: NASA, The U.S. Army, Lockheed Martin, Natick, United States Patent and Trademark Office
- Athletics and Apparel: Nike, Adidas, Under Armour, The North Face, Lululemon, Patagonia, Levis, Peter Millar, HanesBrands
- Healthcare/Medical Textiles: ATEX, Merck & Co., Stryker, Medline, Secant Medical
- Automotives: Tesla, BMW, Volvo Trucks, Nissan, Goodyear, Michelin, Firestone
- Homewares: Home Depot, Lowes, Mohawk Flooring, Hunter Douglas
- Traditional Textiles: Milliken, Unifi, Contempora Fabrics, Elevate Textiles, SteinFibers
- Advanced Materials: Technimark, DuPont, Eastman, Honeywell

## Career Titles

- Materials Developer / Specialist / Designer
- Research and Development Engineer
- Product Development Specialist
- Strategic Sourcing Manager
- Logistics Manager / Inventory Manager
- Data Scientist
- Design Engineer / Process Improvement Engineer
- Production Manager / Project Engineer / Product Manager
- Quality Control Engineer
- Technical Marketing Manager
- Technical Service / Sales

## Learn More About Careers

NCcareers.org (<https://nccareers.org/>)

Explore North Carolina's central online resource for students, parents, educators, job seekers and career counselors looking for high quality job and career information.

Occupational Outlook Handbook (<https://www.bls.gov/ooh/>)

Browse the Occupational Outlook Handbook published by the Bureau of Labor Statistics to view state and area employment and wage statistics. You can also identify and compare similar occupations based on your interests.

Career One Stop Videos (<https://www.careeronestop.org/>)

View videos that provide career details and information on wages, employment trends, skills needed, and more for any occupation. Sponsored by the U.S. Department of Labor.

Focus 2 Career Assessment (<https://careers.dasa.ncsu.edu/explore-careers/career-assessments/>) (NC State student email address required)

This career, major and education planning system is available to current NC State students to learn about how your values, interests, competencies, and personality fit into the NC State majors and your future career. An NC State email address is required to create an account. Make an appointment with your career counselor (<https://careers.dasa.ncsu.edu/about/hours-appointments/>) to discuss the results.

Focus 2 Apply Assessment (<https://www.focus2career.com/Portal/Register.cfm?SID=1929>) (Available to prospective students)

A career assessment tool designed to support prospective students in exploring and choosing the right major and career path based on your unique personality, interests, skills and values. Get started with Focus 2 Apply and see how it can guide your journey at NC State.

Careers in the Textile Industry (<http://work.chron.com/careers-textile-industry-10262.html>)

The Fiber Society (<https://www.thefibersociety.org/>)

American Society of Quality (<http://asq.org/>)

National Society of Professional Engineers (<https://www.nspe.org/>)