

# Textile Technology (BS): Medical Textiles Concentration

Our B.S. in Textile Technology (<https://textiles.ncsu.edu/academics/undergraduate/textile-technology/>) is perfect for students who want a hands-on, applied science education spent in labs instead of behind a desk.

Textile technology students learn not only about the fibers that make up the textiles we use in everything from outdoor gear to sneakers, but also about business, management and manufacturing. They then apply this knowledge to work with textile engineering students and industry partners on a year-long Senior Design project.

The Medical Textiles concentration (<https://textiles.ncsu.edu/academics/undergraduate/textile-technology/medical-textiles/>) covers design and methods of production of state-of-the-art textile products and devices used in medical applications including sutures for wound closing to cardiac support devices. It is one of three concentrations students can pursue within our B.S. in Textile Technology.

## 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	
<b>MA/ST and Natural Sciences</b>			
MA 131	Calculus for Life and Management Sciences A <sup>1</sup>	3-4	
or MA 141	Calculus I		
MA 231	Calculus for Life and Management Sciences B	3-4	
or MA 241	Calculus II		
ST 311	Introduction to Statistics	3	
or ST 370	Probability and Statistics for Engineers		
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory <sup>1</sup>	4	

PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory	4
or PY 211	College Physics I	
PY 208 & PY 209	Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory	4
or PY 212	College Physics II	

### Major Requirements

EC 205	Fundamentals of Economics	3
FTM 217	The Textile Industry	3
MT 366	Biotextile Product Development	3
PCC 302	Technology of Textile Wet Processing	4
MT 105	Introduction to Medical Textiles	3
or TT 105	Introduction to Textile Technology	
TE 200	Introduction to Polymer Science and Engineering	3
TE 201	Fiber Science	4
TT 327	Yarn Production and Properties	4
TT 331	Performance Evaluation of Textile Materials	4
TT 341	Knitted Fabric Technology	3
TT 351	Woven Products and Processes	3
TT 380	Management and Control of Textile and Apparel Systems	3
TT 401	Textile Technology Senior Design I	4
TT 402	Textile Technology Senior Design II	4
TT 431	Quality Management and Control In Textile Manufacturing	3

TT 404	Introduction to Nonwovens Products and Processes	3
TT 481	Design and Technology of Technical Textiles	3
<b>Medical Textiles Concentration</b>		
BIO 183	Introductory Biology: Cellular and Molecular Biology	4
MT 432	Evaluation of Biotextiles	3
Medical Textiles Electives (p. 2)		11
<b>GEP Courses</b>		
Acad Writing Resarch (p. 2) <sup>1</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> )		5
GEP Global Knowledge ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/</a> ) (verify requirement)		
World Language Proficiency ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/</a> ) (verify requirement)		
<b>Total Hours</b>		<b>120</b>

<sup>1</sup> C- or better

## Acad Writing Research

Code	Title	Hours	Counts towards
<b>Acad Writing Research</b>			
ENG 101	Academic Writing and Research	4	
FLE 101	Academic Writing and Research	4	
<b>Transfer Sequence</b>			
ENG 1 GEP		3	
ENG 202	Disciplinary Perspectives in Writing	3	

## Medical Textiles Electives

Code	Title	Hours	Counts towards
BIO 240	Principles of Human Anatomy & Physiology (A): Nervous, Skeletal, Muscular, & Digestive Systems	4	
BIO 310	Quantitative Approaches to Biological Problems	3	
BIO 361	Developmental Biology	3	
BIO 405	Functional Histology	3	
BIO 414	Cell Biology	3	
BIO 416	Cancer Cell Biology	3	
BIO 432	Evolutionary Medicine	3	
BAE 305	Biological Engineering Circuits	4	
BAE 321	Bioprocessing Engineering Fundamentals	3	
BME 335	Biomaterials	3	
BME 325	Biochemistry for Biomedical Engineers	3	
BBS 201	Introduction to Biopharmaceutica Science	3	
BIT 402	Biotechnology Networking and Professional Development	1	
BEC 425	Molecular Biology for Biomanufacturing	2	

BEC 475	Global Regulatory Affairs for Medical Products	3	PCC 354	Intro to Color Science Laboratory	1
BEC 525	Molecular Biology for Biomanufacturing	2	PCC 404	Introduction to the Theory and Practice of Fiber Formation	3
BEC 575	Global Regulatory Affairs for Medical Products	3	PCC 471	Chemistry of Biopolymers	3
CH 221	Organic Chemistry I	3	PHI 325	Bio-Medical Ethics	3
GPH/ST 404	Epidemiology and Statistics in Global Public Health	3	STS 325	Bio-Medical Ethics	3
CLA 115	Medical Terminology	3	T 104	Fabric of Success and Career Readiness	1
DSC 201	Introduction to R/Python for Data Science	1	T 497	Independent Research in Textile Engineering, Chemistry and Materials Science I	1-3
DSC 205	Data Communication	1	T 498	Independent Research in Textile Engineering, Chemistry and Materials Science II	1-3
DSC 295	Introductory Special Topics in Data Science	1-3	TE 110	Computer-Based Modeling for Engineers	3
DSC 406	Exploratory Data Analysis for Big Data	1	TE 440	Textile Information Systems Design	4
DSC 412	Exploring Machine Learning	1	TE 466	Polymeric Biomaterials Engineering	3
DSC 495	Special Topics in Data Science	1-3	TE 467	Mechanics of Tissues & Implants Requirements	3
FTM 486	Supply Chain Management in the Textile Industry	3	TT/NW 405	Advanced Nonwovens Processing	3
GC 120	Foundations of Graphics	3	TT 407	Characterization Methods in Nonwovens	3
MT 381	Medical Textile and the Regulatory Environment	3	TT/NW 408	Nonwoven Product Development	3
MT 471	Chemistry of Biopolymers	3	TT/NW 503	Materials, Polymers, and Fibers used in Nonwovens	3
PCC 201	Impact of Industry on the Environment and Society	3			
PCC 274	Introduction to Forensic Science	3			
PCC 350	Introduction to Color Science and Its Applications	2			

TT/NW 505	Advanced Nonwovens Processing	3
TT/NW 507	Nonwoven Characterization Methods	3
TT/NW 508	Nonwoven Product Development	3
TT 486	Supply Chain Management in the Textile Industry	3
TOX 401	Principles of Toxicology	4

## 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
ENG 101	Academic Writing and Research	4
MA 131 or MA 141	Calculus for Life and Management Sciences A <sup>1</sup> or Calculus I	3-4
MT 105 or TT 105	Introduction to Medical Textiles (CP) or Introduction to Textile Technology	3
T 101	Strategies for Success in the Wilson College of Textiles	1
<b>Hours</b>		<b>15</b>

### Spring Semester

MA 231 or MA 241	Calculus for Life and Management Sciences B or Calculus II	3-4
PY 211 or PY 205 <i>and</i> PY 206	College Physics I or Physics for Engineers and Scientists I <i>and</i> Physics for Engineers and Scientists I Laboratory	4
FTM 217	The Textile Industry	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 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>14</b>

### Second Year

#### Fall Semester

PY 212 or PY 208 <i>and</i> PY 209	College Physics II or Physics for Engineers and Scientists II <i>and</i> Physics for Engineers and Scientists II Laboratory	4
TE 201	Fiber Science (CP)	4
TT 327	Yarn Production and Properties (CP)	4

TT 380	Management and Control of Textile and Apparel Systems	3
<b>Hours</b>		<b>15</b>

#### Spring Semester

ST 311 or ST 370	Introduction to Statistics or Probability and Statistics for Engineers	3
TE 200	Introduction to Polymer Science and Engineering	3
EC 205 or EC 201	Fundamentals of Economics or Principles of Microeconomics	3
TT 341	Knitted Fabric Technology (CP)	3
Medical Textiles Elective (p. 2)		3
<b>Hours</b>		<b>15</b>

### Third Year

#### Fall Semester

TT 351	Woven Products and Processes	3
TT 404	Introduction to Nonwovens Products and Processes	3
PCC 302	Technology of Textile Wet Processing	4
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> )		2-3
BIO 183	Introductory Biology: Cellular and Molecular Biology	4
<b>Hours</b>		<b>16</b>

#### Spring Semester

TT 331	Performance Evaluation of Textile Materials (CP)	4
MT 366	Biotextile Product Development	3
TT 431	Quality Management and Control In Textile Manufacturing	3
Medical Textiles Elective (p. 2)		3
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>16</b>

### Fourth Year

#### Fall Semester

TT 401	Textile Technology Senior Design I	4
MT 432	Evaluation of Biotextiles	3
TT 481	Design and Technology of Technical Textiles	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
Medical Textiles Elective (p. 2)		2-3
<b>Hours</b>		<b>15</b>

#### Spring Semester

TT 402	Textile Technology Senior Design II	4
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 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 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
Medical Textiles Elective (p. 2)	3
<b>Hours</b>	<b>14</b>
<b>Total Hours</b>	<b>120</b>

<sup>1</sup> Must be completed with a grade of C- or higher for major requirements

## Career Opportunities

You can find textiles just about anywhere, which means you can find our graduates there too. TT alumni land jobs within aerospace, medicine, architecture, automotive, apparel, sports, manufacturing and more.

These are just a few of the places our graduates go:

- Athletics and Apparel: Nike, Adidas, The North Face, New Balance, Reebok, Levis, Fruit of the Loom, Hanesbrands
- Healthcare/Medical Textiles: Medline, Secant Medical
- Homewares: Target, Kohl's
- Government Agencies/Defense: United States Patent and Trademark Office, State Bureau of Investigation (SBI)
- Traditional Textiles: Milliken, Unifi, Parkdale Mills, Glen Raven, Springs Global
- Plus: SAS, All Trails, Lenovo, Cisco, Accenture, IBM, Wolfspeed Inc.

## 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.

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

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