Sustainable Materials and Technology (BS)

The Sustainable Materials & Technology degree prepares students for 21st century jobs helping businesses and communities reduce their ecological footprint through efficient use of renewable natural materials, such as wood, bamboo and cork, in the manufacture and use of value-added products. You'll gain a strong foundation in environmental science, economics, social sciences, and materials science which prepares you to design, manufacture and sell sustainable bio-based products. This degree is for students interested in a career in a growing field with job flexibility, high placement rates, great starting salaries, a tradition of success and an unlimited future.

Summer Internship

Graduates of the Sustainable Materials and Technology program enter the real world with hands-on experience gained through internships, lab experiments, and practical coursework. More than one half of students participate in paid undergraduate research and work study opportunities. In addition, students are required to complete a paid summer internship or a semester co-op with a company in the industry. There are many other summer employment opportunities that are available to you beyond the required internship.

Contact

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Plan Requirements

Code	Title	Hours	Counts towards
Departmental Requirements			
Select one of the following:		3	
ENV 100 & ENV 101	Student Success in Environmental First Year and Exploring the Environment		
ES 100	Introduction to Environmental Sciences		
SMT 200	Introduction to Sustainable Materials and Technology	3	
SMT 203	Physical Properties of Sustainable Materials	4	
SMT 210	Sustainable Materials Internship	1	
SMT 301	Chemistry of Sustainable Materials	3	
SMT 302	Processing of Biomaterials	4	
SMT 320	Industrial Chemical Pollutants	2	
SMT 441	Mechanical Properties of Sustainable Materials	4	
SMT 444	Sustainable Composites and Biopolymers	3	
SMT 450	Sustainable Business and Innovation	2	
SMT 483	Capstone in Sustainable Materials and Technology	3	
PSE 476	Environmental Life Cycle Analysis	3	
MIE 201	Introduction to Business Processes	3	
EC 205	Fundamentals of Economics	3	
ISE 311	Engineering Economic Analysis	3	
Select one of the following:		3	
PS 320	U.S. Environmental Law and Politics		
PS 336	Global Environmental Politics		
ARE 309	Environmental Law & Economic Policy		
IDS 201	Environmental Ethics	3	
Mathematics & Natural Sciences			
Select one of the following Calculus courses:		3	
MA 121	Elements of Calculus		
MA 131	Calculus for Life and Management Sciences A		
MA 141	Calculus I		
ST 311	Introduction to Statistics	3	

CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4	
CH 220 & CH 222	Introductory Organic Chemistry and Organic Chemistry I Lab	4	
Select one of the following Physics courses:		4	
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory		
PY 211	College Physics I		
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4	
Concentration Requirements			
Technical Electives (p. 2)		15	
Advised Electives [2]		18	
General Education Program (GEP) Courses			
ENG 101	Academic Writing and Research [1]	4	
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		6	
GEP Elective (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)		3	
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		2	
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (Verify Requirement)			
Foreign Language Proficiency (Verify Requirement)			
Total Hours		**120**	

[1] A grade of C- or better is required.

[2] Students should consult their academic advisors to determine how to complete this requirement.

Technical Electives

Code	Title	Hours	Counts towards
ACC 200	Introduction to Managerial Accounting	3	
ACC 210	Concepts of Financial Reporting	3	
ACC 220	Introduction to Managerial Accounting	3	
ACC 230	Individual Income Taxation	3	
ACC 280	Survey of Financial and Managerial Accounting	3	
ACC 295	Special Topics in Accounting	1-6	
ACC 310	Intermediate Financial Accounting I	3	
ACC 311	Intermediate Financial Accounting II	3	
ACC 330	An Introduction To Income Taxation	3	
ACC 340	Accounting Information Systems	3	
ACC 411	Business Valuation	3	
ACC 420	Cost Accounting for Effective Management	3	
ACC 440	Enterprise Resource Planning Systems: Implementation, Risk, and Analytics	3	
ACC 450	Auditing and Assurance Services	3	
ACC 451	Internal Auditing	3	
ACC 460	Governmental and Nonprofit Accounting	3	
ACC 495	Special Topics in Accounting	1-6	
ACC 498	Independent Study in Accounting	1-6	
ACC 499	Internship in ACC	1-6	

ACC 508	Advanced Commercial Law	3
ACC 510	Advanced Financial Accounting	3
ACC 519	Applied Financial Management	3
ACC 520	Advanced Management Accounting	3
ACC 530	Advanced Income Tax	3
ACC 533	Accounting and Tax Research	3
ACC 540	IT Risks and Controls	3
ACC 550	Advanced Auditing	3
ACC 560	Tools for Tax Analytics	1
ACC 561	Database Management in Tax	1
ACC 562	Forecasting Effective Tax Rates and Scenario Analysis - Introduction	1
ACC 563	Forecasting Effective Tax Rates and Scenario Analysis - Advanced Application	1
ACC 564	Project Management and Process Documentation in Tax	1
ACC 565	Visual Analytics in Tax	1
ACC 566	Database Management Applications in Tax	1
ACC 567		1
ACC 568		1
ACC 569	Advanced Visual Analytics in Tax	1
ACC 570	Data Security and Warehousing in Tax	1
ACC 571		1
ACC 588	Special Topics in Accounting	1-6

ARE 301	Intermediate Microeconomics	3
ARE 336	Introduction to Resource and Environmental Economics	3
BUS 225	Personal Finance	3
BUS 295	Special Topics in Business Management	1-6
BUS 320	Financial Management	3
BUS 340	Information Systems Management	3
BUS 350	Economics and Business Statistics	3
BUS 351	Introduction to Business Analytics	3
BUS 360	Marketing Methods	3
BUS 370	Operations and Supply Chain Management	3
CSC 110	Computer Science Principles - The Beauty and Joy of Computing	3
CSC 111	Introduction to Computing: Python	3
CSC 112	Introduction to Computing- FORTRAN	3
CSC 113	Introduction to Computing - MATLAB	3
CSC 116	Introduction to Computing - Java	3
CSC 200		3
CSC 216	Software Development Fundamentals	4
CSC 217	Software Development Fundamentals Lab	1
CSC 226	Discrete Mathematics	3
CSC 230	C and Software Tools	3

CSC 236	Computer Organization and Assembly Language for Computer Scientists	3
CSC 246	Concepts and Facilities of Operating Systems for Computer Scientists	3
CSC 251	Web Page Development	1
CSC 255	String Processing Languages	1
CSC 281	Foundations of Interactive Game Design	3
CSC 295	Special Topics in Computer Science	1-3
CSC 302	Introduction to Numerical Methods	3
CSC 316	Data Structures and Algorithms	3
CSC 326	Software Engineering	4
CSC 333	Automata, Grammars, and Computability	3
CSC 342	Applied Web-based Client-Server Computing	3
CSC 379	Ethics in Computing	1
CSC 401	Data and Computer Communications Networks	3
CSC 402	Networking Projects	3
CSC 405	Computer Security	3
CSC 406	Architecture Of Parallel Computers	3
CSC 411	Introduction to Artificial Intelligence	3
CSC 412	Compiler Construction	3
CSC 415	Software Security	3
CSC 416	Introduction to Combinatorics	3
CSC 417	Theory of Programming Languages	3
CSC 422	Automated Learning and Data Analysis	3
CSC 427	Introduction to Numerical Analysis I	3
CSC 428	Introduction to Numerical Analysis II	3
CSC 431	File Organization and Processing	3
CSC 440	Database Management Systems	3
CSC 442	Introduction to Data Science	3
CSC 450	Web Services	3
CSC 453	Introduction to Internet of Things (IoT) Systems	3
CSC 454	Human-Computer Interaction	3
CSC 455	Social Computing and Decentralized Artificial Intelligence	3
CSC 456	Computer Architecture and Multiprocessors	3
CSC 461	Computer Graphics	3
CSC 462	Advanced Computer Graphics Projects	3
CSC 467	Multimedia Technology	3
CSC 474	Network Security	3
CSC 481	Game Engine Foundations	3
CSC 482	Advanced Computer Game Projects	3
CSC 484	Building Game AI	3
CSC 492	Senior Design Project	3
CSC 495	Special Topics in Computer Science	1-6
CSC 499	Independent Research in Computer Science	1-6

CSC 501	Operating Systems Principles	3
CSC 503	Computational Applied Logic	3
CSC 505	Design and Analysis Of Algorithms	3
CSC 506	Architecture Of Parallel Computers	3
CSC 510	Software Engineering	3
CSC 512	Compiler Construction	3
CSC 513	Electronic Commerce Technology	3
CSC 515	Software Security	3
CSC 517	Object-Oriented Design and Development	3
CSC 519	DevOps: Modern Software Engineering Practices	3
CSC 520	Artificial Intelligence I	3
CSC 522	Automated Learning and Data Analysis	3
CSC 530	Computational Methods for Molecular Biology	3
CSC 533	Privacy in the Digital Age	3
CSC 540	Database Management Concepts and Systems	3
CSC 541	Advanced Data Structures	3
CSC 546	Management Decision and Control Systems	3
CSC 547	Cloud Computing Technology	3
CSC 548	Parallel Systems	3
CSC 554	Human-Computer Interaction	3
CSC 555	Social Computing and Decentralized Artificial Intelligence	3
CSC 561	Principles of Computer Graphics	3
CSC 562	Introduction to Game Engine Design	3
CSC 563	Visual Interfaces for Mobile Devices	3
CSC 565	Graph Theory	3
CSC 568	Enterprise Storage Architecture	3
CSC 570	Computer Networks	3
CSC 573	Internet Protocols	3
CSC 574	Computer and Network Security	3
CSC 575	Introduction to Wireless Networking	3
CSC 576	Networking Services: QoS, Signaling, Processes	3
CSC 577	Switched Network Management	3
CSC 579	Introduction to Computer Performance Modeling	3
CSC 580	Numerical Analysis I	3
CSC 582	Computer Models of Interactive Narrative	3
CSC 583	Introduction to Parallel Computing	3
CSC 584	Building Game AI	3
CSC 591	Special Topics In Computer Science	1-6
EC 202	Principles of Macroeconomics	3
EC 301	Intermediate Microeconomics	3
EC 302	Intermediate Macroeconomics	3
EC 305	A Closer Look at Capitalism	3
EC 336	Introduction to Resource and Environmental Economics	3

EC 348	Introduction to International Economics	3
EC 351	Econometrics I	3
EC 404	Money, Financial Markets, and the Economy	3
EC 410	Public Finance	3
EC 413	Industrial Organization	3
EC 431	Labor Economics	3
EC 437		3
EC 449	International Finance	3
EC 451	Econometrics II	3
EC 468	Game Theory	3
EC 474	Economics of Financial Institutions and Markets	3
EC 480		3
EC 490	Research Seminar in Economics	3
EC 495	Special Topics in Economics	1-6
EC 498	Independent Study in Economics	1-6
ECE 406	Architecture Of Parallel Computers	3
ECE 460	Embedded System Architectures	3
ECE 506	Architecture Of Parallel Computers	3
ECE 514	Random Processes	3
ECE 517	Object-Oriented Design and Development	3
ECE 547	Cloud Computing Technology	3
ECE 560	Embedded System Architectures	3
ECE 570	Computer Networks	3
ECE 573	Internet Protocols	3
ECE 574	Computer and Network Security	3
ECE 575	Introduction to Wireless Networking	3

ECE 576	Networking Services: QoS, Signaling, Processes	3
ECE 577	Switched Network Management	3
ECE 579	Introduction to Computer Performance Modeling	3
FOR 339		4
GC 120	Foundations of Graphics	3
GC 250	Architectural Graphic Communications	3
GC 320	3D Spatial Relations	3
GC 330	Basic Technical Animation	3
GC 340	Concepts of Website Development	3
GC 350	Applied CAD/D and Geometric Controls	3
GC 420	Visual Thinking	3
GC 450	Advanced Graphics Usage with CAD	3
GC 496	Special Topics in Graphic Communications	1-4
GC 498	Independent Study in Graphic Communications	1-4
ISE 135	Computer-Based Modeling for Industrial Engineering	3
ISE 215	Foundations of Design & 3D Modeling for Engineers	1
ISE 216	Product Development and Rapid Prototyping	3
ISE 311	Engineering Economic Analysis	3
ISE 315	Introduction to Computer-Aided Manufacturing	1
ISE 316	Manufacturing Engineering I - Processes	3

ISE 352	Fundamentals of Human-Machine Systems Design	3
ISE 361	Deterministic Models in Industrial Engineering	3
ISE 362	Stochastic Models in Industrial Engineering	3
ISE 408	Design and Control of Production and Service Systems	3
ISE 413	Humanitarian Logistics	3
ISE 416	Manufacturing Engineering II - Automation	3
ISE 417	Database Applications in Industrial & Systems Engineering	3
ISE 435	Python Programming for Industrial & Systems Engineers	3
ISE 437	Data Analytics for Industrial Engineering	3
ISE 441	Introduction to Simulation	3
ISE 443	Quality Design and Control	3
ISE 452	Advanced Human-Machine Systems Design	3
ISE 453	Modeling and Analysis of Supply Chains	3
ISE 462	Advanced Stochastic Models in Industrial Engineering	3
ISE 489	Special Topics in Industrial and Systems Engineering	1-3
ISE 495	Project Work in Industrial Engineering	1-3
ISE 498	Senior Design Project	3

ISE 501	Introduction to Operations Research	3
ISE 505	Linear Programming	3
ISE 510	Applied Engineering Economy	3
ISE 513	Humanitarian Logistics	3
ISE 515	Manufacturing Process Engineering	3
ISE 519	Database Applications in Industrial and Systems Engineering	3
ISE 520	Healthcare Systems Performance Improvement I	3
ISE 521	Healthcare Systems Performance Improvement II	3
ISE 535	Python Programming for Industrial & Systems Engineers	3
ISE 540	Human Factors In Systems Design	3
ISE 541	Occupational Safety Engrg	3
ISE 543	Musculoskeletal Mechanics	3
ISE 544	Occupational Biomechanics	3
ISE 546	Management Decision and Control Systems	3
ISE 552	Design and Control of Production and Service Systems	3
ISE 553	Modeling and Analysis of Supply Chains	3
ISE 560	Stochastic Models in Industrial Engineering	3
ISE 562	Simulation Modeling	3

ISE 589	Special Topics In Industrial Engineering	1-6
ISE 714	Product Manufacturing Engineering for the Medical Device Industry	3
M 100	Personal and Professional Identity Development	1
MA 416	Introduction to Combinatorics	3
MA 427	Introduction to Numerical Analysis I	3
MA 428	Introduction to Numerical Analysis II	3
MA 505	Linear Programming	3
MA 565	Graph Theory	3
MA 580	Numerical Analysis I	3
MA 583	Introduction to Parallel Computing	3
MA 587	Numerical Solution of Partial Differential Equations--Finite Element Method	3
MIE 201	Introduction to Business Processes	3
MIE 295	Special Topics in MIE	1-6
MIE 305	Legal and Regulatory Environment	3
MIE 306	Managing Ethics in Organizations	3
MIE 310	Introduction to Entrepreneurship	3
MIE 330	Human Resource Management	3
MIE 335	Organizational Behavior	3
MIE 410	Business Opportunity Analysis	3
MIE 411	Managing the Growth Venture	3
MIE 412	Finance and Accounting for Entrepreneurs	3
MIE 413	New Venture Planning	3
MIE 416	The Legal Dynamics of Entrepreneurship	3
MIE 418	Social Entrepreneurship Practicum	3
MIE 419	Entrepreneurship Practicum	3
MIE 430	Teamwork in Organizations	3
MIE 432	Employee Relations	3
MIE 434	Compensation Systems	3
MIE 435	Leadership and Management	3
MIE 436	Training and Development	3
MIE 438	Staffing	3
MIE 439	Human Resources Practicum	3
MIE 480	Business Policy and Strategy	3
MIE 495	Special Topics in MIE	1-6
MIE 498	Independent Study in MIE	1-6
OR 501	Introduction to Operations Research	3
OR 505	Linear Programming	3
OR 560	Stochastic Models in Industrial Engineering	3
OR 562	Simulation Modeling	3
OR 565	Graph Theory	3
OR 579	Introduction to Computer Performance Modeling	3
PSY 540	Human Factors In Systems Design	3
ST 350	Economics and Business Statistics	3
ST 442	Introduction to Data Science	3
TE 110	Computer-Based Modeling for Engineers	3

TE 562	Simulation Modeling	3

Semester Sequence

This is a sample.

First Year

Fall Semester		Hours
Select one of the following:		3
ENV 100 & ENV 101	Student Success in Environmental First Year and Exploring the Environment	
ES 100	Introduction to Environmental Sciences	
SMT 200	Introduction to Sustainable Materials and Technology	3
MA 121	Elements of Calculus (CP)	3
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
	Hours	**16**
Spring Semester		
ENG 101	Academic Writing and Research [1]	4
CH 101	Chemistry - A Molecular Science (CP)	3
CH 102	General Chemistry Laboratory (CP)	1
Select one of the following Physics electives:		4
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory	
PY 211	College Physics I	
Advised Elective [2]		3
	Hours	**15**

Second Year

Fall Semester		
CH 220	Introductory Organic Chemistry (CP)	3
CH 222	Organic Chemistry I Lab (CP)	1
MIE 201	Introduction to Business Processes	3
IDS 201	Environmental Ethics	3
Advised Elective [2]		3
Technical Elective (p. 2)		3
	Hours	**16**
Spring Semester		
SMT 203	Physical Properties of Sustainable Materials (CP)	4
SMT 301	Chemistry of Sustainable Materials (CP)	3
EC 205	Fundamentals of Economics	3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
Advised Elective [2]		3
	Hours	**14**
Summer		
SMT 210	Sustainable Materials Internship	1
	Hours	**1**

Third Year

Fall Semester		
ISE 311	Engineering Economic Analysis	3
ST 311	Introduction to Statistics	3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		3
Advised Elective [2]		1
Technical Elective (p. 2)		3
	Hours	**13**
Spring Semester		
SMT 302	Processing of Biomaterials	4
SMT 320	Industrial Chemical Pollutants	2
GEP Elective (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)		3
Advised Elective [2]		3
Technical Elective (p. 2)		3
	Hours	**15**

Fourth Year

Fall Semester		
SMT 441	Mechanical Properties of Sustainable Materials	4
SMT 444	Sustainable Composites and Biopolymers	3
SMT 450	Sustainable Business and Innovation	2
PSE 476	Environmental Life Cycle Analysis	3
Advised Elective [2]		3
	Hours	**15**
Spring Semester		
SMT 483	Capstone in Sustainable Materials and Technology	3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
Technical Elective (p. 2)		3
Advised Elective [2]		3
Technical Elective (p. 2)		3
	Hours	**15**
	Total Hours	**120**

[1] A grade of C- or better is required.

[2] Students should consult their academic advisors to determine how to complete this requirement.

Career Opportunities

Graduates of the Sustainable Materials and Technology curriculum have many and varied job opportunities upon graduation with most receiving more than one job offer. Graduates enter the industry as management trainees, sales trainees, process engineers, quality assurance specialist, research & development associates and many others.

Career Titles

- Director of New Products
- Certification Specialist
- Sustainability Manager
- Plant Manager

- Quality Control Manager
- Project Engineer
- Material Scientist
- Market Analyst

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.

Sustainable Materials and Technology Careers (http://cnr.ncsu.edu/fb/future/wood-products-careers-opportunities/)