

Polymer and Color Chemistry (BS): ACS Certification Concentration

This bachelor's degree takes an applied, hands-on approach to chemistry focusing on the building blocks of the materials we come into contact with every day: polymers and dyes.

Students majoring in Polymer and Color Chemistry (<https://textiles.ncsu.edu/academics/undergraduate/polymer-and-color-chemistry/>) (PCC) learn about dye chemistry, color science and textile wet processes in our Dyeing and Finishing Lab Pilot Plant and DataColor Lab. This experiential learning wraps up with a capstone project covering a range of projects unavailable anywhere else.

The American Chemical Society Certified concentration (<https://textiles.ncsu.edu/academics/undergraduate/polymer-and-color-chemistry/american-chemical-society-certified/>) is one of three concentrations offered in the PCC degree. It is the best fit for students looking to enter the textile, polymer and color-based industries and is designed for students looking to pursue a graduate degree in chemistry upon graduation. This concentration focuses on polymer chemistry, fiber formation, color physics, dyeing, finishing, and chemical modification of fabrics, as well as how those disciplines are applied in industry.

Contact

Dr. Ahmed El-Shafei

Textile Engineering, Chemistry and Science Department
Wilson College of Textiles
amelsha@ncsu.edu

Plan Requirements

Code	Title	Hours
Orientation		
T 101	Strategies for Success in the Wilson College of Textiles	1
Writing & Speaking		
Acad Writing Research (p. 2) ¹		4
Major Requirements		
PCC 101	Introduction to Polymer and Color Chemistry	2
PCC 104	Introduction to Polymer and Color Chemistry Lab	1
PCC 106	Chemistry of Colorants and Auxiliaries (Polymer Synth. Sustain. the Env.)	3
TE 200	Introduction to Polymer Science and Engineering	3
TE 201	Fiber Science	4
TMS 212	Yarn and Fabric Formation and Properties	2
PCC 201	Impact of Industry on the Environment and Society	3
PCC 301	Technology of Dyeing and Finishing	3
PCC 304	Technology of Dyeing & Finishing Laboratory	1
PCC 350	Introduction to Color Science and Its Applications	2
PCC 354	Intro to Color Science Laboratory	1
PCC 412	Textile Chemical Analysis	2

PCC 414	Textile Chemistry Analysis Lab	1
PCC 442	Theory of Physico-Chemical Processes in Textiles II	3
PCC 461	Chemistry of Polymeric Materials	3
PCC 462	Characterization and Physical Properties of Polymers	3
PCC 464	Chemistry of Polymeric Materials Laboratory	1
PCC 471	Chemistry of Biopolymers	3
Mathematics		
MA 141	Calculus I	4
MA 241	Calculus II	4
MA 242	Calculus III	4
MA 341	Applied Differential Equations I	3
Sciences		
CH 101	Chemistry - A Molecular Science	3
CH 102	General Chemistry Laboratory	1
CH 201	Chemistry - A Quantitative Science	3
CH 202	Quantitative Chemistry Laboratory	1
CH 221	Organic Chemistry I	3
CH 222	Organic Chemistry I Lab	1
CH 223	Organic Chemistry II	3
CH 224	Organic Chemistry II Lab	1
CH 431	Physical Chemistry I	3
CH 433	Physical Chemistry II	3
CH 401	Systematic Inorganic Chemistry I	3
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory	4
PY 208 & PY 209	Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory	4
ST 370	Probability and Statistics for Engineers	3
Major Electives		
Economics Elective (p. 2)		3
PCC Electives (p. 2)		4
GEP Courses		
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 Elective (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)		3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		2
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)		
GEP Foundations of American Democracy (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/) (verify requirement)		

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

Total Hours	120
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¹ C- or better

Acad Writing Research

Code	Title	Hours
Acad Writing Research		
ENG 101	Academic Writing and Research	4
WLEN 101	Academic Writing and Research	4
Transfer Sequence		
ENG 202	Disciplinary Perspectives in Writing	3
ENG 1GEP		3

Economics Elective

Code	Title	Hours
EC 201	Principles of Microeconomics	3
EC 205	Fundamentals of Economics	3
ARE 201	Introduction to Agricultural & Resource Economics	3

PCC Electives

Code	Title	Hours
Choose from the approved list or any 300 or 400-level CH course		
PCC 274	Introduction to Forensic Science	3
PCC 404	Introduction to the Theory and Practice of Fiber Formation	3
PCC 420	Textile Dyeing and Printing	3
PCC 466	Polymer Chemistry Laboratory	3
PCC 474	Forensic Chemistry Laboratory	3
PCC 490	Undergraduate Research in Polymer and Color Chemistry	1-6
T 497	Independent Research in Textile Engineering, Chemistry and Materials Science I	1-3

Semester Sequence

This is a sample.

First Year

Fall Semester		Hours
T 101	Strategies for Success in the Wilson College of Textiles	1
PCC 101	Introduction to Polymer and Color Chemistry (CP)	2
PCC 104	Introduction to Polymer and Color Chemistry Lab	1
MA 141	Calculus I	4
CH 101	Chemistry - A Molecular Science	3
CH 102	General Chemistry Laboratory	1
ENG 101	Academic Writing and Research	4
Hours		16

Spring Semester

PCC 106	Chemistry of Colorants and Auxiliaries (Polymer Synth. Sustain. the Env. CP)	3
CH 221	Organic Chemistry I	3
CH 222	Organic Chemistry I Lab	1
MA 241	Calculus II	4
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
Economics Elective (p. 2)		3
Hours		17

Second Year

Fall Semester

TE 200	Introduction to Polymer Science and Engineering (CP)	3
CH 223	Organic Chemistry II	3
CH 224	Organic Chemistry II Lab	1
MA 242	Calculus III	4
PY 205	Physics for Engineers and Scientists I	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
Hours		16

Spring Semester

TE 201	Fiber Science	4
CH 201	Chemistry - A Quantitative Science	3
CH 202	Quantitative Chemistry Laboratory	1
PY 208	Physics for Engineers and Scientists II	3
PY 209	Physics for Engineers and Scientists II Laboratory	1
MA 341	Applied Differential Equations I	3
Hours		15

Third Year

Fall Semester

PCC 461	Chemistry of Polymeric Materials (CP)	3
PCC 464	Chemistry of Polymeric Materials Laboratory	1
PCC 301	Technology of Dyeing and Finishing (CP)	3
PCC 304	Technology of Dyeing & Finishing Laboratory	1
TMS 212	Yarn and Fabric Formation and Properties	2
CH 431	Physical Chemistry I	3
Hours		13

Spring Semester

PCC 350	Introduction to Color Science and Its Applications (CP)	2
PCC 354	Intro to Color Science Laboratory	1
PCC 462	Characterization and Physical Properties of Polymers	3
CH 433	Physical Chemistry II	3
ST 370	Probability and Statistics for Engineers	3

GEP Interdisciplinary Perspectives (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/>) 2-3

Hours 14

Fourth Year

Fall Semester

PCC 442 Theory of Physico-Chemical Processes in Textiles II 3

CH 401 Systematic Inorganic Chemistry I 3

PCC 201 Impact of Industry on the Environment and Society 3

PCC Electives (p. 2) 4

GEP Humanities (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/>) 3

Hours 16

Spring Semester

PCC 412 Textile Chemical Analysis 2

PCC 414 Textile Chemistry Analysis Lab 1

PCC 471 Chemistry of Biopolymers 3

GEP Elective (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/>) 3

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/>) 1

Hours 13

Total Hours 120

Career Opportunities

Employers across the country and the world specifically seek out our students for their unique and in-demand knowledge. From apparel and more traditional textile applications to chemical companies, plastics, cosmetics and even forensics, our graduates are anything but boxed in by this unique degree.

- Apparel: Nike, GAP, Victoria's Secret, Under Armour, HanesBrands Inc., Abercrombie & Fitch
- Forensics: FBI, SBI
- Traditional Textiles: Unifi, Milliken, ITG, Guilford Performance, LORD Corporation, PVH Corp.
- Fiber Producers/Chemical Companies: PGI, DuPont, Monsanto, Eastman Chemical Company, Cotton Inc., Teijin, Highland Industries, Honeywell
- Plastics: Plaspak Inc., IPS Adhesives
- Other: L'Oréal, Eisai Pharmaceuticals, Merc, Underwriters Laboratory, Ideal Fasteners, APJeT

Career Titles

- Color Scientist
- Dye Chemist / Textile Chemist
- Research and Development (R&D) Polymer Chemist
- Forensic Chemist
- Plant / Development Chemist
- Process Manager and/or Production Manager

- Laboratory Director
- Quality Control Chemist
- Health Care Manager

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/](https://www.focus2career.com/Portal/Register.cfm?SID=1929)

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/>)

American Association of Chemists and Colorists (<https://www.aatcc.org/>)