

# Polymer and Color Chemistry (BS): Science & Operations 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 Polymer and Color Chemistry (PCC) is a flexible and rigorous program that provides courses in fundamental chemistry, while incorporating some unique areas of applied chemistry in polymer and color chemistry. The applied courses are heavily oriented to the chemistry and technology of polymers, including polymer synthesis, extrusion and characterization. In addition, the color chemistry component of the degree includes the synthesis and application of dyes and other compounds associated with the coloration of textiles, fibers, and other materials, as well as the science of color perception and color measurement.

The degree program offers three concentrations: American Chemical Society (ACS) Certified, Science and Operations and Medical Sciences. The ACS Certified concentration is designed for students wishing to pursue advanced studies in chemistry and related subjects and the Medical Sciences Concentration is for those students who wish to pursue medical school, dental school, pharmacy or optometry. This concentration includes all courses a student will need for application to these professional programs. Each concentration incorporates a number of electives allowing students to develop focus areas, including medical textiles, polymer chemistry, and color chemistry.

More information about the degrees is available on the the TECS PCC website (<https://textiles.ncsu.edu/tecs/undergraduate/polymer-and-color-chemistry/>). (<https://textiles.ncsu.edu/tecs/undergraduate/polymer-and-color-chemistry/>)

## 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>Writing &amp; Speaking</b>			
Acad Writing Research (p. 2)	<sup>1</sup>	4	
<b>Major Requirements</b>			
PCC 101	Introduction to Polymer and Color Chemistry	2	

PCC 104	Introduction to Polymer and Color Chemistry Lab	1
PCC 106	Polymer Chemistry and Environmental Sustainability	3
TE 201	Fiber Science	4
TE 200	Introduction to Polymer Science and Engineering	3
TMS 212	Yarn and Fabric Formation and Properties	2
PCC 301	Technology of Dyeing and Finishing	3
PCC 304	Technology of Dyeing & Finishing Laboratory	1
CH 331	Introductory Physical Chemistry	3
or TE 303	Thermodynamics for Textile Engineers	
PCC 350	Introduction to Color Science and Its Applications	2
PCC 354	Intro to Color Science Laboratory	1
PCC 201	Impact of Industry on the Environment and Society	3
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

**Mathematics**

MA 131	Calculus for Life and Management Sciences A	3
or MA 141	Calculus I	
MA 231	Calculus for Life and Management Sciences B	3
or MA 241	Calculus II	

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

**Major Electives**

Economics Elective (p. 2)	3
Statistics Elective (p. 2)	3
PCC Electives (p. 3)	14
Advised Electives (p. )	8-9

**GEP Courses**

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 US Diversity, Equity, and Inclusion ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/</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> )	2
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)	
Foreign Language Proficiency ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/</a> ) (verify requirement)	

**Total Hours** **120**

<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 1GEP	100 Level English Composition	3	
ENG 202	Disciplinary Perspectives in Writing	3	

**Economics Elective**

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

**Statistics Elective**

Code	Title	Hours	Counts towards
ST 311	Introduction to Statistics	3	

ST 370	Probability and Statistics for Engineers	3
ST 380	Probability and Statistics for the Physical Sciences	3

## PCC Electives

Code	Title	Hours	Counts towards
CH 441	Forensic Chemistry	3	
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 471	The Chemistry of Synthetic and Natural Bipolymers	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	
CH 335	Principles of Green Chemistry	4	
CH 345	Chemistry and War	3	
CH 442	Advanced Synthetic Techniques	4	
CH 452	Advanced Measurement Techniques I	4	

## Advised Electives

Code	Title	Hours	Counts towards
<b>Advised Electives (Choose from this list or any 300 or 400 level CH course)</b>			

BEC 475	Global Regulatory Affairs for Medical Products	3
CH 441	Forensic Chemistry	3
MB 351	General Microbiology	3
MT 366	Biotextile Product Development	3
MT 381	Medical Textile and the Regulatory Environment	3
MT 432	Evaluation of Biotextiles	3
STS/PHI 325	Bio-Medical Ethics	3

## PCC Electives

CH 441	Forensic Chemistry	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 471	The Chemistry of Synthetic and Natural Bipolymers	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	2

PCC 104	Introduction to Polymer and Color Chemistry Lab	1
MA 131 or MA 141	Calculus for Life and Management Sciences A or Calculus I	3-4
CH 101	Chemistry - A Molecular Science	3
CH 102	General Chemistry Laboratory	1
ENG 101	Academic Writing and Research	4

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**Hours** **15**

**Spring Semester**

PCC 106	Polymer Chemistry and Environmental Sustainability (Polymer Synth. Sustain. the Env.)	3
CH 221	Organic Chemistry I	3
CH 222	Organic Chemistry I Lab	1
MA 231 or MA 241	Calculus for Life and Management Sciences B or Calculus II	3-4
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
Economics Elective (p. 2)		3

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**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
PY 211 or PY 205/206	College Physics I or Physics for Engineers and Scientists I	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> )		2-3

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**Hours** **14**

**Spring Semester**

TE 201	Fiber Science	4
CH 201 & CH 202	Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory	4
PY 212 or PY 208/209	College Physics II or Physics for Engineers and Scientists 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 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

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**Hours** **16**

**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
TE 303 or CH 331	Thermodynamics for Textile Engineers or Introductory Physical Chemistry	3-4

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**Hours** **13**

**Spring Semester**

PCC 350	Introduction to Color Science and Its Applications	2
PCC 354	Intro to Color Science Laboratory	1
PCC 462	Characterization and Physical Properties of Polymers	3
PCC Elective (p. 3)		3
Advised Electives (p. )		3
Statistics Elective (p. 2)		3

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**Hours** **15**

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

PCC 442	Theory of Physico-Chemical Processes in Textiles II	3
PCC Electives (p. 3)		6
PCC 201	Impact of Industry on the Environment and Society	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

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**Hours** **15**

**Spring Semester**

PCC 412	Textile Chemical Analysis	2
PCC 414	Textile Chemistry Analysis Lab	1
PCC Electives (p. 3)		3
Advised Electives (p. )		6
GEP US Diversity, Equity, and Inclusion ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/</a> )		3

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**Hours** **15**

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**Total Hours** **120**