

Polymer and Color Chemistry (BS): Medical Sciences 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/>)

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Plan Requirements

Code	Title	Hours
Orientation		
T 101	Introduction to the 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	Polymer Chemistry and Environmental Sustainability	3
TMS 211	Introduction to Fiber Science	3
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 464	Chemistry of Polymeric Materials Laboratory	1
BCH 451	Principles of Biochemistry	3
or PCC 471	The Chemistry of Synthetic and Natural Bipolymers	
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
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
BIO 183	Introductory Biology: Cellular and Molecular Biology	4
PY 211	College Physics I	4
PY 212	College Physics II	4
MB 351	General Microbiology	3
MB 352	General Microbiology Laboratory	1
Major Electives		
Select one of the following:		3
ARE 201	Introduction to Agricultural & Resource Economics	
ARE 201A	Introduction to Agricultural & Resource Economics	
EC 201	Principles of Microeconomics	
EC 205	Fundamentals of Economics	
PCC Electives (p. 2)		5
Advised Elective Group II (p. 2)		9
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 Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/) (Humanities/Social Sciences/Visual and Performing Arts)		3

GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)	2
GEP U.S. Diversity (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/) (verify requirement)	
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)	
Foreign Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/) (verify requirement)	
Total Hours	120

¹ C- or better

Acad Writing Research

Code	Title	Hours
Acad Writing Research		
ENG 101	Academic Writing and Research	4
FLE 101	Academic Writing and Research	4
Transfer Sequence		
ENG 1GEP	100 Level English Composition	3
ENG 202	Disciplinary Perspectives in Writing	3

PCC Electives

Code	Title	Hours
PCC 404	Introduction to the Theory and Practice of Fiber Formation	3
PCC 410	Textile Preparation and Finishing Chemistry	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

Advised Elective Group II

Code	Title	Hours
BIO 414	Cell Biology	3
GN 311	Principles of Genetics	4
MB 411	Medical Microbiology	3
MT 366	Biotextile Product Development	3
MT 381	Medical Textile and the Regulatory Environment	3
MT 432	Biotextiles Evaluation	3
ST 311	Introduction to Statistics	3
ZO 250	Animal Anatomy and Physiology	4

Semester Sequence

This is a sample.

Course	Title	Hours
First Year		
Fall Semester		
T 101	Introduction to the 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
Hours		15-16

Spring Semester

PCC 106	Polymer Chemistry and Environmental Sustainability (CP)	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
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
Hours		14-15

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	College Physics I	4
BIO 183	Introductory Biology: Cellular and Molecular Biology	4
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
Hours		16

Spring Semester

TMS 211	Introduction to Fiber Science	3
CH 201	Chemistry - A Quantitative Science	3
CH 202	Quantitative Chemistry Laboratory	1
PY 212 or PY 208	College Physics II or Physics for Engineers and Scientists II	4
Advised Elective Group 1		3
Hours		14

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
TMS 214	Yarn and Fabric Formation and Properties Lab	1

TE 303 or CH 331	Thermodynamics for Textile Engineers or Introductory Physical Chemistry	3-4
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1

Hours	15-16
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Spring Semester

PCC 350	Introduction to Color Science and Its Applications (CP)	2
PCC 354	Intro to Color Science Laboratory	1
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
Advised Elective Group 2		3-4

Hours	15-16
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Fourth Year**Fall Semester**

PCC 201	Impact of Industry on the Environment and Society	3
PCC 442	Theory of Physico-Chemical Processes in Textiles II	3
PCC Electives		3
MB 351	General Microbiology	3
MB 352	General Microbiology Laboratory	1
Advised Elective Group 2		3-4

Hours	16-17
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Spring Semester

PCC 412	Textile Chemical Analysis	2
PCC 414	Textile Chemistry Analysis Lab	1
BCH 451 or PCC 471	Principles of Biochemistry or The Chemistry of Synthetic and Natural Bipolymers	3-4
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		2-3
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/) (Humanities/Social Sciences/Visual and Performing Arts)		3
Advised Elective Group 2		3-4

Hours	14-17
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Total Hours	119-127
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