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/)

Contact

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Plan Requirements

Code	Title	Hours	Counts towards
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	Polymer Chemistry and Environmental Sustainability (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 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
or PY 205/206	Physics for Engineers and Scientists I	
PY 212	College Physics II	4
or PY 208/209	Physics for Engineers and Scientists II	
MB 351	General Microbiology	3
MB 352	General Microbiology Laboratory	1
Major Electives		
Economics Elective (p. 2)		3
PCC Electives (p. 3)		5
Advised Electives (p.)		8
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 US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)		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)		
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	Counts towards
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	

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

PCC Electives

Code	Title	Hours	Counts towards
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	

Advised Electives

Code	Title	Hours	Counts towards
Choice of advised electives depends on the health-related field (e.g. Dentistry, Medical, Optometry, Pharmacy, etc.) and entrance requirements of health professional graduate degree programs. In addition to courses on this list, you can choose any 300 or 400-level CH course.			
BEC 475	Global Regulatory Affairs for Medical Products	3	
BIO 240	Principles of Human Anatomy & Physiology (A): Nervous, Skeletal, Muscular, & Digestive Systems	4	
BIO 245	Principles of Human Anatomy & Physiology (B): Endocrine, Cardiovascular, Respiratory & Renal Systems	4	
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	Evaluation of Biotextiles	3	
ST 311	Introduction to Statistics	3	
STS/PHI 325	Bio-Medical Ethics	3	
ZO 250	Animal Anatomy and Physiology	4	

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
	Hours	**16**
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
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
	Hours	**14**

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		
TE 201	Fiber Science	4
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
Economics Elective (p. 2)		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
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**
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 Electives (p.)		3
	Hours	**15**
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 (p. 3)		3
MB 351	General Microbiology	3
MB 352	General Microbiology Laboratory	1
Advised Electives (p.)		3
	Hours	**16**
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 US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)		3
Advised Electives (p.)		2
	Hours	**13**
	Total Hours	**120**