



Biotechnology- Associate in Applied Science (2020-2021 Catalog)

SEMESTER-BY-SEMESTER PROGRAM MAP FOR FULL-TIME STUDENTS

Courses are listed in preferred order of completion

Plans can be modified to fit student needs by adding more semesters

Choose your courses with your Advisor.

Developmental Education Courses (if required)			
<input type="checkbox"/>	ACLS050	Introduction to Academic Literacy	<input type="checkbox"/>
<input type="checkbox"/>	ENGL027	Writing Skills Workshop	<input type="checkbox"/>

Location: B= BETH, M= MROE, S=SBTH, E= ESTN, D= DIST *subject to change

complete	Course #	Course Title	Credits	Gen Ed	Fall	Winter	Spring	Summer	Pre-requisites / Co-requisites
Semester 1	<input type="checkbox"/>	COLS101	College Success	1		B, M, D	----	B, M, D	D
	<input type="checkbox"/>	BIOS107	Biology I	4	Science	B, M	----	B,M	M
	<input type="checkbox"/>	BIOT184	Introduction to Biotechnology	4		M	----	M,D	----
	<input type="checkbox"/>	CHEM120	General Chemistry I	4	Science	B, M	----	B, M	M
	<input type="checkbox"/>	ENGL101	English I	3	Comm.	B, M, D, E	----	B, M, D, E	B, M, D
	<input type="checkbox"/>	MATH140	College Algebra	3	QL	B, M, D	----	B, M, D	B, M, D
		Total Semester Credits:	19						
Semester 2	<input type="checkbox"/>	BIOS150	Biology II	4	Science	B, M	----	B,M	M
	<input type="checkbox"/>	BIOT185	Biotechnology Techniques	4		----	----	M	----
	<input type="checkbox"/>	CHEM220	General Chemistry II	4	Science	M	----	B,M	B, M
	<input type="checkbox"/>	ENGL151T	English II (Technical Writing)	3	Comm.	B, M	----	B, M	----
	<input type="checkbox"/>	CISC101	Introduction to Information Technology	3	CL	B, M, D	D	B, M, D	B, M, D
		Total Semester Credits:	18						
Semester 3	<input type="checkbox"/>	CMTH102	Introduction to Communication	3	Comm.	B, M, D	D	B, M, D	B, M, D
	<input type="checkbox"/>	BIOS240	Microbiology	4	Science	M	----	B	----
	<input type="checkbox"/>	BIOT175	Introduction to Biomanufacturing	4		----	----	M	----
	<input type="checkbox"/>	CHEM201G	Organic Chemistry I (WI)	4	Science	B, M	----	M	----
	<input type="checkbox"/>		SSHB General Education Elective	3	SSHB	B, M, D	D	B, M, D	B, M, D
		Total Semester Credits:	18						
Semester 4	<input type="checkbox"/>	BIOT202	Biotechnology Seminar	1		----	----	M	----
	<input type="checkbox"/>	BIOT220	General Biotechnology	4		----	----	M	----
	<input type="checkbox"/>	MATH150	Introductory Statistics	3		B, M, D	----	B, M, D	B, M, D
	<input type="checkbox"/>		AH General Education Elective	3	AH	B, M, D	D	B, M, D	B, M, D
	<input type="checkbox"/>		Elective	3		B, M, D	D	B, M, D	B, M, D
		Total Semester Credits:	14						
		Total Degree Credits	69						

General Education Requirements		
<input type="checkbox"/>		Diversity
<input type="checkbox"/>	CHEM201G	Writing Intensive

rev. date7/18/2019

Notes:

- Students should complete their English and Algebra requirements within the first two semesters.
- While selecting AH and SSHB electives and Free Electives students must remember that; at least one course must be designated Diversity and Global Awareness(D).

Industrial Internships are strongly recommended for students in the biotechnology program. Students are encouraged to seek internship opportunities. Program coordinator will assist students in identifying proper internship sites and the application process.

***It is the student's responsibility to be knowledgeable of NCC graduation requirements and to verify transfer requirements with the 4-year institution. Courses listed on the program map are based upon the assumption that prerequisites and courses taken in previous semesters will be successfully completed**

Arts & Humanities (AH)
ARTA 100 Art and Visual Thinking
ARTA 101 Art History Survey
CMTH 110 Introduction to the Theatre
CMTH 111 Acting I
CMTH 115 Technical Theatre
CMTH 117 Stagecraft
CMTH 126 The Communication Arts
CMTH 189 Stage Voice and Movement
CMTH 190 Stage Production
CMTH 206 Directing
CMTH 211 Plays: Classical to Contemp. (G-WI)
CMTH 212 Acting II
CMTH 218 Theatre Portfolio
CMTH 220 Introduction to Film
DANC 101 Dance History
DANC 110 Ballet I
DANC 120 Modern Dance I
DANC 130 Jazz I
DANC 210 Ballet II
DANC 220 Modern Dance II
DANC 230 Jazz II
ENGL 201 British Literature I (G-WI)
ENGL 203 Shakespeare (G-WI)
ENGL 205 American Literature I (G-WI)
ENGL 211 Plays: Classical to Contemp. (G-WI)
ENGL 215 Multicultural Adolescent Lit (G-WI)
ENGL 250 Latin American Literature (G-WI)
ENGL 251 British Literature II (G-WI)
ENGL 253 Creative Writing
ENGL 255 American Literature II (G-WI)
ENGL 256 Modern Poetry (G-WI)
ENGL 257 20th Century Lit by Women (G-WI)
ENGL258 Fiction Writing
ENGL 260 Contemporary Literature (G-WI)
ENGL 264 Irish Literature (G-WI)
ENGL 265 African-American Literature (G-WI)
ENGL 267 Poetry Writing
HUMA 121 The American Work Experience (G-WI)
HUMA 140 Intro to Women & Gender Studies (G-WI)
HUMA 150 Nature of the Environment
HUMA210 Creativity and the Origin of Ideas
JOUR 101 Journalism and Society
Modern Language - All MDLA Courses
MUSC 101 Introduction to Music
PHIL 111 On Death and Dying (G-WI)
PHIL 121 World Religions
PHIL 201 Introduction to Philosophy
PHIL 202 Ethics and Moral Problems (G-WI)
PHIL 204 Asian Philosophies
PHIL 211 Ancient Philosophy
PHIL 215 Modern Philosophy
PHIL 225 What is Freedom?

Free Elective
All course except: OXX courses; EARL221, EARL222

Students need to take 9 credits in the following fields: SSHB, AH, Free Elective. One course must be designated Diversity and Global Awareness (D)

Scientific Study of Human Behavior (SSHB)
ECON 201 Macroeconomics
GEOG 121 Environmental Sustainability (G-WI)
GEOG 140 Investigating Climate Change)
GEOG 271 Intro to Geographic Info Systems
HUMA 250 Research Methods in Social Sciences (G-WI)
INTS 250 Study Abroad
PSYC 103 Introduction to Psychology (G-WI)
PSYC 205 Research Methods
PSYC 230 Introduction to Health Psychology
PSYC 235 Dev Child Psychopathology
PSYC 245 Cognitive Psychology
PSYC 255 Abnormal Psychology
PSYC 258 Developmental Psychology (G-WI)
PSYC 265 Psychology of Sex and Gender
SOCA 103 Principles of Sociology (G-WI)
SOCA 125 Sociology of Families (G-WI)
SOCA 210 Sociology of Gender

Diversity (D) Electives
BIOS 126 Environmental Science
BIOS 210 Environmental Biology
BUSA 115 Intro to International Business
CJST 250 Contemporary Issues in Criminal Justice
CMTH 126 The Communication Arts
CMTH 211 Plays: Classical to Contemporary
CMTH 215 Intercultural Communication
DANC 101 Dance History
ENGL 151L English II (Literature)
ENGL 205 American Literature I
ENGL 211 Plays: Classical to Contemporary
ENGL 215 Multicultural Adolescent Literature
ENGL 250 Latin American Literature
ENGL 251 British Literature II
ENGL 253 Creative Writing
ENGL 255 American Literature II
ENGL 256 Modern Poetry
ENGL 257 20th Century Lit by Women
ENGL 260 Contemporary Literature
ENGL 264 Irish Literature
ENGL 265 African-American Literature
ENGL 267 Poetry Writing
GEOG 101 World Geography
GEOG 121 Environmental Sustainability
GEOG 151 Geography of the U.S. and Canada
GEOG 210 Weather and Climate
GLBL 130 Intro to Global Studies
GLBL 160 Field Experience & Acad Research in GS
GLBL 230 Global Studies Capstone
HIST 113 American History I
HIST 121 The Black Experience
HIST 140 Modern Chinese History
HIST 165 The American Experience of Warfare
HIST 166 Civil War & Reconstruction
HIST 168 History of the Middle East
HIST 173 Mod Euro History: 1815-Present
HIST 183 Modern American History 1945-Present
HUMA 121 American Work Experience
HUMA 140 Intro to Women and Gender Studies
HUMA 150 Nature of the Environment
HUMA210 Creativity and The Origin of Ideas
INTS 201 Implement Sustain Energy Sys in Dev Com
MATH150 Introductory Statistics
Modern Language - All MDLA Courses
PHIL111 On Death and Dying
PHIL 121 World Religions
PHIL 204 Asian Philosophies
POLS 101 Introduction to Political Science
POLS 105G American Constitutional Law
POLS 150 Peace Studies & Conflict Resolution (Study Abroad)
POLS 202 International Relations
POLS205 Women & Politics
POLS 251 State & Local Government
PSYC 258 Developmental Psychology
SOCA 102 Cultural Anthropology
SOCA103 Principles of Sociology
SOCA 105 American Ethnicity
SOCA 150 Deviance
SOCA160 Issues in Cont Genocide & Mass Violence
SOCA204 Social Problems

Program Narrative:

- Major improvements in agriculture, breakthroughs in health care, energy production, and solutions to environmental challenges - biotechnology is changing our world in exciting ways. Biotech is also one of the more rapidly expanding and diverse areas of employment in today's economy. A career in a biotechnology- related field could lead you to the development of new products and processes to improve the quality of life.
- NCC graduates are positioned to compete for a wide range of positions in the chemical and pharmaceutical industries, governmental institutions such as the FDA, USDA, Department of Defense, NIH, EPA, forensics laboratories, the cosmetic industry, biomedical research institutions and the expanding field of green energy.
- Students entering this program should be interested in science and should have taken high school classes in biology, chemistry and algebra (or the equivalent).
- Students who have not taken chemistry or algebra may do so before beginning the program.
- Industrial internships are considered the important part of the biotechnology program. Students are strongly encouraged to seek and apply for the internships; program coordinator will assist interested biotechnology majors in the applications process.
- Students in NCC's Biotechnology program receive a solid background in math and science and practical knowledge in biotechnology. Students also gain good laboratory and critical thinking skills that make them attractive to employers in the biotechnology and pharmaceutical industry as manufacturing or research technicians. In addition this program prepares students to transfer to a four year institution should they want to pursue a Bachelors degree in Biotechnology.
- The program can be completed on a part time or full time basis.

Program Learning Outcomes: Graduates of the program will:

- Demonstrate skills necessary to work in a typical biotechnology laboratory or biomanufacturing facility while following appropriate safety procedures and complying with the federal regulations for the industry.
- Demonstrate an understanding of biotechnological principles and concepts.
- Follow written instructions and work both independently and collaboratively on a wide variety of projects.
- Demonstrate literacy in data manipulation and analysis using computerized spreadsheets and graphing programs.
- Apply statistics to analyze the credibility of scientific results and to follow the biomanufacturing processes.
- Demonstrate the ability to communicate both orally and through written reports in an effective and efficient manner.
- Apply all the steps of the scientific method to research, design, perform, and report on a solution to a scientific or manufacturing problem.

Transfer Information:

Optional Fifth Semester for Biotechnology AAS Degree

- Students in the program have the option to acquire additional skills by attending a capstone semester at Penn State focusing on nanotechnology. This optional fifth semester of study will provide students with hands-on experience using state-of-the-art equipment found in industries that apply nanotechnology. Students who are interested in pursuing this training should work closely with their advisor to ensure that they choose those electives that will best prepare them for the capstone semester.
- Nanofabrication Specialization (Optional 5th Semester)

Semester at the Nanofabrication Facility at Pennsylvania State University, Main Campus

NANF 211	Materials, Safety and Equipment Overview for Nanofabrication	3
NANF 212	Basic Nanofabrication Processes	3
NANF 213	Thin Films in Nanofabrication	3
NANF 214	Lithography for Nanofabrication	3
NANF 215	Materials Modification in Nanofabrication	3
NANF 216	Characterization, Packaging, and Testing of Nanofabricated Structures	<u>3</u>
		18 credits

Northampton Community College has Articulation Agreements for the transfer of all Biotechnology Program credits with the following institutions:

East Stroudsburg University
Marywood University
Cedar Crest College.

Institutions to which NCC graduates transferred

University of Hawaii
East Stroudsburg University
Cedar Crest College
Lehigh University
Lafayette College
Drexel University
University of Pennsylvania
Pennsylvania State University

Career Information:

- Biotechnology belongs to the broader field of Life Sciences Industry.
- Students graduating with the degree in biotechnology are well positioned to enter one of the more rapidly expanding and diverse areas of employment in today's economy; Life Sciences industry. More than 2,300 life sciences establishments and over 78,000 employees call Pennsylvania their home.
- Our state has high rankings across the board for key measures of life sciences R&D (research and development) and innovation.
- PA also holds specialized employment concentrations in drugs and pharmaceuticals and research, testing, and medical labs, with larger employment in medical devices and bioscience-related distribution.
- According to Pharmexec.com employees in direct biopharmaceutical sector earn on average \$123,108, more than twice the average annual salary \$57,149 for all other U.S. jobs.
- Overall Bioscience/ Life science industry workers earn on average \$94,543 annually.
- At the entry level positions employees with less than bachelor's degree earn \$40,000 – 50,000 annually. •Its total life sciences employment concentration is 10 percent greater than the national average.

Career Potential, Jobs Examples: Laboratory Technician, Process Supervisor, Quality Control Technician, Quality Assurance Technician, Manufacturing Operator/Technician, Research Technician, Research Associate, Forensic Lab Technician, Environmental Lab Technician, Bioinformatics Specialist, Clinical Research Associate.