

# DEPARTMENT OF CHEMISTRY

## DEGREE CHECKLIST FOR ASSOCIATE IN SCIENCE IN CHEMICAL TECHNOLOGY AND BACHELOR OF SCIENCE IN APPLIED CHEMISTRY

For students entering the program Fall 2018.

### ASSOCIATE DEGREE

#### GENERAL EDUCATION REQUIRED AND FLEXIBLE COMMON CORE (30 TO 34 CREDITS)

At least 1 course designated WI is required from the Gen Ed Flexible Common Core.

COURSE	COURSE TITLE	PRE/CO REQUISITES	CREDITS
ENG 1101	English Composition I (EC)	<b>Prereq:</b> CUNY Read, Write Proficiency	3 credits.
ENG 1121	English Composition II (EC)	<b>Prereq:</b> ENG 1101	3 credits.
	Math and Quantitative Reasoning (STEM Math Strongly Recommended <sup>2 3</sup> )		3 to 4 credits.
	Life and Physical Sciences (CHEM 1110 <sup>2</sup> Recommended)		3 to 4 credits.
	*World Cultures and Global Issues		3 credits.
	*US Experience and its Diversity		3 credits.
	*Individual and Society		3 credits.
	*Creative Expression		3 credits.
	*Scientific World (STEM Math Strongly Recommended <sup>2 3</sup> )		3 to 4 credits.
	*Additional Flexible Common Core Course (CHEM 1210 <sup>2</sup> Recommended)		3 to 4 credits.

#### PROGRAM-SPECIFIC DEGREE REQUIREMENTS (27 TO 31 CREDITS)

**Double Duty**<sup>2</sup> Specific courses listed indicate double duty courses, i.e., program degree requirements that also meet general education requirements in that category.

CHEM 1110 <sup>2</sup>	General Chemistry I (LPS)	<b>Prereq or Coreq:</b> MAT 1275 or higher, ENG 092R	4 credits.
CHEM 1210 <sup>2</sup>	General Chemistry II (sw, wi)	<b>Prereq:</b> CHEM 1110 and CUNY Writing Proficiency	4 credits.
CHEM 2223	Organic Chemistry I (wi)	<b>Prereq:</b> CHEM 1210	5 credits.
CHEM 2323	Organic Chemistry II (wi)	<b>Prereq:</b> CHEM 2223	5 credits.
PHYS 1441 <sup>2</sup>	General Physics I: Calculus Based (sw, wi)	<b>Prereq or Coreq:</b> MAT 1475 or higher	5 credits.
MAT 1475 <sup>2</sup>	Calculus I or higher (MQR)	<b>Prereq:</b> MAT 1375	4 credits.

#### PROGRAM ELECTIVE COURSES

Take as needed to equal 61 credits.

	Mathematics/Science Elective <sup>4</sup>		4 credits.
	Mathematics/Science Elective <sup>4</sup>		4 credits.

**ASSOCIATE IN SCIENCE IN CHEMICAL TECHNOLOGY: 60 TO 61 CREDITS.  
MINIMUM REQUIRED LIBERAL ARTS AND SCIENCES CREDITS: 30 CREDITS.**

### BACHELOR'S DEGREE

#### GENERAL EDUCATION FLEXIBLE COMMON CORE AND COLLEGE OPTION REQUIREMENTS (12 CREDITS)

<sup>1</sup> Students must take at least one advanced liberal arts course or choose two sequential courses in a foreign language.

At least 1 course designated WI is required from the College Option or Gen Ed Flexible Common Core.

COURSE	COURSE TITLE	PRE/CO REQUISITES	CREDITS
COM 1330	Public Speaking or higher	<b>Prereq:</b> CUNY Read, Write Proficiency	3 credits.
	*Interdisciplinary course		3 credits.
	*Liberal Arts Elective (LibArt) or Foreign Language Sequence (FL)		3 credits.
	*Liberal Arts Elective (LibArt) <sup>1</sup> or Foreign Language Sequence (FL) <sup>1</sup>		3 credits.

#### PROGRAM-SPECIFIC DEGREE REQUIREMENTS (47 CREDITS)

**Double Duty**<sup>2</sup> Specific courses listed indicate double duty courses, i.e., program degree requirements that also meet general education requirements in that category.

MAT 1575	Calculus II or higher	<b>Prereq:</b> MAT 1475	4 credits.
PHYS 1442 <sup>2 5</sup>	General Physics II: Calculus Based (sw, wi)	<b>Prereq:</b> PHYS 1441	5 credits.
BIO 1101 <sup>2</sup>	Biology I	<b>Prereq:</b> CUNY Proficiency	4 credits.
BIO 3601	Biochemistry	<b>Prereq:</b> BIO 1101, MAT 1275 or higher, ENG 1101, CHEM 2223	4 credits.
CHEM 3222	Physical Chemistry: Thermodynamics and Kinetics (wi)	<b>Prereq:</b> CHEM 1210, PHYS 1442, MAT 1575 or higher	4 credits.
CHEM 3312	Analytical Chemistry (wi)	<b>Prereq:</b> CHEM 1210	5 credits.
CHEM 3412	Instrumental Methods of Analysis (wi)	<b>Prereq:</b> CHEM 1210	5 credits.
CHEM 3622	Inorganic Chemistry (wi)	<b>Prereq:</b> CHEM 1210	4 credits.
CHEM 4312	Instrumental Chromatography (wi)	<b>Prereq:</b> CHEM 3412	4 credits.
CHEM 4901	Internship/Research in Applied Chemistry I (wi)	<b>Prereq:</b> Dept Approval and CHEM 2323 or 3412	3 credits.
CHEM 4902	Internship/Research in Applied Chemistry II (wi)	<b>Prereq:</b> Dept Approval and CHEM 4901	3 credits.

#### PROGRAM ELECTIVE COURSES

Take as needed to equal 120 credits.

	*Mathematics/Science Elective (MAT/SCI) <sup>4</sup>		3 credits.
	*Mathematics/Science Elective (MAT/SCI) <sup>4</sup>		4 credits.

**BACHELOR OF SCIENCE IN APPLIED CHEMISTRY: 120 CREDITS.  
MINIMUM REQUIRED LIBERAL ARTS AND SCIENCES CREDITS: 60 CREDITS**

# DEPARTMENT OF CHEMISTRY

## PROGRAM-SPECIFIC ELECTIVE COURSES

### MATHEMATICS/SCIENCE ELECTIVES (MAT/SCI ELECT)

Courses are 3 credits except where noted ( )

#### FOR AAS SCIENCE AND MATHEMATICS ELECTIVE COURSES

##### BIOLOGY

BIO 1101 Biology I (4)  
BIO 1201 Biology II (4)  
BIO 2311 Human Anatomy and Physiology I (4)  
BIO 2312 Human Anatomy and Physiology II (4)  
BIO 3302 Microbiology (4)  
BIO 3350 Bioinformatics I (4)  
BIO 3601 Biochemistry (4)

##### CHEMISTRY

CHEM 2411 Special Topics in Chemistry (3)  
CHEM 3312 Analytical Chemistry (5)  
CHEM 3412 Instrumental Methods of Analysis (5)  
CHEM 3622 Inorganic Chemistry (4)

##### MATHEMATICS

MAT 1476L Calculus Laboratory (1)  
MAT 1575 Calculus II (4)  
MAT 2675 Calculus III (4)

##### PHYSICS

PHYS 1117 Astronomy I (4)  
PHYS 1118 Astronomy II: Stars, Galaxies,  
Cosmology (4)  
PHYS 1442 Calculus-based Physics 2 (5)  
PHYS 2443 Modern Physics (4)  
PHYS 2605 Laser Physics and Photonics (4)  
IS 9010 Independent Study (1 to 3)

#### FOR BS SCIENCE AND MATHEMATICS ELECTIVE COURSES

##### BIOLOGY

BIO 2311 Anatomy and Physiology I (4)  
BIO 2312 Anatomy and Physiology II (4)  
BIO 3302 Microbiology (4)  
BIO 3350 Elements of Bioinformatics (4)  
BIO 3352 Bioinformatics (4)  
BIO 3354 Computational Genomics  
BIO 3356 Molecular Modeling in Biology  
BIO 3524 Nutrition (2)  
BIO 3526 Pathophysiology  
BIO 3620 Molecular and Cell Biology (4)

CHEM 2411 Special Topics  
CHEM 4322 Advanced Spectroscopy  
CHEM 4822 Medicinal Chemistry

##### COMPUTER SYSTEMS TECHNOLOGY

CST 1101 Problem Solving with Computer  
Programming  
CST 2403 Introductory C++ Programming  
Language Part I  
CST 3503 C++ Programming Part II

##### PHYSICS

PHYS 2601 Introduction to Research  
PHYS 2603 Physical Principles of  
Medical Imaging  
PHYS 2605 Introduction to Laser Physics  
and Photonics (4)  
PHYS 2607 Introduction to  
Quantum Mechanics  
PHYS 2609 Introduction to Quantum  
Computing (4)

##### MATHEMATICS

MAT 2071 Introduction to Proofs and Logic (4)  
MAT 2440 Discrete Structures and Algorithms I  
MAT 2540 Discrete Structures and Algorithms II  
MAT 2572 Probability and Mathematical  
Statistics I (4)  
MAT 2580 Introduction to Linear Algebra  
MAT 2588 6 The Mathematics of Finance  
MAT 2630 6 Applied Mathematics  
Technology--Numerical Analysis  
MAT 2675 Calculus III (4)  
MAT 2680 Differential Equations  
MAT 3021 Number Theory (4)  
MAT 3050 Geometry I (4)  
MAT 3075 Introduction to Real Analysis (4)  
MAT 3080 Modern Algebra (4)  
MAT 3672 Probability and Mathematical  
Statistics II (4)  
MAT 3770 6 Mathematical Modeling I –  
Optimization  
MAT 3772 Stochastic Models  
MAT 3777 Applied Mathematics: Applications  
of the Wave Equations  
MAT 3787 6 Applied Mathematics –  
Finite Fields  
MAT 3788 6 Applications of the Heat Equation  
for Financial Mathematics  
MAT 3880 Introduction to Partial Differential  
Equations using Mathematical  
Models in Biology  
MAT 4030 History of Mathematics  
MAT 4050 Geometry II  
MAT 4672 Computational Statistics  
with Applications  
MAT 4788 Financial Risk Modeling  
MAT 4872 Probability and Mathematical  
Statistics III (4)  
MAT 4880 Mathematical Modeling II

## SAMPLE COURSE OF STUDY

For Associate in Science in Chemical Technology and Bachelor of Science in Applied Chemistry, entering at MAT 1275.

### SEMESTER 1

(Total Credits 14)

MAT 1275	College Algebra and Trigonometry (MQR)	4 credits.
ENG 1101	English Composition I	3 credits.
CHEM 1110	General Chemistry I (LPS)	4 credits.
WCGI	World Cultures and Global Issues	3 credits.

### SEMESTER 2

(Total Credits 17)

MAT 1375	Precalculus (SW)	4 credits.
ENG 1121	English Composition II	3 credits.
CHEM 1210	General Chemistry II (Add. Flex Core)	4 credits.
USED	US Experience in its Diversity	3 credits.
CE	Creative Expression	3 credits.

### SEMESTER 3

(Total Credits 14)

MAT 1475	Calculus I	4 credits.
PHYS 1441	General Physics I: Calculus Based	5 credits.
CHEM 2223	Organic Chemistry I	5 credits.

### SEMESTER 4

(Total Credits 16)

IS	Individual and Society	3 credits.
PHYS 1442	General Physics II: Calculus Based (MAT/SCI Elective)	5 credits.
CHEM 2323	Organic Chemistry II	5 credits.
MAT/SCI Elect		3 credits.

### SEMESTER 5

(Total Credits 16)

MAT 1575	Calculus II or higher	4 credits.
CHEM 3622	Inorganic Chemistry	4 credits.
CHEM 3412	Instrumental Methods of Analysis	5 credits.
COM 1330	Public Speaking or higher	3 credits.

### SEMESTER 6

(Total Credits 16)

ID	Interdisciplinary Course	3 credits.
BIO 1101	Biology I	4 credits.
CHEM 3312	Analytical Chemistry	5 credits.
CHEM 3222	Physical Chemistry: Thermodynamics and Kinetics	4 credits.

### SEMESTER 7

(Total Credits 14)

LibArt		3 credits.
MAT/SCI Elect		4 credits.
CHEM 4312	Instrumental Chromatography	4 credits.
CHEM 4901	Internship/Research in Applied Chemistry I	3 credits.

### SEMESTER 8

(Total Credits 13)

LibArt <sup>1</sup>		3 credits.
MAT/SCI Elect		3 credits.
BIO 3601	Biochemistry	4 credits.
CHEM 4902	Internship/Research in Applied Chemistry II	3 credits.

#### Footnotes

<sup>1</sup> Examples of advanced liberal arts courses include SOC 3301 (prerequisite: ECON 1101); SOC 2403 (prerequisite: PSY 1101). In meeting their general education requirements overall, students must take at least one advanced liberal arts course or choose two sequential courses in one of the foreign language (FL) course offerings, such as Arabic (ARB), Spanish (SPA), Chinese (CHN), or French (FREN).

<sup>2</sup> Specific courses listed indicate double duty courses, i.e., program degree requirements that also meet general education requirements. Choosing to take advantage of double duty can speed up progress toward graduation and increase elective credits. Consult with an advisor about your options.

<sup>3</sup> The STEM math series is MAT 1275, MAT 1375, MAT 1475, MAT 1575, and MAT 2675, with each course a prerequisite for the next. Students who, due to their initial placement, are required to begin their mathematics studies in a course before MAT 1475, must select MAT 1275 and/or MAT 1375 as their Mathematics and Quantitative Reasoning and Scientific World courses.

<sup>4</sup> The number of science/math elective credits will vary depending upon the program-specific courses students use to meet Common Core requirements.

<sup>5</sup> PHYS 1442 is strongly recommended and satisfies a degree requirement for the BS in Applied Chemistry.