

SCHOOL OF SCHOOL OF NATURAL SCIENCES AND TECHNOLOGY			
Degree: BACHELOR OF SCIENCE Credits: 123		CURRICULUM Since: August 2018	
Program: CHEMISTRY			
<p><b>Description:</b> The program in chemistry provides students with a solid foundation in chemistry and the analysis and solution of chemical problems. Our graduates will have received training in the core areas of chemistry, with emphasis on scientific research. The design of the program and its courses are approved by the American Chemical Society (ACS)<sup>a</sup> and comply with the licensing requirements of the Puerto Rico College of Chemists (<i>Colegio de Químicos de Puerto Rico</i>)<sup>b</sup>. Graduates of our program will be able to work in industry, research laboratories, government agencies, forensic laboratories and other chemistry related scenarios.</p>			
Course Code	Course Title	Credits	Requisites
<b>General Education Courses</b>			
ENGL 152	Fundamentals of Reading and Writing	3	Placement test
ENGL 153	Advanced Communicative English	3	ENGL 152 or placement test
ENGL 231	Research and Writing	3	ENGL 153
HUMA 111	Civilizations and Universal Culture I	3	
MATH 152	Pre-Calculus II	4	Placement test or MATH 151
MATH 152L	Pre-Calculus II Laboratory	0	Placement test or MATH 151L
GESC 105	Freshmen Seminar	3	
GESC 107 <sup>5</sup>	Introduction to Computers	3	
SOSC 111	Individual, Community, Government and Social Responsibility I	3	
SOSC 112	Individual, Community, Government and Social Responsibility II	3	SOSC 111
SPAN 152	Fundamentals of Reading and Writing	3	
SPAN 250	Writing Techniques	3	SPAN 152
		34	
<b>Professional/Core Courses</b>			
BIOL 203	General Biology I	3	Co-req. BIOL 203L
BIOL 203L	General Biology I Laboratory	1	Co-req. BIOL 203
BIOL 204	General Biology II	3	BIOL 203, BIOL 203L Co-req. 204L
BIOL 204L	General Biology II Laboratory	1	Co-req. 204
PHSC 203	General Physics I	3	MATH 221, Co-req. PHSC 203L
PHSC 203L	General Physics I Laboratory	1	Co-req. PHSC 203
PHSC 204	General Physics II	3	PHSC 203, Co-req. PHSC 204L
PHSC 204L	General Physics II Laboratory	1	Co-req. PHSC 204
MATH 221	Calculus I	4	MATH 152, Co-req. MATH 221L
MATH 221L	Calculus I Laboratory	0	MATH 152, Co-req. MATH 221
		20	

Course Code	Course Title	Credits	Requisites
<b>Specialization Courses</b>			
CHEM 203 <sup>b</sup>	General Chemistry I	4	Co-req. Math 152, CHEM 203L
CHEM 203L <sup>b</sup>	General Chemistry I Laboratory	0	Co-req. CHEM 203
CHEM 204 <sup>b</sup>	General Chemistry II	4	CHEM 203, CHEM 203L Co-req. CHEM 204L
CHEM 204L <sup>b</sup>	General Chemistry II Laboratory	0	Co-req. CHEM 204
CHEM 221 <sup>a, b</sup>	Analytical Chemistry	3	CHEM 204, Co-req. 221L
CHEM 221L <sup>a, b</sup>	Analytical Chemistry Laboratory	1	Co-req. CHEM 221
CHEM 311 <sup>a</sup>	Inorganic Chemistry I	3	CHEM 204, MATH 221, Co-req. CHEM 311L
CHEM 311L <sup>a</sup>	Inorganic Chemistry I Laboratory	1	Co-req. CHEM 311
CHEM 351 <sup>a, b</sup>	Organic Chemistry I	3	CHEM 204, Co-req. CHEM 351L
CHEM 351L <sup>a, b</sup>	Organic Chemistry I Laboratory	1	Co-req. CHEM 351
CHEM 352 <sup>a, b</sup>	Organic Chemistry II	3	CHEM 351, Co-req. CHEM 352L
CHEM 352L <sup>a, b</sup>	Organic Chemistry II Laboratory	1	CHEM 351L, Co-req. CHEM 352
CHEM 365 <sup>a</sup>	Undergraduate Research I	3	Authorization from the Chair
CHEM 385 <sup>a</sup>	General Biochemistry I	3	CHEM352, BIOL204, Co-req. CHEM385L
CHEM 385L <sup>a</sup>	Laboratory of General Biochemistry I	1	CHEM 352, BIOL 204, Co-req. CHEM 385
CHEM 390 <sup>a</sup>	Spectroscopy	3	CHEM 221, CHEM 352
CHEM 430 <sup>a, b</sup>	Instrumental Chemistry	3	CHEM 221, MATH 221, Co-req. CHEM 430L
CHEM 430L <sup>a, b</sup>	Instrumental Chemistry Laboratory	1	Co-req. CHEM 430
CHEM 463 <sup>a, b</sup>	Physical Chemistry I	3	CHEM 221, PHSC 359, MATH 223, Co-req. CHEM 463L
CHEM 463L <sup>a, b</sup>	Physical Chemistry I Laboratory	1	Co-req. CHEM 463
CHEM 464 <sup>a, b</sup>	Physical Chemistry II	3	CHEM 463, Co-req. CHEM 464L
CHEM 464L <sup>a, b</sup>	Physical Chemistry II Laboratory	1	CHEM 463L, Co-req. CHEM 464
MATH 222	Calculus II	4	MATH 221, Co-req. MATH 222L
MATH 222L	Calculus II Laboratory	0	MATH 221, Co-req. MATH 222
MATH 223	Calculus III	4	MATH 222
PHSC 359	Modern Physics	3	PHSC 204, Co-req. PHSC 359L
PHSC 359L	Modern Physics Laboratory	1	Co-req. PHSC 359
		58	
<b>Elective Courses ( 11 credits)</b>			
<b>Option in General Chemistry</b>			
	Directed Electives	11	
<b>Option in Biochemistry</b>			
BIOL 340	Genetics	3	BIOL204
BIOL 355	Cellular and Molecular Biology	3	BIOL340, CHEM352, Co-req. BIOL 355L
<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>	<b>Requisites</b>

BIOL 355L	Laboratory of Cellular and Molecular Biology	1	BIOL 340, CHEM 352, Co-req. BIOL 355
	Elective	4	
		11	
<b>Option in Pre-Pharmacy <sup>5</sup></b>			
BIOL 313	Anatomy and human Physiology I	3	BIOL 204, BIOL 204L, Co. Req. BIOL 313L
BIOL 313L	Laboratory of Anatomy and human Physiology I	1	BIOL 204, BIOL 204L Co. Req. BIOL 313
BIOL 314	Anatomy and human Physiology II	3	BIOL313, 313L, Co-req. BIOL314L
BIOL 314L	Laboratory of Anatomy and human Physiology II	1	Co-req. BIOL314
ECON 123	Economy Principles and problems	3	SOSC111
		11	
<b>Directed Elective Options</b>			
BIOT 210	Regulations and good manufacturing practices	3	
BIOT 240	Validations	3	BIOT210
PSYC 123	General Psychology	3	SOSC111
ECON 123	Economy Principles and problems	3	SOSC111
BIOL 313	Anatomy and human Physiology I	3	BIOL 204, BIOL 204L, Co. Req. BIOL 313L
BIOL 313L	Laboratory of Anatomy and human Physiology I	1	BIOL 204, Co. Req. BIOL 313
BIOL 314	Anatomy and human Physiology II	3	BIOL313, 313L, Co-req. BIOL314L
BIOL 314L	Laboratory of Anatomy and human Physiology II	1	Co-req. BIOL314
BIOL 317	Bioinformatics	3	BIOL340
BIOL 320	Microbiology	3	BIOL-204, BIOL-204L Co-req BIOL 320L
BIOL 320L	Laboratory of Microbiology	1	Co-req BIOL 320
BIOL 340	Genetics	3	BIOL204, BIOL 204L, BIOL 315
BIOL 355	Cellular and Molecular Biology	3	BIOL340, CHEM352, CHEM, Co-req. BIOL355L
BIOL 355L	Laboratory of Cellular and Molecular Biology	1	BIOL340, CHEM352, CHEM, Co-req. BIOL355L
CHEM 355	Internship Practice in External Laboratories I	1	CHEM430
CHEM 356	Internship Practice in External Laboratories II	1	CHEM355
CHEM 366	Undergraduate Research II	3	Authorization from the Chair
CHEM 386	General Biochemistry II	3	CHEM385
CHEM 411	Inorganic Chemistry II	3	CHEM311, CHEM464
CHEM 451	Organic Synthesis	3	CHEM352
CHEM 475	Preparation for the Chemistry Profession	3	CHEM 463, Authorization from the Chair
CHEM 481	Computational Chemistry	3	CHEM204
CHEM 485	Electrochemistry	3	CHEM221
CHEM 499	Special Topics in Chemistry	3	Authorization from the Chair
ENCH 358	Environmental Chemistry	3	CHEM 352
MATH 305	Probability and Statistics I	3	MATH 152
MATH 395	Differential Equations	3	MATH 222

Notas:

1. El promedio general de graduación es 2.00; el promedio de graduación en concentración es 2.30.
2. Para tomar el curso MATH 152, el estudiante deberá haber cumplido con uno de los siguientes requisitos: a) Aprobar MATH 151-b) Aprobar prueba de ubicación ofrecida por la Vicerrectoría de Desarrollo y Retención-c) Obtener un mínimo de 700 en la prueba de aprovechamiento del CEEB. Todo estudiante que apruebe con mínimo de 3 el examen avanzado (Nivel 2) del CEEB podrá matricular el curso MATH 221.
3. Los cursos de concentración y electivas dirigidas de concentración deben ser aprobados con A, B ó C.
4. Un estudiante podrá matricular la electiva dirigida de su interés siempre y cuando haya aprobado el curso pre-requisito con A, B ó C. Si la electiva conlleva un curso de laboratorio, el estudiante deberá matricularlo de manera simultánea. No se consideran electivas los siguientes cursos o sus equivalentes: MATH 120, 121, 126, 151, 152, 199, 200; PHSC 101, 102; BIOT 210, 240.
5. Los estudiantes que seleccionen la opción de Pre-Farmacia tienen un permiso de autorización para sustituir el curso GESC 107 por PSYC 123.

**LA ESCUELA DE CIENCIAS NATURALES Y TECNOLOGÍA DE LA UNIVERSIDAD DEL TURABO SE RESERVA EL DERECHO DE REVISAR ESTE DOCUMENTO.  
ENE/2018**

<b>SCHOOL OF SCIENCE AND TECHNOLOGY</b>			
<b>Degree: BACHELOR OF SCIENCE</b> <b>credits: 123</b>		<b>PLAN OF STUDY</b> <b>August 2018</b>	
<b>Program: CHEMISTRY</b>			
<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>	<b>Requisites</b>
<b>FIRST YEAR - FIRST SEMESTER</b>			
MATH 152	Pre-Calculus II	4	Placement test or MATH 151
MATH 152L	Pre-Calculus II Laboratory	0	Placement test or MATH 151L
GESC 105	Freshman Seminar	3	
BIOL 203	General Biology I	3	Co-req. BIOL 203L
BIOL 203L	General Biology I Laboratory	1	Co-req. BIOL 203
CHEM 203 <sup>b</sup>	General Chemistry I	4	Co-req. MATH 152, CHEM 203L
CHEM 203L <sup>b</sup>	General Chemistry I Laboratory	0	Co-req. CHEM 203
		<b>15</b>	
<b>FIRST YEAR – SECOND SEMESTER</b>			
MATH 221	Calculus I	4	MATH 152, Co-req. MATH 221L
MATH 221L	Calculus I Laboratory	0	MATH 152, Co-req. MATH 221
SOSC 111	Individual, Community, Government and Social Responsibility I	3	
BIOL 204	General Biology II	3	BIOL 203, BIOL 230L Co-req. BIOL 204L
BIOL 204L	General Biology II Laboratory	1	BIOL 203, BIOL 203L Co-req. BIOL 204
CHEM 204 <sup>b</sup>	General Chemistry II	4	CHEM 203, 203L Co-req. 204L
CHEM 204L <sup>b</sup>	General Chemistry II Laboratory	0	Co-req. CHEM 204
		<b>15</b>	
<b>SECOND YEAR – FIRST SEMESTER</b>			
CHEM 351 <sup>a, b</sup>	Organic Chemistry I	3	CHEM 204, Co-req. CHEM 351L
CHEM 351L <sup>a, b</sup>	Organic Chemistry I Laboratory	1	Co-req. CHEM 351
MATH 222	Calculus II	4	MATH 221, Co-req. MATH 222L
MATH 222L	Calculus II Laboratory	0	MATH 221, Co-req. MATH 222
PHSC 203	General Physics I	3	MATH 221, Co-req. PHSC 203L
PHSC 203L	General Physics I Laboratory	1	Co-req. PHSC 203
ENGL 152	Fundamentals of Reading and Writing	3	Placement test
		<b>15</b>	
<b>SECOND YEAR - SECOND SEMESTER</b>			
CHEM 352 <sup>a, b</sup>	Organic Chemistry II	3	CHEM 351, Co-req. CHEM 352L

Course Code	Course Title	Credits	Requisites
CHEM 352L <sup>a, b</sup>	Organic Chemistry II Laboratory	1	CHEM 351L, Co-req. CHEM 352
MATH 223	Calculus III	4	MATH 222
PHSC 204	General Physics II	3	PHSC 203, Co-req. PHSC 204L
PHSC 204L	General Physics II Laboratory	1	Co-req. PHSC 204
ENGL 153	Advanced Communicative English	3	ENGL 152 or placement test
		<b>15</b>	
<b>THIRD YEAR - FIRST SEMESTER</b>			
CHEM 221 <sup>a, b</sup>	Analytical Chemistry	3	CHEM 204, Co-req. 221L
CHEM 221L <sup>a, b</sup>	Analytical Chemistry Laboratory	1	Co-req. CHEM 221
CHEM 385 <sup>a</sup>	General Biochemistry I	3	CHEM352, BIOL204, Co-req. CHEM385L
CHEM 385L <sup>a</sup>	Laboratory of General Biochemistry I	1	CHEM 352, BIOL 204, Co-req. CHEM 385
CHEM 365 <sup>a</sup>	Undergraduate Research I	3	Authorization from the Chair
ENGL 231	Research and Writing	3	ENGL 153
	ELECTIVE	3	
		<b>17</b>	
<b>THIRD YEAR – SECOND SEMESTER</b>			
CHEM 430 <sup>a, b</sup>	Instrumental Chemistry	3	CHEM 221, MATH 221, Co-req. CHEM 430L
CHEM 430L <sup>a, b</sup>	Instrumental Chemistry Laboratory	1	Co-req. CHEM 430
PHSC 359	Modern Physics	3	PHSC 204 , Co-req. PHSC 359L
PHSC 359L	Modern Physics Laboratory	1	Co-req. PHSC 359
HUMA 111	Civilizations and Universal Culture I	3	
SPAN 152	Fundamentals of Reading and Writing	3	
		<b>14</b>	
<b>FOURTH YEAR - FIRST SEMESTER</b>			
CHEM 463 <sup>a, b</sup>	Physical Chemistry I	3	CHEM 221, PHSC 359, MATH 223 Co-req. CHEM 463L
CHEM 463L <sup>a, b</sup>	Physical Chemistry I Laboratory	1	Co-req. CHEM 463
	ELECTIVE	3	
	ELECTIVE	1	
GESC 107 or PSYC 123 <sup>5</sup>	Introduction to Computers or General Psychology	3	
SPAN 250	Writing Techniques	3	SPAN 152
	ELECTIVE	4	
		<b>18</b>	
<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>	<b>Requisites</b>

<b>FOURTH YEAR - SECOND SEMESTER</b>			
CHEM 464 <sup>a, b</sup>	Physical Chemistry II	3	CHEM 463, Co-req. CHEM 464L
CHEM 464L	Physical Chemistry II Laboratory	1	CHEM 463, Co-req. CHEM 464
CHEM 311 <sup>a</sup>	Inorganic Chemistry I	3	CHEM 204, MATH 221 Co-req. CHEM 311L
CHEM 311L <sup>a</sup>	Inorganic Chemistry Laboratory	1	Co-req. CHEM 311
CHEM 390 <sup>a</sup>	Spectroscopy	3	CHEM 221, CHEM 352
SOSC 112	Individual, Community, Government and Social Responsibility II	3	SOCS 111
		<b>14</b>	

<sup>a</sup> Courses approved by the American Chemical Society (ACS)

<sup>b</sup> Courses required by the Puerto Rico College of Chemists (*Colegio de Químicos de Puerto Rico*)