Biotechnology

Program Requirements

Biochemistry and Biotechnology B.Sc. Honours (20.0 credits)

A. Credits Included in the Major CGPA (15.0 credits)

1. 2.5 credits in:		2.5
BIOL 1103 [0.5]	Foundations of Biology I	
BIOL 1104 [0.5]	Foundations of Biology II	
BIOL 2104 [0.5]	Introductory Genetics	
BIOL 2303 [0.5]	Microbiology	
BIOL 3104 [0.5]	Molecular Genetics	
2. 0.5 credit from:		0.5
BIOL 2001 [0.5]	Animals: Form and Function	
BIOL 2002 [0.5]	Plants: Form and Function	
3. 0.5 credit from:		0.5
BIOL 3201 [0.5]	Cell Biology	
BIOL 3205 [0.5]	Plant Biochemistry and Physiology	
BIOL 3303 [0.5]	Experimental Microbiology	
BIOL 3305 [0.5]	Human and Comparative Physiology	
4. 1.5 credit from:		1.5
BIOL 2301 [0.5]	Biotechnology I	
BIOL 3201 [0.5]	Cell Biology	
BIOL 3301 [0.5]	Biotechnology II	
BIOL 3303 [0.5]	Experimental Microbiology	
BIOL 4106 [0.5]	Advances in Molecular Biology	
BIOL 4109 [0.5]	Laboratory Techniques in Molecular Genetics	
BIOL 4201 [0.5]	Advanced Cell Culture and Tissue Engineering	
BIOL 4300 [0.5]	Applied Microbiology	
BIOL 4301 [0.5]	Current Topics in Biotechnology	
5. 3.0 credits in:		3.0
BIOC 2200 [0.5]	Cellular Biochemistry	
BIOC 3101 [0.5]	General Biochemistry I	
BIOC 3102 [0.5]	General Biochemistry II	
BIOC 3103 [0.5]	Practical Biochemistry I	
BIOC 3104 [0.5]	Practical Biochemistry II	
BIOC 3202 [0.5]	Biophysical Techniques and Applications	
6. 1.0 credit from:		1.0
BIOC 4907 [1.0]	Honours Essay and Research Proposal	
BIOC 4908 [1.0]	Research Project	
7. 1.0 credit from:		1.0
BIOC 4004 [0.5]	Industrial Biochemistry	
BIOC 4005 [0.5]	Biochemical Regulation	
BIOC 4007 [0.5]	Membrane Biochemistry	
BIOC 4009 [0.5]	Biochemistry of Disease	
BIOC 4200 [0.5]	Immunology	
BIOC 4201 [0.5]	Advanced Cell Culture and Tissue Engineering	
BIOC 4202 [0.5]	Mutagenesis and DNA Repair	
BIOC 4203 [0.5]	Advanced Metabolism	
BIOC 4204 [0.5]	Protein Biotechnology	
BIOC 4400 [0.5]	Nuclear Dynamics and the Cell Cycle	
BIOC 4708 [0.5]	Principles of Toxicology	
8. 4.0 credits in:		4.0
CHEM 1001 [0.5]	General Chemistry I	
CHEM 1002 [0.5]	General Chemistry II	
CHEM 2103 [0.5]	Physical Chemistry I	
or BIOC 2300 [0.5]	Physical Biochemistry	
CHEM 2203 [0.5]	Organic Chemistry I	
CHEM 2204 [0.5]	Organic Chemistry II	
CHEM 2303 [0.5]	Analytical Chemistry II	
CHEM 2501 [0.5]	Introduction to Inorganic and Bioinorganic Chemistry	
CHEM 3201 [0.5]	Advanced Organic Chemistry I	
9. 0.5 credit from:		0.5
CHEM 3202 [0.5]	Advanced Organic Chemistry II	
CHEM 3205 [0.5]	Experimental Organic Chemistry	
10. 0.5 credit from:		0.5
BIOC courses listed in, but not used to fulfil, Item 7 above		
BIOC 2400 [0.5]	Independent Research I	
BIOC 3400 [0.5]	Independent Research II	
BIOC 3008 [0.5]	Bioinformatics	
BIOC 4001 [0.5]	Methods in Biochemistry	
BIOC 4008 [0.5]	Computational Systems Biology	
BIOC 4901 [0.5]	Selected Topics in Biochemistry	
BIOL courses listed in, but not used to fulfil, Item 3 or 4		
BIOL 2001 [0.5]	Animals: Form and Function	
BIOL 2002 [0.5]	Plants: Form and Function	
BIOL 3102 [0.5]	Mycology	
BIOL 3202 [0.5]	Principles of Developmental Biology	
BIOL 3306 [0.5]	Human Anatomy and Physiology	
BIOL 3307 [0.5]	Advanced Human Anatomy and Physiology	
BIOL 4206 [0.5]	Human Genetics	
BIOL 4209 [0.5]	Advanced Plant Physiology	
- BIOL courses listed in but not used to fulfil Item 4 above		
CHEM 3100 [0.5]	Physical Chemistry II	
CHEM 3107 [0.5]	Experimental Methods in Nanoscience	
CHEM 3202 [0.5]	Advanced Organic Chemistry II	
CHEM 3205 [0.5]	Experimental Organic Chemistry	
CHEM 3600 [0.5]	Introduction to Nanotechnology	
CHEM 3700 [0.5]	Industrial Applications of Chemistry	
CHEM 3800 [0.5]	The Chemistry of Environmental Pollutants	
CHEM 4201 [0.5]	Macromolecular Nanotechnology	
CHEM 4406 [0.5]	Pharmaceutical Drug Design	

B. Credits Not Included in the Major CGPA (5.0 credits)

11. 1.0 credit from:		1.0
PHYS 1007 [0.5] & PHYS 1008 [0.5]	Elementary University Physics I Elementary University Physics II	
PHYS 1003 [0.5] & PHYS 1004 [0.5]	Introductory Mechanics and Thermodynamics Introductory Electromagnetism and Wave Motion	
12. 1.5 credits in:		1.5

	MATH 1007 [0.5]	Elementary Calculus I
	MATH 1107 [0.5]	Linear Algebra I
	STAT 2507 [0.5]	Introduction to Statistical Modeling I
13. 2.0 credits in Approved Courses Outside the Faculties of Science and Engineering and Design (may include NSCI 1000)		2.0
14. 0.5 credit in free elective.		0.5
Total Credits		20.0

Biology and Biotechnology B.Sc. Honours (20.0 credits)

A. Credits Included in the Major CGPA (12.5 credits)

1. 6.0 credits in:		6.0
BIOL 1103 [0.5]	Foundations of Biology I	
BIOL 1104 [0.5]	Foundations of Biology II	
BIOL 2001 [0.5]	Animals: Form and Function	
BIOL 2002 [0.5]	Plants: Form and Function	
BIOL 2104 [0.5]	Introductory Genetics	
BIOL 2200 [0.5]	Cellular Biochemistry	
BIOL 2301 [0.5]	Biotechnology I	
BIOL 2303 [0.5]	Microbiology	
BIOL 3104 [0.5]	Molecular Genetics	
BIOL 3201 [0.5]	Cell Biology	
BIOL 3301 [0.5]	Biotechnology II	
BIOL 4301 [0.5]	Current Topics in Biotechnology	
2. 1.0 credit in:		1.0
BIOC 3101 [0.5]	General Biochemistry I	
BIOC 3102 [0.5]	General Biochemistry II	
3. 4.5 credits from:		4.5
BIOC 2300 [0.5]	Physical Biochemistry	
or CHEM 2103 [0.5]	Physical Chemistry I	
BIOC 3008 [0.5]	Bioinformatics	
BIOC 3103 [0.5]	Practical Biochemistry I	
BIOC 3104 [0.5]	Practical Biochemistry II	
BIOC 3202 [0.5]	Biophysical Techniques and Applications	
BIOL 3004 [0.5]	Insect Diversity	
BIOL 3102 [0.5]	Mycology	
BIOL 3205 [0.5]	Plant Biochemistry and Physiology	
BIOL 3303 [0.5]	Experimental Microbiology	
BIOL 3305 [0.5]	Human and Comparative Physiology	
BIOL 3501 [0.5]	Biomechanics	
BIOL 3901 [0.5]	Research Proposal	
BUSI 2800 [0.5]	Entrepreneurship	
CHEM 3700 [0.5]	Industrial Applications of Chemistry	
CHEM 3800 [0.5]	The Chemistry of Environmental Pollutants	
FOOD 3005 [0.5]	Food Microbiology	
BIOC 4001 [0.5]	Methods in Biochemistry	
BIOC 4004 [0.5]	Industrial Biochemistry	
BIOC 4005 [0.5]	Biochemical Regulation	
BIOC 4007 [0.5]	Membrane Biochemistry	
BIOC 4008 [0.5]	Computational Systems Biology	
BIOC 4009 [0.5]	Biochemistry of Disease	
BIOC 4203 [0.5]	Advanced Metabolism	
BIOC 4204 [0.5]	Protein Biotechnology	
BIOC 4708 [0.5]	Principles of Toxicology	
BIOL 4106 [0.5]	Advances in Molecular Biology	
BIOL 4109 [0.5]	Laboratory Techniques in Molecular Genetics	
BIOL 4200 [0.5]	Immunology	
BIOL 4201 [0.5]	Advanced Cell Culture and Tissue Engineering	
BIOL 4202 [0.5]	Mutagenesis and DNA Repair	
BIOL 4206 [0.5]	Human Genetics	
BIOL 4901 [0.5]	Directed Special Studies	
TSES 4001 [0.5]	Technology and Society: Risk	
TSES 4002 [0.5]	Technology and Society: Forecasting	
4. 1.0 credit in:		1.0
BIOL 4905 [1.0]	Honours Workshop	
or BIOL 4907 [1.0]	Honours Essay and Research Proposal	
or BIOL 4908 [1.0]	Honours Research Thesis	

B. Credits Not Included in the Major CGPA (7.5 credits)

5. 2.0 credits in:		2.0
CHEM 1001 [0.5] & CHEM 1002 [0.5]	General Chemistry I General Chemistry II	
CHEM 2203 [0.5] & CHEM 2204 [0.5]	Organic Chemistry I Organic Chemistry II (See Note, below)	
6. 1.0 credit in:		1.0
BIOL 1105 [0.5]	Biological Methods, Analysis and Interpretation	
MATH 1007 [0.5]	Elementary Calculus I	
7. 1.5 credits from:		1.5
COMP 1005 [0.5]	Introduction to Computer Science I	
COMP 1006 [0.5]	Introduction to Computer Science II	
MATH 1107 [0.5]	Linear Algebra I	
PHYS 1007 [0.5]	Elementary University Physics I	
or PHYS 1003 [0.5]	Introductory Mechanics and Thermodynamics	
PHYS 1008 [0.5]	Elementary University Physics II	
or PHYS 1004 [0.5]	Introductory Electromagnetism and Wave Motion	
STAT 2507 [0.5]	Introduction to Statistical Modeling I	
8. 2.0 credits in Approved Courses Outside the Faculties of Science and Engineering and Design (may include NSCI 1000)		2.0
19. 1.0 credit free elective.		1.0
Total Credits		20.0

Note: For **Item 5** above, CHEM 1001 General Chemistry I and CHEM 1002 General Chemistry II are strongly recommended for this program. Students may substitute CHEM 1001 General Chemistry I and CHEM 1002 General Chemistry II with CHEM 1005 Elementary Chemistry I and CHEM 1006 Elementary Chemistry II, respectively. Students choosing CHEM 1005 Elementary Chemistry I and CHEM 1006 Elementary Chemistry II will be required to obtain a grade of B- or higher in CHEM 1006 Elementary Chemistry II to take BIOL 2200 Cellular Biochemistry and more advanced courses in BIOC and CHEM. Students completing CHEM 1005 Elementary Chemistry I with a grade of B- or higher are encouraged to register for CHEM 1002 General Chemistry II.