



## B.S. Degree in Biochemistry and Biotechnology Emphasis in Biological Chemistry

The following is a sample schedule to help students plan their coursework. These are suggestions and the schedule is flexible. In addition to fulfilling the courses specifically required for this degree, it is important that students also fulfill Dragon Core requirements and normal graduation requirements (at least 120 total credits, at least 40 upper/division credits [300/400 level], and a GPA of at least 2.0.)

FALL				FRESHMAN YEAR				DC	
		Dragon Core (1A or 2) or Bioscience Elective <sup>4</sup>	4						
CHEM	150	Gen Chem I (lab)	4			4L			
ENGL	101	English Composition <sup>1</sup>	3			1B			
MATH	142	Precalculus <sup>2</sup>	4			3			
HLTH	122	Personal Health/Wellness	1						
Total Credits			16						

SPRING				DC	
BIOL	111	Cell Biology (lab)	4		
CHEM	210	Gen Chem II (lab)	4		
		Dragon Core (1A or 2) <sup>1</sup>	3		Y
		Dragon Core (1A or 2)	3		2
		Dragon Core (3, 5, 6, or 7) <sup>3</sup>	3		Y
Total Credits			17		

FALL				SOPHOMORE YEAR			
BIOL	341	Genetics (lab)	4				
CHEM	350	Organic Chem I	3				
CHEM	355	Organic Chem Lab I	1				
MATH	261	Calculus I <sup>2</sup>	4			3	
PHYS	200	Physics I (lab)	4			4L	
Total Credits			16				

SPRING			
BIOL	385	Molecular Biology (lab)	4
CHEM	360	Organic Chem II	3
CHEM	365	Organic Chem Lab II	1
MATH	262	Calculus II	4
PHYS	201	Physics II (lab)	4
Total Credits			16

FALL				JUNIOR YEAR			
CHEM	300	Inorganic Chemistry	3				
CHEM	400	Biochemistry I	3				
CHEM	405	Biochemistry I Lab	1				
CHEM	450	Physical Chemistry I	3				
CHEM	455	Physical Chem Lab I	1				
		Dragon Core (3, 5, 6, or 7) or Bioscience Elective <sup>4</sup>	3			Y	
Total Credits			14				

SPRING					
CHEM	380	Analytical Chemistry	4		
CHEM	410	Biochemistry II	3		
CHEM	415	Biochemistry II Lab	1		
CHEM	460	Physical Chem II <sup>5</sup>	3		
CHEM	465	Phys Chem Lab II <sup>5</sup>	1		
		Dragon Core (3, 5, 6, or 7) or Bioscience Elective <sup>4</sup>	3		Y
Total Credits			15		

FALL				SENIOR YEAR			
BCBT	475	Biotechniques I	2				
BCBT		Biotechniques Block	2				
BCBT		Biotechniques Block	2				
		Dragon Core (3, 5, 6, or 7) or Bioscience Elective <sup>4</sup>	3			Y	
		Dragon Core (8, 9, or 10)	3			Y	
Total Credits			12				

SPRING					
BCBT	476	Biotechniques II	2		
BCBT		Biotechniques Block	2		
		Dragon Core (8, 9, or 10)	3		Y
		Dragon Core (3, 5, 6, or 7) or Bioscience Elective <sup>4</sup>	3		Y
		Dragon Core (8, 9, or 10)	3		Y
Total Credits			13		

<sup>1</sup> These are standard Dragon Core courses, but others can be taken in their place.

<sup>2</sup> ACS math scores or a mathematics placement exam is needed to inform whether a student should begin directly in calculus, precalculus or a different math class. Math 142 can only be taken by students with an ACT Math Sub Score of 24 or above.

<sup>3</sup> English Composition II (ENGL 201) is strongly recommended.

<sup>4</sup> At least one of the Bioscience electives must be a Physiology course (BIOL 347, 349, or 360). For the other electives, see [http://www.mnstate.edu/biotech/BCBT\\_Advising\\_Guide.pdf](http://www.mnstate.edu/biotech/BCBT_Advising_Guide.pdf)

<sup>5</sup> Molecular and Biophysical Chemistry (BCBT 450) can be taken (Fall) instead of Physical Chemistry II (Chem 460/465). Physical Chemistry 460/465 is normally offered every other year, in the spring of even-numbered years.



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## Curriculum Planning

<b>Dragon Core Checksheet</b>			
<b>Foundation Four</b>			
		Grade	Credits W?
1A	Oral Communication	_____	_____
1B	Written Communication (W) <b>English 102</b>	_____	3 X
2	Critical Thinking	_____	_____
3	Mathematics/Symbolic <b>MATH 102 or 142</b>	_____	3/4
<b>Inner Cluster Electives &amp; Middle Cluster – Competency Areas 3-7, seven courses total</b>			
		Grade	Credits W?
3	Mathematical/Symbolic Systems (optional)	_____	_____
3I or 3M	<b>Calculus I</b>	_____	4
4	Natural Sciences (One Lab Class Required)	_____	_____
4I or 4M	<b>CHEM 150 &amp; Lab</b>	_____	4
4I or 4M	<b>Physics (160 or 20)</b>	_____	4
5	History and the Social Sciences	_____	_____
5I or 5M		_____	_____
5I or 5M		_____	_____
6	Humanities	_____	_____
6I or 6M		_____	_____
6I or 6M		_____	_____
7	Human Diversity	_____	_____
7I or 7M		_____	_____
7I or 7M		_____	_____
<b>Outer Cluster – Competency Areas 8-10, three courses total</b>			
		Grade	Credits W?
8	Global Perspective	_____	_____
9	Ethical and Civic Responsibility	_____	_____
10	People and the Environment	_____	_____
<b>Total Dragon Core Credits:</b>			
<b>(Minimum 14 courses and 42 credits)</b>			
<b>Writing Intensive Requirements</b>			
W 1 (1B)		ENGL 102	_____
W 2 (MC or OC)		BIOL 341	_____
W 3 (MC or OC, 300-400 level)		BIOL 405	_____
W 4 (Major, 300-400 level)		BCBT 475	_____
W 5 (any W 200-400 level, MC/OC)		_____	_____

		When Offered	Credits	Grade
<b>Requirements</b>				
BIOL 111	Cell Biology	S	4	
BIOL 341	Genetics	F	4	
BIOL 385	Molecular Biology	S	3	
BIOL 385L	Molecular Lab	S	1	
CHEM 150	General Chemistry I	F/Sp/Sum	4	
CHEM 210	General Chemistry II	F/Sum	4	
CHEM 300	Inorganic Chem	F	3	
CHEM 350	Organic Chem I	F	3	
CHEM 355	Organic Chem Lab I	F	1	
CHEM 360	Organic Chem II	Sp	3	
CHEM 365	Organic Chem Lab II	Sp	4	
CHEM 380	Analytical Chem	Sp	4	
CHEM 400	Biochemistry I	F	3	
CHEM 405	Biochemistry Lab I	F	1	
CHEM 410	Biochemistry II	Sp	3	
CHEM 415	Biochemistry Lab II	Sp	1	
CHEM 450	Physical Chem I	F	3	
CHEM 455	Physical Chem Lab I	F	1	
BCBT 475	Biotechnology I	Sp	2	
BCBT 476	Biotechnology II	F	2	
MATH 261	Calculus I	F/Sp	4	
MATH 262	Calculus II	F/Sp	4	
PHYS 200	General Physics I	F	4	
PHYS 201	General Physics II	S	4	
<b>Restricted Electives</b>				
BIOL	One Physiology Elective (349, 347, or 360)		4	
BCBT	Three Biotechnology Blocks from 477-483		3 x 2	
BIOL ≥300	One Bioscience Electives from: 115, 323, 305, 321, 345, 347, 348, 349, 350, 360, 365, 372, 402, 430 Physical Chemistry II (CHEM 460) or Molecular and Biophysical Chemistry (BCBT 450)		3-4	