



### BS MBB CURRICULUM

As per BOR Approved last August 2018

FIRST YEAR			
First Semester		Second Semester	
Course No. and Title	Units	Course No. and Title	Units
<b>Math 21</b> Elementary Analysis I <sup>1</sup>	4	<b>Bio 11</b> Fundamentals of Biology I	3
<b>Eng 13</b> Writing as Thinking or	3	<b>Bio 11.1</b> Fundamental of Biology I Laboratory	2
<b>Speech 30</b> Public Speaking and Persuasion	3	<b>Math 22</b> Elementary Analysis II	4
<b>Chem 16</b> General Chemistry	3	<b>Chem 26</b> Analytical Chemistry	3
<b>Chem 16.1</b> General Chemistry Laboratory	2	<b>Chem 26.1</b> Analytical Chemistry Laboratory	2
<b>Geol 11</b> Introduction to Geology	3	<b>Fil 40</b> Wika, Kultura at Lipunan	3
<b>Kas 1</b> Kasaysayan I	3	<b>MBB 10</b> Introduction to Molecular Biology	3
<b>P.E.</b>	(2)	<b>P.E.</b>	(2)
<b>Total Units</b>	<b>18</b>	<b>Total Units</b>	<b>20</b>
Midyear Semester			
		Course No. and Title	Units
		<b>Soc Sci 1</b> Foundations of Social Science	3
		<b>Total Units</b>	<b>3</b>
SECOND YEAR			
First Semester		Second Semester	
Course No. and Title	Units	Course No. and Title	Units
<b>Bio 12</b> Fundamentals of Biology II	3	<b>Physics 72</b> Elementary Physics II	4
<b>Bio 12.1</b> Fundamentals of Biology II Laboratory	2	<b>Physics 72.1</b> Elementary Physics II Laboratory	1
<b>Math 23</b> Elementary Analysis III	4	<b>Chem 40</b> Elementary Biochemistry	3
<b>Chem 31</b> Elementary Organic Chemistry	3	<b>Chem 40.1</b> Elementary Biochemistry Laboratory	2
<b>Chem 31.1</b> Elementary Organic Chemistry Laboratory	2	<b>MBB 110</b> Fundamentals of Molecular Microbiology	5
<b>Physics 71</b> Elementary Physics I	4	<b>MBB 100</b> Introduction to Scientific Writing	3
<b>Physics 71.1</b> Elementary Physics I Laboratory	1	<b>P.E.</b>	(2)
<b>P.E.</b>	(2)	<b>NSTP</b>	(3)
<b>NSTP<sup>2</sup></b>	(3)	<b>Total Units</b>	<b>18</b>
<b>Total Units</b>	<b>19</b>	<b>Total Units</b>	<b>18</b>
Midyear Semester			
		Course No. and Title	Units
		<b>Stat 101</b> Elementary Statistics <sup>3</sup>	3
		<b>Total Units</b>	<b>3</b>

<sup>1</sup>All students required to take Math 21 must have passed any of the following: (1) Pre-Calculus from the STEM or equivalent strand of K-12; (2) the validation examination for Math 20 (Pre-calculus: Functions and their Graphs) administered by the UPD Institute of Mathematics; or (3) Math 20 as a non-credit course.

<sup>2</sup>As a requirement for graduation, all students must take six (6) units in one of the National Service Training Program (NSTP) components: Civil Welfare Training Service (CWTS), Literal Training Service (LTS), and Reserved Officers' Training Corps Military Science (ROTC Mil Sci). These are offered by UPD.

<sup>3</sup>Students who pass the Validation Examination for Stat 101 are considered to have satisfied this course requirement.



THIRD YEAR			
First Semester		Second Semester	
Course No. and Title	Units	Course No. and Title	Units
<b>MBB 140</b> Molecular Genetics	3	<b>MBB 141</b> Principles of Gene Manipulation	5
<b>MBB 126</b> Molecular Physiology of Animal Cells	3	<b>MBB 127</b> Molecular Physiology of Plant Cells	3
<b>MBB 126.1</b> Molecular Physiology of Animal Cells Lab.	2	<b>MBB 127.1</b> Molecular Physiology of Plant Cells Lab.	2
<b>Stat 102</b> General Statistical Methods for Research	3	<b>MBB 194</b> Ethics in Scientific Research	3
<b>MBB 130</b> Molecular Biophysics	5	<b>MBB 150</b> Cellular and Molecular Immunology	3
		<b>MBB 190</b> Intro. to Bioinformatics and Systems Biology	4
Total Units	16	Total Units	20
		Midyear Semester	
		Course No. and Title	Units
		<b>Philo 1</b> Philosophical Analysis II	3
		Total Units	3
FOURTH YEAR			
First Semester		Second Semester	
Course No. and Title	Units	Course No. and Title	Units
<b>MBB 195</b> Biotechnology Enterprise	3	<b>MBB 197</b> Special Topics in MBB	3
<b>MBB 142</b> Genes and Development	5	<b>MBB 195</b> Undergraduate Seminar	1
<b>MBB 180</b> Industrial Biotechnology	5	<b>ARTS 1</b> Critical Perspectives in the Arts	3
<b>PI 100</b> The Life and Works of Jose Rizal	3	<b>STS</b> Science, Technology and Society	3
<b>MBB 200</b> Undergraduate Thesis	2	<b>Soc Sci 2</b> Social, Economic and Political Thought	3
		<b>MBB 200</b> Undergraduate Thesis	2
Total Units	18	Total Units	15

**Total Number of Units = 153**



## LIST OF COURSES

**MBB 10 Introduction to Molecular Biology.** An introduction to the fundamentals of molecular biology and biotechnology. 3 u.

**MBB 100 Introduction to Scientific Writing in Molecular Biology and Biotechnology.** Principles and methods in scientific writing. Prereq: Sophomore standing, COI. 3 h. (2 lec) 3 u.

**MBB 110 Fundamentals of Molecular Microbiology.** Molecular diversity, physiology, and genetics of microorganisms. Prereq: MBB 10, BIO 12, BIO 12.1. 9 h. (3 lec, 6 lab) 5 u.

**MBB 126 Molecular Physiology of Animal Cells.** Internal organization, physiology, and behavior of animal cells *in vitro*. Prereq: MBB 10, BIO 12, BIO 12.1. 3 u.

**MBB 126.1 Molecular Physiology of Animal Cells Laboratory.** Foundational techniques to study the internal organization, physiology, and behavior of animal cells *in vitro*. Prereq: MBB 10, BIO 12, BIO 12.1. 6 h. (6 lab). 2 u.

**MBB 127 Molecular Physiology of Plant Cells.** Internal organization, physiology, and behavior of plant cells *in vitro*. Prereq: MBB 10, BIO 12, BIO 12.1. 3 u.

**MBB 127.1 Molecular Physiology of Plant Cells Laboratory.** Foundational techniques to study the internal organization, physiology, and behavior of plant cells *in vitro*. Prereq: MBB 10, BIO 12, BIO 12.1. 6 h. (6 lab). 2 u.

**MBB 130 Molecular Biophysics.** Characterization of biomolecules and their interactions through structural analysis and computational techniques. Prereq: Math 23, Chem 40. Chem 40.1. 9 h. (3 lec, 6 lab) 5 u.

**MBB 140 Molecular Genetics.** Principles and mechanisms of heredity at the molecular level based on studies of prokaryotic, eukaryotic, and viral systems. Prereq: MBB 10, BIO 12, BIO 12.1, Chem 40, Chem 40.1. 3 u.

**MBB 141 Principles of Gene Manipulation.** Principles of recombinant DNA technology and its applications. Prereq: MBB 140. 9 h. (3 lec, 6 lab) 5 u.

**MBB 142 Genes and Development.** Molecular and genetic mechanisms underlying multicellularity during embryogenesis and formation of the body plan in model organisms. Prereq: MBB 126, MBB 127, MBB 130, MBB 141. 9 h. (3 lec, 6 lab) 5 u.

**MBB 150 Cellular and Molecular Immunology.** Cellular and molecular aspects of the immune response. Prereq: MBB 126, Chem 40, Chem 40.1. 3 u.

**MBB 180 Industrial Biotechnology.** Principles and applications of traditional methods and novel molecular biology techniques in making useful industrial products. Prereq: MBB 110, MBB 126, MBB 127, MBB 141. 9 h. (3 lec, 6 lab) 5 u.

**MBB 190 Introduction to Bioinformatics and Systems Biology.** Basic concepts of systems biology and the application of computational analysis in molecular biology. Prereq: MBB 130, MBB 140. 8 h. (2 lec, 6 lab) 4 u.

**MBB 194 Ethics in Scientific Research.** Discussion of case studies and topics pertaining to social issues and the proper conduct of scientific research relevant to molecular biology. Prereq: Junior standing. 3 u.

**MBB 195 Biotechnology Enterprise.** Fundamentals of biotechnology commercialization and entrepreneurship. Prereq: Senior standing, COI. 3 u.

**MBB 196 Undergraduate Seminar.** Prereq: Senior standing. 1 u.



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**MBB 197 Special Topics in Molecular Biology and Biotechnology.** Current trends and concepts in molecular biology and biotechnology. Prereq: Senior standing. 3 u.

**MBB 200 Undergraduate Thesis.** Prereq: Senior standing. 4 u. (2 u./sem)