

**FISHERIES AND AQUATIC SCIENCES-BS**THIS IS A **GENERAL** CURRICULUM GUIDE AND IS NOT APPLICABLE TO EVERY STUDENT. IT IS IMPORTANT TO MEET WITH YOUR ADVISOR.

Year One			
<b>BIO 121*</b> General Biology II w/lab Prerequisite: MTH 110 (may be taken concurrently)	4 (6)	<b>BIO 120*</b> General Biology I w/lab (GE Life Science) Prerequisites: High school chemistry, CHM 109, or CHM 115 strongly recommended (CHM 109 or 115 may be taken concurrently)	4 (6)
<b>CHM 109</b> Introductory Chemistry (GE Physical Science) <b>OR</b> Prerequisites: MTH 109 or 110 (may be taken concurrently)	4 (6)	<b><sup>1</sup>CHM 127+128</b> Principles of Chemistry II w/lab <b>OR</b> Prerequisites: CHM 125+126 and (MTH 122 or MTH 125 or MTH 201)	5 (7)
<b><sup>1</sup>CHM 125+126</b> Principles of Chemistry I w/lab (GE Physical Science) Prerequisites: High school chemistry and (MTH 110 or MTH 122 or MTH 125 or MTH 201)	4 (6)	<b>CHM 231</b> Introductory Organic Chemistry w/lab Prerequisite: CHM 109 or CHM 116	4 (6)
Gen Ed (GE Art) or <b><sup>2</sup>WRT 120</b> (self-placement)	3	<b>NRM 150</b> Introduction to Natural Resource Conservation	3
Gen Ed (GE Social/Behavioral) <b>OR</b> <b><sup>3</sup>MTH 122</b> College Algebra Prerequisite: MTH 110 or assignment through Grand Valley math placement	3	<b><sup>2</sup>WRT 130 or WRT 150</b> Strategies in Writing (GE Writing)	3-4
<b><sup>4</sup>Elective</b>	1	<b><sup>4</sup>Elective</b> (if needed)	1
<i>*It is strongly recommended that FAS majors take BIO 121 before BIO 120.</i>			
<i>Numbers noted within (parentheses) are contact hours</i>	<i>Total</i>	<i>Total</i>	<i>15-16*</i>
	15		
Year Two			
<b>BIO 215</b> Ecology w/lab ( <i>summer and fall only</i> ) Prerequisites: BIO 121 (CLAS Voyage: Experiential Learning)	4 (6)	<b><sup>5</sup>MTH 125</b> Survey of Calculus Prerequisite: MTH 110; or assignment through math placement	3
<b>NRM 250</b> Natural Resource Measurements & Mapping ( <i>fall with limited winter availability</i> )	3 (5) 3	<b><sup>2</sup>Physical Science Elective w/ lab</b> (CHM 231, CHM 234, GEO 111, PHY 220 or PHY 200)	4-5
<b>STA 215</b> Intro to Applied Statistics (GE Math) Prerequisite: MTH 110 or equivalent	3	Gen Ed (GE Philosophy & Literature (COM 202 recommended))	3
Gen Ed (GE Historical Analysis) or <b><sup>3</sup>MTH 123</b> Trigonometry Prerequisite: MTH 122 or assignment through Grand Valley math placement (MTH 122 may be taken concurrently)	1-3	Gen Ed (GE Social/Behavioral)	3
Gen Ed or <b><sup>4</sup>Elective</b>		<b><sup>4</sup>Elective</b>	1
<i>Total</i>	<i>14-16*</i>	<i>Total</i>	<i>14-15*</i>
Year Three			
<b>BIO 323*</b> Aquatic and Wetland Plants ( <i>fall only</i> ) Prerequisites: BIO 121	3 (5)	<b>BIO 375</b> Genetics and <b>BIO 376</b> Genetics Laboratory BIO 375 Prerequisites: BIO 120 or CMB 155 and 156 BIO 376 Prerequisites: BIO 375 or 355 (either may be taken concurrently) (CLAS Voyage: Experiential Learning)	4 (6)
<b>OR</b> <sup>2/6</sup> Issues Gen Ed-SWS (BIO 338-SWS recommended)	3	<b>BIO 413*</b> Freshwater Algae ( <i>winter only</i> ) Prerequisites: BIO 121 and BIO 215	3 (5)
<b>BIO 451</b> Stream Ecology ( <i>fall even years only</i> ) <b>OR</b> <b>BIO 440</b> Limnology ( <i>fall odd years only</i> ) Prerequisites: BIO 215 or permission of instructor	3 (5) 3 (5)	<b>OR</b> <sup>2/6</sup> Issues Gen Ed-SWS (BIO 338-SWS recommended)	3
<b>BIO 362</b> Biology and Diversity of Fishes ( <i>fall only</i> ) Prerequisites: BIO 215	4 (6)	Fisheries & Aquatic Sciences Elective (see below)	3-4
Gen Ed (GE Global Perspectives)	3	Gen Ed (GE US Diversity) or <b><sup>4</sup>Elective</b>	3
<b><sup>7</sup>NRM 377</b> Project Design & Seminar	1	<b><sup>4</sup>Elective</b>	1-2
<b><sup>4</sup>Elective</b>	1	<i>*Only need one of BIO 323 or BIO 413, not both.</i>	
<i>Total</i>	<i>15</i>	<i>Total</i>	<i>15</i>
Year Four			
<b>BIO 451</b> Stream Ecology ( <i>fall even years only</i> ) <b>OR</b> <b>BIO 440</b> Limnology ( <i>fall odd years only</i> ) Prerequisites: BIO 215 or permission of instructor	3 (5) 3 (5)	<b>BIO 495 SWS</b> Perspectives in Biology (CLAS Voyage: Capstone) Prerequisites: Senior Standing, and either STA 215, MTH 125 or MTH 201 <b>OR</b>	3
Fisheries & Aquatic Sciences Elective (see below)	3-4	<b><sup>2/6</sup>NRM 495 SWS</b> Senior Project & Seminar (CLAS Voyage: Capstone) Prerequisites: Senior Standing, STA 215, NRM 377; NRM 454 or NRM 472	3
Fisheries & Aquatic Sciences Elective (see below)	3-4	<b>BIO 402</b> Aquatic Insects ( <i>winter only</i> ) Prerequisites: BIO 120 and BIO 121	3 (5)
Issues Gen Ed (NRM 451 recommended)	3	Fisheries & Aquatic Sciences Elective (see below, if needed)	3-4
<b><sup>4</sup>Elective</b> (if needed)	1-3	Gen Ed (if needed) or <b><sup>4</sup>Elective</b>	3
		Gen Ed (if needed) or <b><sup>4</sup>Elective</b>	3
<i>Total</i>	<i>15</i>	<i>Total</i>	<i>15-17*</i>

\*The block tuition rate is for 12-15 credits. You will pay additional tuition for any credits over 15 credits.

<sup>1</sup> Students planning to pursue careers in fisheries management, graduate school, or participate in research are advised to take CHM 125+126 and CHM 127+128.

<sup>2</sup> A grade of C or better is required in WRT 130 or 150 and SWS courses in order to satisfy the WRT requirement at GVSU.

<sup>3</sup> MTH 122 is required for CHM 127+128. MTH 122 + 123 are required for PHY 220. **Take the Math Proficiency Tests for MTH 122 and/or 123 online:** [www.gvsu.edu/s/mv](http://www.gvsu.edu/s/mv)

<sup>4</sup> Students must have a **minimum of 120 credits** to graduate with **58 of the 120 credits** being from a senior level institution and the **final 30 of the 120 credits** completed at GVSU. Elective refers to any course that will help meet these requirements.

<sup>5</sup> MTH 201 can be used in place of MTH 125.

<sup>6</sup> Students must complete a total of two courses with an SWS attribute.

<sup>7</sup> NRM 377 is required for NRM 495 and NRM 496/497.

CLAS Voyage Courses	
What is the CLAS Voyage? <a href="https://www.gvsu.edu/clas/clas-voyage-1184.htm">https://www.gvsu.edu/clas/clas-voyage-1184.htm</a> or search "GVSU CLAS Voyage"	
Experiential Learning:	BIO 215 and BIO 376
Capstone:	NRM 495 or BIO 495
General Education Categories fulfilled by the Fisheries & Aquatic Sciences major:	
Life Science and Physical Science: BIO 120 and CHM 109 or CHM 125+126 (all fulfill lab requirement)	
Mathematical Sciences: STA 215	
Philosophy & Literature (recommended): COM 202	
Issues (recommended): BIO 338-SWS* and NRM 451*	

### Fisheries and Aquatic Sciences Electives

**Students must complete at least 12 credits from the options below.**

**Courses marked with a \* need approval of a faculty advisor.**

Students pursuing American Fisheries Society certification should take NRM 405, NRM 451, and NRM 472. Students interested in aquatic sciences are recommended to select at least 1 genetics course (BIO 475 or BIO 485) and NRM 454. Students interested in marine biology are advised to take BIO 232, BIO 370, GEO 430, and a field course in Marine studies.

BIO 210 – Evolutionary Biology (3)

Prerequisites: BIO 120 and BIO 121

<sup>wo</sup> BIO 232 – Natural History of Invertebrates (3) w/ lab

Prerequisites: BIO 121

<sup>F</sup> BIO 323 – Aquatic and Wetland Plants (3) w/ lab

Prerequisites: BIO 121

<sup>F</sup> BIO 370 – Marine Biology (3)

Prerequisites: BIO 121 and BIO 215

<sup>W</sup> BIO 413 – Freshwater Algae (3) w/ lab (if not taken for major)

Prerequisites: BIO 121 and BIO 215

BIO 417 – International Field Biology (1-4)\*

Prerequisites: Variable and with permission of instructor

BIO 418 – Regional Field Biology (1-4)

Prerequisites: Variable and with permission of instructor

BIO 470 – Conservation Biology (3)

Prerequisites: BIO 215

<sup>FE</sup> BIO 475 – Population Genetics (3)

Prerequisites: BIO 210 and (either BIO 355 or BIO 375), or by permission

<sup>W</sup> BIO 485 – Molecular Ecology (3) w/ lab

Prerequisites: BIO 375

CHM 221 – Survey of Analytical Chemistry (4) w/ lab

Prerequisites: CHM 127+128 or one full year of general chemistry

<sup>FE</sup> GEO 430 – Oceanography (3) w/ lab

Prerequisites: GEO 112

<sup>W</sup> NRM 405 – GIS Applications in Natural Resources (3) w/ lab

Prerequisites: GPY 307 or NRM 250

NRM 451 – Natural Resource Policy (3)

Prerequisites: Junior standing and completion of Foundations - Natural Sciences; or permission of instructor. Fulfills one Issues requirement.

<sup>F</sup> NRM 454 – Watershed and Wetland Management (4) w/ lab

Prerequisites: MTH 122, NRM 250

<sup>wo</sup> NRM 472 – Fisheries Management (3) w/ lab

Prerequisites: BIO 362 and STA 215

<sup>F</sup> Offered in Fall

<sup>W</sup> Offered in Winter

<sup>SS</sup> Offered in Spring/Summer

<sup>E</sup> Offered in Even years only

<sup>O</sup> Offered in Odd years only

### Physical Science Electives

Must complete one of the following sequences:

- CHM 109 and CHM 231 and one of CHM 234, GEO 111, PHY 220 or PHY 200
- CHM 125+126 and CHM 127+128 and CHM 231

Be active in relevant student clubs, such as the Soil & Water Conservation and Wildlife Clubs. Visit [gvsu.campuslabs.com/engage](http://gvsu.campuslabs.com/engage) to learn more. More information about the American Fisheries Society certification can be found here, <https://fisheries.org/membership/afs-certification/>. Consult your faculty advisor for more information.

**It is imperative to meet with your faculty advisor and an advisor in the CLAS Academic Advising Center regularly.**

The CLAS Academic Advising Center is located in C-1-120 MAK, 616-331-8585. To schedule an appointment with an advisor in the CLAS Academic Advising Center, visit [www.gvsu.edu/clasadvising](http://www.gvsu.edu/clasadvising) and click on "Schedule Appointment."