

OCEANOGRAPHY - 5-YEAR BACHELOR OF SCIENCE AND MASTER OF OCEAN AND SCIENCE TECHNOLOGY

Program Requirements

First Year

		Semester Credit Hours
Fall		
CHEM 119	Fundamentals of Chemistry I	4
ENGL 104	Composition and Rhetoric	3
MATH 151	Engineering Mathematics I ¹	4
OCNG 101	Succeeding in Oceanography	1
OCNG 251 & OCNG 252	The Blue Planet - Our Oceans and The Blue Planet - Our Oceans Laboratory	4
Semester Credit Hours		16

Spring

BIOL 111	Introductory Biology I	4
CHEM 120	Fundamentals of Chemistry II	4
MATH 152	Engineering Mathematics II ¹	4
American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history)		3
Semester Credit Hours		15

Second Year

		Semester Credit Hours
Fall		
BIOL 112	Introductory Biology II	4
OCNG 203	Communicating Oceanography	3
PHYS 206 & PHYS 226	Newtonian Mechanics for Engineering and Science and Physics of Motion Laboratory for the Sciences	4
STAT 211	Principles of Statistics I	3
Creative arts (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts)		3
Semester Credit Hours		17

Spring

COMM 203 or COMM 205	Public Speaking or Communication for Technical Professions	3
OCNG 330	Geological Oceanography	3
PHYS 207 & PHYS 227	Electricity and Magnetism for Engineering and Science and Electricity and Magnetism Laboratory for the Sciences	4
American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history)		3

Theme requirement ^{2,3}	3-4	
Semester Credit Hours		16

Third Year

		Semester Credit Hours
Fall		
OCNG 456 or OCNG 469	MATLAB Programming for Ocean Sciences ⁴ or Python for Geosciences	3
OCNG 470	Data Analysis Methods in Geosciences	4
Government/Political science (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science)		3
Theme requirement ^{2,3}		3-4
Theme elective ^{2,5}		2-3
Semester Credit Hours		16

Spring

OCNG 303	Professional Communication in Oceanography	3
OCNG 320	Biological Oceanography	3
OCNG 340	Chemical Oceanography	3
OCNG 443	Oceanographic Field and Laboratory Methods	3
Theme elective ²		3
Semester Credit Hours		15

Fourth Year

		Semester Credit Hours
Fall		
OCNG 608	Physical Oceanography ⁶	3
OCNG 655	Experimental Design and Analysis in Oceanography	3
Government/Political science (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science)		3
Social and behavioral sciences (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences)		3
Theme elective ^{2,5}		2-3
Semester Credit Hours		15

Spring

OCNG 657	Data Methods and Graphical Representation in Oceanography	3
Select one of the following:		3
OCNG 620	Biological Oceanography	3
OCNG 630	Geological Oceanography	3
OCNG 640	Chemical Oceanography	3
Language, philosophy and culture (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture)		3
Technical elective ⁷		4
Theme elective ²		3
Semester Credit Hours		16

Fifth Year

Fall		
OCNG 604	Ocean Observing Systems	3

OCNG 656 or OCNG 669	MATLAB Programming for Ocean Sciences ⁴ or Python for Geosciences	3
	Advanced specialized OCNG graduate course	3
	Advanced specialized OCNG graduate course	3
Semester Credit Hours		12
Spring		
OCNG 603	Communicating Ocean Science	3
OCNG 661	Advanced Oceanographic Data Analysis and Communication ⁶	3
	Advanced specialized OCNG graduate course	3
	Advanced specialized OCNG graduate course	3
Semester Credit Hours		12
Total Semester Credit Hours		150

¹ A grade of C or better is required.

² Select one of the following tracks: Marine Ecological Processes, Marine Chemistry and Geochemistry, Ocean Climate, Ocean Observing Science and Technology

³ If Marine Chemistry and Geochemistry track is chosen, this will be 4 credits instead of 3 credits

⁴ Students will not be permitted to receive credit for both the 400- and 600-level versions of certain courses because the content and learning outcomes are too similar (OCNG 404/OCNG 604; OCNG 470/OCNG 655)

⁵ If Marine Chemistry & Geochemistry track is chosen, this will be 2 credits instead of 3 credits.

⁶ Applied toward both the Bachelor of Science in Oceanography and the Master of Ocean Science and Technology.

⁷ Select from ATMO 201, ATMO 203, ATMO 251, ATMO 300-499 (<http://catalog.tamu.edu/undergraduate/course-descriptions/atmo/>); BIOL 213, BIOL 214, BIOL 300-399 (<http://catalog.tamu.edu/undergraduate/course-descriptions/biol/>); BICH 300-499 (<http://catalog.tamu.edu/undergraduate/course-descriptions/bich/>); CHEM 300-499 (<http://catalog.tamu.edu/undergraduate/course-descriptions/chem/>); CVEN 221; GENE 300-499 (<http://catalog.tamu.edu/undergraduate/course-descriptions/gene/>); GEOG 442/GEOL 442, GEOG 361, GEOG 370/MARS 370, GEOG 390; GEOS 442; MATH 251; MATH 300-499 (<http://catalog.tamu.edu/undergraduate/course-descriptions/math/>); PHYS 221; PHYS 300-499 (<http://catalog.tamu.edu/undergraduate/course-descriptions/phys/>); OCEN 300-499 (<http://catalog.tamu.edu/undergraduate/course-descriptions/oceng/>); STAT 212, STAT 400-499 (<http://catalog.tamu.edu/undergraduate/course-descriptions/stat/>).

Any of the required courses may be taken during the Summer Sessions to diminish the heavy semester loads during Years 2 and 3.

The program includes a total of 156 hours with 6 hours being applied toward both the Bachelor of Science in Oceanography and the Master of Ocean Science and Technology.

Code	Title	Semester Credit Hours
Marine Ecosystem Processes Theme		
BIOL 214	Genes, Ecology and Evolution	3
BIOL 357	Ecology	3
Select 12 hours from the following:		12
BIOL 213	Molecular Cell Biology	

BIOL 335	Invertebrate Zoology	
BIOL 351	Fundamentals of Microbiology	
BIOL 440	Marine Biology	
BIOL 451	Bioinformatics	
CHEM 383	Chemistry of Environmental Pollution	
GEOG 410/ OCNG 412	Global Change	
GENE 302	Principles of Genetics	
OCNG 350	Marine Pollution	
OCNG 411	Global Oceanography	
OCNG 425	Microbial Oceanography	
OCNG 453	Hydrothermal Vents and Mid-Ocean Ridges	
OCNG 456	MATLAB Programming for Ocean Sciences	
OCNG 469	Python for Geosciences	
OCNG 491	Research (limit to 3 credits)	

Total Semester Credit Hours 18

Code	Title	Semester Credit Hours
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Marine Chemistry and Geochemistry Theme

Select 4 hours from the following: 4

CHEM 227 Organic Chemistry I & CHEM 237and Organic Chemistry Laboratory

CHEM 257 Organic Chemistry I - Structure and Function

Select 4 hours from the following: 4

CHEM 228 Organic Chemistry II & CHEM 237and Organic Chemistry Laboratory

CHEM 258 Organic Chemistry II - Reactivity and Applications

Select 10 hours from the following: 10

ATMO 363 Introduction to Atmospheric Chemistry and Air Pollution

CHEM 315 Fundamentals of Quantitative Analysis

CHEM 362 Descriptive Inorganic Chemistry

CHEM 383 Chemistry of Environmental Pollution

CHEM 415 Analytical Chemistry

CHEM 483 Green Chemistry

GEOG 443/ GEOL 443 Global Biogeochemical Cycles

GEOL 451 Introduction to Geochemistry

OCNG 350 Marine Pollution

OCNG 411 Global Oceanography

OCNG 425 Microbial Oceanography

OCNG 453 Hydrothermal Vents and Mid-Ocean Ridges

OCNG 456 MATLAB Programming for Ocean Sciences

OCNG 469 Python for Geosciences

OCNG 491 Research (limit to 3 credits)

Total Semester Credit Hours 18

Code	Title	Semester Credit Hours
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Ocean Climate Theme

MATH 251	Engineering Mathematics III	3
MATH 308	Differential Equations	3
Select 12 hours from the following:		12
ATMO 201	Weather and Climate	
ATMO 203	Weather Forecasting Laboratory	
ATMO 210	Climate Change	
ATMO 324	Physical and Regional Climatology	
ATMO 441	Satellite Meteorology and Remote Sensing	
GEOG 442/ GEOL 442	Past Climates	
MATH 304	Linear Algebra	
OCNG 411	Global Oceanography	
OCNG 451	Mathematical Modeling of Ocean Climate	
OCNG 456	MATLAB Programming for Ocean Sciences	
OCNG 469	Python for Geosciences	
OCNG 491	Research (limit to 3 credits)	
PHYS 221	Optics and Thermal Physics	
STAT 212	Principles of Statistics II	

Total Semester Credit Hours 18

Code	Title	Semester Credit Hours
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Ocean Observing Science and Technology Theme

STAT 212	Principles of Statistics II	3
OCNG 404	Ocean Observing Systems	3
Select 12 hours from the following:		12
ATMO 201	Weather and Climate	
ATMO 203	Weather Forecasting Laboratory	
ATMO 251	Weather Observation and Analysis	
GEOG 361	Remote Sensing in Geosciences	
OCNG 350	Marine Pollution	
OCNG 411	Global Oceanography	
OCNG 456	MATLAB Programming for Ocean Sciences	
OCNG 469	Python for Geosciences	
OCNG 491	Research (limit to 3 credits)	
STAT 407	Principles of Sample Surveys	

Total Semester Credit Hours 18