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

The Department of Oceanography offers a 5-year combination degree program that allows a Bachelor of Science in Oceanography major to enter the Master of Ocean Science and Technology at the start of their senior year (typically year four) at Texas A&M University. This enables students to receive their Oceanography undergraduate degree (BS) and a Master of Ocean Science and Technology (MOST) graduate degree in five years.

The BS in Oceanography curriculum: 1) Provides students with an interdisciplinary understanding of the oceans and the processes affecting them for use in careers in marine science or other related fields; 2) Provides students with the skills to retrieve, evaluate, and analyze large oceanographic datasets such as those generated from long term oceanographic studies and observing systems; and 3) Emphasizes critical thinking and problem solving skills.

The BS in Oceanography has four themes: Ocean Observing Science and Technology (OOST), Ocean Climate (OC), Marine Ecosystems Processes (MEP) and Marine Chemistry and Geochemistry (MCG). All four themes share common requirements but allow for specialization depending on a student's interest. The OOST theme provides more emphasis in statistics and ocean observing systems; all students will gain skill in handling, evaluating and analyzing large datasets. The OC theme provides more emphasis in advanced math skills that can be applied to understanding ocean climate interactions; all students will gain skill in handling, evaluating and analyzing large datasets. The MEP theme provides more emphasis in biological and ecological processes; all students will gain skill in understanding and applying a biological framework to understanding the ocean. The MCG theme provides more emphasis on marine chemistry and geochemistry; all students will gain skill in understanding and applying a chemical and geochemical framework to understanding the ocean.

The Master of Ocean Science and Technology (MOST) is a non-thesis degree. It provides students with education and training from scientists who are active researchers and educators working at the cutting edge of ocean sciences throughout the global ocean, from the Gulf of Mexico to the waters around Antarctica.

The curriculum is designed to: 1) Provide students with a basic understanding of the major concepts in oceanography that can be applied in their Ocean Sciences careers, 2) Provide students with the skills and tools to evaluate and analyze data, particularly large datasets of the type generated by ocean observing systems, and 3) Facilitate critical thinking and problem solving.

Many graduates will obtain jobs in in a variety of fields including marine technical support, energy and transportation industries, insurance industries, hazard mitigation, marine operations, homeland security, oil spill response, etc.

For additional information, please visit https://ocean.tamu.edu/.

Program Requirements

First Year		
Fall		**Semester Credit Hours**
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		
Fall		
BIOL 112	Introductory Biology II	4
OCNG 203	Communicating Oceanography	1
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	**15**
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		
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		
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
Technical elective [7]		3
Theme elective [2,5]		2-3
	Semester Credit Hours	**18**
Spring		
OCNG 657	Data Methods and Graphical Representation in Oceanography	3
Select one of the following:		3
OCNG 620	Biological Oceanography	
OCNG 630	Geological Oceanography	
OCNG 640	Chemical Oceanography	
Language, philosophy and culture (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture)		3
Technical elective [7]		3
Theme elective [2]		3
	Semester Credit Hours	**15**
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/GEOS 442, GEOG 361, GEOG 370/MARS 370, GEOG 390; GEOS 442/GEOG 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/ocen/); OCNG 400-499 (http://catalog.tamu.edu/undergraduate/course-descriptions/ocng/); 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	
GEOS 410	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)	
RWFM 417	Biology of Fishes	
WFSC 425	Marine Fisheries	
Total Semester Credit Hours		**18**

Code	Title	Semester Credit Hours
Marine Chemistry and Geochemistry Theme		
CHEM 227 & CHEM 237	Organic Chemistry I and Organic Chemistry Laboratory	4
CHEM 228 & CHEM 238	Organic Chemistry II and Organic Chemistry Laboratory	4
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	
GEOS 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
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/ GEOS 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
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**