

OCEANOGRAPHY - 5-YEAR BACHELOR OF SCIENCE AND MASTER OF GEOSCIENCE IN GEOSCIENCE

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 Geoscience 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 Geoscience (MGSc) 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 Geoscience (MGSc) is a non-thesis degree. It provides students opportunities to study a broad range of environmental, energy and geoscience topics. The graduate portion of this 5-year program also includes some online (distance education) courses and prepares graduates to drive innovation and apply modern technologies to careers in nonprofit, government, or business sectors. Students admitted to this program are housed in a home department (e.g. the Oceanography department) but may receive advising from across the College. All documents submitted to the Graduate and Professional School must be signed by the student's department head in their designated home department.

Application and Eligibility

- Applications to the combined program will be submitted by June 15, after the completion of the student's junior year, after 90 hours of coursework are completed. Applications submitted after that time will be evaluated on a case-by-case basis.
- The graduate director of the department of oceanography will serve as the faculty advisor. Students may seek additional mentors, but a formal committee is not required.

- The bachelor's and master's degrees will be conferred concurrently after completion of 150 hours, and successful completion of the final project and final exam.
- Students not admitted to or wishing to discontinue the graduate portion of the 5-year program will earn their Bachelor of Science degree in Oceanography after successfully completing 120 hours of coursework.

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

Program Requirements

First Year		Semester Credit Hours
Fall		
CHEM 119	Fundamentals of Chemistry I	4
ENGL 104	Composition and Rhetoric	3
GEOS 101	Introduction to the Geosciences	1
MATH 151	Engineering Mathematics I ¹	4
OCNG 251 & OCNG 252	Oceanography and Oceanography 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	
GEOS 470 Data Analysis Methods in Geosciences	4
OCNG 310 Physical Oceanography	3
OCNG 456 MATLAB Programming for Ocean Sciences or OCNG 469 ⁴ or Python for Geosciences	3
Government/Political science (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science)	3
Theme requirement ^{2,3}	3-4
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	
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
Oceanography graduate elective ⁷	6
Technical elective ⁵	3
Theme elective ^{2,6}	2-3
Semester Credit Hours	18
Spring	
Select two of the following:	6
OCNG 608 Physical Oceanography	
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 ⁵	3
Theme elective ²	3
Semester Credit Hours	15
Fifth Year	
Fall	
Geoscience graduate elective ⁸	9
Oceanography graduate elective ⁷	3
Semester Credit Hours	12
Spring	
GEOS 676 Capstone Experience ⁹	6

Geoscience graduate elective ⁸	3
Oceanography graduate elective ⁷	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 & Geochemistry, Ocean Climate, Ocean Observing Science and Technology

³ If Marine Chemistry & 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.

⁵ 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 444; 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/>).

⁶ If Marine Chemistry & Geochemistry track is chosen, this will be 2 credits instead of 3 credits.

⁷ Select from OCNG 600-689 (<http://catalog.tamu.edu/graduate/course-descriptions/ocng/>).

⁸ Select from ATMO 600-689 (<http://catalog.tamu.edu/graduate/course-descriptions/atmo/>), GEOG 600-689 (<http://catalog.tamu.edu/graduate/course-descriptions/geog/>), GEOL 600-689 (<http://catalog.tamu.edu/graduate/course-descriptions/geol/>), GEOS 600-689 (<http://catalog.tamu.edu/graduate/course-descriptions/geos/>), OCNG 600-689 (<http://catalog.tamu.edu/graduate/course-descriptions/ocng/>).

⁹ Applied toward both the Bachelor of Science in Oceanography and the Master of Geoscience.

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

Code	Title	Semester Credit Hours
Marine Ecosystem Processes Theme		
BIOL 214	Genes, Ecology and Evolution	3
BIOL 357	Ecology	3
Select 9 hours from the following:		
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
GENE 302	Principles of Genetics
GEOS 410	Global Change
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	15

ATMO 441	Satellite Meteorology and Remote Sensing
GEOG 442/	Past Climates
GEOS 442	
GEOS 210	Climate Change
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	15

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 7 hours from the following:		7
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		15

Code	Title	Semester Credit Hours
Ocean Observing Science and Technology Theme		
OCNG 404	Ocean Observing Systems	3
STAT 212	Principles of Statistics II	3
Select 9 hours from the following:		9
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		15

A maximum of 15 hours of graduate courses can be taken online, which is less than 50% of the required graduate degree hours.

The program includes a total of 156 hours, which up to 6 hours may be applied toward both the Bachelor of Science in Oceanography and the Master of Geoscience in Geoscience face-to-face program.

Code	Title	Semester Credit Hours
Ocean Climate Theme		
MATH 251	Engineering Mathematics III	3
MATH 308	Differential Equations	3
Select 9 hours from the following:		9
ATMO 201	Weather and Climate	
ATMO 203	Weather Forecasting Laboratory	
ATMO 324	Physical and Regional Climatology	