**OCNG - OCEANOGRAPHY (OCNG)**

**OCNG 203 Communicating Oceanography**  
Credit 1. 2 Lab Hours.  
Learn and practice basic writing skills for ocean science; basic background on the research being conducted in the Department of Oceanography through seminars given by Oceanography graduate students.  
**Prerequisites:** OCNG 251; majors in oceanography.

**OCNG 251 Oceanography**  
Credits 3. 3 Lecture Hours.  
(GEOL 1345, GEOL 1445*) Oceanography. Overview of the ocean environment; interrelation of the subdisciplines of ocean sciences; importance of the oceans to human beings; human impact on the oceans; also taught at Galveston campus.

**OCNG 252 Oceanography Laboratory**  
Credit 1. 2 Lab Hours.  
(GEOL 1145, GEOL 1445*) Oceanography Laboratory. Hands-on laboratory experiments and exercises demonstrating principles of ocean sciences; emphasis on the unique interdisciplinary nature of the ocean and current ocean issues relevant to today's society. Honors sections and contracts are also available; also taught at Galveston campus.

**OCNG 281 Seminar**  
Credit 1. 1 Other Hour.  
Basic background on the research being conducted in the Department of Oceanography through seminars given by Oceanography graduate student; basic writing skills for ocean science through instruction and assignments during the semester.  
**Prerequisites:** OCNG 251; OCNG 252; or approval of instructor.

**OCNG 291 Research**  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in oceanography. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
**Prerequisites:** Freshman or sophomore classification and approval of instructor.

**OCNG 303 Professional Communication in Oceanography**  
Credits 3. 3 Lecture Hours.  
Exploration of the fundamental skills required for effective communication of various forms of writing and for oral presentations of various lengths and purposes; addresses preparation for various ocean science-related careers.  
**Prerequisite:** OCNG 203; COMM 203 or COMM 205, junior or senior classification or approval of instructor.

**OCNG 310 Physical Oceanography**  
Credits 3. 3 Lecture Hours.  
Elements of the physics of the sea; descriptive aspects as well as cause and effect relations in respect to currents, thermal structure and waves. Intended for majors in the physical sciences or engineering.  
**Prerequisites:** MATH 152; junior or senior classification.

**OCNG 320 Biological Oceanography**  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Biological aspects of the marine environment; marine organisms; productivity of the sea; marine pollution and fouling; use of the sea.  
**Prerequisites:** OCNG 251, BIOL 112, and junior or senior classification; or permission of instructor.

**OCNG 330 Geological Oceanography**  
Credits 3. 3 Lecture Hours.  
History of Oceanography; physiographic provinces of the oceans, their origins and sediments; geological sampling techniques and geophysical methods; coasts and beaches; paleoceanography; global tectonics.  
**Prerequisites:** OCNG 251, GEOL 101 or GEOG 203, or approval of instructor.

**OCNG 340 Chemical Oceanography**  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Chemical aspects of the marine environment; biogeochemical cycles of organic and inorganic constituents; primary productivity, the carbon dioxide system, nutrient cycles, stable and radioactive isotopes in the sea.  
**Prerequisites:** CHEM 120 and OCNG 251.

**OCNG 350 Marine Pollution**  
Credits 3. 3 Lecture Hours.  
Sources and fates of marine pollutants; types of pollutants including plastics, oil and sound; impact of pollution on society.  
**Prerequisite:** Junior or senior classification or approval of instructor.

**OCNG 404 Ocean Observing Systems**  
Credits 3. 3 Lecture Hours.  
Investigate the rationale behind ocean observing systems; familiarize with the relevant social, scientific design, technology and policy issues associated with observing systems.  
**Prerequisite:** OCNG 251 or approval of instructor.

**OCNG 411 Global Oceanography**  
Credits 3. 3 Lecture Hours.  
The ocean's large-scale circulation and water mass structure based on the interpretation of modern observations; emphasis on the ocean's role in global climate and physical-chemical property fluxes in basin to global scale budgets.  
**Prerequisite:** OCNG 251.

**OCNG 425 Microbial Oceanography**  
Credits 3. 3 Lecture Hours.  
Diversity and ecology of microorganisms in the ocean; role in the Earth system both in the contemporary ocean and the geological past.  
**Prerequisites:** Junior or senior classification, OCNG 251, or approval of instructor.

**OCNG 443 Oceanographic Field and Laboratory Methods**  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Development of skills needed to collect, prepare and analyze oceanographic samples; perform data analysis, interpretation and reporting for common oceanographic analyses.  
**Prerequisite:** OCNG 251 and CHEM 120; junior or senior classification or approval of instructor.

**OCNG 451 Mathematical Modeling of Ocean Climate**  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Problem-based course in theoretical and computer techniques applied to mathematical solutions of ocean climate, including ocean circulation, climate variability, El Niño.  
**Prerequisite:** MATH 308.
OCNG 453 Hydrothermal Vents and Mid-Ocean Ridges
Credits 3. 3 Lecture Hours.
Exploration of the creation of various types of hydrothermal fluids, the associated chemical behavior of vent and plume fluids, and the ecology of hydrothermal vent systems; emphasis on the interdependence of the geological, chemical, and biological aspects of hydrothermal systems.
Prerequisite: OCNG 251; BIOL 112; CHEM 120; junior or senior classification or approval of instructor.

OCNG 456 MATLAB Programming for Ocean Sciences
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Computation techniques for oceanographic data processing using MATLAB; focus on the analysis of oceanographic-related data sets and real-world oceanographic applications; analyze individual data sets.
Prerequisite: Junior or senior classification or approval of the instructor.

OCNG 461 Advanced Oceanographic Data Analysis and Communication
Credits 3. 3 Lecture Hours.
Project design and planning for oceanographers; oceanographic data organization and analysis; synthesis and interpretation of data analysis; technical report writing and presentation.
Prerequisite: OCNG 203; OCNG 310; OCNG 456 or 469; GEOS 470; or approval of instructor.

OCNG 469 Python for Geosciences
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Core language Python programming, scientific programming analysis methods, analysis of large geophysical data sets, plotting geophysical data, interpolation.
Prerequisite: Junior or senior classification.

OCNG 481 Seminar
Credit 1. 1 Lecture Hour.
Analysis, review and critique of current research themes in oceanography based on reading assignments and seminar presentations. May be taken four times for credit.
Prerequisite: Junior or senior classification.

OCNG 484 Internship
Credits 0 to 3. 0 to 3 Lecture Hours. 0 to 3 Other Hours.
Directed internship in a private firm, government agency or non-governmental organization to provide work experience related to the student’s degree program and career objectives. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: OCNG major or approval of instructor.

OCNG 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special reading assignments, problems and discussion on oceanographic topics of mutual interest to student and instructor.
Prerequisites: OCNG 251 or approval of instructor. An honors section is also available.

OCNG 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of oceanography. May be taken two times for credit.
Prerequisite: OCNG 251 or approval of instructor. An honors section is also available.

OCNG 491 Research
Credits 0 to 9. 0 to 9 Other Hours.
Research conducted under the direction of faculty member in oceanography. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Honors section also available. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Junior or senior classification and approval of instructor.