

General Studies Gold Request Form

Consult the [General Studies Request FAQ](#) for more information and quick answers.

New permanent numbered courses must be submitted to the workflow in [Kuali CM](#) before a General Studies request is submitted here. The General Studies Council will not review requests ahead of a new course proposal being reviewed by the Senate.

Submission Information

College/School

College of Global Futures (CGF)

Department/School

School of Ocean Futures (CSOF)

Submission Type

New Request

Requested Effective Date

Fall 2024

ASU Request

Is this request for a permanent course or a topic?

Topic

Subject Code

SEA

Course Number

394

Units/Credit Hours

3

Topic Information

If your request is approved:

1. Topics on [omnibus courses](#) only carry designations for three consecutive semesters (excluding summer), *whether or not they are scheduled*. Once expired, a new request must be submitted.
2. Topics on **permanent courses** require mandatory review every five years.

Topic Title

Digital Blue Planet

List all other courses where this topic exists and the sections will be combined in the schedule.

Topic Description

This course is intended for junior and senior undergraduate students, covering the foundation of data access, data analysis, data visualization and entry-level coding for coastal and marine science. The curriculum will introduce the theory, data format, data type, analysis methods, vector and raster oceanic data to conduct research and applications. Lectures offer a comprehensive introduction to data knowledge for the coastal regions, ocean, and land-water-air interface. Labs take students through the real-world mapping and analysis cases (e.g., ocean SST, coastal water conditions, Allen Coral Atlas, etc.) of coastal and marine exploration. Project work will be carried out in a group (2-4

students). Recommended background: SOS 101: Introduction to Applied Mathematics for the Life and Social Sciences OR STP 231: Statistics for Life Science OR SOS 211: Calculus and Probability for the Life and Social Sciences OR College level math course.

If this course or topic already carries a General Studies Gold designation, please check this box.

General Studies Gold Designation Request

Requested Designation

Quantitative Reasoning (QTRS)

Attach a representative syllabus for the course, including course learning outcomes and descriptions of assignments and assessments.

[Digital Blue Planet Syllabus 2024 v1.docx](#)

Quantitative Reasoning (QTRS)

Quantitative and computational reasoning is essential for success in 21st-century careers, for critically evaluating information in the age of "big data," for assessing the quality of arguments conveyed through digital media, for informed participation in community and social life, and for contributing to the formulation of effective solutions for achieving a sustainable and just future. Quantitative reasoning enables students to apply relevant mathematical, statistical, computational, and visualization methods in academic, social and personal settings.

In a quantitative reasoning course, students learn about data, data management, data summaries, data visualization, and the use of computational tools with data. Data can take many forms, including numerical data, textual data, images, and others. Students also learn about how quantitative reasoning can be used to make arguments clear, precise and verifiable. Finally, they learn to build quantitative models, make predictions, and communicate their findings based on available data. This may include some combination of mathematical, statistical, computational or network models, or visualizations.

Instructions: In the fields below, state the assignment, project, or assessment that will measure each learning outcome, and provide a description. The description should provide enough detail to show how it measures the learning outcome. If needed, more than one can be identified.

The proposal does not need to include all course assessments that measure a given learning outcome. The provided assessment should include sufficient detail to allow the subcommittee to make their evaluation. When appropriate, the same assessment can be listed for more than one learning outcome (e.g., a culminating project).

You may provide links to a document (Google Drive or Dropbox) that includes the relevant details for the assessment. **Do not provide links to Canvas shells.**

QTRS Learning Outcome 1: Understand variables, measurement and data, including how they can be used to pose and answer questions about society and nature, and to manipulate, organize, classify and visualize quantitative data.

Assignment 1. Analysis of oceanic data from shipborne and autonomous platforms. In this assignment, you will understand basic oceanic data from Bermuda Atlantic Time-series Study (BATS) and Argo float project. You will explore, download, and visualize time series oceanic data and analyze how the patterns and trends illustrate the changes of the ocean (e.g., salinity and temperature).

Assignment 6. A.I. for oceanic data. In this assignment, you will learn how to better utilize ChatGPT in oceanic data analysis, download, and basic coding assistance. You will gain the ability to improve your research and data analysis efficacy by using the A.I. tool.

QTRS Learning Outcome 2: Evaluate arguments from everyday life or academic fields of study that are represented mathematically, statistically, computationally, or in visualizations.

Assignment 2. Coastal spatial data analysis. In this assignment, you will apply coastal spatial data analysis skills to plan a marine protection area. You will understand how to use statistical analysis and spatial data visualization to make decisions.

Assignment 4. Google Earth Engine APP design. In this assignment, you will learn how to build a public available web-based sharing tool, the Google Earth Engine APP. You will understand cloud-computing, cloud storage and cloud data publication to a very broad community.

QTRS Learning Outcome 3: Formulate hypotheses, mathematical models or narratives that are consistent with quantitative data.

Assignment 3. Open ocean satellite monitoring. In this assignment, you will explore, download, and analyze ocean satellite monitoring maps from NOAA. You will understand how physical modeling could be applied to generate major ocean health indexes, including chlorophyll values and ocean turbidity.

Mid-Term Exam: The mid-term exam will consist of short answer and/or essay questions, but will not contain multiple choice questions. The mid-term exam will consist of material covered in class including class lectures, and labs. This exam has a focus on oceanic data, models, and platforms.

QTRS Learning Outcome 4: Communicate how quantitative data, interpretations, or models are connected to outcomes, predictions, decisions, explanations, or future states.

Assignment 5. Global scale marine analysis. In this assignment, you will learn how to use modern web-based platforms to search, download, and analyze coral reefs and fishing data at a global scale. You will understand how web-based quantitative data could be utilized to formulate hypotheses to lead marine conservation plans.

Final Project: The final project can be done in a group (2-4 people). You need to finish a final project using public coastal and marine datasets. Students need to use the coastal and marine data analysis skills learned from this class to address how the data from oceanic observations and modeling could 1) guide marine conservation plans, or 2) predict future coastal and marine environmental changes, or 3) explain the past coastal and marine environmental patterns, as a case study.

QTRS Learning Outcome 5: Employ one or more digital tools effectively to accomplish these outcomes.

Throughout the assignments and labs, multiple digital tools will be introduced including, QGIS, Google Earth Engine, Web-based digital platforms, and ChatGPT.

List all course-specific learning outcomes. Where appropriate, identify the associated QTRS learning outcome(s) in brackets (see below for example). Note: It is expected that a majority of course-specific learning outcomes will be associated with a QTRS learning outcome.

Learning Outcomes

Students completing course Digital blue planet will be able to:

1. Identify, access, analyze oceanic shipborne and auto platform databases to analyze historical patterns and changes. **QTRS LO1**
2. Identify, access, and analyze oceanic spatial databases using open-source software QGIS. Conduct spatial analysis, spatial visualization using public datasets. **QTRS LO2**
3. Identify, access, and analyze oceanic satellite products and images from NOAA and NASA. Conduct analysis and visualization of raster results using QGIS. **QTRS LO3**
4. Access, and analysis coastal shallow ecosystem information from the Allen Coral Atlas project. Conduct analysis and mapping of shallow coral reefs environments. **QTRS LO4**
5. Be familiar with A.I. tools in oceanic research. Apply ChatGPT in research backgrounds survey and analysis. **QTRS LO5**
6. Be familiar with the Google Earth Engine, building a Google Earth Engine APP to share research outcomes. **QTRS LO3**
7. Understand data roles in coastal and marine research. Design and conduct data analysis research to guide real-world marine and coastal protection and management. **QTRS LO4**

Form Submission - Proposer

Submitted for Approval | Proposer

Laura Zafirakis - April 10, 2024 at 8:11 PM (America/Phoenix)

Department Approval

Approved

Susanne Neuer - April 11, 2024 at 12:23 AM (America/Phoenix)

GSC Coordinator Review

Approved

Kaitlyn Dorson - April 11, 2024 at 9:21 AM (America/Phoenix)

April Randall

Assistant Vice Provost Review

Approved

Tamiko Azuma - April 11, 2024 at 9:22 AM (America/Phoenix)

Pre-GSC Meeting

Approved

Kaitlyn Dorson - April 11, 2024 at 10:16 AM (America/Phoenix)

April Randall

Quantitative Reasoning (QTRS) Subcommittee

Acknowledgement Requested

Pierre Herckes

Terri Kurz - April 22, 2024 at 11:11 AM (America/Phoenix)

Revise and Resubmit: The course description appears to be focused on data and analysis. However, the assignments within the QTRS system that are aligned with learning outcomes are not clear. The course might fit this designation, but as written it is unclear just exactly how the assignments and course content align with the Gold QTRS learning outcomes.

Michelle Mancenido

Elizabeth Kizer

General Studies Council Meeting

Waiting for Approval

Kaitlyn Dorson

April Randall

Registrar Notification

Notification

Courses Implementation

Implementation

Approval

Rebecca Klein

Lauren Bates

Alisha Von Kampen

Proposer Notification

Notification

Laura Zafirakis

College Notification

Notification

Sharon Hall

Lisa Murphy

DARS Notification

Notification

Leticia Mayer

Peggy Boivin
