Texas A&M University

Departmental Request for a New Course
Undergraduate + Graduate + Professional

1. This request is submitted by the Department of **Oceanography**

2. Course prefix, number and complete title of course: **OCNG 658 Ocean Computational Analysis Lab**

3. Course description (not more than 50 words): This laboratory course is designed to train students in computational techniques using modern (python) and classic (FORTRAN) programming languages and scientific software packages (Generic Mapping Tools and MATLAB). The labs will focus on real oceanographic applications.

4. Prerequisite(s) encourage concurrent with OCNG 657

5. Is this a variable credit course? ☐ Yes ☑ No

6. Is this a repeatable course? ☐ Yes ☑ No

7. Has this course been taught as a 289/489/489? ☑ Yes ☐ No

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

5. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Approval recommended by:

   Head of Department Date

10. Prefix Course # Title (excluding punctuation)

    OCNG 658 Ocean Computational Analysis Lab

    Lect. Lab SCH Subject Matter Content Code Admin. Unit Acad. Year FICR Code

   06 04 01 40 06 07 00 2 0 0 0 8 1 0 9 00 3 6 3 2

   Chair, College Review Committee Date

   Dean of College Date

   Date

   Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8836.
OAR/AS - 04/07
COURSE SYLLABUS

OCNG 658 OCEANOGRAPHIC COMPUTATIONAL ANALYSIS LABORATORY
SPRING 2008

Time: TBD (Two 2-hr sessions per week)
O&M Room: MOTL 1104
1 Credit

Instructor:
Dr. Steven F. DiMarco
Department of Oceanography
3146 TAMU
Office: 614B Eller O&M Building
Phone: 979-862-4168
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Email: sdimarco@tamu.edu
Office Hours: TBA

Objective: to provide laboratory instruction of computational techniques useful to oceanographers.

Course Description:
Today’s oceanographers must have proper training to attain the computation skills needed for successful research. This laboratory course is designed to train students in computation techniques using modern (UNIX) and classic (FORTRAN) programming languages and scientific software packages (Generic Mapping Tools, MATLAB, IDL). Each lab will consist of a short (15-minute) lecture that will introduce the day’s topic. The students are then given an assignment that will be completed in the laboratory time allotted. Whenever possible, the labs will focus on the analysis of oceanographic-related data sets and real-world oceanographic applications. Students are encouraged to bring their own data sets to analyze.

Prerequisites: Graduate level status (concurrent with OCNG 657 highly recommended).

Grading. Each lab will graded. Grades will be based on the following grading system: 90-100%=A, 80-89%=B, 70-79%=C, 60-69%=D, <60=F. Labs are to be turned in before the end of the week the lab was assigned. Late labs will not be accepted without prior arrangement before the lab. Final grades will be based on the student’s average score on all labs. No final test will be given, however, unannounced pop-quizzes may be given at the instructor’s discretion.
Laboratory Topics:
1. Introduction to scientific programming languages: MATLAB and IDL
2. Programming algebraic instructions and working with vectors
3. Matrix methods and manipulation
4. Plotting data and visualization techniques, output formats
5. Function fitting and interpolation
6. Structured programming, subroutines, and debugging strategies
7. Reading and writing data, data conversion
8. Objective analysis and contouring
9. Spectral analysis and the Signal Processing Toolbox
10. Scripting languages and UNIX
11. Scientific programming languages: FORTRAN

Class calendar:
- Week 1. Introduction Structured programming, and debugging (subroutines)
- Week 2. Basics of MATLAB programming: basic algebra and working with vectors
- Week 3. More with MATLAB: matrices, conditionals
- Week 4. UNIX programming and scripting
- Week 5. Graphical representations of oceanographic data and GMT
- Week 6. The National Ocean Data Center
- Week 7. Curve fitting and interpolation in MATLAB
- Week 8. FORTRAN programming
- Week 9. Gridding and contouring with GMT
- Week 10. Hand contouring versus machine contouring
- Week 11. Using date/time strings in MATLAB
- Week 12. Combining imagery and and shipborne data
- Week 13. Using spectral toolboxes and the signal processing toolbox

Textbook: none.

Other required material: Laboratory materials (prepared by instructor).

Resources:
The class will make use of computational resources of the Department of Oceanography and the Department of Atmospheric Sciences.

Americans with Disabilities Act (ADA) Policy Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room B118 of Cain Hall, or call 845-1637.
AGGIE HONOR CODE

"An Aggie does not lie, cheat, or steal or tolerate those who do."

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

For additional information please visit: www.tamu.edu/aggiehonor/

Copyright and Plagiarism Policy

The materials used in this course are copyrighted. These materials include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless permission is expressly granted.

As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, http://student-rules.tamu.edu, under the section "Scholastic Dishonesty."