FLORIDA ATLANTIC UNIVERSITY™

Graduate Programs—NEW COURSE PROPOSAL[1]

UGPC APPROVAL _____
UFS APPROVAL _____
SCNS SUBMITTAL _____
CONFIRMED _____
BANNER POSTED _____
CATALOG _____

DEPARTMENT: GEOSCIENCES

COLLEGE: CESCOS

RECOMMENDED COURSE IDENTIFICATION:

PREFIX ___OCE_____ COURSE NUMBER ___6269_____ LAB CODE (L or C) _____

(TO OBTAIN A COURSE NUMBER, CONTACT NMALDONADO@FAU.EDU)

COMPLETE COURSE TITLE: MARINE OPTICS

EFFECTIVE DATE
(first term course will be offered)
Fall 2015

CREDITS[2]: 3

TEXTBOOK INFORMATION: NONE

GRADING *(SELECT ONLY ONE GRADING OPTION)*: REGULAR __XXX_ SATISFACTORY/UNSATISFACTORY _____

COURSE DESCRIPTION, NO MORE THAN THREE LINES MARINE OPTICS IS RELEVANT TO A DIVERSE ARRAY OF MARINE AND ENVIRONMENTAL SCIENCE DISCIPLINES. THE COURSE INTRODUCES THE THEORETICAL CONCEPTS OF THE IRRADIATIVE TRANSFER OF LIGHT THROUGH NATURAL WATERS AND HOW ELECTROMAGNETIC WAVES INTERACT WITH NATURAL WATER AND ITS CONSTITUENTS.

PREREQUISITES *:	COREQUISITES*:	REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL)*:
PERMISSION OF THE INSTRUCTOR		

** PREREQUISITES, COREQUISITES AND REGISTRATION CONTROLS WILL BE ENFORCED FOR ALL COURSE SECTIONS.*

MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:
MEMBER OF THE GRADUATE FACULTY OF FAU AND HAS A TERMINAL DEGREE IN THE SUBJECT AREA (OR A CLOSELY RELATED FIELD)

Faculty contact, email and complete phone number:	Please consult and list departments that might be affected by the new course and attach comments.[3]
Anni Dalgleish, adalglei@fau.edu 772-242-2477	See Memo from Ocean Engineering

Approved by:	*Date:*
Department Chair:	2/5/15
College Curriculum Chair:	2/5/15
College Dean:	2/5/15
UGPC Chair:	2/18/15 2/25/15
Graduate College Dean:	2/26/15
UFS President:	
Provost:	

1. **Syllabus** must be attached; see guidelines for requirements: *www.fau.edu/provost/files/course syllabus.2011.pdf*
2. Review **Provost Memorandum: Definition of a Credit Hour** *www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf*
3. **Consent** from affected departments (attach if necessary)

Email this form and syllabus to *UGPC@fau.edu* **one week before** the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website prior to the meeting.

Course Syllabus for Marine Optics

1. **Course title/number, number of credit hours**

   Marine Optics – OCE 6269 – 3 credit hours

2. **Course prerequisites**
   a. Permission of the instructor

3. **Course logistics**
   a. Term – **Spring 2015**
   b. Notation if online course – N/A
   c. Class location and time (if classroom-based course)
      W/F – MC 209

4. **Instructor contact information**
   a. Instructor's name –Anni Dalgleish
   b. Office address – HBOI, Ed Link Bldg, Room 131
   c. Office hours – To be determined
   d. Contact telephone number – office 772 2422477 (A. Dalgleish)
   e. E-mail address –adalglei@fau.edu

5. **TA contact information (if applicable)**
   N/A

6. **Course description**

Marine Optics is relevant to a diverse array of Marine and Environmental Science disciplines. The course introduces the theoretical concepts of the radiative transfer of light through natural waters, and how electromagnetic waves interact with natural water and its constituents. The emphasis of the course is the practical application of *in-situ* optical methods to characterize water masses, for example in order to detect or trace pollutants, study primary production or estimate attenuation through oceanic particle fluxes. The course introduces the various optical sensors used by scientists and engineers, the principles behind their operation, their advantages and limitations, and also includes a hands-on portion, which focuses on practical aspects of optical sensor operation, standards and procedures, calibration, deployment and data interpretation.

7. **Course objectives/student learning outcomes**

The students will be able to explain basic concepts of optical phenomena in natural waters, and how the phenomena can be used to characterize the environment. The students also will have a hands-on understanding of the optical methods and technologies, their application in Oceanography and the correct interpretation of results.

8. Course evaluation method

There will be graded homework assignments accounting for 40% of the student's cumulative performance, a midterm exam, accounting for 30% of the student's cumulative performance, and a final exam that accounts for 30% of the cumulative performance. The overall grade in the course is derived from the cumulative performance according to the following table.

9. Course grading scale (optional)

Cumulative Performance	Grade
>94%	A
>90% - 94%	A-
>87% - 90%	B+
>83% - 87%	B
>80% - 83%	B-
>75% - 80%	C+
>65% - 75%	C
>60% - 65%	C-
>57% - 60%	D+
>53% - 57%	D
>50% - 53%	D-
<50%	F

10. Policy on makeup tests, late work, and incompletes

If a student cannot attend an exam or hand in a homework project on time due to circumstances beyond their control then the instructor may assign appropriate make-up work. Students will not be penalized for absences due to participation in University-approved activities, including athletic or scholastics teams, musical and theatrical performances, and debate activities. These students will be allowed to make up missed work without any reduction in the student's final course grade. Reasonable accommodation will also be made for students participating in a religious observance. Also, note that grades of Incomplete ("I") are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances. A grade of "I" will only be given under certain conditions and in accordance with the academic policies and regulations put forward in FAU's University Catalog. The student must show exceptional circumstances why requirements cannot be met. A request for an incomplete grade has to be made in writing with supporting documentation, where appropriate.

11. Special course requirements (if applicable)

Laboratory and field studies

12. Classroom etiquette policy (if applicable)

University policy on the use of electronic devices states: "In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions."

13. Disability policy statement

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodation due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) -- in Boca Raton, SU 133 (561-297-3880); in Davie, MOD 1 (954-236-1222); in Jupiter, SR 117 (561-799-8585); or at the Treasure Coast, CO 128 (772-873-3305) – and follow all OSD procedures.

14. Honor Code policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001 at http://www.fau.edu/regulations/chapter4/Reg_4.001_5-26-10_FINAL.pdf

15. Required texts/readings

Mobley, C. D. *Light And Water: Radiative Transfer in Natural Waters*. Selected Chapters. Academic Press, 2004. CD Edition.

Kirk, J.T.O. *Light And Photosynthesis in Aquatic Ecosystems*. Selected Chapters Cambridge University Press. Third Edition. 2011

Moore, C., A. Barnard, P. Fietzek, M. R. Lewis, H. M. Sosik, S. White, and O. Zielinski, *Optical tools for ocean monitoring and research*, Ocean Sci., 5, 661-684, 2009

16. Supplementary/recommended readings (optional)

Jerlov, N.G. *Marine Optics*, Elsevier, 1976.

Jonasz, M.C and Fournier, G.R. *Light Scattering by particles in water*. Academic press, 2007.

17. Course topical outline

1. **Introduction and course objectives**
   Homework assignment: evaluate (1) the relevance of optics to various marine science disciplines and (2) the application of *in-situ* optical methods to environmental sensing and its societal benefits

2. **Radiometry and photometry - Basics**
   Homework assignment: Problems relating to basic radiometric theory and quantities

3. **Optical properties of water - Basics**
   Homework assignment: Evaluate the most (optically) important constituents of natural waters relating to marine ecosystems in Florida

4. **Optical properties of water – Absorption and Scattering**
   Homework assignment: evaluate the importance of the measurements of absorption and scattering to oil spill response

5. **Optical properties of water – Total attenuation and optical water types**
   Homework assignment: evaluate the importance of optical water types on ocean color and transmittance

6. **Radiative transfer in natural waters - Basics**
   Homework assignment: evaluate the importance of the measurement of optical properties to the estimation of level of irradiance at depth

7. **Radiative Transfer – Polarization and inelastic scattering in natural waters**
   Homework assignment: evaluate the opportunities and challenges considering non-scalar and inelastic phenomena in the interaction between light and water and its constituents

8. **Instruments to measure radiometric quantities**
   Homework assignment: evaluate the theoretical and technological challenges related to the measurement of radiometric quantities

9. **Instruments to measure bulk optical properties of natural waters**
   Homework assignment: evaluate the theoretical and technological challenges related to the measurement of bulk optical properties

10. **Instruments to measure properties of particles**
    Homework assignment: evaluate the theoretical and technological challenges related to the measurement of particle properties

11. **Field study planning**
    Homework assignment: conceptual design of the field study

12. **Instrument orientation**
    Homework assignment: instrument operation and data acquisition

13. **Laboratory study**
    Homework assignment: instrument calibration curve

14. **Field study**
    Homework assignment: analysis of the measured data

15. Data quality assurance and control
Homework assignment: error quantification of field data

16. Evaluation of the success of the field study
Homework assignment: field study report