MEMORANDUM

DATE:    September 5, 2012

TO:    Dr. Marshall Jones, Undergraduate Curriculum Committee

FROM:    Dr. Edward Kalajian, Associate Dean, College of Engineering

RE:    New Courses for Curriculum

The College of Engineering Council has approved the following courses and requests approval of the Undergraduate Curriculum Committee.

- OCN 2801 Research Vessel Operations (3cr.)
- OCE 4522 Coastal Engineering Processes and Shoreline Design (3cr.)
- OCN 4107 Pacific Coast Engineering (3cr.)
- ENS 4702 Lake and Reservoir and Management (3cr.)

*Please note that OCN 4107 and ENS 4702 are Bi-level courses and are being submitted to the Graduate Council for approval.
This course is available for student registration only after the approval process has been completed.

**Florida Institute of Technology**

**ADDING A NEW COURSE TO THE CURRICULUM**

SUBJECT: OCN 2801
COURSE NO. (eg, 1301) 2801
CREDIT HOURS: 3
TERM TO BE ADDED TO THE FILE: Spring 2013

CLASS HOURS: 46
LECTURE HOURS: 16
LAB HOURS: 30
CONTACT HOURS (CEU ONLY): 

DEPARTMENT: Marine & Environmental Systems
SCHEDULE TYPE: Lecture/Lab

☐ COLLEGE OF AERONAUTICS - 23
☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS - 25
☐ NATHAN M. BISK COLLEGE OF BUSINESS - 24
☐ COLLEGE OF SCIENCE - 26
☐ COLLEGE OF ENGINEERING - 1
☐ EXTENDED STUDIES DIVISION / NATHAN M. BISK COLLEGE OF BUSINESS - 90

COMPUTER TITLE: Restricted to 25 characters, including spaces
Research Vessel Ops

Dual-Prefix, 81-Level, Full-Load? ☐ Yes ☐ No

CATALOG TITLE: RESEARCH VESSEL OPERATIONS

CATALOG DESCRIPTION OF COURSE: Restricted to 350 characters, including spaces
Covers nautical skills needed for scientists and engineers working on research vessels. Includes classes of ships, marine terminology, deck machinery, ship handling, seamanship, admiralty law, charts, compasses, position fixing, first aid and safety of life at sea. Also includes cruise planning, cost estimation and elements of navigation.

This description has been approved by the catalog office: T. Sato 7/11/12

Catalog Director

In addition, please attach a course syllabus and/or more detailed description.

RESTRICTIONS:
☐ Prerequisite: OCN 1010
☐ Corequisite: Course Number
☐ and ☐ or

☐ Prerequisite: ENS 1001
☐ Corequisite: Course Number
☐ and ☐ or

G Rades TO B E I SSUED:
☐ A, B, C, D, F
☐ A, B, C, D, E, F, CEU/Audit
☐ CEU
☐ S, U
☐ P, F
☐ Other

ADDITIONAL RESTRICTION:
(e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.

SUBJECT Alpha Prefix (e.g., CSE)
COURSE NO. (eg, 1301)
TERM TO INACTIVATE

APPROVALS: Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

Originator: J. Mall
Date: 8-21-2012

Chair, Graduate Council: Date

Department Head/Program Chair: Date

Dean or Associate Dean: Date

Chair, Undergraduate Curriculum Committee: Date

CATALOG DIRECTOR
These changes/additions have been made for the University Catalog and entered into the BANNER term named above.

Catalog Director: 
Date: 

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SCADEF: 
SCAPERQ: 
SCABASE: 

SCARRES: Operator Init. Date:

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Florida Institute of Technology • Office of the Registrar

RGR150 412
Course: OCN 2801 Research Vessel Operations (3 credits); CRN 12345

2013-2014 Catalog Data: Covers nautical skills needed for scientists and engineers working on research vessels. Includes classes of ships, marine terminology, deck machinery, ship handling, seamanship, admiralty law, charts, compasses, position fixing, first aid, and safety of life at sea. Also includes cruise planning, cost estimation, and elements of navigation. (Prerequisite: ENS 1001 or OCN 1010).


Course Objectives: Gain a general understanding of working at sea as an ocean or atmospheric scientist, ocean engineer, marine meteorologist, or coastal zone manager, emphasizing the practical aspects of seamanship, navigation, handling scientific equipment, safety, and tradition. Upon successful completion of the course the student should be able to:
- Identify classes of research vessels, their equipment, and their capabilities.
- Properly trailer, launch, navigate, anchor, recover, and secure a Class I research vessel.
- Handle a variety of scientific equipment from an ocean-going ship.
- Understand and apply admiralty laws and maritime best-practice to safety of life at sea.
- Organize, plan, and execute a multi-day research cruise in international waters.

Course Website: The course website is on ANGEL. To access the site, go to https://courses.fit.edu and log on with your Tracks username and password. Once you have logged on, you’ll see your courses listed on the left. Click on the course that you wish to access.

Topics Covered:

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
<th>PAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Welcome and Introduction</td>
<td>12-55</td>
</tr>
<tr>
<td>2*</td>
<td>Nautical Terms</td>
<td>56-87</td>
</tr>
<tr>
<td>3</td>
<td>Boating Laws and Regulations</td>
<td>403-407</td>
</tr>
<tr>
<td>4*</td>
<td>CPR and First Aid (certificate earned)</td>
<td>120-173</td>
</tr>
<tr>
<td>5</td>
<td>Navigation Rules</td>
<td>242-266</td>
</tr>
<tr>
<td>6*</td>
<td>Trailering</td>
<td>174-219, 266-273</td>
</tr>
<tr>
<td>7</td>
<td>Small Boat Handling</td>
<td>369-402, 408-431</td>
</tr>
<tr>
<td>8*</td>
<td>Safety Afloat and Emergencies Underway</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>SPRING BREAK</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Handling Scientific Equipment (Saturday 0700-1700)</td>
<td>MV Thunderforce</td>
</tr>
</tbody>
</table>
11* Anchoring 316-349
12 The Mariner's Compass 432-472
13* Nautical Charts and Publications 503-555
14 Basic Piloting and Position Determination 556-580; 631-645
15* Elements of Celestial Navigation Handout
16 Marlinspike Seamanship 774-800
17* Final Exam (term paper due)

* Assignments due at class time. Note, some classes will be held at the FIT Anchorage or Front Street Park; transportation will be arranged. "Boatsafe" course completion certificate is due at the time of the final.

_class Schedule:_ Wednesday: 5:00 PM – 7:45 PM, Skurla Hall, Room 121
_final Exam:_ Wednesday, May 2nd, 8:30 PM – 10:30 PM
_final Grade:_ The course grade will be based on homework assignments (60%), final exam (20%), term paper (20%).
Grades: A: 90-100; B 80-89; C 70-79; D: 60-69; F <60.

Contribution of course to meeting ABET professional component:
Engineering Science: 3 credits or 100%
Engineering Design: 0 credits or 0%

Relationship of course to program ABET objectives:

<table>
<thead>
<tr>
<th>Course Outcomes</th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
<th>(f)</th>
<th>(g)</th>
<th>(h)</th>
<th>(i)</th>
<th>(j)</th>
<th>(k)</th>
<th>(l)</th>
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</table>

Program Outcomes

(a) An ability to apply knowledge, science, and engineering.
(b) An ability to design and conduct experiments, as well as to analyze and interpret data.
(c) An ability to design a system, component, or process to meet desired needs.
(d) An ability to function on multi-disciplinary teams.
(e) An ability to identify, formulate, and solve engineering problems.
(f) An understanding of professional and ethical responsibility.
(g) An ability to communicate effectively.
(h) The broad education necessary to understand the impact of engineering solutions in global and societal context.
(i) A recognition of the need for, and an ability to engage in life-long learning.
(j) A knowledge of contemporary issues.
(k) An ability to use techniques, skills, and modern engineering tools necessary for engineering practice.
(l) Knowledge and skills to apply the principles of probability and statistics.
(m) Knowledge and skills to apply the principles of oceanography, water waves, and underwater acoustics to engineering problems.
(n) An ability to integrate multiple technical areas.
(o) An understanding of the necessity for design optimization.

Person who prepared this description and date:
George A. Maul, Ph.D. – August 21, 2012
Professor of Oceanography and Department Head
Department of Marine & Environmental Systems
Room 258, Olin Engineering Building
College of Engineering · Florida Institute of Technology
150 West University Boulevard · Melbourne FL 32901
Tel: 321 674 7453; Fax: 321 674 7212; Email: gmaul@fit.edu
Website: http://coc.fit.edu/dmes

Teaching Associates:
Capt. Tim Fletcher, tfletcher@fit.edu, 432-5875; SCPO Bill Battin, wbattin@fit.edu, 674-7618.

Requirements:
In addition to the material in the textbooks, homework assignments, and field practical demonstrations, a written term paper is required relating research vessel operations to your academic major, and to give the term paper as a 5-minute oral presentation in the style of FAS (Florida Academy of Sciences) meetings, at the time of the final exam. The paper is to be two pages long, single-spaced typed, double column (newspaper style), including title, author, figures, references, and acknowledgments. Assignments must be turned in on time; no credit for late submissions. Attend class regularly!

As part of this course you must complete an on-line boating safety course. The URL is: http://boatsafe.com/. You do not have to pay the $25 fee unless you want to be registered as having completed their “Basic Boating Safety Course”; just take the practice exam, print out the score (you must get 80% or better), and turn in the printout; write your name on the printout.

Suggestions:
Read the assigned chapter before coming to class; bring the textbook to class as we will be discussing many of the figures during the lectures; rewrite your notes after each lecture; bring a calculator to class as we will be solving practical problems in navigation and cruise planning. We will briefly review the previous lecture at the start of each class - this is a good time to resolve problems; start a personal glossary of terms. See me immediately if you are having difficulty with the material - don't wait until the final! A field trip is planned on the MV Thunderforce; prepare now to miss other classes.

Expectations:
You can expect that your instructors will be prepared, on-time, courteous, and engaged. You are expected to be prepared, courteous, on-time, and engaged! By this it is meant come to class a few minutes early and do not leave until the class is dismissed, that cellphone ringers are off and calls are forwarded to messages, no text-messaging, excused absences are arranged in advance, and an environment of respect and learning is maintained at all times. Never plagiarize!
**Florida Institute of Technology**

**ADDING A NEW COURSE TO THE CURRICULUM**

This course is available for student registration only after the approval process has been completed.

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>O C E</th>
<th>COURSE NO.*</th>
<th>4 5 2 2</th>
<th>CREDIT HOURS</th>
<th>3</th>
<th>TERM TO BE ADDED TO THE FILE</th>
<th>Spring 2013</th>
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*Justify level, if 1000-level and no co- or prerequisite.

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<tr>
<th>CLASS HOURS</th>
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<th>LECTURE HOURS</th>
<th>45</th>
<th>LAB HOURS</th>
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<table>
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<tr>
<th>DEPARTMENT</th>
<th>Marine and Environmental Systems</th>
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<thead>
<tr>
<th>SCHEDULE TYPE</th>
<th>Lecture</th>
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</table>

- **□** COLLEGE OF AERONAUTICS - 23
- **□** COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS - 25
- **□** NATHAN M. BISK COLLEGE OF BUSINESS - 24
- **□** COLLEGE OF SCIENCE - 26
- **X** COLLEGE OF ENGINEERING - 1
- **□** EXTENDED STUDIES DIVISION / NATHAN M. BISK COLLEGE OF BUSINESS - 90

**COMPUTER TITLE** Restricted to 25 characters, including spaces: **Coast Proc & Shore Des**

**Dual Prefix, BI-Level, Full Load?**

- **□** Yes
- **X** No

**CATALOG TITLE**

Coastal Engineering Processes and Shoreline Design

- **CATALOG DESCRIPTION OF COURSE** Restricted to 350 characters, including spaces:

  Introduces engineering design in the dynamic coastal zone. Focuses on shoreline design and management, the physical processes of sandy beaches, coastal sediments, surf zone dynamics, beach profiles, cross-shore and alongshore sand transport, reaction of beaches to storms, coastal structures and sea-level rise.

  This description has been approved by the catalog office.

**Catalog Director**

| Date | 8/14/12 |

In addition, please attach a course syllabus and/or more detailed description.

**RESTRICTIONS**

- **X** Prerequisite: OCE 3521
- **□** Corequisite: Course Number
- **□** and **□** or: Course Number
- **□** Prerequisite: Course Number
- **□** Corequisite: Course Number
- **□** and **□** or: Course Number
- **□** Prerequisite: Course Number
- **□** Corequisite: Course Number
- **□** and **□** or: Course Number

**ADDITIONAL RESTRICTION**

(e.g. Major, Class Level, Department/Program Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.

**SUBJECT** Alpha Prefix (e.g. CSE) | **O C E** | COURSE NO. (e.g. 1101) | **4 5 2 3** | **TERM TO INACTIVATE** | Fall 2012

**APPROvals:** Upon completion of appropriate department approvals, submit form to Chairs, Graduate Council, or Chairs, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

**Originator**

| Date | 8/14/2012 |

**Department Head/Program Chair**

| Date | 8-14-12 |

**Dean or Associate Dean**

| Date | 9-4-12 |

**CATALOG DIRECTOR**

| Date | |

These changes/additions have been made for the University Catalog and entered into the BANNER term named above.

**REGISTRAR'S USE ONLY**

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150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7822
Course: OCE 4522 COASTAL ENGINEERING PROCESSES & SHORELINE DESIGN (3 credits).

2012-2013 Catalog Data: The course introduces students to engineering design in the dynamic coastal zone, with a focus on shoreline design and management: covering the physical processes of sandy beaches; coastal sediments; surf zone dynamics; beach profiles; cross-shore and alongshore sand transport; the reaction of beaches to storms, coastal structures and sea-level rise. (Prerequisites: OCE 3521).

Textbook (T) and References (R):
(R) Dean, R.G., (2002), Beach Nourishment in Theory and Practice, World Scientific

Course Objectives: Upon successful completion of this course, the student should be able to:
1. Identify common terminology used in the coastal environment,
2. Explain and apply basic coastal hydrodynamic principles,
3. Discuss properties and characteristics of common marine sediments,
4. Describe short-term and long-term sediment processes,
5. Recognize and describe common coastal features,
6. Qualitatively and quantitatively describe and estimate sediment transport,
7. Predict future shoreline change based on historic trends,
8. Identify engineering applications in the coastal environment,
9. Based on available information, design engineering solutions to manage shoreline positions.

Course Website: The course website is on ANGEL (https://courses.fit.edu)

Topics Covered:

1. Introduction to coastal environment
   (description of features, terminology and processes) (5 weeks)
   a. Introduction to Coastal Processes (1 week)
   b. Sediment characteristics and statistics (1 week)
   c. Long-term coastal processes (sea-level rise etc.) (1 week)
   d. Review of tides, storm surge, waves (1 week)
   e. Nearshore Circulation (1 week)
2. Coastal response to forcing (4 weeks)
   a. Sediment transport (1 week)
   b. Analysis of shoreline change (1 week)
      i. development of shoreline model (1 class)
   c. Equilibrium Beach Profiles (EBP) (1 week)
   d. EBP and Profile types (1 week)

3. Shoreline design, modification and analysis (5 weeks)
   a. Beach Nourishment (1 week)
   b. Dredging Hydraulics (1 week)
   c. Pelnard-Considere Equation (diffusion Eq) (1 week)
   d. Beach Planform modeling (1 week)
   e. Environmental effects of Beach nourishment (1 week)

Class Schedule: Spring, Tuesday/Thursday, Time to be decided

Contribution of course to meeting ABET professional component:
Engineering Science: 2 credits or 66%
Engineering Design: 1 credits or 34%

Relationship of course to program ABET objectives

<table>
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<tr>
<th>Course Outcomes</th>
<th>A</th>
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<tr>
<td>OCE 4522 COASTAL ENGINEERING PROCESSES &amp; SHORELINE DESIGN</td>
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</tr>
</tbody>
</table>

Program Outcomes

A. Ability to apply knowledge of mathematics, science and engineering
B. Ability to design and conduct experiments, as well as to analyze and interpret data
C. Ability to design a system, component or process to meet desired needs
D. Ability to function on multi-disciplinary teams
E. Ability to identify, formulate and solve engineering problems
F. Understanding of professional and ethical responsibility
G. Ability to communicate effectively
H. Broad education to understand the impact of engineering solutions in global and societal context
I. Recognition of the need for, and an ability to engage in life-long learning
J. Knowledge of contemporary issues
K. Ability to use the techniques, skills, and engineering tools necessary for engineering practice
L. Knowledge and skills to apply principles of probability and statistics
M. Knowledge and skills to apply the principles of oceanography, waves and acoustics to engineering problems
N. An ability to integrate multiple technical areas
O. An understanding of the necessity for design optimization
Person who prepared this description and date:
Robert J. Weaver, Ph.D. – August 16, 2012
Assistant Professor of Ocean Engineering
Department of Marine & Environmental Systems
Room 229, Olin Physical Science Building
College of Engineering · Florida Institute of Technology
150 West University Boulevard · Melbourne FL 32901
Tel: 321 674 7273; Email: rjweaver@fit.edu
Website: http://coc.fit.edu/dmes

Requirements:
In addition to the material in the textbook and references, the homework assignments and the
exams, each student will participate in a group project that reflects a culmination of the material
learned in this course as well as topics learned in previous courses in the ocean engineering
curriculum. This project is a design project where teams will represent their ‘company’,
competing for a project. The presentation and report need to include: Background; Objectives;
Design Considerations; Introduction; Site Design Conditions; Proposed Structure Design;
Stability analysis; Settlement Analysis; Construction Plan; Contingency Plan; Monitoring
Program; Cost Analysis; Summary; Recommendations; and References.
Florida Institute of Technology

ADDING A NEW COURSE TO THE CURRICULUM

This course is available for student registration only after the approval process has been completed.

SUBJECT OCN
(Course No. 4107)

CREDIT HOURS 3
TERM TO BE ADDED TO THE FILE Spring 2013

*Justify level if 1000-level or no co-requirements
Restricted to Instructor approval of student registering for field course

CLASS HOURS LECTURE HOURS LAB HOURS CONTACT HOURS (CEU ONLY) 120

DEPARTMENT Marine & Environmental Studies
(Schedule Type: Field Project (J))

☐ COLLEGE OF AERONAUTICS – 23
☐ NATHAN M. BISK COLLEGE OF BUSINESS – 24
☒ COLLEGE OF SCIENCE – 26
☒ EXTENDED STUDIES DIVISION / NATHAN M. BISK COLLEGE OF BUSINESS – 90

COMPUTER TITLE: Restricted to 25 characters, including spaces

Pacific Coast Environment

Dust-Prefic, E-L-Level, Full-Load? ☑ Yes ☐ No

CATALOG TITLE: Pacific Coastal Environments

CATALOG DESCRIPTION OF COURSE: Restricted to 350 characters, including spaces

A two-week field course examines environmental science and biological oceanography on the Pacific coast (Oregon or other locale). Covers such habitats as rocky intertidal, mudflats, sandy beaches and subtidal environments. Includes daily field trips with mild hiking. Travel, room and board managed by instructor. (Requirement: Instructor approval.)

This description has been approved by the catalog office: ☑

Catalog Director 8/15/12

In addition, please attach a course syllabus and/or more detailed description.

RESTRICTIONS:
☒ Prerequisite: OCN 101
☐ Corequisite: ____________
☐ and ☐ or

☒ Prerequisite: BIO 102
☐ Corequisite: ____________
☐ and ☐ or

☐ Prerequisite: ____________
☐ Corequisite: ____________
☐ and ☐ or

ADDITIONAL RESTRICTION: Requirement: Instructor approval

GRADES TO BE ISSUED:
☒ A, B, C, D, F
☐ A, B, C, D, F, CEU/Audit
☐ CEU
☐ S, U
☐ P, F
☐ Other ____________

If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.

SUBJECT Alpha Prefix (e.g., CSE) ____________ COURSE NO. (e.g., 1301) ____________ TERM TO INACTIVATE ____________

APPROVALS: Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

Originator ____________ Date 8/13/12

Chair, Graduate Council ____________ Date

OR

Department Head, Program Chair ____________ Date 8/15/12

Chair, Undergraduate Curriculum Committee ____________ Date

Dean or Associate Dean ____________ Date 9/4/12

CATALOG DIRECTOR

These changes/additions have been made for the University Catalog and entered into the BANNER term named above.

Catalog Director ____________ Date

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RGR-100 4/12
Field Course: OCN 4107 - Pacific Coastal Environments (3 credits)
Instructor: K.B. Johnson; johnson@fit.edu; Ph: (321) 674-7186

2012-2013 Catalog Data/Course Description: OCN 4107 PACIFIC COASTAL ENVIRON. Two-week field course examines environmental science and biological oceanography on the Pacific Coast (Oregon or other location). Habitats will include rocky intertidal, mudflats, sandy beaches, and subtidal environments. Course has daily field trips, mild hiking. Travel, room, board managed by instructor. (Requirements: Instructor Approval)

Prerequisites: No prerequisites, instructor approval required.

Textbook (T) and References (R):

Course Learning Outcomes: The student will be able to:
1. Understand the coastal, marine, and environmental issues of a temperate rocky coastline
2. Explain the unique issues associated with large tidal amplitudes.
3. Appreciate classic studies of biological oceanography, along with their historical significance, in the habitats in which they were originally conducted.
5. Understand how competition and predation can shape a community.
6. Explain how conservation and sustainable harvests compete or compliment one another.
7. Demonstrate knowledge of the causes of depletion of resources in the fishing and logging industries, and also management approaches to make them sustainable.

Topics Covered and Associated Time (note this is a focused field course with 10+ contact hours per day):
1. Introduction, Course Objectives, Overview (1 hour).
2. Terrestrial resource depletion and conservation (8 hours).
3. Competition and predation (16 hours)
4. The stress of the physical environment (16 hours)
5. Rocky Intertidal diversity (8 hours)
6. Shifting and unstable habitats (8 hours)
7. Anoxic sheltered environments (8 hours)
8. Marine mammals (4 hours)
9. Pacific Northwest coastal industry, historical perspective (8 hours)
10. Riparian watersheds (4 hours)
11. Salt marshes and invasive species (4 hours)
12. Coastal reserves (2 hours)
13. Water column habitats and ecology (8 hours)
14. Subtidal and deep habitats (12 hours)

Class/Laboratory Schedule: Summer Term, all day, daily for two weeks.

Contribution of Course to Meeting the Professional Component:  
Engineering Science: 3 credits or 100%.  
Engineering Design: 0 credits or 0%

Grade Determination: Grades will be determined in the course based upon overall performance in the following areas and with the following scale:

<table>
<thead>
<tr>
<th>Tests and Assignments</th>
<th>Course Points (1000 possible)</th>
<th>Overall course percentage:</th>
<th>Grade:</th>
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<tr>
<td>Quizzes</td>
<td>100</td>
<td>90-100%</td>
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<td>Field/Lab Assignments</td>
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<td>60-69%</td>
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</tr>
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<td>Participation/Attitude</td>
<td>250</td>
<td>&lt; 60%</td>
<td>F</td>
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Other Information: The Pacific Northwest Coast is notoriously cold and wet. Students should be prepared for inclement weather and are responsible for supplying their own foul weather and field attire. This includes layers of warm clothing, extra socks, raincoat or poncho, hat, sunglasses, sunscreen, hiking boots, and knee-high rubber boots.

Travel Plans: The students and instructor will fly as a group from Orlando International Airport to Eugene, Oregon. Once in Oregon, the class will travel together in rented vans.

Meals, Lodging, and Teaching Lab Facilities: The course will be hosted at a university coastal lab, which provides dorm space, dining hall service, teaching lab space, and field equipment. Dining hall staff prepare sack lunches when field trips conflict with scheduled meal times. The teaching labs are furnished with microscopes, standard marine lab equipment, and flow-through seawater systems.

Relationship of Course to Program Outcomes:

<table>
<thead>
<tr>
<th>Course Outcomes</th>
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<tbody>
<tr>
<td>Course Number - Course Name</td>
</tr>
<tr>
<td>OCN 4107 - Pacific Coastal Environments</td>
</tr>
</tbody>
</table>

Program Outcomes

A. Ability to apply knowledge of mathematics, science and engineering

B. Ability to design and conduct experiments, as well as to analyze and interpret data
C. Ability to design a system, component or process to meet desired needs

D. Ability to function on multi-disciplinary teams

E. Ability to identify, formulate and solve engineering problems

F. Understanding of professional and ethical responsibility

G. Ability to communicate effectively

H. Broad education to understand the impact of engineering solutions in global and societal context

I. Recognition of the need for, and an ability to engage in life-long learning

J. Knowledge of contemporary issues

K. Ability to use the techniques, skills, and engineering tools necessary for engineering practice

L. Knowledge and skills to apply principles of probability and statistics

M. Knowledge and skills to apply the principles of oceanography, waves and acoustics to engineering problems

N. An ability to integrate multiple technical areas

O. An understanding of the necessity for design optimization

**Prepared By:** Kevin D. Johnson, Ph.D., Associate Professor of Oceanography and Environmental Science, 08/2012.
This course is available for student registration only after the approval process has been completed.

SUBJECT ENS COURSE NO. 4702 CREDIT HOURS 3 TERM TO BE ADDED TO THE FILE Spring 2013

*Justify level if 1000 level+ and no co- or prerequisites

CLASS HOURS 45 LECTURE HOURS ___________ LAB HOURS __________ CONTACT HOURS (CEU ONLY) __________

DEPARTMENT Marine and Environmental Studies

SCHEDULE TYPE Lecture (A)

☐ COLLEGE OF AERONAUTICS - 23
☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS - 25
☐ NATHAN M. BISK COLLEGE OF BUSINESS - 24
☐ COLLEGE OF SCIENCE - 26
☒ COLLEGE OF ENGINEERING - 1
☐ EXTENDED STUDIES DIVISION / NATHAN M. BISK COLLEGE OF BUSINESS - 90

COMPUTER TITLE Restricted to 25 characters, including spaces Restore & Mgmt

Dual-Prefix (Bi-Level) Full-Load? ☒ Yes ☐ No

CATALOG TITLE Lake and Reservoir Restoration and Management

CATALOG DESCRIPTION OF COURSE Restricted to 350 characters, including spaces


This description has been approved by the catalog office

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Catalog Director
8/30/12
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In addition, please attach a course syllabus and/or more detailed description.

REQUIREMENTS ☒ Prerequisite CHE 1101 ☐ Corequisite ___________ Course Number ☒ and ☐ or

☐ Prerequisite CHE 1102 ☐ Corequisite ___________ Course Number ☒ and ☐ or

☐ Prerequisite ___________ Course Number ☐ Corequisite ___________ Course Number ☐ and ☐ or

ADDITIONAL RESTRICTION

(e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.

SUBJECT Alpha Prefix (e.g., CSE) ___________ COURSE NO. (e.g., 1201) ___________ TERM TO INACTIVATE ___________

APPROVALS: Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

Originator

Chair, Graduate Council

Date

Department Head / Program Chair

Date

Dean or Associate Dean

Date

Chair, Undergraduate Curriculum Committee

Date

CATALOG DIRECTOR

These changes/additions have been made for the University Catalog and entered into the BANNER term named above.

Catalog Director

Date

REGISTRAR'S USE ONLY

SCCARES ___________ SCADSD ___________ SCAPREQ ___________

SCARES ___________ Operator Init. ___________ Date ___________

Florida Institute of Technology • Office of the Registrar

150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7827

RDR-130-412
Course: ENS 4702/5702 Lake and Reservoir Restoration and Management (3 credits).

2012-2013 Catalog Data: This course reviews basic limnology and important lake and reservoir data collection techniques. It provides in-depth coverage of the chemical, physical and biological processes influencing nutrient enrichment (eutrophication) and other water body problems, and evaluates numerous lake management and restoration methods. Successful lake restoration case studies are used to illustrate lake restoration principles. (Prerequisite for: ENS 4702 is Chem 1101, Chem. 1102; for ENS 5702-Consent of Instructor)

Textbook (T) and Reference(R):


Course Objectives: Upon successful completion of this course, students should be able to:

1. Identify the common pollution problems and sources affecting lakes and reservoirs,
2. Design and conduct a sampling program to assess the water quality trophic state and pollution sources of lakes and reservoirs, and
3. Select and apply appropriate restoration and management techniques in various lake and reservoir water quality situations.

Topics Covered:

Introduction----The Need for Lake Restoration (week 1)
History of Lake Restoration and Management (week 1)
Basic Limnology and Eutrophication Review (week 2)
The Role of Biology in Lake Management and Restoration
   Ecological Concepts
   Exotic Species
Problem Diagnosis and Evaluation (weeks 3, 4)
Nutrient and Other Pollutant Sources (weeks 5, 6, 7)
   Point Source
   Nonpoint Source
   Internal Loading
Lake Restoration and Management Techniques (weeks 8, 9, 10, 11)
   Techniques to Control Algae (Plankton)
Techniques to Control Macrophytes
Techniques to Control Oxygen Problems
Techniques to Control Lake Acidification and other Pollution Problems

Multiple Benefit Treatments (week 12)
Predicting Lake Water Quality (week 13)
Data Analysis and Modeling (week 13)
Hypothetical Case Study (week 14)
Other Case Studies (week 15)

Class Schedule: Spring 2013, Tuesday/Thursday 9:30-10:45

Contribution of course to meeting ABET prof. component: Eng. Science: 100%.

Relationship of course to program ABET objectives

<table>
<thead>
<tr>
<th>Course Outcomes</th>
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<tbody>
<tr>
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<td>ENS 4702/5702 LAKE AND RESERVOIR RESTORATION AND MANAGEMENT</td>
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Program Outcomes

A. Ability to apply knowledge of mathematics, science and engineering
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N. An ability to integrate multiple technical areas
O. An understanding of the necessity for design optimization

Person who prepared this description: Thomas V. Belanger, Ph.D. Prof. of Env. Science-8-20-12

Requirements:

In addition to the participating in class discussions and completing midterm and final exams, each student will write and in-depth report on a chosen lake restoration method and present it to the class.