FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Graduate Programs

UGPC Approval _____
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

Department OME

College College of Engineering and Computer Science
*(To obtain a course number, contact **erudolph@fau.edu**)*

Prefix EOC **Number** 6145	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code**	**Type of Course** Lecture	**Course Title** Marine Renewable Energy

Credits *(Review Provost Memorandum)* 3

Effective Date *(TERM & YEAR)* Fall 2019

Grading *(Select One Option)*
Regular (●)
Sat/UnSat ( )

Course Description *(Syllabus must be attached; see Guidelines)*

Fundamentals of Marine Renewable Energy including a review of the state-of-the-industry related to producing electrical power from tides, ocean currents, waves, offshore wind, and thermal gradients. The fundamental design and operating principles of each type of energy extraction systems will be discussed, as well as the associated available energy densities and total available resources for each.

Prerequisites	**Corequisites**	**Registration Controls** *(Major, College, Level)*
Graduate standing or permission of instructor	N/A	Graduate Students in the College of Eng. & Comp. Sci.

Prerequisites, Corequisites and Registration Controls are enforced for all sections of course

Minimum qualifications needed to teach course:
Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.)

List textbook information in syllabus or here
Marine Renewable Energy Handbook (1st Edition) by Bernard Multon, 2012 John Wiley & Sons, ISBN-13: 978-1848213326.

Faculty Contact/Email/Phone
James VanZwieten/jvanzwi@fau.edu/(561) 297-0955

List/Attach comments from departments affected by new course
N/A

Approved by	***Date***
Department Chair	2/28/19
College Curriculum Chair	3/11/19
College Dean	3/11/2019
UGPC Chair	3/27/2019
UGC Chair	3/27/19
Graduate College Dean	3/27/2019
UFS President	
Provost	

Email this form and syllabus to UGPC@fau.edu one week before the UGPC meeting.

GRADUATE COLLEGE
MAR 12 2019
Received

Department of Ocean and Mechanical Engineering
Florida Atlantic University
Course Syllabus

1. Course title/number, number of credit hours	
Marine Renewable Energy – EOC 6145	3 credit hours
2. Course prerequisites, corequisites, and where the course fits in the program of study	
Prerequisites: Graduate standing or permission of instructor	
3. Course logistics	
Term: Fall 2019 *Room: TBD;* *Time: TBD;* *Final Exam*: TBD	
4. Instructor contact information	
Instructor's name	Dr. James VanZwieten
Office address	Engineering East (EE-96) Bldg., Rm. 316
Office Hours	TBD
Contact telephone number	(561) 297-0955
Email address	jvanzwi@fau.edu
5. TA contact information	
TA's name	TBD
Office address	TBD
Office Hours	TBD
Email address	TBD
6. Course description	
Fundamentals of Marine Renewable Energy including a review of the state-of-the-industry related to producing electrical power from tides, ocean currents, waves, offshore wind, and thermal gradients. The fundamental design and operating principles of each type of energy extraction systems will be discussed, as well as the associated available energy densities and total available resources for each.	
7. Course objectives/student learning outcomes/program outcomes	
Course objectives	By the end of the course, students will: 1) Understand present and future trends in marine renewable energy production; 2) Be familiar with basic design and operating principles of each type of marine renewable energy system; 3) Understand the regional availability and intensity of each marine renewable energy resource; 4) Be familiar with the measurements needed to assess the power potential of each device type; 5) Be able to estimate energy production potential from each device type as a function of deployment location; 6) Be familiar with how each form of marine renewable energy can help meet the energy needs of society.
Student learning outcomes & relationship to ABET 1-7 objectives	(1) An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and mathematics. (2) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. (6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
8. Course evaluation method	

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Homework 35%; First Midterm 15%; Second Midterm 15%; Final Exam 30%; Attendance 5%
9. Course grading scale
Grading Scale: 90 and above: "A", 86-89: "A- ", 82-85: "B+", 80-83: "B", 76-79: "B- ", 72-75: "C+", 68-71: "C", 64-67: "C- ", 60-63: "D+", 56-59: "D", 52-55: "D- ", 51 and below: "F." Note: Calculated grades will be rounded to the nearest integer.
10. Policy on makeup tests, late work, and incompletes
Makeup exams are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student of participating in the exam. Makeup exams will be administered and proctored by department personnel unless there are other pre-approved arrangements *Incomplete grades* are against the policy of the department, unless there is solid evidence of medical or otherwise serious emergency situation incomplete grades will not be given.
11. Special course requirements
None
12. Classroom etiquette policy
University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in class sessions.
13. Disability policy statement
In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS)—in Boca Raton, SU 133 (561-297-3880); in Davie, LA 203 (954-236-1222); or in Jupiter, SR 110 (561-799-8585) —and follow all SAS procedures.
14. Honor code policy
Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty 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 unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and place high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. See University Regulation 4.001 at www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf
15. Counseling and Psychological Services Center
Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/
16. Required texts/reading
Marine Renewable Energy Handbook, 1st Edition by Bernard Multon, 2012 John Wiley & Sons, ISBN-13: 978-1848213326.
17. Course topical outline

Department of Ocean and Mechanical Engineering
Florida Atlantic University
Course Syllabus

DATE	TOPIC
Week 1	-Course introduction -Overview of marine renewable energy -Overview of marine renewable energy research at FAU -Overview of the physics of energy -Homework 1 posted
Week 2	- In-stream hydrokinetic electricity production (river, tidal and ocean currents) • State-of-the-industry • Operating principles -Homework 1 due; Homework 2 posted
Week 3	- In-stream hydrokinetic electricity production (river, tidal and ocean currents) • Resource assessment including 1) numerical modeling of resources, 2) available energy assessment, and 3) turbulence and shear characterization. -Homework 2 due; Homework 3 posted
Week 4	- In-stream hydrokinetic electricity production (river, tidal and ocean currents) • Analysis of total available power from river, tidal, and ocean currents in the US • Economics of energy production. -Homework 3 due; Homework 4 posted
Week 5	- In-stream hydrokinetic electricity production (river, tidal and ocean currents) • Devices loadings and failure mechanisms • Basics of system design (part 1) -Homework 4 due; Homework 5 posted
Week 6	- In stream hydrokinetic electricity production (river, tidal and ocean currents) • Basics of system design (part 2) • System operation and control -Homework 5 due; Homework 6 posted - First Midterm Exam
Week 7	- Wave Energy Conversion • State-of-the-industry • Operating principles -Homework 6 due; Homework 7 posted
Week 8	- Wave Energy Conversion • Resource assessment including available energy assessment • Analysis of total available power from waves • Economics of wave energy production -Homework 7 due; Homework 8 posted
Week 9	- Wave Energy Conversion • Devices loadings and failure mechanisms • Basics of system design • System operation and control -Homework 8 due; Homework 9 posted
Week 10	- Ocean Thermal Energy Conversion • State-of-the-Industry • Operating principles -Homework 9 due; Homework 10 posted
Week 11	- Ocean Thermal Energy Conversion • Resource assessment including numerical modeling of resources and available energy prediction

	• Analysis of total available power from ocean thermal energy conversion • Economics of ocean thermal energy conversion -Homework 10 due; Homework 11 posted
Week 12	- Ocean Thermal Energy Conversion • Devices loadings and failure mechanisms • Basics of system design • System operation and control -Homework 11 due; Homework 12 posted
Week 13	- Offshore wind • State-of-the-Industry • Operating principles • Resource assessment including estimation of average energy densities and capacity factors. -Homework 12 due; Homework 13 posted
Week 14	- Sea Water Based Cooling • State-of-the-industry • Operating principles • Resource assessment including numerical modeling of resources and associated energy usage reductions • Basics of system design -Homework 13 due; Homework 14 posted
Week 15	- Sub-sea cables, foundations and anchoring • Loads on cables and anchors • Anchoring technology overview • Sub-sea cable technology overview -Homework 15 posted; Homework 14-15 due
Final Exam	Final Exam