FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Graduate Programs

Department Department of Ocean and Mechanical Engineering

College College of Engineering and Computer Science

*(To obtain a course number, contact **erudolph@fau.edu**)*

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

Prefix EML **Number** 6446	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code**	**Type of Course** Lecture	**Course Title** Wind and Ocean Energy Turbines

Credits *(Review Provost Memorandum)*
3

Effective Date *(TERM & YEAR)*
Spring 2021

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

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

A comprehensive introduction to wind and ocean energy systems, turbine blade design, wind and ocean current loading, advanced materials in design, cyclic and cumulative fatigue, matrix stiffness and finite element method. The application of advanced topics in wind and ocean energy systems to address contemporary issues. Students cannot take both EML 4442 and EML 6446 for credit.

Prerequisites

EGN 3331 Strength of Materials

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

Academic Service Learning (ASL) course

Academic Service Learning statement must be indicated in syllabus and approval attached to this form.

Corequisites
None

Registration Controls *(For example, Major, College, Level)*
Graduate students and seniors in the College of Engineering and Computer Science.

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
Wind Energy Explained: Theory, Design and Application, 2nd edition, J.F. Manwell, J.G. MCGowan and A.L. Rogers, Wiley, UK, 2010, ISBN-13: 978-0470015001

Faculty Contact/Email/Phone
Hassan Mahfuz/hmahfuz@fau.edu/7-3483

List/Attach comments from departments affected by new course
NA

Approved by	***Date***
Department Chair: Manhar Dhanak	5/13/2020
College Curriculum Chair: Ramesh Teegavarapu (Digitally signed by Ramesh Teegavarapu, DN: cn=Ramesh Teegavarapu, o=Florida Atlantic University, ou=Civil, Environmental and Geomatics Engineering, email=rteegava@fau.edu, c=US, Date: 2020.05.14 08:59:40 -04'00')	5/14/2020
College Dean: Mihaela Cardei (Digitally signed by Mihaela Cardei, DN: cn=Mihaela Cardei, o=Florida Atlantic University, ou, email=mcardei@fau.edu, c=US, Date: 2020.05.24 17:13:44 -04'00')	5/24/2020
UGPC Chair	
UGC Chair	
Graduate College Dean	
UFS President	
Provost	

Email this form and syllabus to UGPC@fau.edu 10 days before the UGPC meeting.

Department of Ocean and Mechanical Engineering
Florida Atlantic University
Course Syllabus

1. Course title/number, number of credit hours	
EML 6446 Wind and Ocean Energy Turbines	3 credit hours
2. Course prerequisites, corequisites, and where the course fits in the program of study	
EGN 3331 Strength of Materials	
3. Course logistics	
Term: Spring 2021 Class time and location: TBA	
4. Instructor contact information	
Instructor's name *Office address* *Office Hours* *Contact telephone number* *Email address*	Dr. Hassan Mahfuz, Professor of Ocean and Mechanical Engineering Engineering West (Bldg. 36), Room 179 TBA 561 843-4714 (cell), 561 297-3483 (office) hmahfuz@fau.edu
5. TA contact information	
TA's name *Office address* *Office Hours* *Contact telephone number* *Email address*	TBA
6. Course description	
A comprehensive introduction to wind and ocean energy systems, turbine blade design, wind and ocean current loading, advanced materials in design, cyclic and cumulative fatigue, matrix stiffness and finite element method. The application of advanced topics in wind and ocean energy systems to address contemporary issues. Students cannot take both EML 4442 and EML 6446 for credit.	
7. Course objectives/student learning outcomes/program outcomes	
Course objectives	Introduce students to advances in state-of-the-art wind and ocean energy systems that are deployed and are at developmental stage. Particular focus is given to the structural design of turbine blades. Expose students to fundamental knowledge of structural modeling and mathematical methods needed to analyze wind and ocean turbines, cumulative fatigue and life prediction, new materials for blades, and finite element tools.
Student learning outcomes & relationship to ABET a-k objectives	NA
8. Course evaluation method	
2 Assignments (each 10%) 20% Midterm Exam 25% Project Presentation 10%	The course has design content through a project assignment.

Project Report 15% Final Exam 30%	

9. Course grading scale

Grading Scale:
90 and above: "A", 87-89: "A- ", 83-86: "B+", 80-82: "B", 77-79: "B- ", 73-76: "C+", 70-72: "C", 67-69: "C- ", 63-66: "D+", 60-62: "D", 51-59: "D- ", 50 and below: "F."

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

Makeup tests 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 exam should be administered and proctored by department personnel unless there are other pre-approved arrangements

Late work is not acceptable.

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

NA

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. Attendance Policy Statement

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance.

Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

14. 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) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/

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. Code of Academic Integrity policy statement

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 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.*

17. Required texts/reading

Wind Energy Explained: Theory, Design and Application, 2nd ed, J.F. Manwell, J.G. MCGowan and A.L. Rogers, Wiley, UK, 2010, ISBN-13: 978-0470015001.

Additional lecture notes prepared by the instructor will be posted on Canvas.

18. Supplementary/recommended readings

Advances in Wind Turbine Blade Design and Materials, Povl Brondsted and Roger P.L. Nijssen, Woodland Publishing Limited, Oxford, 2013.

19. Course topical outline, including dates for exams/quizzes, papers, completion of reading

Course Outline:

1. Introduction to wind and ocean energy turbines (**week 1-2**)
2. Wind and Ocean resource characterization (**week 3-4**)
3. Blade design – loading on wind and ocean turbine blades (**week 5-6**)
4. Aerodynamic and hydrodynamic design (**week 7-9**)
5. Advanced materials (composites) in blade design (**week 10-11**)
6. Fatigue behavior and life cycle prediction of wind and ocean turbine blades (**week 12-13**)
7. Blade design and analysis tools – matrix stiffness and finite element method (**week 14-15**).

Tentative Dates:

Assignment 1	Week 3
Assignment 2	Week 6
Midterm Exam:	Week 8
Project Presentation:	Week 14
Project Report Due:	Week 15
Final Exam:	Scheduled by the Registrar Office