FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Undergraduate Programs

Department Ocean and Mechanical Engineering

College Engineering and Computer Science

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

UUPC Approval 4-25-22
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

Prefix EML **Number** 4442	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code**	**Type of Course** Lecture	**Course Title** Introduction to Wind and Ocean Energy Turbines

Credits *(Review Provost Memorandum)*: 3

Effective Date *(TERM & YEAR)*: Summer 2023

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

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

An introduction to wind and ocean energy systems, turbine blade design, wind, wave, and ocean current loading, advanced materials in design, cyclic and cumulative fatigue, matrix stiffness and finite element methods.

Prerequisites, with minimum grade*	**Corequisites**	**Registration Controls** *(Major, College, Level)*
EGN 3331 Strength of Materials, with a minimum grade of C		

Default minimum passing grade is D-.** **Prereqs., Coreqs. & Reg. Controls are enforced for all sections of course

WAC/Gordon Rule Course

( ) Yes (●) No

WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to proposal. See WAC Guidelines.

Intellectual Foundations Program (General Education) Requirement *(Select One Option)*

None

General Education criteria must be indicated in the syllabus and approval attached to the proposal. See GE Guidelines.

Minimum qualifications to teach course

MS degree in related engineering fields

Faculty Contact/Email/Phone	**List/Attach comments from departments affected by new course**
Hassan Mahfuz/hmahfuz@fau.edu/7-3483	NONE

Approved by	***Date***
Department Chair: Pierre-Philippe Beaujean	4/12/22
College Curriculum Chair: Hongbo Su	
College Dean:	4/14/22
UUPC Chair: Ethlyn Williams	4-25-22
Undergraduate Studies Dean: Dan Meeroff	4-25-22
UFS President:	
Provost:	

Email this form and syllabus to mjenning@fau.edu seven business days before the UUPC meeting.

Department of Ocean and Mechanical Engineering
Florida Atlantic University
Course Syllabus

1. Course title/number, number of credit hours	
EML 4442 Intro to Wind and Ocean Energy Turbines	3 credit hours
2. Instructional Method	
This class will be conducted in class and also recorded so students can watch the lectures at a later time and date.	
3. COVID-19 Statement	
Due to the surge in COVID-19 cases and the omicron variant, all students regardless of vaccination status are expected to wear masks while indoors in any FAU facilities, including classrooms and laboratories. Students experiencing flu-like symptoms (fever, cough, shortness of breath) or students who have come in contact with confirmed positive cases of COVID-19 should immediately contact FAU Student Health Services (561-297-3512). Symptomatic students will be asked to leave the classroom to support the safety and protection of the university community. For additional information visit www.fau.edu/coronavirus. In classes with face-to-face components, quarantined students should notify me immediately as you will not be able to attend class. I will not be able to offer an online version of the class but will make reasonable efforts to assist students in making up the work.	
4. Course prerequisites, corequisites, and where the course fits in the program of study	
EGN 3331 Strength of Materials *Students cannot take both EML 4442 and EML 6455 for credits*	
5. Course logistics	
Class hours: MW 04:00 – 7:10 PM, May 14th through June 24th , 2022. The course has design content through a project assignment.	
6. 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 Set up through emails 561 843-4714 (cell), 561 297-3483 (office) hmahfuz@fau.edu
7. TA contact information	
TA's name *Office address* *Office Hours* *Contact telephone number* *Email address*	TBA
8. Course description	
Introduction to wind and ocean energy systems, turbine blade design, wind, wave and ocean current loading, advanced materials in design, cyclic and cumulative fatigue, matrix stiffness and finite element methods.	

9. Course objectives/student learning outcomes/program outcomes

Course objectives	Introduce students to the 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	1. Ability to design structural models of wind and ocean turbines. (1,2,6) 2. Ability to calculate aerodynamic and hydrodynamic loading on turbines. (1,2,6) 3. Ability to consider and implement new materials in the design of turbine. (1,2,6) 4. Knowledge of constitutive equations for composite materials (1,2,6) 5. Ability to determine turbine response under cumulative fatigue (1,2,6) 6. Knowledge of matrix stiffness and finite element tools for blade design and analysis (1,2,6) 7. A term project and presentation to reflect contemporary issues in the scientific, technological, and environmental issues related with wind and ocean energy turbines (3,4).

10. Course evaluation method

Midterm Exam 35% Project Presentation 10% Project Report 15% Final Exam 40%	*Note:* The minimum grade required to pass the course is C

11. Course grading scale

Tentative Grading Scale: (Subject to change)
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."

12. 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.

13. Special course requirements

14. 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.

15. 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.

16. 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/*

17. 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/

18. 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*.

19. Required texts/reading

1. Lecture Notes
2. Wind Energy Explained – Theory, Design and Application, 2nd edn, J.F. Manwell, J.G.

MCGowan and A.L. Rogers, Wiley, UK, 2010

20. Supplementary/recommended readings

1. Advances in Wind Turbine Blade Design and Materials, Povl Brondsted and Roger P.L. Nijssen, Woodland Publishing Limited, Oxford, 2013.
2. Reading materials posted in Canvas

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

Course Outline:

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

Tentative Dates:

Midterm Exam:	June 8, 2022
Project Presentation:	June 15, 2022
Final Exam:	June 22, 2022
Project Report Due:	June 24, 2022