

 FLORIDA ATLANTIC UNIVERSITY	NEW COURSE PROPOSAL Undergraduate Programs		UUPC Approval <u>4-26-21</u> UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____
	Department Ocean & Mechanical Engineering College Engineering & Computer Science (To obtain a course number, contact erudolph@fau.edu)		
Prefix BME Number 4361	(L = Lab Course; C = Combined Lecture/Lab; add if appropriate) Lab Code	Type of Course <input style="border: 1px solid red;" type="text" value="Lecture"/>	Course Title Neural Engineering
Credits (Review Provost Memorandum) 3	Grading (Select One Option) Regular <input checked="" type="radio"/> Pass/Fail <input type="radio"/> Sat/UnSat <input type="radio"/>	Course Description (Syllabus must be attached; Syllabus Checklist recommended; see Guidelines) This course introduces students to the nervous system and basic neuroscience principles that govern neural interface engineering. After an introduction to the nervous system and brain diseases, the course will focus on bioengineering technologies for neural interfaces towards imaging, sensing, interfacing, and activating neural function in health and disease.	
Effective Date (TERM & YEAR) Fall 2021	Prerequisites, with minimum grade* None		
		Corequisites None	Registration Controls (Major, College, Level) None
*Default minimum passing grade is D-. Prereqs., Coreqs. & Reg. Controls are enforced for all sections of course			
WAC/Gordon Rule Course <input type="radio"/> Yes <input checked="" type="radio"/> 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 PhD in mechanical or biomedical engineering or equivalent			
Faculty Contact/Email/Phone Kevin Kang kangy@fau.edu/7-3943		List/Attach comments from departments affected by new course	
Approved by <small>Digitally signed by Manhar Dhanak DN: cn=Manhar Dhanak, o=Florida Atlantic University, ou=Ocean and Mechanical Engineering, email=dhanak@fau.edu, c=US Date: 2021.04.12 13:15:20 -05'00'</small> Department Chair _____ College Curriculum Chair <u>Danley M</u> College Dean <u>Fred Bloetscher</u> UUPC Chair <u>Jerry Haky</u> Undergraduate Studies Dean <u>Edward Pratt</u> UFS President _____ Provost _____			Date <u>4-12-21</u> <u>4/2/2021</u> <u>4-15-21</u> <u>4-26-21</u> <u>4-26-21</u> _____ _____

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	
Neural Engineering/ BME 4361	3 credit hours
2. Instructional Method	
<p>This class consists of lectures which will be conducted in-class and/or live using WebEx or Zoom, and recorded so students can watch the lectures at a later time and date. Students will be accommodated as much as possible with their needs during the pandemic.</p> <p><u>You will need to have a computer (or laptop), a reliable WIFI access, and a webcam and micro-phone connected to your computer for this course.</u></p> <p>In the event you might not have a computer, there is a Laptop Loaner Program at FAU for first-generation, low-income students. https://www.fau.edu/newsdesk/articles/fau-announces-laptop-loaner-program.php</p> <p>In the event you might not have reliable internet access remotely, you may use the internet connection on campus. You may use the classroom () during the live course times for watching lectures, and taking quizzes and exams. Note that there are only reduced seating capacities in the classroom, and only those who do not have reliable internet access should use the classroom. Social distancing must be strictly followed in the classroom at all times. You will need to make reservation for your seating every week on Canvas. The instructions for the reservation are provided at the following link: https://fau.edu/oit/instructional/support/files/seatReservationTool_student.pdf</p> <p><u>After two full weeks of face to face instruction with consecutive 'no show' of any students in person section in the classroom, the modality of this course section may be changed to remote instruction only at the discretion of the university.</u></p>	
3. COVID 19 Statement	
<p>All students in face-to-face classes are required to wear masks during class, and students must sanitize their own workstations upon entering the classroom. Taking these measures supports the safety and protection of the FAU community. Students who do not adhere to these rules will be asked to leave the classroom and/or be removed from the course. Students experiencing flu-like symptoms (fever, cough, shortness of breath), or students who have come in contact with an infected person should immediately contact FAU Student Health Services (561-297-3512).</p>	
4. Course pre-requisites, co-requisites, and where the course fits in the program of study	
<p>List Prerequisites, Co-requisites: None</p> <p>If students have not completed the required prerequisites for the course and do not inform their course instructor and advisor, they will be dropped from the course. If this occurs after the first week of the semester, they will be fee liable to the University.</p>	
5. Course logistics	
<p>Term: Fall 2021/Spring 2022 Time, Location, Mode of Delivery for Lectures (and Labs if applicable): Lectures:</p>	
6. Instructor contact information	
Instructor's name	Dr. Kevin Kang, Dr. Sarah Du, Dr. Erik Engeberg, Dr. Mike Kim, et al.
Office address	Engineering West (EW36-177)
Office Hours	One-to-one virtual meeting by WebEx, available time M-F 10am-6pm.
Contact telephone number	(561) 297-3943
Email address	kangy@fau.edu

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7. TA contact information																
<i>TA's name</i> <i>Office address</i> <i>Office Hours</i> <i>Contact telephone number</i> <i>Email address</i>																
8. Course description																
<p>This course introduces students to the nervous system and basic neuroscience principles that govern neural interface engineering. After an introduction to the nervous system and brain diseases, the course will focus on bioengineering technologies for neural interfaces towards imaging, sensing, interfacing, and activating neural function in health and disease.</p>																
9. Course objectives/student learning outcomes/program outcomes																
<i>Course objectives</i>	<p>The objective of this course is to provide students with a broad overview of neural engineering as an interdisciplinary field. It will provide a general overview that covers the important area in neural engineering research to students interested in the brain, particularly the intersection of technology and the nervous system, as well as those interested in developing biotechnical skills related to biomedical engineering.</p>															
<i>Student learning outcomes & relationship to ABET 1-7 objectives</i>	<p>Students will be able to: 1) understand the basic principles of neuroscience and neural engineering; 2) record neural signals and analyze large neural data sets using biorobot; 3) design simple microfluidic devices to address neural engineering problems; and 4) under the principle of neural tissue engineering using nanotechnology and biomaterials and its clinical application potential.</p>															
10. Course evaluation method																
<ul style="list-style-type: none"> • Midterm exam 30 % • Final Exam 40 % • Final project (Oral Presentation) 30 % 																
11. Course grading scale																
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">A 92.5-100</td> <td style="width: 33%;">C+ 77.5-79.9</td> <td style="width: 33%;">D- 60-62.4</td> </tr> <tr> <td>A- 90-92.4</td> <td>C 72.5-77.4</td> <td><60 Don't Ask</td> </tr> <tr> <td>B+ 87.5-89.9</td> <td>C- 70-72.4</td> <td></td> </tr> <tr> <td>B 82.5-87.4</td> <td>D+ 67.5-69.9</td> <td></td> </tr> <tr> <td>B- 80-82.4</td> <td>D 62.5-67.4</td> <td></td> </tr> </table> <ul style="list-style-type: none"> • The minimum grade required to pass the course is C. 		A 92.5-100	C+ 77.5-79.9	D- 60-62.4	A- 90-92.4	C 72.5-77.4	<60 Don't Ask	B+ 87.5-89.9	C- 70-72.4		B 82.5-87.4	D+ 67.5-69.9		B- 80-82.4	D 62.5-67.4	
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12. Policy on makeup tests, late work, and incompletes																
<p><i>Makeup tests</i> are given only if there is solid evidence of a medical or otherwise serious emergency before the tests that prevented the student of participating in the exam. Makeup exams should be administered and proctored by department personnel unless there are other pre-approved arrangements.</p> <p><i>Late work without verifiable justification will NOT be graded.</i></p> <p><i>Incomplete grades</i> 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.</p>																
13. Special course requirements																
<ul style="list-style-type: none"> • No watches, cell-phones, i-pads capable of taking pictures or communicating with others via emails and text messages are allowed during the quizzes and exams. 																

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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, are to be turned off 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 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 Cell phones are not allowed during exams. If cell phones are detected during any exam periods, this will result in a grade of "zero" on that exam and a note in the student's academic file.
19. Required texts/reading/Lab kits
<ol style="list-style-type: none">1. Lecture notes2. Textbook "Neural Engineering 3rd Ed. 2020 Edition" by Bin He.

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20. Supplementary/recommended readings

- Read papers from academic journals
- Recommended Textbook 'Neuroengineering' by Evelyn Page.

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

Course Topics:

1. Introduction of Neuroengineering
2. Basic neural anatomy and neurophysiology
3. Bio-robotics and large-scale neural data acquisition and processing
4. Neuromodulation techniques for closed-loop control and therapeutic intervention
5. Microfluidic technologies for neural network engineering and neurological disorders modeling
6. Nano-drug delivery system and biomaterials for neural tissue engineering
7. Journal paper discussion and final project presentation

Exam Dates

1. Tentative Midterm: Based on the schedule of the University
2. Final Exam: Based on the schedule of the University

CANVAS: Class notes, practice exercises, quiz/exam date/time, and other administrative information will be posted/announced in *CANVAS*.