

 FLORIDA ATLANTIC UNIVERSITY	NEW COURSE PROPOSAL Undergraduate Programs		UUPC Approval <u>12-2-24</u> UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____	
	Department Biomedical Engineering College (To obtain a course number, contact erudolph@fau.edu)			
Prefix Number	(L = Lab Course; C = Combined Lecture/Lab; add if appropriate) Lab Code	Type of Course	Course Title	
Credits (See Definition of a Credit Hour)	Grading (Select One Option) Regular Sat/UnSat	Course Description (Syllabus must be attached; see Template and Guidelines)		
Effective Date (TERM & YEAR)				
Prerequisites, with minimum grade*		Corequisites	Registration Controls (Major, College, Level)	
*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) General Education criteria must be indicated in the syllabus and approval attached to the proposal. See Intellectual Foundations Guidelines .		
Minimum qualifications to teach course				
Faculty Contact/Email/Phone		List/Attach comments from departments affected by new course		
Approved by Department Chair <u>Javad Hashmei</u> College Curriculum Chair <u>Galan Liu</u> College Dean <u>[Signature]</u> UUPC Chair <u>Korey Sorge</u> Undergraduate Studies Dean <u>Dan Meeroff</u> UFS President _____ Provost _____			Date <u>11/7/2024</u> <u>11/21/2024</u> <u>11/21/24</u> <u>12-2-24</u> <u>12-2-24</u> _____ _____	

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

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and Computer Science
Florida Atlantic University
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1. Course title/number, number of credit hours	
Modeling in Biomedical Engineering BME 4062 Website: Canvas.fau.edu	# of credit hour: 3
2. Course prerequisites, corequisites, and where the course fits in the program of study	
Prerequisites: <ul style="list-style-type: none"> EGN 3331, with minimum grade "C". 	
3. Course logistics	
Term: Springs Class location and time: TBD	
4. Instructor contact information	
Instructor's name Office address Office Hours Email address	TBD TBD TBD TBD
5. TA contact information	
TA's name Office address Office Hours Contact telephone number Email address	NA
6. Course description	
<p><i>This course is designed for both undergraduate and graduate students interested in applying finite element analysis (FEA) to the biomedical field. The course will focus on simulation cases for the spine, shoulder, hand, hip joint, knee, ankle, feet, and head. Students will learn how to process CT images into 3D models, perform simulations using Ansys Workbench and open-source FEBio software, and explore disease and implant simulations. The course also includes an introduction to machine learning integration with FEA.</i></p>	
7. Course objectives/student learning outcomes/program outcomes	
Course objectives	<ul style="list-style-type: none"> To provide a foundational understanding of finite element analysis, particularly in biomedical applications. To teach students how to convert medical imaging data into 3D models for FEA.

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	<ul style="list-style-type: none"> • <i>To enable students to perform simulations for various orthopedic and biomedical scenarios.</i> • <i>To introduce the basics of machine learning techniques to enhance FEA outcomes.</i>
8. Course evaluation method	
<ul style="list-style-type: none"> • Midterm Exam: 15% • Final Exam: 25% • Laboratory Reports: 20% • Final Project: 40% 	
9. Course 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	
<p>Students must turn in homework on time. Students will lose 25% (after 1 day) and 50% of marks (after 2 days) if they turn in late. Submissions are not accepted after 3rd day of due date.</p> <p>Students are strongly suggested to inform the instructor in advance in the case of emergency (if possible) for exam attendance. Makeup exams are given only if there is solid evidence of a medical or otherwise serious emergency that prevents the student of participating in the exam.</p>	
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	
<p>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.</p> <p>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</p>	

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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.

Special note: *"After two full weeks of face to face instruction with consecutive 'no show' of any students in person in the classroom, the modality of this course section may be changed to remote instruction only at the discretion of the university."*

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 (CAPS) 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](#). If your college has particular policies relating to cheating and plagiarism, state so here or provide a link to the full policy—but be sure the college policy does not conflict with the University Regulation.

17. Required texts/reading

To reduce costs for our students, we strongly encourage you to explore the adoption of open educational resources (OER), textbooks and other materials that are freely accessible. We also encourage you to clearly state in the syllabus if course materials are available on reserve in the Library.

- 1) *Finite Element Procedures* by Klaus-Jürgen Bathe.
- 2) *Finite Element Analysis for Biomedical Engineering Applications* by Z. Yang.
- 3) *Introduction to Finite Element Analysis and Design* by Nam-Ho Kim, Bhavani V. Sankar, and Ashok V. Kumar.

18. Supplementary/recommended readings

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Lecture notes.
19. Course topical outline, including dates for exams/quizzes, papers, completion of reading
<ul style="list-style-type: none">• Weeks 1-2: Introduction to Finite Element Analysis in Biomedical Engineering.• Weeks 3-4: Medical Imaging to 3D Modeling (Focus on Cervical Spine and Lumbar Spine).• Weeks 5-6: FEA Simulation of Cervical Spine and Lumbar Spine using Ansys Workbench.• Weeks 7-8: Anatomy and FEA of the Shoulder and Knee.• Weeks 9-10: Open-Source FEBio Simulations for Shoulder and Knee.• Weeks 11-12: FEA of the Spine, Knee, and Ankle: Disease and Implant Simulation.• Weeks 13-14: FEA of the Head: Brain Injury and Skull Implants/ Introduction to Machine Learning in FEA.

