
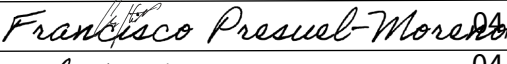

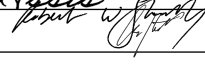
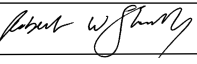
 FLORIDA ATLANTIC UNIVERSITY	NEW COURSE PROPOSAL Graduate Programs		UGPC Approval _____ UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner _____ Catalog _____	
	Department Biomedical Engineering College Engineering and Computer Science (To obtain a course number, contact erudolph@fau.edu)			
Prefix BME Number 5741	(L = Lab Course; C = Combined Lecture/Lab; add if appropriate) Lab Code	Type of Course Lecture	Course Title	
Credits (See Definition of a Credit Hour) 3	Grading (Select One Option) Regular <input type="radio"/> Sat/UnSat <input type="radio"/>	Course Description (Syllabus must be attached; see Template and Guidelines)		
Effective Date (TERM & YEAR) Fall 2025				
Prerequisites <i>Prerequisites, Corequisites and Registration Controls are enforced for all sections of course.</i>		Academic Service Learning (ASL) course <input type="checkbox"/> Academic Service Learning statement must be indicated in syllabus and approval attached to this form.		
		Corequisites	Registration Controls (For example, Major, College, Level)	
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		
Faculty Contact/Email/Phone Prof. Vivian Merk/VMerk@fau.edu		List/Attach comments from departments affected by new course There is no other course affected.		

Approved by		Date
Department Chair		3/10/25
College Curriculum Chair		04/03/2025 3/11/2025
College Dean		04/03/2025 3/11/2025
UGPC Chair		04/03/2025 04/03/2025
UGC Chair		04/03/2025
Graduate College Dean		04/03/2025
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	
Electron Microscopy, BME 5741	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.</p> <p>You will need to have a computer (or laptop), a reliable WIFI access, and a webcam and micro-phone connected to your computer if you wish to enroll in distance-learning option.</p> <p>Please note: Students will be required to attend instrument demonstrations and take exam on campus.</p>	
3. Course pre-requisites, co-requisites, and where the course fits in the program of study	
<p>Prerequisites: None.</p> <p>This course is designed for any student in science, engineering, or medicine with an interest in electron microscopy.</p>	
4. Course logistics	
<p>Term: TBA</p> <p>Time & Location: TBA</p>	
5. Instructor contact information	
<p>Instructor's name: Dr. Vivian Merk</p> <p>Office address: SE 43, Rm. 138</p> <p>Office Hours: TBA</p> <p>Contact telephone number: 561 297 3819</p> <p>Email address: vmerk@fau.edu</p>	
6. 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>	TBA TBA TBA TBA TBA
7. Course description	
<p>Course topics:</p> <ul style="list-style-type: none"> - Imaging with light vs. electrons - Scanning Electron Microscopy (SEM) - Transmission Electron Microcopy (TEM) - Preparation of TEM samples for materials and life sciences - Scanning Transmission Electron Microscopy (detectors, applications) - Energy-dispersive X-ray Spectroscopy (EDS) - Electron Energy Loss Spectroscopy (EELS) 	

Department of Ocean and Mechanical Engineering, Florida Atlantic University
Course Syllabus

<p>- Advanced topics (e.g., Electron Tomography, in-situ TEM, cryo-TEM, Correlative Imaging)</p>	
<p>8. Course objectives/student learning outcomes/program outcomes</p>	
<p><i>Course objectives</i></p>	<p>This course will provide an in-depth introduction to Scanning Electron Microscopy (SEM) and transmission Electron Microscopy (TEM) in materials and life science. The course will enable students to understand the physical principles of electron microscopy, discuss suitable sample preparation strategies, and learn about state-of-the-art developments (e.g., Electron Energy Loss Spectroscopy, in-situ TEM). This course will include hands-on demonstrations at FAU's SEM and TEM facilities.</p>
<p><i>Student learning outcomes & relationship to ABET 1-7 objectives</i></p>	<p>The student will learn how to solve complex engineering problems by applying their knowledge of science, engineering and mathematics (1). Students will discuss the pros and cons of different sample preparation and characterization methods (2, 4). To apply engineering design to produce solutions, the course will cover recent developments and technologies in the field of electron microscopy (2). Active participation in class is encouraged (3). Students will give a presentation on a current topic of their choice in front of a diverse audience (3). To foster inquiry-based learning, students will watch pre-recorded experiments, participate in hands-on demonstrations and draw conclusions from their experimental observations (6). Students will extract information from various media, e.g. research publications (7).</p>
<p>9. Course evaluation method</p>	
<p>Homework assignments (20%), research talk and report (20%), midterm exam (30%), final exam (30%) = 100% Graduate students will be asked to give a research talk and write a report on a current topic in Electron Microscopy.</p>	
<p>10. Course grading scale</p>	
<p>100-92(A), 91-90(A-), 89-88(B+), 87-82(B), 81-80(B-), C+(79-78), C (77-71), C- (70), D+ (69-68), D (67-61), D- (60), F (less than 60) Note: For graduate students, the minimum grade required to pass the course is C.</p>	
<p>11. Policy on makeup tests, late work, and incompletes</p>	
<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. Exams can be seen after taken, but not after the subsequent exam is taken. The final exam can be seen the day after grades are posted on Canvas. No grade changes will be allowed after a week from the final exam day. After that period, the grade stands. <i>Late work without verifiable justification will NOT be graded.</i></p>	

Department of Ocean and Mechanical Engineering, Florida Atlantic University
Course Syllabus

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.

12. Special course requirements

N/A

13. 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.

14. Policy on the Recording of Lectures

Students enrolled in this course may record video or audio of class lectures for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct and/or the Code of Academic Integrity.

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

Department of Ocean and Mechanical Engineering, Florida Atlantic University
Course Syllabus

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](http://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

Textbook: Peter J. Goodhew, John Humphreys, Richard Beanland, Electron Microscopy and Analysis, 3rd Edition, 2000, 272pp, softcover, ISBN 0-748-40968-8.

20. Supplementary/recommended readings

Lecture notes, additional course material, and homework assignments will be uploaded on Canvas.

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

Course Topics (tentative course schedule):

- 1) History of electron microscopy; principle of imaging with light vs. electrons
- 2) Electrons and their interactions with the specimen
- 3) Scanning Electron Microscopy (SEM): Instrument components, imaging modes, applications
- 4) Electron Diffraction
- 5) Transmission Electron Microscopy (TEM): Instrument components, imaging contrast, applications
- 6) Scanning Transmission Electron Microscopy (STEM)
- 7) Chemical Analysis in the Electron Microscope (EDS, EBSD, EELS)
- 8) Sample Preparation for Life Sciences: Fixation, dehydration, embedding, thin sectioning (ultramicrotomy), cryo-preparation

Department of Ocean and Mechanical Engineering, Florida Atlantic University
Course Syllabus

- 9) Sample Preparation for Materials Science: Electropolishing, mechanical polishing, cleaving, Focused Ion Beam (FIB)
- 10) Recent Developments (e.g., Electron Tomography, in-situ TEM, cryo-TEM, Correlative Imaging)

Exam Dates:

Midterm exam: TBA

Final exam: TBA

Mahsa Ranji

From: Andrew Terentis
Sent: Tuesday, March 25, 2025 1:46 PM
To: Mahsa Ranji
Subject: RE: BME 5741

Hi Mahsa,

We have no concerns and support the proposal.

best,
Andrew

From: Mahsa Ranji <mranji@fau.edu>
Sent: Monday, March 24, 2025 2:53 PM
To: Andrew Terentis <terentis@fau.edu>
Subject: BME 5741

Dear Dr. Terentis,

The BME department is planning to offer Electron Microscopy course (please see attached) from Fall semester. Please kindly confirm that there is no overlap with any of the courses in your department. Since we are on a timeline to get the approvals for this course, if I don't hear back by 3/26th about any overlap, I assume that there is none.

Thanks in advance for your time and consideration.

Best,
Mahsa

Mahsa Ranji, Ph.D.
Professor and BME Associate Chair
BME and EECS Dept.
ISENSE & SNBI Fellow
Florida Atlantic University
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Office: EE 315
Tel: (561)-297-0089

IEEE senior editor: <https://www.embs.org/jtehm/editorial-board/>
Biophotonics lab director: <https://www.fau.edu/engineering/research/biophotonics/>



BIOPHOTONICS LAB

Mahsa Ranji

From: Sarah Milton
Sent: Wednesday, March 26, 2025 9:53 AM
To: Mahsa Ranji
Subject: Re: BME 5741

Good morning - this does not overlap with any of our courses.

Regards,

Dr. Sarah L. Milton
Professor and Chair
Department of Biological Sciences
FAU

From: Mahsa Ranji <mrانji@fau.edu>
Sent: Tuesday, March 25, 2025 2:44 PM
To: Sarah Milton <smilton@fau.edu>
Subject: BME 5741

Dear Dr. Milton:

The BME department is planning to offer Electron Microscopy course (please see attached) from Fall semester. Please kindly confirm that there is no overlap with any of the courses in your department. Since we are on a timeline to get the approvals for this course, if I don't hear back by 4/1st about any overlap, I assume that there is none.

Thanks in advance for your time and consideration.

Best,
Mahsa

Mahsa Ranji, Ph.D.
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BME and EECS Dept.
ISENSE & SNBI Fellow
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Biophotonics lab director: <https://www.fau.edu/engineering/research/biophotonics/>



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