FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Graduate Programs

Department Biomedical Engineering

College Engineering and Computer Science
*(To obtain a course number, contact **erudolph@fau.edu**)*

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

Prefix BME **Number** 5905	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code**	**Type of Course** Lecture/Lab	**Course Title** Advanced Methods of Biomedical Engineering Research

Credits *(See Definition of a Credit Hour)*
3

Effective Date *(TERM & YEAR)*
Spring 2025

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

Course Description *(Syllabus must be attached; see Template and Guidelines)*
This course introduces the principles and practices of biomedical research. Topics covered include research design, data collection and analysis, laboratory techniques, and ethical considerations in research. The lab component offers hands-on experience with research methodologies and techniques.
- Understand the principles of biomedical research.
- Learn experimental design and methodology.
- Develop skills in data collection, analysis, and interpretation.
- Gain hands-on experience with laboratory techniques used in biomedical resear

Prerequisites
BCB 4843C or BME 4904 or instructor's permission.

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
N/A

Registration Controls *(For example, Major, College, Level)*
BME, COECS, Graduate

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.)

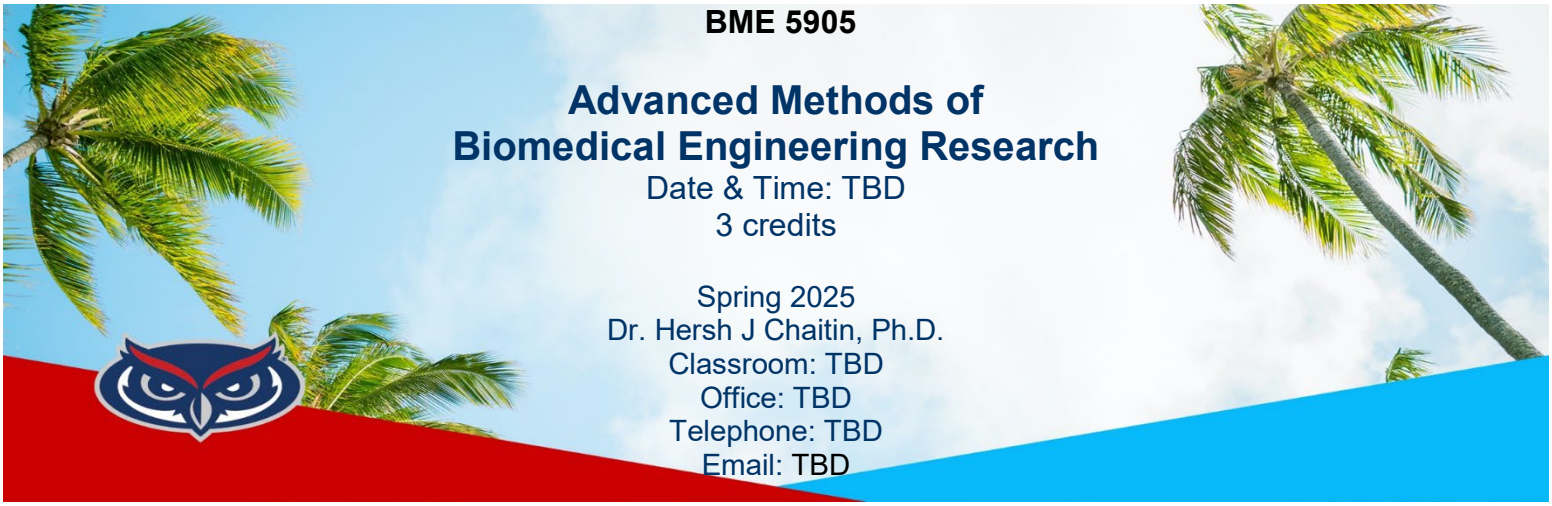
List textbook information in syllabus or here
Scientific Writing and Communication 5th Edition by Angie Hofmann.

Faculty Contact/Email/Phone
Dr. Hersh J Chaitin/hersh.chaitin@gmail.com

List/Attach comments from departments affected by new course
NA.

Approved by		***Date***
Department Chair	Janack Cohen	9/4/24
College Curriculum Chair	Francisco Presuel-Moreno (Digitally signed by Francisco Presuel-Moreno DN: cn=Francisco Presuel-Moreno, o=Florida Atlantic University, ou, email=fpresuel@fau.edu, c=US Date: 2024.09.23 11:08:00-04'00')	9/23/24
College Dean	Raquel Assis	9/21/24
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.



Office instructor/TA	TBD
TA Office hours	TBD
TA email:	TBD
Telephone	TBD
Email	TBD

Course Description

This course introduces the principles and practices of biomedical research. Topics covered include research design, data collection and analysis, laboratory techniques, and ethical considerations in research. The lab component offers hands-on experience with research methodologies and techniques.

- *Understand the principles of biomedical research.*
- *Learn experimental design and methodology.*
- *Develop skills in data collection, analysis, and interpretation.*
- *Gain hands-on experience with laboratory techniques used in biomedical research.*
- *Understand ethical considerations and responsible conduct in research.*

Instructional Method

This class is designated as one mode: In person. Attendance: Optional but highly recommended.

Prerequisites/Corequisites

BCB 4843C or BME 4904 or instructor's permission

Building: TBD

Room: TBD

Days: TBD

Time: TBD

Course Evaluation Method

Assessment: Assessment methods include exams, weekly laboratory reports, research papers, class presentations. Students may also be evaluated based on their participation in discussions and group projects.

5905 - Graduate Student Assessment:

- In-class quizzes (20%)
- Midterm examination (20%)
- Weekly Lab Reports (20%)
- Final 5-page Literature Review Paper + Presentation (40%)

Course Format: The course is typically structured around lectures, laboratory sessions, and interactive discussions. Students will have the opportunity to engage with cutting-edge research articles, case studies, and planned guest lectures from experts in the field.

Final Project:

Graduate students currently engaged with neuroscience/biomechanics research labs at FAU will further advance their work by preparing a course relevant 5-7 page review paper in the student's field of study. The written manuscript will accompany an end-of-semester 10 minute in-class presentation on their work. This final research paper and presentation will make up 40% of the students

Course Grading Scale

Grade 90 and above: "A", 86-89: "A-", 82-85: "B+", 78-81: "B", 74-77 : "B-", 73-76: "C+", 69-72: "C", 65-68: "C-", 61-64: "D+", 57-60: "D", 51-56: "D-", 50 and below: "F."

Policy on Makeup Tests, Late Work, and Incompletes (if applicable)

There are no late assignments. There will be no make-up exams unless specifically approved by the instructor in advance or excused by official documentation (i.e. hospital discharge, police report…).

Regularly scheduled doctors' appointments are not acceptable excuses for missing an exam.

WE WILL ALWAYS MAKE ACCOMMODATION FOR CONFLICTS WITH RELIGIOUS OBSERVANCE, BUT THESE MUST BE COMMUNICATED WITH THE INSTRUCTOR IN ADVANCE OF THE EXAM.

Classroom Etiquette Policy (if applicable)

Class attendance optional but recommended.

Attendance Policy

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.

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/

Disability Policy

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/.

Code of Academic Integrity

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.

Required Texts/Readings

Scientific Writing and Communication 5th Edition
by Angie Hofmann

Tentative Topical Outline

Week-by-Week Class Schedule:

Week 1: Syllabus Overview + Introduction to Lab Safety

- Monday (Lecture) – Syllabus + Introduction to Biomedical Research
- Wednesday (Lab) - Introduction to Lab Environment + Safety

Week 2: Biomaterials & Applications in Biomedical Research

- Monday (Lecture) – Materials, Biocompatibility, Biomimetics, Biosimilars
- Wednesday (Lab) – Lab setup / Lab equipment / Sterile field / Reagent Prep

Weeks 3: Experiment Design & Methods

- Monday (Lecture) – in vivo, ex vivo, in-situ, translational models, clinical trials
- Wednesday (Lab) – Reviving human cells from -80 C freeze + seeding cells.

Weeks 4: Data

- Monday (Lecture) – Quantitative Data, Quasi-Quantitative, and Qualitative Data
- Wednesday (Lab) – Cell Culture maintenance, and characterization of viability

Weeks 5: Statistics I

- Monday (Lecture) – Introduction to data description and evaluation
- Wednesday (Lab) – Cell detachment + Re-seeding + Cell Scaffolds

Weeks 6: Statistics II

- Monday (Lecture) – Intro to Analysis (ANOVA, 2-way ANOVA, F-dist…)
- Wednesday (Lab) – Cell detachment + Re-seeding + Cell Scaffolds

Weeks 7: MIDTERM REVIEW & EXAM

- Monday (Lecture) – Midterm Review
- Wednesday (Lab) – Cell & Tissue FIxation

Weeks 8: MIDTERM EXAM

- Monday (Lecture) – In-Class Exam
- Wednesday (Lab) – Immunohistochemistry (IHC), Immunofluoresence (IF) Staining

Weeks 9: Presentation Workshop I

- Monday (Lecture) – Introduction to Research Writing
- Wednesday (Lab) – Continued IHC/IF staining

Weeks 10: Presentation Workshop II

- Monday (Lecture) – Research Writing - Abstracts
- Wednesday (Lab) – Introduction to IF Microscopy I

Weeks 13: Presentation Workshop III

- Monday (Lecture) – Research Writing – Materials + Methods Sections
- Wednesday (Lab) – Introduction to IF Microscopy II

Week 14: Presentation Workshop IV

- Monday (Lecture) – Research Writing – Results Sections
- Wednesday (Lab) – SEM, TEM, Stress/Strain Analysis

Week 15: STUDENT PRESENTATIONS

- Monday (Lecture) – STUDENT PRESENTATIONS
- Wednesday (Lab) – STUDENT PRESENTATIONS

Week 16: STUDENT PRESENTATIONS

- Monday (Lecture) – STUDENT PRESENTATIONS
- Wednesday (Lab) – STUDENT PRESENTATIONS