FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Graduate Programs

Department Biomedical Science

College Medicine

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

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

Prefix PCB **Number** 6818	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code**	**Type of Course** Lecture	**Course Title** Multi-omics health and disease

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

Effective Date *(TERM & YEAR)*
Fall 2025

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

Course Description *(Syllabus must be attached; see Template and Guidelines)*

In the rapidly evolving fields of fundamental biology research and biomedicine, multi-omics studies combining genomics, transcriptomics, proteomics, and other modalities - are becoming increasingly prevalent. These integrative approaches, applied at both bulk and single-cell resolutions, have the power to identify novel biomarkers in disease and uncover the complex biological mechanisms within the context of health and disease.

Certificate ... electives ... Biomedic...

Prerequisites
Permission of instructor

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

Registration Controls *(For example, Major, College, Level)*
Permission of instructor

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
N/A

Faculty Contact/Email/Phone
Dr. Jianning Wei jwei@health.fau.edu 561-297-0(

List/Attach comments from departments affected by new course

Approved by	***Date***
Department Chair marc kantorow	1/8/2025
College Curriculum Chair marc kantorow	1/8/2025
College Dean marc kantorow	1/8/2025
UGPC Chair	02/06/2025
UGC Chair	02/06/2025
Graduate College Dean	02/06/2025
UFS President	
Provost	

Email this form and syllabus to UGPC@fau.edu 10 days before the UGPC meeting.

FLORIDA ATLANTIC UNIVERSITY

PCB 6933-002 15709

Multi-omics health and disease

Date: Tuesday, Thursday 12:30 PM - 1:50 PM

3 Credit(s)

Fall 2024 - 1 Full Term

Instructor Information

Jianning Wei
Email: jwei@health.fau.edu
Classroom location: Biomedical Science Building, Room 314

Office: Biomedical Science Building, Room 210
Office Hours: Tuesday and Thursday 2:00-2:30, or by appointment
Phone: 561-297-0002

Course Description

Special Topics
Prerequisite: Permission of instructor
Topics of interest to students in Biomedical Science, such as clinical microbiology and protein misfolding and disease.
Variable title

In the rapidly evolving fields of fundamental biology research and biomedicine, multi-omics studies—combining genomics, transcriptomics, proteomics, and other modalities—are becoming increasingly prevalent. These integrative approaches, applied at both bulk and single-cell resolutions, have the power to identify novel biomarkers in disease and uncover the complex biological mechanisms within the context of health and disease.

This course offers students an in-depth understanding of the conceptual principles underlying genomics, transcriptomics, proteomics, and metabolomics. We will cover various state-of-the-art multi-omics methods and explore their practical applications in both fundamental research and medical contexts.

Students should have a foundational understanding of genetics, protein biology, and molecular and cellular biology.

Instructional Method

In-Person
Traditional concept of in person. Mandatory attendance is at the discretion of the instructor.

Required Texts/Materials

No text book is required

Recommended Readings and Materials

will be provided during the lecture

Course Objectives/Student Learning Outcomes

Through practical sessions utilizing databases from single-cell and bulk multi-omics studies, students will gain hands-on experience in data exploration and analysis. They will learn to address critical questions related to human health and disease, preparing them to understand the cutting-edge advancements in the field of multi-omics, paving the way for their future endeavors in research and clinical field.

Faculty Rights and Responsibilities

Florida Atlantic University respects the rights of instructors to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede their exercise. To ensure these rights, faculty members have the prerogative to:

• Establish and implement academic standards.

• Establish and enforce reasonable behavior standards in each class.

• Recommend disciplinary action for students whose behavior may be judged as disruptive under the Student Code of Conduct University Regulation 4.007.

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/.

Course Evaluation Method

•Attendance (10%)

•Discussion (10%)

•Five essay questions based on case studies (80%, 16 each)

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.

Attendance Policy Statement

Students are expected to attend all 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.

Religious Accommodation Policy Statement

In accordance with the rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs regarding admissions, registration, class attendance, and the scheduling of examinations and work assignments. University Regulation 2.007, Religious Observances, sets forth this policy for FAU and may be accessed on the FAU website at www.fau.edu/regulations.

Any student who feels aggrieved regarding religious accommodations may present a grievance to the executive director of The Office of Civil Rights and Title IX. Any such grievances will follow Florida Atlantic University's established grievance procedure regarding alleged discrimination.

Time Commitment Per Credit Hour

For traditionally delivered courses, not less than one (1) hour of classroom or direct faculty instruction each week for fifteen (15) weeks per Fall or Spring semester, and a minimum of two (2) hours of out-of-class student work for each credit hour. Equivalent time and effort are required for Summer Semesters, which usually have a shortened timeframe. Fully Online courses, hybrid, shortened, intensive format courses, and other non-traditional modes of delivery will demonstrate equivalent time and effort.

Course Grading Scale

Letter Grade	Letter Grade
A	94 - 100%
A-	90 - 93%
B+	87 - 89%
B	83 - 86%
B-	80 - 82%
C+	77 - 79%
C	73 - 76%
C-	70 - 72%
D+	67 - 69%
D	63 - 66%

Letter Grade	Letter Grade
D-	60 - 62%
F	Below 60

Grade Appeal Process

You may request a review of the final course grade when you believe that one of the following conditions apply:

• There was a computational or recording error in the grading.

• The grading process used non-academic criteria.

• There was a gross violation of the instructor's own grading system.

University Regulation 4.002 of the University Regulations contains information on the grade appeals process

Policy on Make-up Tests, Late work, and Incompletes

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.

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.

Artificial Intelligence Preamble

FAU recognizes the value of generative AI in facilitating learning. However, output generated by artificial intelligence (AI), such as written words, computations, code, artwork, images, music, etc., for example, is drawn from previously published materials and is not your own original work.

FAU students are not permitted to use AI for any course work unless explicitly allowed to do so by the instructor of the class for a specific assignment. **[Policy 12.16 Artificial Intelligence]**

Class policies related to AI use are decided by the individual faculty. Some faculty may permit the use of AI in some assignments but not others, and some faculty may prohibit the use of AI in their course entirely. In the case that an instructor permits the use of AI for some assignments, the assignment instructions will indicate when and how the use of AI is permitted in that specific assignment. It is the student's responsibility to comply with the instructor's expectations for each assignment in each course. When AI is authorized, the student is also responsible and accountable for the content of the work. AI may generate inaccurate, false, or exaggerated information. Users should approach any generated content with skepticism and review any information generated by AI before using generated content as-is.

If you are unclear about whether or not the use of AI is permitted, ask your instructor before starting the assignment.

Failure to comply with the requirements related to the use of AI may constitute a violation of the **Florida Atlantic Code of Academic Integrity, Regulation 4.001.**

Proper Citation: If the use of AI is permitted for a specific assignment, then use of the AI tool must be properly documented and cited. For more information on how to properly cite the use of AI tools, visit **https://fau.edu/ai/citation**

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 therapy, group therapy, and crisis services, to name a few - offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/

Student Support Services and Online Resources

- Center for Learning and Student Success (CLASS)
- Counseling and Psychological Services (CAPS)
- FAU Libraries
- Math Learning Center
- Office of Information Technology Helpdesk
- Center for Global Engagement
- Office of Undergraduate Research and Inquiry (OURI)
- Science Learning Center
- Speaking Center
- Student Accessibility Services
- Student Athlete Success Center (SASC)
- Testing and Certification
- Test Preparation
- University Academic Advising Services
- University Center for Excellence in Writing (UCEW)
- Writing Across the Curriculum (WAC)

Course Topical Outline

Title	Multi-omic integration for understanding health and disease
8/20	Course overview and introduction of the course of the structure.

Session 1: DNA: genomics

8/22	Basic genomics
8/27	Genomic technologies, human genome project
8/29	Application: Genomic data visualization UCSC
9/3	Genomics in health and disease
9/5	Genomics in health and disease-continued
9/10	Case study

9/12	Ethical and future direction in genomics
Session 2: RNA: Transcriptomics	
9/17	Transcriptome Basics and principle,
9/19	Bulk RNA-seq, data analysis/visualization
9/24	data analysis/visualization
9/26	scRNA-seq, data analysis/visualization and presentation-continued
10/1	RNA-seq in health and disease (Rm314 is not available)
10/3	RNA-seq in health and disease-continued
10/8	applications
10/10	Case studies
Session 3: Protein: proteomics	
10/15	Principle and approaches for proteomics,
10/17	Principle and approaches for proteomics-continued
10/22	Understand protein network analysis
10/24	Explore proteomics database
10/29	Protein expression changes in healthy and disease
10/31	PPI changes in healthy and disease
11/5	applications
11/7	Case studies
Session 4: Metabolites: metabolomics	
11/12	Principle and approaches
11/14	explore human metabolome database (HMDB)
11/19	Metabolomics in health and disease
11/21	Case studies
Session 5: Integrated approach to study diseases	
11/26	Case studies: Integrative omics approaches provide biological and clinical insights: examples from mitochondrial diseases.
11/27-12/1	Thanksgiving Break
Reading day 12/2-12/4	
12/5	Reading day, no class
12/7	Reading day, no class
No final exam	

Subject: FW: College of science overlap
Date: Monday, January 27, 2025 at 08:36:56 Eastern Standard Time
From: Zhixiao Xie
To: Christine Kraft
CC: Marianne Porter
Attachments: ncp-pcb6818-multi-omics-health-disease.pdf

Hi Christine,
Please see email below from Biology the comments on a new course proposal PCB 6818 Multi-omics health and disease.

Best Regards,

Zhixiao Xie
Associate Dean for Graduate Studies
Professor of Geosciences
Charles E. Schmidt College of Science
Florida Atlantic University

From: Sarah Milton <smilton@fau.edu>
Sent: Monday, January 27, 2025 8:26 AM
To: Zhixiao Xie <xie@fau.edu>
Cc: Tobin Hindle <thindle@fau.edu>; Marianne Porter <mporte26@fau.edu>
Subject: Re: College of science overlap

Greetings -
I asked my faculty to look this over and compare to our Bioinformatics course. It seems like there will be as much or more discussion of the methodologies by which the data are generated than there will be training on how to use the available tools to analyze the data. If this is the case, then the two courses will complement each other nicely. If this is not the case then there is a quite a lot of overlap...

They should, however, also check with computer science and engineering. They have two bioinformatics courses with which it could also potentially conflict.

Perhaps they might emphasize applications in human medicine throughout the topics in the syllabus rather than only/primarily keeping biomed application as it's own section at the end of the syllabus. This should help them to more clearly differentiate it from the other related courses.

Best,
Sarah

Dr. Sarah L. Milton

Professor and Chair
Department of Biological Sciences
FAU

From: Zhixiao Xie <xie@fau.edu>
Sent: Tuesday, January 21, 2025 3:16 PM
To: Sarah Milton <smilton@fau.edu>
Cc: Tobin Hindle <thindle@fau.edu>; Marianne Porter <mporte26@fau.edu>
Subject: Re: College of science overlap

Hi Sarah,
Could you please take a quick look at attached a new course proposal and let us know whether Biology is okay with it?

Thank you,
Zhixiao

From: Marianne Porter <mporte26@fau.edu>
Sent: Tuesday, January 21, 2025 3:10 PM
To: Zhixiao Xie <xie@fau.edu>; Tobin Hindle <thindle@fau.edu>
Subject: College of science overlap

Hi All,
Here is the link for that multiomics course, is there overlap anyway in the COS?

Marianne

Marianne Porter, PhD
Florida Atlantic Biomechanics Lab
(The FAB Lab)
www.mepbiomechanics.com
Associate Professor
Department of Biological Sciences
Co-Director, Marine Science and Oceanography Master's Program
Florida Atlantic University
Boca Raton, FL 33431
www.fau.edu