# NEW/CHANGE PROGRAM REQUEST
## Graduate Programs

FLORIDA ATLANTIC UNIVERSITY

UGPC Approval _____
UFS Approval _____
Banner _____
Catalog _____

**Department** Biomedical Science

**College** Medicine

**Program Name**
Genomics and Predictive Health Certificate

☐ **New Program***

☑ **Change Program***

**Effective Date**
*(TERM & YEAR)*
Spring 2025

**Please explain the requested change(s) and offer rationale below or on an attachment.**

This is a change to the Genomics and Predictive Health Certificate program requirements. The change is to add the special topics course Multi-Omic Applications Towards Understanding Health and Disease as a new requirement. This change also removes Emerging Applications in Oncology Pharmacogenomics, Communicating in the Age of Predictive Health and Implementing Learning Health Systems as elective course requirements and to substitute all Biomedical Science electives as elective courses for the Certificate. Attached is a copy of the Multi-omic applications course syllabus and a list of elective courses.

*All new programs and changes to existing programs must be accompanied by a catalog entry showing the new or proposed changes.

**Faculty Contact/Email/Phone**
Dr. Marc Kantorow mkantoro@health.fau.edu 561-297-2910

**Consult and list departments that may be affected by the change(s) and attach documentation**

| ***Approved by*** | | ***Date*** |
|---|---|---|
| Department Chair | marc kantorow | 2/28/24 |
| College Curriculum Chair | marc kantorow | 2/28/24 |
| College Dean | marc kantorow | 7/22/24 |
| UGPC Chair | | |
| UGC Chair | | |
| Graduate College Dean | | |
| UFS President | | |
| Provost | | |

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

# GENOMICS AND PREDICTIVE HEALTH
# GRADUATE CERTIFICATE

*(Minimum of 12 credits required)*

The Genomics and Predictive Health certificate is offered to provide master's and Ph.D. students an integrated background in the field of genomics and predictive health. The certificate program covers advancements in the field of personalized medicine, DNA sequencing technologies and commercial applications of genetic research. A minimum of 12 graduate credits of coursework is required to provide core experiences in the various predictive health domains (disease discovery, customized therapies and prevention). Although the program is centered within the Charles E. Schmidt College of Medicine, faculty from other FAU colleges and institutions contribute to the program's success, and students from many departments and colleges throughout the University are welcomed.

Genomics and predictive health is a broad, interdisciplinary field focused on understanding and improving human health. It incorporates diverse areas of specialized investigation that share this common goal including anatomy, biochemistry, cell biology, clinical sciences, cognitive sciences, development, genetics, immunology, medical sciences, microbiology, molecular biology, pathology, pharmacology, psychology and others.

**Admission Requirements**
Admission to and completion of this program is overseen by the Graduate Program Office in the Charles E. Schmidt College of Medicine. For admission, the applicant must satisfy the following criteria:

1. Must be enrolled in an FAU master's or Ph.D. program including, but not limited to, Biomedical Science, Biology, Biochemistry, Complex Systems and Brain Sciences, Integrative Biology, Psychology and Bioengineering. Students must have approval of their graduate program to enroll and must remain in good standing with their graduate program to continue in the certificate program;
2. Must meet with the Office of Graduate Programs' advisor to discuss program goals and requirements and obtain permission to enroll.

**Program Requirements**
The certificate program requires 12 credits that are designed to be tailored to the individual student with previous coursework and future goals in mind.

| | | |
|---|---|---|
| **Required Courses (9 credits)** | | |
| Human Genetics | PCB 6665 | 3 |
| Integrating Genomics into Predictive Health | PCB 6667 | 3 |
| Multi-omic applications towards understanding health and disease (Special Topics) | PCB 6933 | 3 |
| ~~Graduate Seminars (1 credit per semester on a continuous basis for total of 3 credits)~~ | ~~PCB 6934~~ | ~~3~~ |
| **Complete one of the following Graduate Biomedical Science elective courses (3 credits)** | | |
| ~~Emerging Applications in Oncology and Pharmacogenomics~~ | ~~PCB 6230~~ | ~~3~~ |
| ~~Special Topics (Communicating in the Age of Predictive Health)~~ | ~~PCB 6933~~ | ~~3~~ |
| ~~Special Topics (Implementing Learning Health Systems)~~ | ~~PCB 6933~~ | ~~3~~ |

| | | |
|---|---|---|
| Integrated Morphology 1 | BMS 6102C | 4 |
| Integrated Morphology 2 | BMS 6104C | 4 |
| Advanced Molecular and Cellular Biology | PCB 5532 | 3 |
| Clinical Microbiology | BMS 6303 | 3 |
| Autonomic Function and Diseases | BMS 6523 | 3 |
| Fundamentals of General Pathology | BMS 6601 | 3 |
| Brain Diseases: Mechanism and Therapy | BMS 6736 | 3 |
| Bioinformatics | BSC 6458C | 3 |
| Biomedical Data and Informatics | BSC 6459 | 3 |
| Cognitive Neuroscience | ISC 5465 | 3 |
| Biomedical Science Core Technologies Laboratory | GMS 6091C | 3 |
| Macromolecular Therapy for Human Diseases | GMS 6301 | 3 |
| Molecular Basis of Disease and Therapy | GMS 6302 | 3 |
| Pharmacology | GMS 6513 | 3 |
| Biomedical Concepts and Translational Applications | GMS 6841 | 3 |
| Host Defense and Inflammation | MCB 6208 | 3 |
| Advanced Molecular Genetics of Aging | PCB 5245 | 3 |
| Neurobiology of Addiction | PCB 5844 | 3 |
| Advanced Cell Physiology | PCB 6207 | 3 |
| Molecular Basis of Human Cancer | PCB 6235 | 3 |
| Advanced Immunology | PCB 6236 | 3 |
| Problem-Based Immunology | PCB 6238 | 3 |
| Tumor Immunology | PCB 6239 | 3 |
| Molecular Biology of the Cardiovascular System and Cardiac Disease | PCB 6705 | 3 |
| Adult Neurogenesis | PCB 6848 | 3 |
| Physiology of the Heart | PCB 6885 | 3 |
| Special Topics (general) | PCB 6933 | 1-8 |
| Graduate Seminars | PCB 6934 | 1 |
| Biological Vision | PSB 5117 | 3 |
| Principles of Neuroscience | PSB 6037 | 3 |
| Cellular and Molecular Neuroscience | PSB 6345 | 3 |

| | | |
|---|---|---|
| Systems and Integrative Neuroscience | PSB 6346 | 3 |
| Developmental Neurobiology | PSB 6515 | 3 |
| Radiation Biology | RAT 6204 | 3 |
| Radiation Protection and Safety | RAT 6310 | 3 |

Link to Course Descriptions for the Charles E. Schmidt College of Medicine

Temporary draft

**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 | |