Florida Institute of Technology

ADDING A NEW COURSE TO THE CURRICULUM

This is a request for reactivation of a course in the system. ☐ Yes ☐ No

New courses are available beginning with the fall term in which they appear in the University Catalog.

SUBJECT B I O COURSE NO. 4 3 0 5 CREDIT HOURS 3 ACADEMIC YEAR TO BE ADDED TO THE FILE Fall 2016

(eg, CS1) (eg, 1301)

Classify level if 1000-level+ and no co- or prerequisites

CLASS HOURS 3 LECTURE HOURS 3 LAB HOURS 0 CONTACT HOURS (CEU ONLY) 0

DEPARTMENT Biological Sciences SCHEDULE TYPE Lecture

(eg, Computer Sciences) (eg, Lecture, Lab or Special Topics/Project)

☐ COLLEGE OF AERONAUTICS – 23 ☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS – 25
☐ NATHAN M. BISK COLLEGE OF BUSINESS – 24 ☐ COLLEGE OF SCIENCE – 26
☐ COLLEGE OF ENGINEERING – 1 ☐ EXTENDED STUDIES / NATHAN M. BISK COLLEGE OF BUSINESS – 90

COMPUTER TITLE Restricted to 25 characters, including spaces Molecular Biol of Disease Dual-Prefix ☐ Bi-Level ☐ Full-Load ☐

CATALOG TITLE Molecular Basis of Human Disease

CATALOG DESCRIPTION OF COURSE Restricted to 350 characters, including spaces

Focuses on understanding how the molecular mechanisms used to regulate basic cellular processes are disrupted in human diseases. Emphasizes the use of genomics in identifying the causes of diseases, and stresses strategies for translating basic knowledge about cellular processes into new therapeutics.

This description has been approved by the catalog office.

Catalog & Curriculum Manager Date

In addition, please attach a course syllabus and/or more detailed description.

RESTRICTIONS

Prerequisite BIO 2110 ☐ Corequisite 0

Course Number

and or

Prerequisite BIO 4010 ☐ Corequisite 0

Course Number

and or

Prerequisite 0 ☐ Corequisite 0

Course Number

and or

GRADES TO BE ISSUED

A, B, C, D, F ☐ A, B, C, D, F, CEU/Audit

A, B, C, D, F, CEU/U ☐ CEU

S, U ☐ P, F

Other

ADDITIONAL RESTRICTION

(e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information and the date term the course may be removed from the system.

SUBJECT Alpha Prefix (e.g., CS1) COURSE NO. (eg, 1301) TERM TO INACTIVATE

☐ Yes ☐ No Will this course be used to measure program-level student learning outcomes? If yes, review and signature required. **

☐ Yes ☐ No Will this course be used to satisfy the scholarly inquiry requirement? If yes, attach "Q" material for review.

☐ Yes ☐ No Will this course impact any existing programs? If yes, attach "Changing Graduation Requirements" form for each program that is impacted.

APPROVALS: On completion of description and course number verification, affix appropriate signatures as indicated, and submit completed form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval.

Organizer 9/18/15

Richard B. Aronson 9/21/15

Chair, Graduate Council

Date

Department Head/Program Chair 9/22/15

Chair, Undergraduate Curriculum Committee

Date

Dean or Associate Dean

Date

**Vice President for Institutional Effectiveness

Catalog & Curriculum Manager

Date

Florida Institute of Technology • Office of the Registrar

150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7827
Molecular Basis for Human Disease

Dr. Julia Grimwade
Office Rm 256 LSB
Telephone: 674-7152
Email: grimwade@fit.edu
Office hours:

Topic: Traditionally, the study of disease and the treatment of disease has focused on physiology, including the normal or perturbed functioning of organ systems. However, advances in molecular and cell biology have allowed us to examine disease at the level of individual genes and proteins, and how changes in cellular function disrupt the entire system. This course will review concepts in molecular and cell biology, and discuss how these apply to the understanding and treatment of disease. The gathering and use of genomic information will also be covered.

Information sources:

Journal articles: I will give you recently published articles to read for class discussions; I will tell you the references in class and when possible provide you with pdf versions on the Canvas site. All assigned reading needs to be completed prior to class.

Seminars: You are encouraged to attend the departmental seminar on Thursday afternoons at 3:30 in the Olin LSB auditorium. You will be told about any specific speakers that are particularly relevant to this course.

Class time: The lectures will complement the material you read. Class discussions are intended to help you develop critical thinking and communication skills, and are an integral part of the course. PowerPoint presentations will be posted on the course website. I do not guarantee that the presentations will be posted before the class meets.

Grading: There are a total of 1000 points that can be earned in this class. The usual grade scale (90%-100%=A, 80%-90%=B, etc.) applies.

Exams: 350 points. Exams will test you on material covered in the modules (see below). The final is cumulative.

Exam 1: 100 points
Exam 2: 100 points
Final: (cumulative) 150 points.

Please see me in advance if you are unable to take the exam at the scheduled time. Make-up exams are possible, but not guaranteed.

Class participation: 250 points. You are expected to attend class. You are also expected and required to participate in class discussions every class period. You will need to be prepared for these discussions by doing the assigned reading/homework before the class period.

Writing assignments: 200 points, total. You will have a writing assignment for 2 modules in the course. The details of these assignments will be given to you in class and will be posted on the canvas site. For all writing/presentation projects, I expect the writing to be your own, and I will spend some time going over the principles of what constitutes plagiarism, so that there is no doubt that you are aware of what is acceptable and what is not. Plagiarism will result in a grade of 0 points for the assignment.

Class Presentations: 200 points, total. There will be student presentations associated with each module, with each student making 2 presentations (about 15 minutes each) during the semester. Details will be given in class and will be posted on the canvas site. All students will submit written reviews of each presentation, and the reviews will form part of the presentation grade (for both the presenter and the reviewer).
Sample Lecture Outline

I. Identifying causes of human disease
   1. mutations in single gene
      a. genetic linkage
      b. mapping and characterization of disease genes
      c. Human genome sequencing
   2. multigenic and complex diseases
      a. Genome wide association studies (GWAS)
      b. personalized medicine
   3. environmental
      a. infectious disease
      b. environmental toxins or other factors
      c. epigenetic changes caused by environmental toxins

II. Molecular mechanisms of disease pathology
   A. Infectious agents
      1. bacterial (example: cholera)
         a. cAMP and its cellular functions
         b. action of cholera toxin
      2. viral (examples include Ebola, influenza, HPV)
   B. Diseases associated with altered gene/protein function
      1. Loss of protein function-cystic fibrosis
         a. membrane transporter proteins
         b. CFTR, normal function
         c. Normal and abnormal protein trafficking in cells
         d. therapies based on understanding of molecular defect-ivectacor
      2. Increased gene function-Inflammatory diseases-COPD
         a. chromatin structure and gene activation
         b. inflammatory cytokines and inflammation
         c. epigenetic changes caused by environmental factors
   3. Presentation topic-class choice

III. Disease associated altered protein structures; conformational diseases
    1. protein structure, folding, degradation and stress responses
    2. neurodegenerative disease-Alzheimer’s Disease, class choice
    3. challenges associated with treatment of conformational diseases