

Biology Registration Newsletter for Fall 2020 Courses

This newsletter contains the information most relevant for registration for Fall 2020 courses. A detailed description of policies, graduation requirements, *etc.* can be found in the Biology Student Handbook: <https://biology.tcnj.edu/resources-for/current-students/biology-student-handbook/>

I. Registration Logistics

A. Registration period. Registration windows are open April 7th – 17th. The opening of your specific window, both date and time, can be found in PAWS and is based on earned course units. The last day to register for Fall 2020 is the end of the first week of classes of Fall 2020, though many courses will be closed long before then (see C., below).

B. “Meet” with your advisor, as possible. You will be prevented from registering until a “registration hold” is removed from your PAWS account. Given our remote operations, each faculty member will be advising students in the way that works best for their situation and their students’ situations. Be patient.

C. Closed courses. If you are unable to register for a course section because it is full or the seats are reserved for other students, you may put your name on the wait list. Wait list protocols vary by department and are summarized here: <https://biology.tcnj.edu/resources-for/current-students/>

Protocols may have changed with the switch to remote operations. For example, Biology wait lists are being handled as described here: <https://biology.tcnj.edu/waitlists-for-fall-2020/>

You cannot put your name on a waiting list until your registration window has opened. Do not ask to be signed into a course above the cap unless there are exceptional circumstances (*e.g.*, you will not graduate on time), and note that Chemistry and Physics courses cannot accept anyone above the cap.

D. Off-campus study. Off-campus study (*e.g.*, a summer course) at a NJ county college is regulated by NJ Transfer (njtransfer.org). Off-campus study at a non-NJ community college or a domestic four-year college must be approved by the chair of the department in which the course(s) would be offered at TCNJ. Any Biology major interested in studying abroad should contact the Office of Global Engagement and speak to their advisor well before they wish to travel abroad. Any course to be taken abroad for biology option credit must receive approval of the chair before you enroll in the abroad course. Domestic or abroad, no credit will be given for online (distance learning) laboratory courses.

E. Holding seats. Registering in a course section in order to hold a seat for another student is a violation of TCNJ’s Academic Integrity Policy for both the student holding the seat and the student taking the held seat. Course registration will be monitored by the chair for anomalies suggestive of seat holding.

F. PAWS ID. Please include your PAWS ID number in any correspondence that concerns registration, enrollment, graduation requirements, or problems with your transcript.

G. Independent Study. If you know that you will be conducting research with a TCNJ faculty member for credit (BIO 393/493/494/495/496) in Fall 2020, you are asked to submit your Independent Study form for Dr. Pecor's digital signature at any time starting April 7th. This is especially relevant if you only plan to take three courses in Fall 2020. **DO NOT** enroll in a course that you have no intention of taking. The form is located here:

<https://recreg.tcnj.edu/wp-content/uploads/sites/166/2019/10/Independent-Study.pdf>

Confirm your enrollment with your mentor in terms of course number and course units, and send the completed form (minus your signature and the mentor's signature) to Dr. Pecor via email: pecor@tcnj.edu

II. Courses Offered

A. Fall 2020 (OE = organisms & evolution)

BIO 201	Foundations of Biological Inquiry
BIO 211	Biology of the Eukaryotic Cell
BIO 221	Ecology and Field Biology
BIO 231	Genetics
BIO 300	Course Assistant in Biology
BIO 301	Human Anatomy and Physiology I*
BIO 312	Microbiology
BIO 330	Mathematical Biology
BIO 332	Biology of Vertebrates (OE)
BIO 350	Biology of Fungi (OE)
BIO 370	Topics in Biology: Systematic Biology (OE)
BIO 393	Independent Research in Biology I
BIO 411	Animal Physiology (OE)
BIO 444	Molecular Immunology
BIO 461	Advanced Evolution
BIO 470	Topics in Biology: Plant Biochemistry
BIO 490	Student Teaching Biology
BIO 493/494	Independent Research in Biology II/Honors
BIO 495/496	Independent Research in Biology Capstone/Honors
BIO 498	Biology Seminar

* Not available as a major option for most Biology students.

B. Spring 2021 options courses likely to be offered (not guaranteed)

(OE = organisms & evolution)

BIO 302	Human Anatomy and Physiology II*
BIO 341	Biology of Seed Plants (OE)
BIO 399	Biology Research Internship
BIO 445	Cancer Genetics
BIO 451	Developmental Biology

BIO 470	Topics in Biology: Bacterial Pathogenesis
BIO 470	Topics in Biology: Animal Behavior
BIO 470	Topics in Biology: Bacterial Signaling and Gene Expression
BIO 470	Topics in Biology: Conservation Genetics
BIO 480	Neurobiology

* Not available as a major option for most Biology students.

III. Notes on Selected Courses

This is a brief reference for courses that are either new or have special attributes. Be sure to refer to PAWS for descriptions of all courses.

- A. BIO 300 Course Assistant in Biology.** There will be opportunities for students to serve as Course Assistants in Fall 2020. Being a course assistant provides advanced students with experience mentoring students in introductory and options courses. Course Assistants earn either 0.25 or 0.5 course units of elective credit, depending upon the expectations for the course with which they are affiliated. The courses needing assistants will be advertised later in the Spring 2020 semester.
- B. BIO 301 & 302 Human Anatomy and Physiology I & II.** Students who plan to pursue Physical / Occupational Therapy or Physicians' Assistant programs or are in an education program may count one of these two courses as a Biology major option with the chair's approval. These courses cannot serve as an option for most students and are not recommended for medical school preparation.
- C. BIO 330 Mathematical Biology.** In this course, we will focus on building and analyzing dynamic mathematical models (models that study how processes change in time) to understand the behavior of different biological systems. We will use mathematical tools like difference equations, differential equations, linear algebra and nonlinear analysis to study these biological processes.
- D. BIO 370 Topics in Biology: Systematic Biology.** Systematic Biology explores how we can use the study of evolution, specifically phylogenetics, to discover the historical events that have shaped biodiversity into what we observe today. This course is taught with a computer lab (no prior computer experience necessary) in which students will work directly with DNA sequence data, morphology, and geographical data to ask and answer questions about evolutionary history. Students are assessed by exams, homework and class participation, and a semester long research project.
- E. BIO 393 Independent Research in Biology I.** This course offers students an opportunity to learn about techniques used for biology research. It is taken typically during the sophomore year. Under the direct supervision of a faculty member, students engage in original research experiments, generating new knowledge in the laboratory and/or field. This course is designed to give the student an opportunity to explore research methods and experimental techniques needed to develop an independent research project. Students are permitted to repeat the course one time, if more exploration is needed, or they may proceed directly to BIO 493 to develop an independent project, in collaboration with the faculty mentor. Interested students should contact individual faculty members with whom they are interested in working in order to register for Independent Research.

- F. BIO 470 Topics in Biology: Plant Biochemistry.** Plants are among the most successful organisms on the planet inhabiting nearly all types of environments and dealing with all sorts of challenges. Broadly, the success of plants could be attributed to their diverse biochemistry. Plants are not only the major autotrophic organisms that produce the major macromolecules that nearly all other forms of life depend on, but they also produce a staggering number of specialized metabolites. Overall, the plant kingdom is estimated to produce more than 300,000 metabolites, exceeding the numbers of metabolites found in mammals (~60,000) and microbes (~100,000). These metabolites, in addition to mediating the interactions of plants with other organisms and their environment, have important pharmaceutical, agricultural and culinary advantages. In this course, we will explore the fundamental principles of biochemistry common to all organisms and delve into the world of plant biochemistry to understand how plants generate diverse types of metabolites from relatively few biochemical pathways. We will discuss the scientific approaches, techniques and tools used in studying plant biochemical pathways, explore the evolution of biochemical pathways in different families of plants and study the applications of selected plant metabolite groups in medicine and agriculture.
- G. BIO 493/494 Independent Research in Biology II.** This course involves laboratory or field research under the direction of a faculty member at TCNJ and can be taken for up to 1 course unit/semester (a two-semester project is recommended). Typically, juniors and seniors enroll in Independent Research II. Interested students should contact individual faculty members with whom they are interested in working in order to register for Independent Research.
- H. BIO 495/496 Independent Research in Biology Capstone.** This course may substitute for BIO 498 Biological Seminar as the capstone course, but not as a biology option course. Students who wish to take BIO 495 Independent Research in Biology Capstone or BIO 496 Honors Independent Research in Biology Capstone should enroll in these classes during their *final* semester of independent research. This course involves pursuit of an original research project under the direction of a supervising professor. Results and conclusions serve as the basis of an oral or poster presentation to faculty and students as well as a written paper that has gone through multiple drafts and submitted to the faculty mentor and archived by the Department of Biology. Prerequisites: Completion of at least one course unit of BIO 493 or BIO 494 under the same instructor and a minimum overall GPA of 2.5.
- I. BIO 498A: Sociobiology.** In this seminar we will explore the biology of social behavior: behavioral interactions between individuals of the same species, such as courtship, aggression, and parenting. For decades, observations of social behavior have provided biologists, and non-scientists, with intriguing and sometimes spectacular examples of biological phenomena. In the context of evolutionary theory and The Modern Synthesis, many social behaviors are puzzling—on the surface, they seem hard to explain as an outcome of evolution due to natural selection acting on a population. Students will conduct and communicate in-depth literature-based research on a topic within the field of sociobiology. Research topics will span multiple levels of biological organization, from molecules (DNA) to ecosystems.
- J. BIO 498B: Plant Secondary Metabolism.** Plants are masters of biochemistry. On average, any plant species is estimated to have more than 7000 different metabolites,

each of which are substrates, intermediates or products of various biochemical pathways. Collectively, plants synthesize an astonishing diversity of metabolites amounting to more than 300,000. These diverse groups of metabolites have diverse functions in plants including defending them against herbivores or pathogens, serving as hormones or protecting plants from drought or ultraviolet light. In this course, we will survey the major biosynthetic pathways of secondary metabolites in plants and explore their evolution and functions. We will also study some applications of secondary metabolites in medicine and agriculture.