

Biotechnology (BTEC)

BTEC 1010. Fundamentals of Biotechnology I Career Survey BB. (3 Credits)

Explores careers in biotechnology with emphasis on central dogma of biology, DNA techniques, applications in biotech, and bioethics. Examines forensics and human cloning. Includes lab work.

Course Lab fee of \$26 applies.

BTEC 2010. DNA Manipulation and Analysis. (3 Credits)

Prerequisite(s): BTEC 1010 with a minimum grade of a C; BIOL 1610 and BIOL 1615, with minimum grade of C- in each

Facilitates the mastery of lab skills relevant to DNA technology including recombinant DNA cloning, DNA gel electrophoresis, polymerase chain reaction and DNA sequencing.

Course fee of \$86 for lab applies.

BTEC 2020. Protein Purification and Analysis. (3 Credits)

Prerequisite(s): BTEC 2010 with minimum grade of C

Teaches current techniques with protein production, purification, and analysis. Includes instruction and practice with polyacrylamide gel electrophoresis (PAGE), chromatography, western blot, and FPLC analysis.

Course fee of \$107 for lab applies.

BTEC 2030. Cell Culture Techniques. (2 Credits)

Prerequisite(s): BIOL 1615 with a minimum grade of a "C"

Teaches basics of eukaryote cell culture. Includes handling, storage, and maintenance of mammalian stocks. Emphasizes media preparation and sterile techniques. Includes in vitro labeling and transfection.

Course fee of \$195 for lab applies.

BTEC 2040. Advanced Nucleic Acid Laboratory. (3 Credits)

Prerequisite(s): BTEC 2010 with minimum grade of C

Teaches advanced nucleic acid modification and analysis methods. Includes site-directed mutagenesis, DNA sequencing, and RNA analysis methods, high-resolution DNA melting for genotyping and real-time PCR to quantitate DNA in samples. Incorporates methods to mutate 2 genes using CRISPR gene editing technology followed by RT-PCR to analyze gene expression (RNA isolation, creating cDNA, followed by real-time PCR).

BTEC 3300. Biomolecular Modeling and Simulations. (4 Credits)

Cross-listed with: CHEM 3300

Prerequisite(s): CHEM 3600 or BIOL 3600, and University Advanced Standing

Introduces students to the field of molecular modeling and simulations and to the wide range of problems that can be tackled using computational methods. Focuses on biomolecular simulations and computer-aided drug discovery. Emphasizes the connection between structure, dynamics, and function. Teaches application of algorithmic thinking to solving complex problems. Develops practical skills needed to perform simulations and analyze the results. Develops understanding of the inherent approximations and limitations of the methods for adequate assessment of modeling results. Covers topics such as molecular visualization and rendering, molecular dynamics simulations, and computer-aided drug discovery through virtual screening and small molecule docking.

BTEC 481R. Biotechnology Internship. (1-10 Credits)

Prerequisite(s): BIOL 1610 with a minimum grade of C-, junior standing in Biotechnology B.S. program, and instructor approval

Allows biotechnology majors to earn credit while obtaining practical and research experience as an intern in a government, nonprofit, private agency, or with an approved employer. Must be supervised by agency representative and faculty advisor. Department chairperson approval required and written contracts must be completed and signed. May be repeated for a maximum of 10 credits. May be graded credit/no credit.

BTEC 489R. Student Research. (1-4 Credits)

Prerequisite(s): BIOL 1610, CHEM 1210, BTEC 2010, Junior or Senior Standing, instructor permission, and University Advanced Standing

Provides guided research studies in biotechnology under the direction of a Biology Department mentor. Includes any combination of literature reviews, original research, and/or participation in ongoing departmental projects. Involves students in the methodology of original biology research. Requires preparation and presentation of oral and/or written reports. May culminate in results that will form the basis of the senior thesis in the major, if thesis option is chosen. May be repeated for 8 credits toward graduation.

BTEC 490R. Special Topics in Biotechnology. (1-4 Credits)

Prerequisite(s): BIOL 1610 with minimum grade of C-, and University Advanced Standing

Explores and examines special topics relating to the field of biotechnology. Emphasizes areas of rapid growth in biotechnology or current importance to society. May be repeated for a maximum of 18 credits toward graduation.

BTEC 494R. Student Seminar WE. (2 Credits)

Prerequisite(s): BTEC 2010 with minimum grade of C and University Advanced Standing

Requires students to research scientific literature, write a research paper, give oral presentations, and lead discussions on assigned biotechnology topics in specific areas of current research in biotechnology. May be repeated for up to 4 credits toward graduation.

BTEC 499R. Senior Thesis. (1-2 Credits)

Prerequisite(s): ENGL 2010, junior standing, instructor permission, and University Advanced Standing

Is for students who are nearing completion of a baccalaureate degree in Biotechnology with the thesis option. Assists students who are writing a thesis based only on library research, or those who have performed laboratory/field research under BTEC 499R. Provides experience in critically analyzing published literature and, if laboratory/field research was performed, comparing research results with the scientific literature. Is supervised by an appointed faculty member of the Department of Biology. Requires a technically accurate report on one's findings. Includes the opportunity to present the research results to students, faculty and the community at a Department of Biology seminar and/or other appropriate venues (e.g., conferences). May be repeated for a maximum of 2 credits toward graduation.