

# BESC - BIOENVIRONMENTAL SCI (BESC)

## BESC 201 Introduction to Bioenvironmental Sciences

**Credits 3. 3 Lecture Hours.** A broad survey of environmental science with an emphasis on scientific literacy, current events, global and international issues and historic context.

## BESC 203 Microbiomes and Their Environment

**Credits 3. 3 Lecture Hours.** Fundamentals of microbiomes; emphasis of interactions between microbiomes and their environments; assessment of impacts of microbiome functions on human, animals, plants and environmental processes; consideration of social and legal implications of microbiome engineering.

## BESC 204 Molds and Mushrooms: The Impact of Fungi on Society and the Environment

**Credits 3. 3 Lecture Hours.** Introduction to the fungi and the impact these organisms have on society and the environment; includes life cycles of fungi; classification schemes, pathogens of plants, animals and humans, fungi in food production; toxic fungi and the law, and others.

## BESC 285 Directed Studies

**Credits 1 to 4. 1 to 4 Other Hours.** Individually supervised research or advanced studies for lower-division undergraduate students to independently investigate special problems not available in existing courses. **Prerequisite:** Approval of instructor in consultation with departmental advisor.

## BESC 291 Research

**Credits 1 to 4. 1 to 4 Other Hours.** Research conducted under the direction of faculty member in bioenvironmental sciences. May be repeated 3 times for credit. **Prerequisites:** Freshman or sophomore classification and approval of instructor.

## BESC 311 International Perspectives on Environmental Issues

**Credits 3. 3 Lecture Hours.** Role of the United Nations and other institutions that promote international cooperation toward sustainable development goals; influence of cultural views on critical thinking about environmental issues, including population, water and agriculture, biodiversity and energy. **Prerequisite:** Junior classification or approval of instructor; must attend two mandatory pre-departure meetings.

## BESC 314 Pathogens, the Environment and Society

**Credits 3. 3 Lecture Hours.** The impact of microorganisms (bacteria, fungi and viruses) on the development of modern culture and society; the role pathogens played in the history of mankind and the influence of the changing environment on emerging diseases. **Prerequisite:** Junior or senior classification.

## BESC 320 Water and the Bioenvironmental Sciences

**Credits 3. 3 Lecture Hours.** Critical understanding of salient issues relating to fresh water as a limited and important bioenvironmental resource. **Prerequisite:** Junior or senior classification.

## BESC 357 Biotechnology for Biofuels and Bioproducts

**Credits 3. 3 Lecture Hours.** Biotechnology issues in developing bioenergy as a renewable energy source; emphasis on the three generations of bioenergy and enabling technologies; special topics include recent advances in bioenergy research, government policy, and industrial development. **Prerequisite:** BESC 201 and junior or senior classification.

## BESC 367 U.S. Environmental Regulations

**Credits 3. 3 Lecture Hours.** Investigation of the legal infrastructure of the U.S. associated with regulating environmental impacts; examination of major U.S. environmental statutes associated with air and water quality, toxic substances, waste and hazardous substance release, energy and natural resources; review the relationship between U.S. policy and international environmental regulations. **Prerequisites:** BESC 201, ENSS 105 or RWFM 308.

## BESC 401 Bioenvironmental Microbiology

**Credits 3. 3 Lecture Hours.** The interactions of microorganism in diverse environments; applied aspects of microbial interactions in the environment, their effects on the environment, and potential use to solve environmental problems. **Prerequisites:** CHEM 222 or CHEM 227; or approval of instructor.

## BESC 402 Microbial Processes in Bioremediation

**Credits 3. 3 Lecture Hours.** Metabolic pathways of microbes involved in the biodegradation of hazardous materials; ecological requirements for biotreatability of contaminated sites; emphasis on factors affecting microbial growth; strategies for in situ bioaugmentation. **Prerequisite:** CHEM 222 or CHEM 227.

## BESC 403 Sampling and Environmental Monitoring

**Credits 3. 2 Lecture Hours. 3 Lab Hours.** Introduction to environmental sampling and methodology; strategies and analyses of sampling data; overview of current applications of sampling and monitoring in the environmental sciences; emphasis on practical aspects of sampling from air, soil and water; detection and quantification of microbial and chemical unknowns in environmental media. **Prerequisite:** Junior or senior classification or approval of instructor.

## BESC 411 Environmental Health and Safety Compliance

**Credits 3. 3 Lecture Hours. 1 Lab Hour.** Investigation of various Environmental Health and Safety (EHS) practices necessary for compliance with state and federal regulations; reinforcement of real-world understanding; tour several regulated facilities on campus and learn about the particular TAMU-EHS compliance management strategies for each (utilities, underground storage tanks, wastewater treatment and hazardous waste facility). **Prerequisite:** BESC 367 or similar regulation intensive course and approval of instructor.

## BESC 421 Bioenvironmental Project Planning and Management

**Credits 3. 3 Lecture Hours.** Management processes for managing projects in academic, government or industry settings; exploration of projects that are hypothesis driven, exploratory and product-driven; critical communication planning, meeting stakeholders and sponsors expectations and ensuring regulatory compliance; emphasis on project management life cycle, managing change, communication planning and the work environment. **Prerequisite:** BESC 201; junior or senior classification or approval of instructor.

## BESC 431 Bioenvironmental Data Analysis

**Credits 3. 3 Lecture Hours.** Data management, analysis and interpretation specifically for bioenvironmental research purposes; development of skills required to draw conclusions from data, specifically the types of data relevant to studying the interface of biological and environmental processes; exploration of the challenges of bioenvironmental data analysis; exposure to and development of skills in presentations that highlight the challenges of successfully communicating results and conclusions that necessarily rest on interpretation and assumptions. **Prerequisite:** BESC 201; STAT 201, STAT 302 or STAT 303.

## BESC 481 Seminar

**Credit 1. 1 Lecture Hour.** Capstone course for topics in bioenvironmental sciences; critical analysis of environmental issues through written themes and presentations. May be taken three times for credit. **Prerequisites:** BESC 201 and senior classification in BESC major.

## BESC 484 Field Experience

**Credits 1 to 4. 1 to 4 Other Hours.** An on-the-job supervised experience program conducted in the area of the student's specialization. **Prerequisite:** Junior or senior classification or approval of department head.

## BESC 485 Directed Studies

**Credits 1 to 4. 1 to 4 Other Hours.** Special problems for advanced undergraduates to permit study of subject matter not available in existing courses. **Prerequisite:** BESC 201 or approval of instructor.

## BESC 489 Special Topics in...

**Credits 1 to 4. 1 to 4 Lecture Hours. 1 to 4 Lab Hours.** Selected topics in an identified area of bioenvironmental sciences. May be repeated for credit. **Prerequisite:** BESC 201 or approval of instructor.

## BESC 491 Research

**Credits 1 to 4. 1 to 4 Other Hours.** Research conducted under the direction of faculty member in bioenvironmental sciences. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. **Prerequisites:** Junior or senior classification and approval of instructor.