

BIOLOGY IN ENGINEERING FOR ENGINEERING MAJORS, CERTIFICATE

REQUIREMENTS

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The certificate requires a minimum of 15 credits.

GENERAL BIOLOGY: 5 CREDITS

Choose one from one of the following options.

Code	Title	Credits
BIOCORE 381 & BIOCORE 382	Evolution, Ecology, and Genetics and Evolution, Ecology, and Genetics Laboratory	5
BIOCORE 383 & BIOCORE 384	Cellular Biology and Cellular Biology Laboratory	5
MICROBIO 101 & MICROBIO 102	General Microbiology and General Microbiology Laboratory	5
ZOOLOGY/ BIOLOGY 101 & ZOOLOGY/ BIOLOGY 102	Animal Biology and Animal Biology Laboratory	5
ZOOLOGY/ BIOLOGY/ BOTANY 151	Introductory Biology	5
ZOOLOGY/ BIOLOGY/ BOTANY 152	Introductory Biology	5
ZOOLOGY 153 & BIOLOGY/ ZOOLOGY 102	Introductory Biology and Animal Biology Laboratory	5
ZOOLOGY 153 AND choose 2 additional credits from the advanced biology course list below		5

ADVANCED BIOLOGY: 5 CREDITS MINIMUM

Recommended to choose a lecture/lab combination as outlined below, but any combination of courses is acceptable.

Code	Title	Credits
ANAT&PHY 335	Physiology	5
ANAT&PHY 435	Fundamentals of Human Physiology	5
BIOCORE 485 & BIOCORE 486	Principles of Physiology and Principles of Physiology Laboratory	5
BIOCHEM 501	Introduction to Biochemistry	3
BIOCHEM 507	General Biochemistry I	3
BIOCHEM 508	General Biochemistry II	3-4
BIOCHEM 551	Biochemical Methods	4

BIOCORE 587	Biological Interactions	3
GENETICS 466 & GENETICS 545	Principles of Genetics and Genetics Laboratory	5
GENETICS/ MD GENET 662	Cancer Genetics	3
MICROBIO 303 & MICROBIO 304	Biology of Microorganisms and Biology of Microorganisms Laboratory	5
MICROBIO/ FOOD SCI 324 & MICROBIO/ FOOD SCI 325	Food Microbiology Laboratory and Food Microbiology	5
M M & I 301	Pathogenic Bacteriology	2
M M & I 341	Immunology	3
M M & I/PATH-BIO 528	Immunology	3
M M & I/ BIOCHEM 575	Biology of Viruses	2
ZOOLOGY/ ENVIR ST 315 & ZOOLOGY 316	Limnology-Conservation of Aquatic Resources and Laboratory for Limnology-Conservation of Aquatic Resources	4-5
ZOOLOGY/ENTOM/ M M & I/PATH-BIO 350	Parasitology	3
ZOOLOGY/ ANTHRO/ BOTANY 410	Evolutionary Biology	3
ZOOLOGY 430	Comparative Anatomy of Vertebrates	5
ZOOLOGY 470 & ZOOLOGY 555	Introduction to Animal Development and Laboratory in Developmental Biology	6
ZOOLOGY/ ENVIR ST 510 & ZOOLOGY/ ENVIR ST 511	Ecology of Fishes and Ecology of Fishes Lab	5
ZOOLOGY/ PSYCH 523	Neurobiology	3
ZOOLOGY 570	Cell Biology	3
ZOOLOGY 611 & ZOOLOGY 612	Comparative and Evolutionary Physiology and Comparative Physiology Laboratory	5

BIOLOGY IN ENGINEERING: 3 CREDITS MINIMUM

Choose from the following courses:

Code	Title	Credits
B M E/ M E 414	Orthopaedic Biomechanics - Design of Orthopaedic Implants	3
B M E/ M E 415	Biomechanics of Human Movement	3
B M E/ PHM SCI 430	Biological Interactions with Materials	3
B M E/ E C E 462	Medical Instrumentation	3
B M E/ E C E 463	Computers in Medicine	3

B M E/M E 505	Biofluidics	3
B M E 510	Introduction to Tissue Engineering	3
B M E/M E 516	Finite Elements for Biological and Other Soft Materials	3
B M E 520	Stem Cell Bioengineering	3
B M E 545	Engineering Extracellular Matrices	3
B M E 550	Introduction to Biological and Medical Microsystems	3
B M E/M E 615	Tissue Mechanics	3
B M E/MED PHYS/ PHMCOL- M/PHYSICS/ RADIOL 619	Microscopy of Life	3
BSE 249	Engineering Principles for Biological Systems	3
BSE 349	Quantitative Techniques for Biological Systems	3
BSE 364	Engineering Properties of Food and Biological Materials	3
BSE 365	Measurements and Instrumentation for Biological Systems	3
CBE/B M E 560	Biochemical Engineering	3
CIV ENGR 320	Environmental Engineering	3
CIV ENGR 322	Environmental Engineering Processes	3
CIV ENGR/ M&ENVTOX/ SOIL SCI 631	Toxicants in the Environment: Sources, Distribution, Fate, & Effects	3
COMP SCI/ B M I 576	Introduction to Bioinformatics	3
E C E 542	Introduction to Microelectromechanical Systems	3
ISY E/B M E 564	Occupational Ergonomics and Biomechanics	3
M S & E 553	Nanomaterials & Nanotechnology	3

SEMINAR: 1 CREDIT

Code	Title	Credits
B M E 517	Biology in Engineering Seminar	1

CERTIFICATE COMPLETION REQUIREMENT

This undergraduate certificate must be completed concurrently with the student's undergraduate degree. Students cannot delay degree completion to complete the certificate.