

# COURSE CHECKLIST FOR THE MAJOR IN BIOLOGY

## FOR THOSE ENTERING UNDER THE 2009-10 CATALOG

<http://www.jmu.edu/catalog/09/programs/biology.html>

Students must complete a minimum of 40 BIO credit hours, with at least 20 credit hours at the 300 level or above.

### BIOLOGY CORE

Check when met:

- BIO 114. Organisms
- BIO 124. Ecology and Evolution
- BIO 214. Cell and Molecular Biology
- BIO 224. Genetics and Development

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### COGNATES

*Chemistry* - complete all of the following courses

- CHEM 131/CHEM 131L + CHEM 132/CHEM 132L
- CHEM 341 + CHEM 342 + CHEM 346L

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*Physics* - complete one of the following sequences

- PHYS 125/126 OR PHYS 140/140L + PHYS 150/150L

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*Calculus* - complete one course (or courses sequence)

- MATH 231 + MATH 232 OR MATH 235

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*Statistics* - complete one course

- MATH 220 OR MATH 285 OR MATH 318

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### UPPER DIVISION BIOLOGY

- Students must complete at least 20 credit hours or 300- and 400-level courses. At least one of these must be an organismal diversity course, and at least two must be laboratory/field courses.
- Individual courses may satisfy more than one requirement.
- Students are strongly encouraged to discuss their career interests with an advisor who can help select courses best suited to their needs.
- Students are encouraged to participate in independent research with a faculty mentor. In addition to the courses listed below, a maximum of eight credits of BIO 495, 496, 497, 499 and ISCI 450 can be counted toward the Biology major.

Course / credit hours

Course / credit hours

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**Note:** The JMU Undergraduate Catalog is the official listing of requirements and takes precedence over this guide, in case of conflicts.

## UPPER DIVISION BIOLOGY (continued)

### Upper-level Biology Course Requirements

Students in the biology major must complete at least 20 credit hours at the 300 and 400 level. One course must be from a group of courses on organismal diversity. Two courses must have a laboratory component. Courses in both lists may count for both requirements. Three credits of independent research (BIO 497 and/or 499) may be used for one, but only one, of the laboratory courses.

1) Choose at least one course from the following list of organismal diversity courses:

- BIO 305. Ornithology
- BIO 310. General Entomology
- BIO 320. Comparative Anatomy of Vertebrates
- BIO 340. Morphology and Anatomy of Vascular Plants
- BIO 345. Animal Field Biology
- BIO 360. Plant Biology
- BIO 364. Human Uses of Plants
- BIO 380. General Microbiology
- BIO 386. Field Botany
- BIO 409. Marine and Freshwater Invertebrates
- BIO 412. Mammalogy
- BIO 470. Morphology of Nonvascular Plants
- BIO 486. Systematics of Vascular Plants

2) Choose at least two courses from the following list of laboratory/field courses:

- BIO 305. Ornithology
- BIO 310. General Entomology
- BIO 316. Principles of Animal Development
- BIO 320. Comparative Anatomy of Vertebrates
- BIO 340. Morphology and Anatomy of Vascular Plants
- BIO/MATH 342. Mathematical Models in Biology
- BIO 345. Animal Field Biology
- BIO 365. Laboratory in Human Uses of Plants (must be taken with BIO 364)
- BIO 370. Animal Physiology
- BIO 380. General Microbiology
- BIO 386. Field Botany
- BIO 403. Animal Communication
- BIO 410. Advanced Human Anatomy
- BIO 412. Mammalogy
- BIO 421. Medical Parasitology Laboratory (must be taken with BIO 420)
- BIO 432. Light Microscopy
- BIO 443. Immunology Laboratory (must be taken with BIO 442)
- BIO 445. Neurobiology
- BIO 451. Ecological Systems
- BIO 452. Population Ecology
- BIO 455. Plant Physiology
- BIO 456. Landscape Ecology
- BIO 457. Biological Applications of Geographic Information Systems
- BIO 459. Freshwater Ecology
- BIO 460. Plant Cell and Tissue Culture
- BIO 465. Environmental Toxicology
- BIO 470. Morphology of Nonvascular Plants
- BIO 480. Advanced Molecular Biology
- BIO 481. Genomics
- BIO 482. Human Histology
- BIO 486. Systematics of Vascular Plants
- BIO 490. Biomechanics