

Biomedical Sciences

*Biomedical Sciences Advisory
Committee:*

Snezna Rogelj, Biology

Sally Pias, Chemistry

Mark Samuels, Psychology

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Engineering

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Engineering

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Engineering

Ex officio: Dean of Arts & Sciences,

Dean of

Engineering

Degrees offered: BS in Biomedical Sciences, with options in Biology, Chemistry and Cognitive Neuroscience

The Bachelor of Science in Biomedical Sciences is a broadly interdisciplinary degree, drawing on knowledge from both science and engineering. Students take a common set of core courses from several disciplines. For more in-depth study, they select an option in Biology, Chemistry, or Psychology along with a concentration in one of four engineering fields: Biochemical Engineering, Bioinformatics, Biomaterials, or Biomechanics.

Undergraduate Program Core requirements for the Bachelor of Science degree in Biomedical Sciences (all options)

In addition to the General Education Core Curriculum Requirements (page 89), the following core program is required of all Biomedical Sciences students. Note that courses marked with an asterisk () may also be used to satisfy General Education requirements.*

- BMS 101 (1), BMS 300 & 300L (4)
- BIOL 111 & 111L (4)*, BIOL 331 (3), BIOL 341 (3), BIOL 351 & 353L (4)*, BIOL 437 (3)
- CHEM 333 & 333L (4), CHEM 334 & 334L (4), CHEM 441 & 441L (4)
- CSE 107 & 107L (4) or CSE 113 & 113L (4) or ES 111 & 111L (3)
- MATH 231 (4), MATH 335 (3), MATH 383 (3)
- PHIL 342 (3)*
- PSY 121 (3)*, PSY 309 & 309L (4)*
- Biomedical Senior Thesis I & II (6)
- One of the science options described below
- One of the engineering concentrations listed below

Bachelor of Science in Biomedical Sciences with Biology Option

In addition to the General Education Core Curriculum Requirements (page 89) and the core Biomedical Sciences Requirements (above), the following courses are required:

- BIOL 333 & 333L (4), BIOL 352 & 354L (4), BIOL 435 (3)

Bachelor of Science in Biomedical Sciences with Chemistry Option

In addition to the General Education Core Curriculum Requirements (page 89) and the core Biomedical Sciences Requirements (above), the following courses are required:

- CHEM 311 & 311L (4), CHEM 331 & 331L (4), CHEM 442 & 442L (4)

Bachelor of Science in Biomedical Sciences with Cognitive Neuroscience Option

In addition to the General Education Core Curriculum Requirements (page 89) and the core Biomedical Sciences Requirements (above), the following courses are required:

- PSY 205 (3)*, PSY 212 (3)*, PSY 312 (3), PSY 409 (3)

Engineering Concentrations

Biochemical Engineering

- CH E 326 (3), and two of CH E 476 (3), CH E 4xx (3), and CH E 4yy (3)

Bioinformatics

- BIOL 311 & 311L (3), BIOL 333 & 333L (4) (part of Biology Option), BIOL 435 (3)
- CSE 122 (3), CSE 373(3)

Biomaterials

- MATE 202 & 202L (4), MATE 310 (3), 420 (3)

Biomechanics

- ES 201 (3), ES 216 (3), ES 303 (3)
- MENG 460 (3)

New classes required:

BMS 101, Introductory Biomedical Sciences Seminar, 1 cr., 1 class hour

A discussion-focused course exploring current topics in biomedical research and innovation. The course promotes a broad view of the biomedical sciences and related challenges, with class discussions stimulated largely by TED talks and other internet videos.

BMS 300, 300L - Biotechnology +lab, 3+1 cr, 3 class hours, 3 lab hours

Prerequisites: BMS 101, BIOL 111, CHEM 121

An overview of research in biomedicine, bioinformatics, bioprocesses, and biorobotics.

Attention also given to moral and ethical issues. Lab projects are integral to the course.

Math 383 - Introduction to Biostatistics, 3 cr., 3 class hours

Prerequisite: Math 132 passed with a C- or better

This course covers the fundamental statistical concepts related to the practice of public health: descriptive statistics, design of biological research studies, probability, sampling, statistical distributions, confidence intervals, hypothesis testing, comparison of means and proportions, chi-squared tests, one-way & two-way ANOVA, simple and multiple linear regression, Fisher's Exact test and Mantel Hansel test for comparing several 2x2 tables. The course also uses the R statistical software and includes many applications of statistics to health sciences and medical studies, emphasizing concepts and interpretation of results. Optional topics: principal components and factor analysis.

PSY 409 - Neuroscience

This course will be developed when we get a new Neuroscientist in the Psychology department.

ChE 4xx and 4yy will be developed by the new faculty member in Chem E.

The following classes should be listed with BIOL, CHEM, and PSY prefixes:

(DEPT) 495, Biomedical Senior Thesis I, 3 cr.

For Biomedical Sciences majors. Mentored, problem-oriented biomedical research under the direction of a faculty member. Students should consult with their academic advisor and with various (Department) faculty to identify a Thesis advisor. Near the end of the semester, students will give a formal research presentation.

(DEPT) 496, Biomedical Senior Thesis II, 3 cr.

For Biomedical Sciences majors. Continuation of (DEPT) 496. Students are required to write a paper on the research project and to give an oral presentation.