**Minor in Biomedical Physics**

The minor in biomedical physics involves the departments of biology, chemistry, computer science, engineering, mathematics and statistics, and physics. All students must take at minimum the second semester of an introductory physics course and the first level of calculus. Two physics courses are required that directly relate physics to medicine and the human body. We strongly recommend at least one course at the majors level in biology or chemistry. With the aid of an advisor, the student can tailor the minor to fit particular career interests by choosing two additional courses from a list. The student is encouraged to do an independent study or research project as a capstone experience.

A minor in biomedical physics consists of four required courses and two electives. Please consult with the physics chair as soon as possible for advice on how to fulfill the requirements of the minor. Any alterations from the program require approval by the physics chair.

**Required courses** (and associated labs), 14-16 credits

Either PH 102: Introductory Physics II *and* MA 251: Calculus I

or PH 202 and PH 292: General Physics II + lab co-req *and* one majors course

in chemistry or biology

PH 383: Physics of Medicine and the Human Body

PH 384: Waves and the Physics of Medicine

**Two elective courses** (and associated labs), 5-7 credits

See below. Courses other than the ones listed below may be considered for the biomedical physics minor, but must have approval by the physics chair.

| **Credits** | **First elective course for the minor in biomedical physics** |
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| 3 or 4 | Of the following courses, choose one that is not a requirement of your major. For engineering majors, this course should not be a requirement of the primary concentration, but can fulfill a requirement of the secondary concentration. Other courses may be considered with approval by the physics chair. |
|  | * PH 312 Modern Physics |
|  | * PH 397, 398 Experimental Methods I and II (electronics and data acquisition and control) |
|  | * PH 300- or 400- level course |
|  | * MA 304 Ordinary Differential Equations |
|  | * ST 465 Experimental Research Methods |
|  | * BL 109 Modern Marvels in Biotechnology *(special permission required)* |
|  | * BL 118 Introduction to Cellular and Molecular Biology + lab co-req (BL 119) |
|  | * BL 121 Organismal Biology + lab co-req (BL 126) |
|  | * BL 206 Human Anatomy and Physiology I + lab co-req (BL 207) |
|  | * BL 208 Human Anatomy and Physiology II + lab co-req (BL 209) |
|  | * BL 260 Vertebrate Morphology with Lab |
|  | * BL 317 Comparative Physiology |
|  | * BL 341 Molecular Genetics with lab |
|  | * BL 431/ CH 431 Biochemistry I + lab co-req (BL 433/ CH 433) * or CH 432/CH 434 Biochemistry II + lab co-req |
|  | * BL 426 Cell Biology + lab co-req (BL 427) |
|  | * CH 101 General Chemistry I + lab co-req (CH 105) |
|  | * CH 102 General Chemistry II + lab co-req (CH 106) |
|  | * CH 301 Organic Chemistry I + lab co-req (CH 307) |
|  | * CH 310 Medicinal Chemistry |
|  | * CS 201 Computer Science I * or CS 212 Object-oriented Data Structure |
|  | * EG 331 Linear Circuit Analysis + lab co-req (EG 031) |
|  | * EG 351 Introduction to Engineering Materials + lab co-req (EG 051) |
|  | * EG 423 Manufacturing Materials and Processes. Paper assignment should be restricted to medical devices for those in the minor. |
|  | * EG 424 Mechanical Design |

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| **Credits**  2 or 3 | **Second elective course for the minor in biomedical physics**  Choose one of the following.  Project-based courses should be experimental, theoretical, or computational work related to biophysics, bioengineering, bioinformatics, medicine, or any other subject requiring a quantitative approach to understanding a biological or medical system. Project-based courses require approval by the physics chair. Oher courses may be considered. |
|  | * Two 300- or 400-level lab course credits in PH, CH, BL or EG (any combination) beyond the requirements of the major. Needs approval from physics chair.\* |
|  | * One of the 3- or 4-credit courses in the previous section entitled “First elective course” that is not part of the major. Requires approval from physics chair. |
|  | * EG 495, EG 497, EG 498, or EG 499: Engineering capstone or other engineering courses. |
|  | * PH 388, PH 391, PH 495, or PH 496 Physics research or independent project. |
|  | * BL 481, 482, 491, or 492 Biology research. |
|  | * CH 420.03 Chemistry research. |
|  | * CS 496 Computer Science capstone. |