

# BIOMEDICAL SCIENCE, BAS

Interface the engineering sciences, biology, biomedical sciences, and medicine to advance human health and solve problems in medicine and the biological sciences. The Bachelor of Applied Science degree offers students breadth and flexibility and allows them to combine a technology-based degree with considerable course work in the liberal arts, communications, business or fine arts. It is designed primarily for students whose interests are not oriented toward a professional engineering career. It is a popular degree option for those preparing for careers in medicine, business, and law. Many students who are pursuing dual degree programs opt for this degree.

**For more information:** <http://www.be.seas.upenn.edu/prospective-students/undergraduates/program-bse-bas.php>

## Biomedical Science (ASBS) Major Requirements

37 course units are required.

Code	Title	Course Units
<b>Engineering</b>		
BE 1000	Introduction to Bioengineering	0.5
ENGR 1050	Introduction to Scientific Computing	1
BE 2000	Introduction to Biomechanics	1
BE 2200	Biomaterials	1
BE 2700	Bioengineering Laboratory Principles	1
BE 3010	Bioengineering Signals and Systems	1
or BE 3060	Cellular Engineering	
or BE 3500	Introduction to Biotransport Processes	
BE 3090	Bioengineering Modeling, Analysis and Design Laboratory I	1
BE 4970	Senior Thesis in Biomedical Science	1
BE 4980	Senior Thesis in Biomedical Science	1
BE Elective (4000 or 5000 level)		1
BE Elective (4000 or 5000 level)		1
Engineering Elective		1
Engineering Elective		1
<b>Math and Natural Science</b>		
MATH 1400	Calculus, Part I	1
MATH 1410	Calculus, Part II	1
ENM 2400	Differential Equations and Linear Algebra	1
ENM 3750	Biological Data Science I - Fundamentals of Biostatistics	1
PHYS 0140	Principles of Physics I (without laboratory)	1
PHYS 0141	Principles of Physics II (without laboratory)	1
CHEM 1011	Introduction to General Chemistry I	1
CHEM 1101	General Chemistry Laboratory I	0.5
CHEM 1021	Introduction to General Chemistry II	1
CHEM 1102	General Chemistry Laboratory II	0.5
BIOL 1121	Introduction to Biology - The Molecular Biology of Life	1
BIOL 1124	Introductory Organismal Biology Lab	.5
BIOL 2310	Vertebrate Physiology	1

### Professional Electives

Select any Math, Science, Engineering, Business, or health-related course 3

### General Electives <sup>1</sup>

EAS 2030	Engineering Ethics	1
or HSOC 1330	Bioethics	
or PHIL 1342	Bioethics	
or HSOC 2457	History of Bioethics	
or LGST 1000	Ethics and Social Responsibility	
or LGST 2200	International Business Ethics	
or NURS 3300	Theoretical Foundations of Health Care Ethics	
or PHIL 4330	Metaethics	

Select 1 Social Science course 1

Select 2 Humanities courses 2

Select 1 Social Science or Humanities course 1

Select 2 Social Science or Humanities or Technology in Business & Society courses 2

### Free Elective

Select 3 free electives 3

**Total Course Units** 37

1

Must include a Writing Seminar (a list of approved Writing Seminars can be found in the SEAS Undergraduate Handbook (<https://ugrad.seas.upenn.edu/student-handbook/courses-requirements/writing-courses/>))

## Concentrations

Students may select one of eight concentrations (<http://www.be.seas.upenn.edu/current-students/undergraduates/concentrations.php>):

- Biomedical Data Science and Computational Medicine
- Biomedical Devices
- Cellular/Tissue Engineering and Biomaterials
- Biomedical Imaging and Radiation Physics
- Systems and Synthetic Biology
- Neuroengineering
- Multiscale Biomechanics
- Therapeutics, Drug Delivery & Nanomedicine

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2022 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.