

Much of today's modern science calls for scientists to be knowledgeable in multiple areas of science. There is much overlap and countless connections between the fields of and work happening in Biology, Chemistry, Physics and Mathematics. More commonly today, biologists are using mathematics and physics for quantitative and physical descriptions to better understand biological functions.

My eventual goal after my undergraduate work is to become a physician-scientist. That is, I would like to attend medical school and also pursue research. I am very interested in all of the sciences, and the crossover between them, but specifically, I am interested in the physics of biology. Completing a wide, yet correlated set of coursework in the sciences will help me in more completely understanding scientific problems, gaining a new perspective in the sciences that would allow for more creativity in problem-solving, and being well equipped for medical school and future science-oriented endeavors.

At the University of Utah, the science majors are quite narrowly focused in one discipline, and only call for interdisciplinary studies at a very basic level. Additionally, the minors within the College of Science call for basic and varied course work. The Biophysics major proposed provides a solid background in each of the four areas of science mentioned, not being too basic or becoming too narrowly focused, but instead, providing a strong knowledge base that will allow for me to integrate the sciences in my current and future studies. In addition, the Biophysics major proposed is similar to that of Biophysics majors offered at other Universities, and in fact, exceeds what is required for most of these programs.

The proposed course of study provides a strong background in:

1. Biology; coursework in cell biology, genetics, and human physiology supplemented with other courses that integrate ideas from these courses will provide for a strong understanding of basic biological functions.

2. Physics; coursework in mechanics, electricity and magnetism, modern physics, thermodynamics, optics, and physics in biology provide a solid understanding of physical processes that can be applied to other areas of science.
3. Chemistry; coursework in inorganic chemistry, organic chemistry, biochemistry, and physical chemistry provide necessary knowledge to understand the chemistry behind biological and physical processes.
4. Mathematics; coursework in single and multi-variable calculus, linear algebra, differential equations, analysis, probability, and game theory provides a strong quantitative background, means of analysis, and problem solving skills that can be used in the life and physical sciences.

Knowledge in all of these areas will help prepare me to be a scientist rather than, necessarily, a physicist, biologist, chemist, or mathematician. Ultimately, this curriculum will help me better understand biological processes in terms of what is physical, chemical, and quantitative functioning. In addition, whereas the Pre-Medical Physics program is predominantly merely a combination of physics and pre-med requirements, the proposed major can be distinguished from this program as it goes beyond these requirements and is more intellectually broad.

For my thesis, I will be completing an honors thesis that will focus on a project in a biology or medical research laboratory. The project will include extensive use of the scientific method, which includes characterizations, hypotheses, predictions, and experiments. All of these steps will utilize my training and coursework in the areas of science as previously described. Further, as I am interested in translatable scientific research, I will work on a problem that works towards being able to be applied towards a greater human good. Tentatively, I plan on completing my thesis with Professor Erik M. Jorgensen, working to localize clathrin in synapses using new electron microscopy techniques.

Major Emphasis Courses

Code	Course #	Title	Dept.	Credits
+	1250	Calculus AP Students I	Mathematics	4
+	1260	Calculus AP Students II	Mathematics	4
+	2270	Linear Algebra	Mathematics	4
+	2280	Introduction to Differential Equations	Mathematics	4*
+	2900	Honors Math Seminar	Mathematics	2
+	3210	Foundations of Analysis I	Mathematics	4
+	3220	Foundations of Analysis II	Mathematics	4
+	5010	Introduction to Probability	Mathematics	3
+	5750	Game Theory	Mathematics	3
+	3210	Physics for Scientists I	Physics	4
	2215	Physics Laboratory for Scientists and Engineers I	Physics	1
+	3220	Physics for Scientists II	Physics	4
	2225	Physics Laboratory for Scientists and Engineers II	Physics	1
+	3740	Introduction to Quantum Theory and Relativity	Physics	3
+	3760	Principles of Thermodynamics and Statistical Mechanics	Physics	3
ip	4210	Optics in Biology	Physics	3
	n/a	Physics in Biology	Physics	3
+	1070	AP General Chemistry Laboratory I	Chemistry	1
+	1080	AP General Chemistry Laboratory II	Chemistry	1
+	1210	General Chemistry I	Chemistry	4
+	1221	Honors General Chemistry II	Chemistry	4
+	2311	Honors Organic Chemistry I	Chemistry	4
+	2315	Organic Chemistry Laboratory I	Chemistry	1
ip	2320	Organic Chemistry II	Chemistry	4
ip	2325	Organic Chemistry Laboratory II	Chemistry	1

Major Emphasis Courses

	3510	Biochemistry I	Chemistry	3
	3520	Biochemsitry II	Chemistry	3
+	2021	Principles of Cell Science	Biology	4
	2030	Genetics	Biology	3
+	2115	Basic Techniques Laboratory	Biology	2
ip	2425	Human Physiology	Biology	4
	Lab	Laboratory	Biology	2
	4000+	Biology or Neuroscience Elective	Biology or Neuroscience	3
	4000+	Biology or Neuroscience Elective	Biology	3
	4999	Honors Thesis	Biology or Neuroscience	3
Total major-emphasis credit hours				104
Total number of hours at the 4000 level or above				21

General Education and Graduation Requirements

Note: General education requirements completed with Associates Degree from Salt Lake Community College

Code	Course #	Title	Dept.	Credits	Requirement
+	3960	Psychology and Social Issues: Psychology of Human Sexuality	Psychology	3	DV
+	3220	Foundations of Analysis II	Mathematics	4	QI
+	5010	Introduction to Probability	Mathematics	3	QI
	3200	Research University	Honors	3	CW

Code	Course #	Title	Dept.	Credits	Requirement
	1010	Beginning Mandarin Chinese I	Chinese	4	Language
	1020	Beginning Mandarin Chinese II	Chinese	4	Language
	2010	Intermediate Mandarin Chinese I	Chinese	4	Language
	2020	Intermediate Mandarin Chinese II	Chinese	4	Language

All other coursework

Code	Course #	Title	Dept.	Credits
+	1051	Honors Foundations of Business Thought	Business	3
+	5750	Mathematics, Language and Imagination	Mathematics	3
+	1010	General Psychology	Psychology	4
+	3904	Modes of Learning: Service-Learning	Psychology	1
+	1010	Introduction to Sociology	Sociology	4
+	3620	Editorial Conference	Communications	3
+	3374	Constitutional Trial Rights of the Accused	Honors	3
	210X	Intellectual Traditions	Honors	3
	210X	Intellectual Traditions	Honors	3
+	1980	Undergraduate Seminar	Physics	1
ip	3111	Physics of the Human Body II	Physics	4
+	2500	Introduction to Creative Writing	English	3
+	2600	Critical Introduction to Literary Forms	English	3
+	2010	Principles of Microeconomics	Economics	3
+	2020	Principles of Macroeconomics	Economics	3
+	3200	Deductive Logic	Philosophy	3

All other coursework

+	3025	Service Scholar Seminar	UGS	1
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Totals:

College	credits
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Business	3
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Science	112
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Social and Behavioral Science	18
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Humanities	28
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Honors	12
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Undergraduate Studies	1
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Total hours of courses yet-to-be completed for graduation: 48

Total hours of upper-division Courses: 67

Transfer credits: 34

Test credits: 36

Total amount of hours overall counting toward graduation: 244