

## Biophysics Major Requirements

[EFF. FALL 2021]

### Introductory Courses (not required, but highly recommended):

Biophysics 116 (Intro to Medical Imaging)  
Biophysics 117 (Intro to Programming in the Sciences)  
Biophysics 120 (Mysteries of the Double Helix)  
Biophysics 130 (DNA Origami)

### BIOLOGICAL PHYSICS TRACK

#### Prerequisites:

MATH 115 and 116  
MATH 215 and 216; or CHEM 262  
CHEM 210/211 and 215  
PHYSICS 135/136 and 235/236 **or** 139/239  
**or** 140/141 and 240/241 **or** PHYSICS 150/151  
and 250/251 **or** 160/161 and 260/261  
BIO 172 or 174 or 191 or 192 or 195

#### Core:

BIOPHYS 370 (Phys & Chemical Properties)  
BIOPHYS 417 (Dynamical Processes)  
BIOPHYS 450 (Intro to Biophys Lab)

BIOPHYS 495 (Senior Seminar)

#### Outside Core:

CHEM 351 or MCDB 310 or BIOLCHEM 415

#### Elective\*:

##### Three of:

BIOPHYS 401 (Special Topics in Biophysics)  
BIOPHYS 420 (Struc Bio: Arch of Life)  
BIOPHYS 421 (Struc Bio: Biophys Controversies)  
BIOPHYS 422 (Exp Methods in Struc Bio)  
BIOPHYS 430 (Medical Physics)  
BIOPHYS 433 (Biocomplexity)  
BIOPHYS 435 (Biophysical Modeling)  
BIOPHYS 440 (Biophysics of Diseases)  
BIOPHYS 445 (Intro to Info Theory for Nat Sci)  
BIOPHYS 454 (Macromolec Struct & Dynamics)

BIOPHYS 463 (Math. Modeling in Biology)  
BIOPHYS 520 (Biophys Chem: Methods & Techniques)  
BIOPHYS 521 (Biophys Chem: Theories)

### STRUCTURAL BIOLOGY TRACK

#### Prerequisites:

MATH 115 and 116  
MATH 215 and 216; or CHEM 262  
CHEM 210/211 and 215  
PHYSICS 135/136 and 235/236 **or** 139/239  
**or** 140/141 and 240/241 **or** PHYSICS 150/151  
and 250/251 **or** 160/161 and 260/261  
BIO 172 or 174 or 191 or 192 or 195

#### Core:

BIOPHYS 370 (Phys & Chemical Properties)  
BIOPHYS 420 (Structural Biology: Arch. Of Life)  
BIOPHYS 421 (Structural Biology: Biophysical Controversies)  
BIOPHYS 450 (Intro to Biophys Lab)  
BIOPHYS 495 (Senior Seminar)

#### Outside Core:

CHEM 351 or MCDB 310 or BIOLCHEM 415

#### Elective\*:

##### One of:

BIOPHYS 401 (Special Topics in Biophysics)  
BIOPHYS 417 (Dynamical Processes)  
BIOPHYS 422 (Exp Methods in Struc Bio)  
BIOPHYS 430 (Medical Physics)  
BIOPHYS 435 (Biophysical Modeling)  
BIOPHYS 440 (Biophysics of Diseases)  
BIOPHYS 445 (Intro to Info Theory for Nat Sci)  
BIOPHYS 454 (Macromolec Struct & Dynamics)  
BIOPHYS 463 (Math. Modeling in Biology)  
BIOPHYS 520 (Biophys Chem: Methods & Techniques)  
BIOPHYS 521 (Biophys Chem: Theories)

*\*Other 400-level Physics, Chemistry or Biology courses may be accepted, per approval of the Undergraduate Chair*

**Cognate\*:**

One of:

MATH 404  
MATH 471  
PHYSICS 406  
PHYSICS 453  
CHEM 451  
MCDB 427  
MCDB 428

**Research:**

At least **two credits** of BIOPHYS 399. Students wishing to do research in a laboratory outside the Program must identify a co-sponsor.

**Cognate\*:**

One of:

CHEM 451  
MCDB 427  
MCDB 428  
BIOLCHEM 530  
BIOLCHEM 550

**Research:**

At least **two credits** of BIOPHYS 399. Students wishing to do research in a laboratory outside the Program must identify a co-sponsor.

*\*Other 400-level Physics, Chemistry or Biology courses may be accepted, per approval of the Undergraduate Chair*

**Honors Concentration:** In addition to completing all the Biophysics concentration requirements (in either track), a concentration GPA of at least 3.4, the completion of an honors thesis (BIOPHYS 499) with a grade B or better, and a **second or third Biophysics elective** (depending on which track) are required. Approved honors electives are all Biophysics and cognate electives above; and CHEM 453, MCDB 422 and PHYSICS 402. Other 400-level electives may be accepted, per approval of the Undergraduate Chair.

**Minor in Biophysics:**

At least 15 credits from the following courses are required:

PHYSICS 340 or CHEM 210  
BIOLOGY 305 or MCDB 310 or CHEM 351  
BIOPHYS 370 or 417  
BIOPHYS 290 or 440  
BIOPHYS 450

- Only ONE COURSE may be double-counted towards both the student's major and minor
- For more information on double-counting rules, please refer to the LSA Course Guide or speak with an advisor.

## Suggested 4-Year Course Plan – BIOLOGICAL PHYSICS TRACK

<b>Year 1</b>	<b>Hours Pre-req</b> (req. / recomm.)	<b>Major Hours Dept.</b> (req. / recomm.)	<b>Major Hours non-Dept.</b>	<b>Total Hours</b>
<b>Math 115</b> (4) <b>Chem 210</b> (4) <b>Chem 211</b> (1) Language (4) <i>Biophys 117</i> (3)	9/0	0/3		16
<b>Math 116</b> (4) <b>Chem 215</b> (3) <b>Physics 150</b> (4) <b>Physics 151</b> (1) Language (4)	12/0			16
<b>Year 2</b>				
<b>Physics 250</b> (4) <b>Physics 251</b> (1) Language (4)	5/4			9
<b>Bio 172</b> (4) <b>CHEM 262</b> (4) Language (4)	8/0			12
<b>Year 3</b>				
<b>Chem 351</b> (4) <b>Biophys 370</b> (3) Distribution (3) LS&A Elective (3)	4	3/0	4	13
<b>Biophys 417</b> (3) <b>Biophys 450</b> (3) <b>Biop Elective</b> (3) Distribution (3) LS&A Elective (3)		9/0		15
<b>Year 4</b>				
<b>Biophys 495</b> (3) <b>Biop. Cognate</b> (3) <b>Biophys 399</b> (2) Distribution (3) Distribution (3)		8/0	3	14
<b>Biop. Elective</b> (3) <b>Biop. Elective</b> (3) Distribution (3) LS&A Elective (3)		6/0	0	12
	<b>38/4</b>	<b>26/3</b>	<b>7</b>	<b>107</b>

**Bold:** Required for Major    *Italic:* Recommended for Major

## Suggested 4-Year Course Plan – STRUCTURAL BIOLOGY TRACK

<b>Year 1</b>	<b>Hours Pre-req (req. / recomm.)</b>	<b>Major Hours Dept. (req. / recomm.)</b>	<b>Major Hours non-Dept.</b>	<b>Total Hours</b>
<b>Math 115</b> (4) <b>Chem 210</b> (4) <b>Chem 211</b> (1) Language (4) <i>Biophys 117</i> (3)	9/0	0/3		16
<b>Math 116</b> (4) <b>Chem 215</b> (3) <b>Physics 150</b> (4) <b>Physics 151</b> (1) Language (4)	12/0			16
<b>Year 2</b>				
<b>Chem 262</b> (4) <b>Physics 250</b> (4) <b>Physics 251</b> (1) Language (4)	9/0			13
<b>Bio 172</b> (4) Language (4)	4/0			8
<b>Year 3</b>				
<b>Chem 351</b> (4) <b>Biophys 370</b> (3) <b>BIOPHYS 399</b> (2) Distribution (3) LS&A Elective (3)		5/0	4	15
<b>Biophys 420</b> (3) <b>Biophys 450</b> (3) Distribution (3) LS&A Elective (3)		6/0		12
<b>Year 4</b>				
<b>Biophys 421</b> (3) <b>Biophys 495</b> (3) <b>Biop. Cognate</b> (3) Distribution (3) Distribution (3)		9/0	3	15
<b>Biop. Elective</b> (3) <i>Biophys 498</i> (2) Distribution (3) LS&A Elective (3)		3/2	0	11
	<b>34/4</b>	<b>23/5</b>	<b>7</b>	<b>106</b>

**Bold:** Required for Major    *Italic:* Recommended for Major