

# **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 Controvrsies)

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)

### 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.

**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.

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

# <u>Suggested 4-Year Course Plan – BIOLOGICAL PHYSICS TRACK</u>

Year 1	Hours	Major	Major	<b>Total Hours</b>
	Pre-req	Hours Dept.	Hours non-Dept.	100
	(req. / recomm.)	(req. / recomm.)		
Math 115 (4)	9/0	0/3		16
Chem 210 (4)	•	•		
Chem 211 (1)				
Language (4)				
Biophys 117(3)				
Math 116 (4)	12/0			16
<b>Chem 215</b> (3)				
Physics 150 (4)				
<b>Physics 151</b> (1)				
Language (4)				
Year 2				
<b>Physics 250</b> (4)	5/4			9
<b>Physics 251</b> (1)				
Language (4)				
Bio 172 (4)	8/0			12
<b>CHEM 262</b> (4)				
Language (4)				
Year 3				
Chem 351 (4)	4	3/0	4	13
<b>Biophys 370</b> (3)				
Distribution (3)				
LS&A Elective (3)				
<b>Biophys 417</b> (3)		9/0		15
Biophys 450 (3)				
Biop Elective (3)				
Distribution (3)				
LS&A Elective (3)				
Year 4		0.10	2	14
Biophys 495 (3)		8/0	3	14
Biop. Cognate (3)				
Biophys 399 (2)				
Distribution (3)				
Distribution (3)		6.10	0	12
Biop. Elective (3)		6/0	0	12
<b>Biop. Elective</b> (3) Distribution (3)				
LS&A Elective (3)				
LOCA Elective (3)	20/4	26/2	7	107
	38/4	26/3	1	10/

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

# <u>Suggested 4-Year Course Plan – STRUCTURAL BIOLOGY TRACK</u>

Math 115 (4)   Chem 210 (4)   Chem 211 (1)   Language (4)   Biophys 117 (3)   Math 116 (4)   Chem 215 (3)   Physics 150 (4)   Physics 250 (4)   Physics 251 (1)   Language (4)   Biophys 370 (3)   Biophys 370 (3)   Biophys 420 (3)   Biophys 420 (3)   Biophys 420 (3)   Biophys 421 (3)   Biophys 495 (3)   Distribution	Year 1	Hours	Major	Major	Total Hours
Math 115 (4)   9/0   0/3   16   16   16   16   16   16   16   1	. 54		-	_	10001110015
Math 115 (4) Chem 210 (4) Chem 210 (4) Chem 211 (1) Language (4) Biophys 117 (3)  Math 116 (4) Chem 215 (3) Physics 150 (4) Physics 151 (1) Language (4)  Year 2  Chem 262 (4) Physics 250 (4) Physics 251 (1) Language (4)  Bio 172 (4) Language (4)  Year 3  Chem 351 (4) Biophys 370 (3) BIOPHYS 399 (2) Distribution (3) LS&A Elective (3)  Figure 4  Biophys 420 (3) Biophys 420 (3) Biophys 495 (3) Biophys 496 (3) Biophys 496 (3) Biophys 496 (3) Biophys 497 (3) Biophys 498 (3) Biophys 498 (3) Biophys 498 (3) Biophys 498 (3) Biophys 495 (3) Biophys 498 (2) Distribution (3) Biophys 498 (2) Distribution (3) LS&A Elective (3) Biophys 498 (4) Biophys 498 (5) Biophys 498 (6) Biophys 498 (7) Biophys		=	_		
Chem 210 (4)   Chem 211 (1)   Language (4)   Biophys 117 (3)   Biophys 420 (3)   Biophys 420 (3)   Biophys 495 (3)   Biophys 496 (3)   Biophys 495 (4)   B	Math 115 (4)	, , ,			16
Chem 211 (1)   Language (4)   Biophys 117 (3)		•	•		
Language (4) Biophys 117 (3)  Math 116 (4) Chem 215 (3) Physics 150 (4) Physics 151 (1) Language (4) Year 2  Chem 262 (4) Physics 251 (1) Language (4)  Bio 172 (4) Language (4)  Year 3  Chem 351 (4) Biophys 370 (3) Biophys 370 (3) Biophys 420 (3) Biophys 450 (3) Distribution (3) LS&A Elective (3)  Biophys 495 (3) Biophys 495 (3) Biophys 495 (3) Biophys 495 (3) Biophys 495 (3) Biophys 495 (3) Biophys 495 (3) Biophys 495 (3) Biophys 495 (3) Biophys 496 (3) Biophys 497 (3) Biophys 498 (3) Distribution (3) LS&A Elective (3) Biop. Elective (3) Biophys 498 (2) Distribution (3) LS&A Elective (3)					
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Year 2   9/0   13   13   13   14   15   15   15   15   15   15   15	<b>Physics 151</b> (1)				
Chem 262 (4)					
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Language (4)					
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LS&A Elective (3)					
Year 4         9/0         3         15           Biophys 495 (3)         Biop. Cognate (3)         15           Distribution (3)         3         15           Biop. Cognate (3)         3         15           Distribution (3)         3/2         0         11           Biop. Elective (3)         3/2         0         11           Biophys 498 (2)         0         11           Distribution (3)         15         15           LS&A Elective (3)         3/2         0         11					
Biophys 421 (3) Biophys 495 (3) Biop. Cognate (3) Distribution (3) Distribution (3)  Biop. Elective (3) Biophys 498 (2) Distribution (3) LS&A Elective (3)					
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Distribution (3) LS&A Elective (3)			3,2		**
LS&A Elective (3)					
		34/4	23/5	7	106

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