



DEPARTMENT OF PHYSICS  
AND ASTRONOMY  
272 PHILLIPS HALL  
CAMPUS BOX 3255  
CHAPEL HILL, NC 27599-3255

T 919.962.2079  
F 919.962.0480  
[clemens@physics.unc.edu](mailto:clemens@physics.unc.edu)  
[www.physics.unc.edu](http://www.physics.unc.edu)

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**CHRIS CLEMENS**  
*Department Chair*

Dr. Erika Lindemann  
Associate Dean for Undergraduate Curricula  
Office of Undergraduate Education  
3018 Steele Building, Campus Box 3504  
University of North Carolina at Chapel Hill  
Chapel Hill, NC 27599-3504

Dear Erika,

As you know, the Department of Physics and Astronomy has been engaged in a thorough review of its undergraduate curricula over the past year and a half. During this time, our Undergraduate Affairs and Studies committee broke into four subcommittees, expanded to include approximately 60% of the faculty, and held over thirty meetings: Faculty involvement was both broad and deep.

The Undergraduate Affairs and Studies committee then made a number of recommendations, for course revisions, for new courses, and for changes to our BS options, our BA options, and our minors. Our faculty voted on these recommendations over the course of two, heavily attended faculty meetings, where the votes for what we are now submitting were unanimous or near unanimous.

The new courses and course revisions have been submitted via CRAS. The changes to our BS tracks will be submitted in December, once we have coordinated our changes with those underway in the Department of Mathematics. With this letter, we are submitting the changes to our BA options, including a new BA option in Quantitative Finance, and the changes to our minors.

Many of the changes to our BA options are in response to concerns that you raised with us over the summer:

1. All of our BA options now have similar numbers of core requirements (each one gateway course plus 25 credits). Furthermore, there is now substantial overlap between these core requirements.
2. We have replaced temporary capstone courses in our Biological Physics and Energy options with permanent courses.

3. We have reduced the number of credits in our Energy option.
4. We have eliminated the Geophysical option, due to lack of interest.

Finally, we have introduced a new option, Quantitative Finance, which both Physics and Astronomy and the Kenan-Flagler Business School are very excited about (see attached proposal and letter of support).

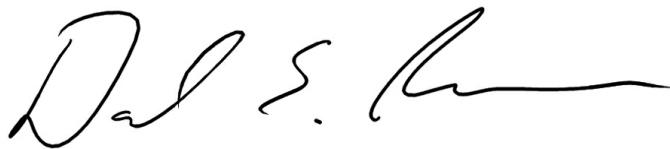
All of our undergraduate advisors are aware of the changes, and in fact contributed to them significantly. Current students will be advised that they may follow the new requirements, but that they are not required to.

Thank you for working with us these past months, weeks, and especially days with our submission.

Sincerely,



Dr. J. Christopher Clemens  
Professor and Chair  
Department of Physics and Astronomy  
University of North Carolina at Chapel Hill



Dr. Daniel E. Reichart  
Bowman and Gordon Gray Professor and Associate Chair  
Department of Physics and Astronomy  
University of North Carolina at Chapel Hill

Here is the text that we want to appear in the undergraduate bulletin (new courses pending approval have been marked with an asterisk):

### **Majoring in Physics and Astronomy: Bachelor of Arts**

#### **B.A. Major in Physics and Astronomy: Standard Option**

##### **Core Requirements**

- PHYS 118\* (gateway course)
- PHYS 119\*, 201 or 301, 211 or 311, 281L\*, and 331
- Nine additional credits chosen from ASTR (numbered above 300) and PHYS (numbered above 200)

##### **Additional Requirements**

- CHEM 101/101L and 102/102L
- MATH 231, 232, 233, and 383

#### **B.A. Major in Physics and Astronomy: Astronomy Option**

##### **Core Requirements**

- PHYS 118\* (gateway course)
- PHYS 119\*, 201 or 301, 211 or 311, 281L\*, and 331
- Six additional credits chosen from ASTR (numbered above 300)
- Three additional credits chosen from ASTR (numbered above 300) and PHYS (231\*, 295\*, 395, and 585\*)


##### **Additional Requirements**

- ASTR 101, 101L or 111L, 102, and 301
- MATH 231, 232, 233, and 383

#### **B.A. Major in Physics and Astronomy: Biological Physics Option**

##### **Core Requirements**

- PHYS 118\* (gateway course)

- PHYS 119\*, 201 or 301, 211 or 311, 281L\*, 331, and 405
- PHYS 341 or CHEM 481
- PHYS 485\* (capstone) 

#### **Additional Requirements**

- BIOL 101
- CHEM 101/101L and 102/102L
- MATH 231, 232, 233, and 383
- Six additional credits chosen from BIOL (numbered above 200), CHEM (261, 262, and 430), and PHYS (numbered above 200)

#### **B.A. Major in Physics and Astronomy: Energy Option**

##### **Core Requirements**

- PHYS 118\* (gateway course)
- PHYS 119\*, 131, 131L or 281L\*, 201 or 301, 211 or 311, 331, and 351
- PHYS 581\* or 582\* (capstone)

##### **Additional Requirements**

- BIOL 101/101L, and 202 or 271
- CHEM 101/101L, 102, 261, and 481
- MATH 231, 232, 233, and 383

#### **B.A. Major in Physics and Astronomy: Quantitative Finance Option**

##### **Core Requirements**

- PHYS 118\* (gateway course)
- PHYS 119\*, 201 or 301, 211 or 311, 281L\*, and 331
- PHYS 341 or CHEM 481
- Six additional credits chosen from BUSI (numbered above 400), MATH (numbered above 200), and PHYS (numbered above 200)

### **Additional Requirements**

- BUSI 408, 580, 588, 589, 600, and 688
- CHEM 101 and 102
- MATH 231, 232, 233, and 383

As part of these course requirements, candidates for the B.A. degree must earn grades of C (not C-) or better in at least 18 credit hours of courses that are listed under Core Requirements.

### **Minoring in Astronomy**

The minor in astronomy consists of six courses:

- ASTR 101, 101L or 111L, 102, and 301
- PHYS 118\* and 119\*

### **Minoring in Physics**

The minor in physics consists of six courses:

- PHYS 118\*, 119\*, 281L\*, and 331
- Two additional courses chosen from ASTR (numbered above 300) and PHYS (numbered above 200)

Here is the text that currently appears in the bulletin, for reference:

**Majoring in Physics and Astronomy: Bachelor of Arts**

**B.A. Major in Physics and Astronomy: Standard Option**

**Core Requirements**

- PHYS 201 or 301, and 211 or 311
- Two physics courses numbered above 200
- Two courses selected from physics courses numbered above 200 or from ASTR 501, 502, and 519

**Additional Requirements**

- CHEM 101/101L and 102/102L
- MATH 231, 232, 233, and 383
- Introductory sequence: PHYS 116, 117, and 128/128L

**B.A. Major in Physics and Astronomy: Astronomy Option**

**Core Requirements**

- ASTR 102 and 301
- PHYS 201 or 301, and 211 or 311
- Three courses chosen from ASTR 501, 502, 503, 505, 519; PHYS 331 (with project on an astrophysics topic)

**Additional Requirements**

- ASTR 101, and 101L or 111L
- MATH 231, 232, 233, and 383
- Introductory sequence: PHYS 116, 117, and 128/128L

**B.A. Major in Physics and Astronomy: Biological Physics Option**

**Core Requirements**

- PHYS 116, 117, 128/128L, 201 or 301, 211 or 311, and 405

- One capstone course, tentatively PHYS 391.003

#### **Additional Requirements**

- BIOL 101

- CHEM 101/101L and 102/102L

- MATH 231, 232, 233, and 383

- PHYS 341 or CHEM 481

- Two additional courses chosen from PHYS (numbered above 200), BIOL (numbered above 200), and CHEM 261, 262, and 430

#### **B.A. Major in Physics and Astronomy: Energy Option**

##### **Core Requirements**

- PHYS 131/131L, 211 or 311, 331, and 351

- Two capstone courses, tentatively PHYS 391.001 and 391.002

##### **Additional Requirements**

- APPL 150

- BIOL 101

- CHEM 101/101L, 102, 261, and 481

- MATH 231, 232, 233, and 383

- Introductory sequence: PHYS 116, 117, and 128/128L

#### **B.A. Major in Physics and Astronomy: Geophysical Option**

##### **Core Requirements**

- PHYS 201 or 301, and 211 or 311

- Two physics courses numbered above 200

- Two courses selected from GEOL 515 and 518 and PHYS 422 and 660

### **Additional Requirements**

- CHEM 101/101L and 102/102L
- MATH 231, 232, 233, and 383
- Introductory sequence: PHYS 116, 117, and 128/128L

As part of these course requirements, candidates for the B.A. degree must earn grades of C (not C-) or better in at least 18 credit hours of courses that are listed under Core Requirements.

### **Minoring in Astronomy**

The minor in astronomy consists of six courses:

- Four semesters of introductory physics and astronomy (ASTR 101 and 102; PHYS 116 and 117)
- ASTR 101L or 111L
- ASTR 301 or 519

### **Minoring in Physics**

The minor in physics consists of five courses:

- Three-semester introductory sequence of mechanics, electromagnetism, and modern physics, i.e., relativity and quantum mechanics (PHYS 116, 117, 128/128L)
- Two physics courses numbered above 200 that have as prerequisites one or more of the courses listed above