

DOCUMENTS OF THE GENERAL FACULTY

PROPOSED CHANGES TO THE BACHELOR OF SCIENCE IN PHYSICS DEGREE PROGRAM IN THE COLLEGE OF NATURAL SCIENCES CHAPTER IN THE *UNDERGRADUATE CATALOG 2016-2018*

Dean Linda A. Hicke in the College of Natural Sciences has filed with the secretary of the Faculty Council the following changes to BS in Physics in the College of Natural Sciences chapter in the *Undergraduate Catalog, 2016-2018*. On August 23, 2015, the faculty representatives from department approved the changes, and on May 20, 2015, the college curriculum committee approved them. On September 28, 2015, On September 28, 2015, Associate Dean David Vanden Bout approved it on behalf of the dean. The secretary has classified this proposal as legislation of *general* interest to more than one college or school.

The Committee on Undergraduate Degree Program Review recommended approval of the changes on October 18, 2015, and forwarded them to the Office of the General Faculty. The Faculty Council has the authority to approve this legislation on behalf of the General Faculty. The authority to grant final approval on this legislation resides with UT System.

If no objection is filed with the Office of the General Faculty by the date specified below, the legislation will be held to have been approved by the Faculty Council. If an objection is filed within the prescribed period, the legislation will be presented to the Faculty Council at its next meeting. The objection, with reasons, must be signed by a member of the Faculty Council.

To be counted, a protest must be received in the Office of the General Faculty by December 11, 2015.



Hillary Hart, Secretary
General Faculty and Faculty Council

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|--|--|------------------------|
| <input type="checkbox"/> curriculum | <input type="checkbox"/> an existing program | added to the inventory |
| <input type="checkbox"/> Change in admission requirements (external or internal) | <input type="checkbox"/> Requirements not explicit in the catalog language (e.g., lists of acceptable courses maintained by department office) | |

4. SCOPE OF PROPOSED CHANGE

- a. Does this proposal impact other colleges/schools? Yes No
If yes, then how? Mechanical Engineering altered the courses that Radiation Physics majors take.
- b. Do you anticipate a net change in the number of students in your college? Yes No
If yes, how many more (or fewer) students do you expect?
- c. Do you anticipate a net increase (or decrease) in the number of students from outside of your college taking classes in your college? Yes No
If yes, please indicate the number of students and/or class seats involved.
- d. Do you anticipate a net increase (or decrease) in the number of students from your college taking courses in other colleges? Yes No
If yes, please indicate the number of students and/or class seats involved.

If 4 a, b, c, or d was answered with yes, please answer the following questions. If the proposal has potential budgetary impacts for another college/school, such as requiring new sections or a non-negligible increase in the number of seats offered, at least one contact must be at the college-level.

How many students do you expect to be impacted? A handful of Radiation Physics majors will take the Mechanical Engineering courses. There will be no need of additional resources.

Impacted schools must be contacted and their response(s) included:

Department of Mechanical Engineering

Person communicated with: Sheldon Landsberger, Professor

Date of communication: August 17, 2015

Response: The new rubric will be ME 336N as I mentioned before. That will make sure there is no confusion with other ME 379 courses.

{Note: ME originally changed 136N to 379M, a general topics course. Later, ME agreed to create ME 336N as a stand-alone course.}

- e. Does this proposal involve changes to the core curriculum or other basic education requirements (42-hour core, signature courses, flags)? If yes, explain: No

If yes, undergraduate studies must be informed of the proposed changes and their response included:

Person communicated with:

Date of communication:

Response:

- f. Will this proposal change the number of hours required for degree completion? If yes, explain: **No**

5. COLLEGE/SCHOOL APPROVAL PROCESS

Department approval date: April 23, 2015; August 18, 2015

College approval date: May 20, 2015; September 9, 2015

Dean approval date: September 28, 2015, David Vanden Bout, Associate Dean

PROPOSED NEW CATALOG TEXT:**BACHELOR OF SCIENCE IN PHYSICS**

{no changes}

Prescribed Work Common to All Options

{no changes}

Prescribed Work Common to All Options for Each**Option I: Physics**

This option is designed to give the student a strong foundation for graduate study or work in physics and for further study or work in a variety of other areas.

6. Chemistry 301 or 301H, and 302 or 302H.
7. Six semester hours in biology, geological sciences, or astronomy; a course may not be used to fulfill this requirement if it cannot be counted toward major requirements in the department that offers it.
8. Physics 301, 101L, 316, 116L, 315, and 115L.
9. Mathematics 408C and 408D or the equivalent, 427J or 427K and 427L, and six additional semester hours of upper-division coursework in mathematics; the following courses are recommended: Mathematics 340L, 361, and 362K. Only courses at the level of calculus and above may be counted toward the total number of hours required for the degree.
10. Physics 336K, 352K, 353L, 355, 362K, 362L, 369, 373, and 474, or their equivalents.
11. Enough additional coursework to make a total of 126 semester hours.

Option II: Computation

This option is designed to provide the necessary foundation and hands-on skill in computation for the student who plans a career or further study in computational physics or computer science. Students who complete this option may simultaneously fulfill some of the requirements of the Certificate in Scientific Computation.

6. Chemistry 301 or 301H, and 302 or 302H.
7. Six semester hours in biology, geological sciences, or astronomy; a course may not be used to fulfill this requirement if it cannot be counted toward major requirements in the department that offers it.
8. Physics 301, 101L, 316, 116L, 315, and 115L.
9. Mathematics 408C and 408D or the equivalent, 427J or 427K and 427L, and six additional semester hours of upper-division coursework in mathematics or statistics and data sciences; Statistics and Data Sciences 329C and Mathematics 362K are recommended; only courses at the level of calculus and above may be counted toward the total number of hours required for the degree.
10. Physics 329, 336K, 338K, 352K, 353L, 355, 369, and 373, or their equivalents.
11. One of the following scientific computation options:
 - a. [~~Statistics and Data Sciences 222,~~] Computer Science 303E; Computer Science 313E or Statistics and Data Sciences 322; [~~and two of the following courses; the student must complete~~] and two courses [~~coursework~~] from [~~at least~~] two of the areas listed below: [~~following areas:~~]
 - i. Numerical methods: Chemical Engineering 348, Computer Science 323E, 323H, 367, Mathematics 348, Statistics and Data Sciences 335.
 - ii. Statistical methods: Biomedical Engineering 335, Mathematics 358K, 378K.
 - iii. Other computing topics: Computer Science 324E, 327E, 329E, 377, Mathematics 346, 362M, 368K, 372K, 376C, Mechanical Engineering 367S, Statistics and Data Sciences 329D, 374C, 374D, 374E.
 - b. Twelve semester hours chosen from Electrical Engineering 306, 312, 316, 319K, and 422C.
12. Enough additional coursework to make a total of 126 semester hours.

Option III: Radiation Physics

This option is designed to provide the necessary foundation for the student who plans a career or further study in nuclear engineering, radiation engineering, or health physics.

6. Chemistry 301 or 301H, and 302 or 302H.

7. Six semester hours in biology, geological sciences, or astronomy; a course may not be used to fulfill this requirement if it cannot be counted toward major requirements in the department that offers it.
8. Physics 301, 101L, 316, 116L, 315, and 115L.
9. Mathematics 408C and 408D or the equivalent, ~~427J~~ or 427K and 427L, and six additional semester hours of upper-division coursework in mathematics; the following courses are recommended: Mathematics 340L, 361, and 362K. Only courses at the level of calculus and above may be counted toward the total number of hours required for the degree.
10. Twenty-four semester hours of upper-division coursework in physics, including Physics 336K, 352K, 353L, 355, 362L, 369, and 373, or their equivalents.
11. ~~Sixteen~~ Eighteen semester hours of upper-division coursework in mechanical engineering, consisting of Mechanical Engineering ~~[436N]~~ 337C, 337F, 337G, 361E, ~~and~~ 361F, and 336N.
12. Enough additional coursework to make a total of 126 semester hours.

Option IV: Space Sciences

This option is designed to provide the necessary foundation for the student who plans a career or further study in space sciences.

6. Chemistry 301 or 301H, and 302 or 302H.
7. Six semester hours in biology, geological sciences, or astronomy; a course may not be used to fulfill this requirement if it cannot be counted toward major requirements in the department that offers it.
8. Physics 301, 101L, 316, 116L, 315, and 115L.
9. Mathematics 408C and 408D or the equivalent, 427J or 427K and 427L, and six additional semester hours of upper-division coursework in mathematics; the following courses are recommended: Mathematics 340L, 361, and 362K. Only courses at the level of calculus and above may be counted toward the total number of hours required for the degree.
10. Physics 329, 336K, 352K, 353L, 355, 362K, 369, and 373, or their equivalents.
11. Either fifteen semester hours of upper-division coursework in aerospace engineering or ~~[thirteen]~~ twelve hours in aerospace engineering and three additional hours of upper-division coursework in physics.
12. Enough additional coursework to make a total of 126 semester hours.

Option V: Teaching

This option is designed to fulfill the course requirements for certification as a middle grades or secondary school science teacher in Texas; the student chooses composite science certification with physics as the primary teaching field, physical sciences certification, physics/mathematics certification, or mathematics, physical science, and engineering certification. However, completion of the course requirements does not guarantee the student's certification. For information about additional requirements, students should consult the UTeach-Natural Sciences academic adviser.

6. Physics 301, 101L, 316, 116L, 315, and 115L.
7. Mathematics 408C and 408D or the equivalent, 427J or 427K, and 427L.
8. At least eighteen semester hours of upper-division coursework in physics, consisting of Physics 341 (Topic 7: *Research Methods: UTeach*), 353L, 355, and three of the following courses: Physics 329, 333, 336K, 338K, 352K, 373, Science 365 ~~[360 (Topic 4: *Physics by Inquiry*)]~~. With the consent of the UTeach-Natural Sciences undergraduate adviser, an upper-division physics course that includes a substantial research component may be substituted for Physics 341.
9. History 329U or Philosophy 329U.
10. The requirements of one of the following certification areas:
 - a. For composite science certification:
 - i. Biology 311C and 311D.
 - ii. Chemistry 301 or 301H and 302 or 302H.
 - iii. Six hours of coursework in geological sciences; courses intended for non-science majors may not be counted toward this requirement.
 - iv. Enough additional approved coursework in biology, chemistry, or geological sciences to provide the required twelve hours in a second field.
 - b. For physical sciences certification:
 - i. Chemistry 301 or 301H, 302 or 302H, 204 or 317, 353, 153K, 154K, 354L, and 455 or 456.

- ii. Three additional hours of upper-division coursework in physics.
 - c. For physics/mathematics certification: Mathematics 315C, 325K, 333L, 341 or 340L, 358K, 362K, 360M or 375D.
 - d. For mathematics, physical science, and engineering certification:
 - i. Mathematics 315C, 325K, 333L, 358K, and 362K.
 - ii. Chemistry 301 or 301H, 302 or 302H, and 204.
 - iii. Chemical Engineering 379 (Topic: *Fundamentals of Engineering and Design*), 379 (Topic: *Engineering Energy Systems*), and Mechanical Engineering 379M (Topic: *Design of Machines and Systems*).
11. Eighteen semester hours of professional development coursework consisting of:
 - a. Curriculum and Instruction 650S.
 - b. Curriculum and Instruction 365C or UTeach-Natural Sciences 350.
 - c. Curriculum and Instruction 365D or UTeach-Natural Sciences 355.
 - d. Curriculum and Instruction 365E or UTeach-Natural Sciences 360.
 - e. UTeach-Natural Sciences 101, 110, and 170.
 12. Students seeking middle grades certification must complete the following courses: Educational Psychology 363M (Topic 3: *Adolescent Development*), or Psychology 301 and 304; and Curriculum and Instruction 339E.
 13. Enough additional coursework to make a total of at least 126 semester hours.

Option VI: Physics Honors

6. Breadth requirement: Biology 315H and 325H, Chemistry 301H and 302H, and Mathematics 427J or 427K and 427L; at least one of the math courses must be a designated honors section; credit earned by examination may not be counted toward this requirement.
7. Mathematics 340L and 361.
8. Physics 301, 101L, 316, 116L, 315, and 115L.
9. Physics 336K, 352K, 353L, 355, 362K, 362L, 369, 373, and 474.
10. A section of Undergraduate Studies 302 or 303 that is approved by the departmental honors adviser.
11. A section of Rhetoric and Writing 309S that is restricted to students in the Dean's Scholars Honors Program.
12. Physics 379H and a three-semester-hour upper-division research course approved by the departmental honors adviser.
13. Ten additional semester hours of coursework approved by the departmental honors adviser.
14. Six semester hours of coursework in the College of Liberal Arts or the College of Fine Arts.
15. Enough additional coursework to make a total of 120 semester hours.

Option VII: Biophysics

6. Chemistry 301 or 301H and 302 or 302H.
7. Either Biology 311C, 311D, and 325 or Biology 315H and 325H; Biology 206L.
8. Physics 301, 101L, 316, 116L, 315, and 115L.
9. Mathematics 408C and 408D or the equivalent, 427J or 427K and 427L, and six additional semester hours of upper-division coursework in mathematics; the following courses are recommended: Mathematics 340L, 361, and 362K.
10. Physics 336K, 345, 352K, 353L, 355, 369, and 373 or their equivalents.
11. Either Chemistry 320M or 328M, and Biochemistry 369.
12. Complete one of the following areas:
 - a. Cell Biology: Biology 320.
 - b. Microbiology: Biology 326R.
 - c. Developmental Biology: Biology 349.
 - d. Neurobiology: Either Neuroscience 365R or Biology 371M.
 - e. Virology: Biology 330.
 - f. Computation: Statistics and Data Sciences 335 and Biology 337J [~~or Statistics and Data Sciences 339 (Topic: *Computational Biology*) or (Topic: *Computational Chemistry*)~~].

A list of recommended biology laboratory courses that complement the lecture courses listed in 12a through 12e are available in the advising center and the dean's office.

13. Enough additional coursework to make a total of 126 semester hours.

Special Requirements

{no changes}