

**DEGREE/PROGRAM CHANGE
FORM C
Form Number: C1282**

Fields marked with * are required

Name of Initiator: Richard Rand **Email:*** rjr@unm.edu **Date:*** 10-01-13
Phone Number:* 505 277-2073 Initiator's Title* Prof. Physics/Astro, Undergrad Cmte
Chair

Associated Forms exist?* No ▼

Faculty Contact* Richard Rand
Department* Physics and Astronomy
Branch

Administrative Contact* Lina Sandve
Admin Email* lsandve@unm.edu
Admin Phone* 277-1514

Proposed effective term:

Semester Fall ▼ Year 2014 ▼

Course Information

Select Appropriate Program Undergraduate Degree Program ▼

Name of New or Existing Program * B.S. in Physics with a concentration in Biophysics

Select Category Concentration ▼ Degree Type B.S.

Select Action New ▼

Exact Title and Requirements as they should appear in the catalog. If there is a change, upload current and proposed requirements.

See current catalog for format within the respective college (upload a doc/pdf file)

[bioconcreqs.txt](#)

Does this change affect other departmental program/branch campuses? If yes, indicate below.

Reason(s) for Request * (enter text below or upload a doc/pdf file)

We wish to create a new concentration in Biophysics within the B.S. in Physics. The full justification is in an uploaded document.
REGISTRAR'S NOTE TO VAL: See comments.

Upload a document that includes justification for the program, impact on long-range planning, detailed budget analysis and faculty workload implications.*

[bioconcall.pdf](#)

bi oconcreqs. txt

Exact title of degree:

B. S. in Physics with a concentration in Biophysics.

Requirements:

For the degree of B. S. in Physics with a concentration in Biophysics:

PHYC 290, 301, 303, 304, 307L, 330, 405, BIOL 201L, 202L, 203, 203L, 204, 204L.

Four electives from, BIOL 425, 429, 436L, 437, 444, 446, 470, 492, 547,

BIOC 423, BME 517, 544, 570, (CHEM 301 and 303L), (CHEM 302 and 304L), CHEM 315, NSMS/CHNE 522L, 530, PHYC 302, 302L, 410. Required supportive courses: MATH 311, 312, 316.

A physics BS is an excellent preparation for many interdisciplinary STEM careers (the national need for which is clear) that don't require graduate physics degrees. Our department is trying to increase opportunities for pursuing STEM career paths through our major programs via the development of new concentrations, thereby also addressing the perception that our major programs are only intended for career physicists and astrophysicists. We hope to attract more students to degrees in physics this way. Such modernization and diversification was a recommendation of our most recent Academic Program Review in 2010, while the initiative has been made much more possible with the elimination of A&S group requirements. This biophysics concentration is designed to meet the needs of students who wish to pursue a career in the rapidly growing field of biophysics, either through graduate biophysics study, medical school, or direct employment after the BS.

The program has been designed to give students the physics background they need to succeed in biophysics. It contains most of the requirements of the B.S. in Physics, with some classes that are of reduced relevance to biophysics eliminated, allowing (along with the elimination of group requirements) a substantial set of eight classes in biological sciences to be added. We will require the foundation classes BIOL 201L, 202L, 203, 203L, 204 and 204L, while we expect students will take our biophysics topics class offered as PHYC 480 (currently we can't require this class as it is a Topics class and we do not yet have a commitment to regularly teach a biophysics version). In consultation with faculty and advisors in the Biology Department, and our own faculty working in biophysics, we have created a list of further electives from which students can design a program suited to their interests and goals. These include typical preparation for medical school if desired. A Road Map for this concentration, including the list of electives, accompanies this proposal. Students will design their program in consultation with Physics and (after consulting with the Undergraduate Program Committee [UPC] of the Biology Department) Biology advisors.

The program has the approval of the Biology Department UPC, as indicated in an accompanying letter from its Chair, Steve Stricker. Impact on capacity in Biology classes should be very small, given that there are over 1000 Biology majors, and we expect several majors in this concentration.

As the concentration is created using existing classes, there is no impact on long-range planning, budget, or faculty workload.

Regarding assessment of this new concentration, the Biology Department carries out program assessment by measuring SLOs in BIOL 202L and 204L. Their UPC has agreed (see accompanying email) to provide to us the results for students taking this concentration. We will also modify a component of our program assessment - our Exit Interviews - to include feedback from students on how well the program is meeting its goals. The following addendum has been added to our assessment plan and the revised plan will be posted to the Outcomes Assessment website once the concentration has been approved:

"To assess whether students are succeeding in the Biology component of the concentration, it makes most sense to assess them in the same way that the Biology Department currently assesses their majors. Their three SLOs are listed in their published assessment plan and are assessed in

BIOL 202L and 204L, which our students will also take. The Biology UPC has agreed to run their assessment analysis for our students and provide the results to us. We will also use our Exit Interviews assessment component. Two of our Biophysics faculty, Keith Lidke and Jim Thomas, have agreed to give the Exit Interviews for these students. Almost all of the questions are already written so that they provide feedback on any of our degree programs and their classes, so they can easily be applied to biology subjects. We will only modify Part 1, Question 3 to 'In which subfields of physics and biology do you feel most educated?'"



Department of Biology

13 March 2014

Professor Sudhakar Prasad
Department of Physics
UNM

Dear Prof. Prasad:

Thank you for allowing us to review your proposal regarding a new concentration in Biophysics for Physics majors. As chair of the Undergraduate Policy Committee here in Biology, I am pleased to inform you that the entire committee endorses your proposal and views it as a very worthwhile endeavor. We hope that you are successful in implementing this program and would be happy to discuss matters further, should you require any further input from Biology.

With best wishes,

A handwritten signature in black ink, appearing to read "Stephen A. Stricker".

Stephen A. Stricker,
Prof. and Chair of Undergraduate Policy
Dept. of Biology
sstr@unm.edu

----- Original Message -----

Subject:pdf of signed letter

Date:Thu, 13 Mar 2014 14:17:07 -0600

From:Stephen Stricker <sstr@unm.edu>

To:Sudhakar Prasad <sprasad@unm.edu>

sorry--to be a bit more official, I meant to send the pdf of the signed version of the letter, as attached here

Stephen A. Stricker
Professor
Dept. of Biology
Univ. of New Mexico
Albuquerque, NM 87131
USA
505 277-1883; fax 505 277-0304

Greetings, Prasad. For what it is worth, please find attached a formal endorsement from the UPC for your Biophysics concentration. As for the question re: assessments, we are just submitting assessment plans for our core courses. If and when they get approved and are up and running, I will let you know. As long as your Biophysics students self-identify to their TAs, then it should not be a problem to partition off their scores on assessment-related questions and send those data over to you all (currently, we are proposing to evaluate all of our core course SLOs via exam questions that the TAs will grade and enter into a spreadsheet).

Let me know if you need any further info from our end, and I wish you good luck in making your concentration a reality.

Cheers,

Steve

Stephen A. Stricker
Professor
Dept. of Biology
Univ. of New Mexico
Albuquerque, NM 87131
USA
505 277-1883; fax 505 277-0304

Course Subject and Title	Cr. Hrs.	Major	Minor/2nd Major	Core	UD	Min Grade	Notes
Semester One:							
Physics 160 & 160L	4	4		4		C	
ENGL 101 Composition 1	3			3		C	
Chem 121 & 123L	4			4		C	
Math 162	4			4		C	
Physics 167*						CR	
Total:	15						
<i>Freshman Advisement</i>							
<i>Departmental Check in</i>							
Semester Three:							
C&J 130 or PHI 156	3			3		C	
Biol 201L	4	4				C	
Physics 262 & 262L	4	4				C	
Physics 267*						CR	
Math 264	4		4			C	
Second Language	3			3		C	
Total	18						
<i>Will be transferred at end of semester</i>							
<i>Departmental Check in</i>							
Semester Five:							
Physics 303	3	3			3	C	
Physics 313	1				1	CR	
Bio Elective 1	3	3			3	C	
Biol 203 & 203L	4	4				C	
Math 312	3			3		C	
Fine Arts	3				3	C	
Total	17						
<i>Visit Career Services</i>							
<i>Departmental Check in</i>							
Semester Seven:							
Social Behavioral Science	3			3		C	
Bio Elective 3	3	3			3	C	
Physics 301	3	3			3	C	
Physics 311	1				1	CR	
Humanities	3			3		C	
Upper Division Elective	3				3	C	
Total	16						
<i>Senior Visit - College Advisement Center</i>							
<i>Departmental Check in</i>							

Course Subject and Title	Cr. Hrs.	Major	Minor/2nd Major	Core	UD	Min Grade	Notes
Semester Two:							
Physics 161 & 161L	4	4		3		C	
ENGL Composition 2	3			3		C	
Math 163	4					C	
Chem 122 & 124L	4					C	
Physics 168*						CR	
Total:	15						
<i>Sophomore Advisement</i>							
<i>Departmental Check in</i>							
Semester Four:							
Biol 202L	4	4				C	
Physics 330	3	3			3	C	
Physics 331	1				1	CR	
Math 311	3			3		C	
Math 316	3			3		C	
Physics 290	3	3				C	
Total	17						
<i>Departmental Orientation</i>							
<i>Departmental Check in</i>							
Semester Six:							
Bio Elective 2	3	3			3	C	
Physics 304	3	3			3	C	
Physics 314	1				1	CR	
Biol 204 & 204L	4	4				C	
Math 314	3			3		C	
Physics 405	3	3			3	C	
Physics 415	1				1	CR	
Total	18						
<i>Apply for degree</i>							
<i>Departmental Check in</i>							
Semester Eight:							
Bio Elective 4	3	3			3	C	
Physics 307L	3	3			3	C	
Upper Division Elective	3				3	C	
Social Behavioral Science	3			3		C	
Upper Division Seminar	1				1	CR	
Humanities	3			3		C	
Total	16						
<i>Senior Visit Advisement</i>							
<i>Departmental Check in</i>							
<i>Graduation Fair</i>	132	61	16	42	54		
Degree Total							

The University of New Mexico Core Curriculum (36 units)

Writing and Speaking: (3-9 units)

Mathematics: (3 units)

Physical and Natural Sciences: (7 units)

Social and Behavioral Sciences: (6 units)

Humanities: (6 units)

Foreign Language: (non-English language; 3 units)

Fine Arts: (3 units)

University Residence Requirements

a. Minimum hours = 30

b. Senior standing = 15 past 92

c. In major = One half

d. In minor = One quarter

Career Opportunities and Pathways



Arts and Sciences College Minimum Requirements

· Total credit hours = 120

· 300/400 level credit hours = 54, or 51 if 202 second language is completed

· Minimum credit hours taught in A&S = 96

Minimum graduation GPA = 2.00

For more information see the catalogue at www.unm.edu

Notes:

1. There is room for up to 6 bio electives, if the other electives in Sems 7 and 8 are used.

2. Phyc 366, to be taken in Sem 5, may be substituted for Math 311 and 312,
but then two additional Math or Stat >300 classes would be needed to get the Math minor.

They could be taken as the two upper-division electives in Sem 8.

Without such substitution of Math 311 and 312, the program grants an automatic Math minor.

3. It is possible to satisfy the pre-med requirements of the UNM Med School by an appropriate
choice of the electives. The Premed Advisement document gives the required classes.

4. Students planning to go to grad school in physics or biophysics are strongly advised to
take Phyc 491 and 492 (QM I and II) for their upper-division electives.

The Departmental Honors Program requires 2 semesters of an Honors Section of Physics 456. The student and
*Physics 167, 168, and 267 are 1-credit hour Recitation Sections associated with Physics 160, 161 and 262,
respectively. These recitation sessions provide practice in solving problems from the associated lecture courses.
They are optional, but very useful.

UC Advisor:

Email:

Website:

Major Advisor: Email: Website:

Minor Advisor: Email: Website:

College Advisor: Email: Website:

BIOPHYSICS ELECTIVES:

Biol 425 Molecular genetics
Biol 429 Molecular Cell Biology
Biol 436L Phylogenetics
Biol 437 Evolutionary Genetics
Biol 444 Genomes and Genomic Analysis
Biol 470 Biology: Discovery and Innovation
Biol 492 Introductory Mathematical Biology
Biol 446 Laboratory Methods in Molecular Biology
Biol 547 Advanced Techniques in Light Microscopy

BME 517 Applied Biology for
Biomedical Engineers
BME 544§ Mechanics/Thermodynamics of Molecular Components in Cells

BME 570 Physical Bioanalytical Methods

Bioc. 423 Introductory Biochemistry (pre-req Chem 302)

NSMS/CHNE 522L Fundamentals of Nanofluids
NSMS/CHNE 530§ Surface and Interfacial Phenomena

Phyc 302 Introduction to Photonics
Phyc 302L Optics Lab
Phyc 410 Chemistry and Physics at
the Nanoscale
Phyc 480 Special topics in Biophysics

Chem 301 and 303L Organic Chem
I with Lab
Chem 302 and 304L Organic Chem
II with Lab
Chem 315 Introductory Physical

Note:

§Phyc 301 may provide good
preparation for these classes