

# Program Change Request

Date Submitted: 12/22/16 10:42 am

Viewing: **PHYSPH : Physics Doctor of Philosophy**

Last edit: 06/05/17 12:53 pm

Changes proposed by: thibado

Catalog Pages Using  
this Program

[Physics \(PHYS\)](#)

Submitter: **5-7932**      User ID: **thibado**      Phone:

Program Status: **Active**

Academic Level: Graduate

Type of proposal: **Major/Field of Study**

Select a reason for this modification  
Reconfiguring an Existing Degree—(LON 11)

Are you adding a concentration?  
**Yes**

Concentration(s):

## In Workflow

1. ARSC Dean Initial
2. GRAD Dean Initial
3. Provost Initial
4. Director of Program Assessment and Review
5. Registrar Initial
6. Institutional Research
7. PHYS Chair
8. ARSC Curriculum Committee
9. ARSC Dean
10. ARSC Dean
11. Global Campus
12. Provost Review
13. University Course and Program Committee
14. Graduate Committee
15. Faculty Senate
16. Provost Final
17. Provost's Office-- Documentation sent to System Office
18. Higher Learning Commission
19. Board of Trustees
20. ADHE Final
21. Provost's Office-- Notification of Approval
22. Registrar Final
23. Catalog Editor Final

## Approval Path

1. 01/13/17 2:08 pm  
Jeannine Durdik  
(jdurdik): Approved  
for ARSC Dean  
Initial
2. 01/13/17 4:40 pm  
Patricia Koski  
(pkoski): Approved  
for GRAD Dean  
Initial
3. 01/18/17 7:27 am  
Terry Martin  
(tmartin): Approved  
for Provost Initial
4. 01/23/17 12:11 pm  
Alice Griffin  
(agriffin): Approved  
for Director of  
Program  
Assessment and  
Review
5. 01/30/17 10:43 am  
Lisa Kulczak  
(lkulcza): Approved  
for Registrar Initial
6. 01/30/17 11:08 am  
Gary Gunderman  
(ggunderm):  
Approved for  
Institutional  
Research
7. 01/30/17 3:44 pm  
Julio Gea-  
Banacloche  
(jgeabana):  
Approved for PHYS  
Chair

- 8. 04/12/17 11:43 am  
Fred Spiegel  
(fspiegel): Approved  
for ARSC Curriculum  
Committee
- 9. 04/12/17 12:00 pm  
Jeannine Durdik  
(jdurdik): Approved  
for ARSC Dean
- 10. 04/12/17 12:02 pm  
Jeannine Durdik  
(jdurdik): Approved  
for ARSC Dean
- 11. 04/21/17 10:52 am  
Kiersten Bible  
(kbible): Approved  
for Global Campus
- 12. 05/02/17 8:58 am  
Terry Martin  
(tmartin): Approved  
for Provost Review
- 13. 08/07/17 2:50 pm  
Alice Griffin  
(agriffin): Approved  
for University  
Course and Program  
Committee
- 14. 08/18/17 5:06 pm  
Patricia Koski  
(pkoski): Approved  
for Graduate  
Committee

Action	Code	Title
Delete Existing	N/A	Physics PhD space and planetary sciences concentration
Add new	PHYS-ASTR	Physics PhD astrophysics concentration
Add new	PHYS-BIPH	Physics PhD biophysics concentration
Add new	PHYS-NEUR	Physics PhD neuroscience concentration

Action	Code	Title
Add new	PHYS-PHYS	Physics PhD general physics

Are you adding a track? **No**

Are you adding a focused study? **No**

Effective Catalog Year **Fall 2018** ~~Summer 2014~~

College/School Code Fulbright College of Arts and Sciences(ARSC)

Department Code Department of Physics(PHYS)

Program Code PHYSPH

Degree Doctor of Philosophy

CIP Code  
40.0801 - Physics, General.

Program Title  
Physics Doctor of Philosophy

Program Delivery

Method

**On Campus**

Is this program interdisciplinary?

**Yes**

College(s)/School(s)

College/School Name
Fulbright College of Arts and Sciences(ARSC)

Does this proposal impact any courses from another College/School?

What are the total hours needed to complete the program?

## Program Requirements and Description

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Requirements

**Requirements for the Doctor of Philosophy Degree:** To be admitted to candidacy for the Ph.D. degree the student must a) form a dissertation committee; b) pass the **research-based** candidacy exam, c) obtain a minimum of B-grade in core physics courses and d) file a Declaration of Intent with the Graduate School. Incoming graduate students will be advised by a departmental adviser for the first **year. two years.** Students must form their dissertation committees by the end of their **second third**-academic semester and file the appropriate forms with the Graduate School. The dissertation committee consists of the research adviser as **chair chair, three members of the Physics faculty,** and **two other members of the one member of the graduate faculty. faculty not from the Physics Department.**

**The research-based candidacy examination, also known as the PhD qualifier, consists of a written proposal and oral presentation. The candidacy examination covers three areas: Quantum mechanics, electromagnetism, and classical mechanics, all at the graduate level, although questions at the undergraduate level may also be asked. The exam is given on three days in the week preceding the start of the Spring semester classes. All students** Students entering the **PhD** graduate program in the **fall Fall** semester **must will** take **their qualifier the exam** no later than **the end after three semesters** of **their fifth graduate study at the University of Arkansas,** and those entering the graduate program in the **Spring** semester **of graduate studies. will take it no later than after the fourth semester of graduate study. Students entering** The exam is given on **three days in the PhD graduate program in week preceding the spring start of the Spring semester must take their qualifier no later than the end of their sixth semester of graduate studies. classes. Especially well-prepared students are encouraged to take their qualifier earlier. A passing grade of 55 percent in each area will be required. The students will be allowed a second and final attempt in the failed areas the following year. A candidate failing** In the **research-based qualifier in his/her first exceptional cases where after the second attempt, will have the student has failed only one additional semester (two if they change adviser) for area and his/her score in that area is not below 50 percent, the faculty may allow a second and final attempt. third attempt or an oral exam.**

~~This exam will be given within six weeks after the second attempt.~~ Ph.D. students must complete a minimum of **33 40**-semester-hours in 5000- and/or 6000-level courses beyond their Bachelor of Science degrees. Courses taken to fulfill the requirements for the University of Arkansas M.S. physics degrees can be included in this **33 40**-semester-hour requirement. Students who have had similar courses as part of an M.S. physics program at another institution may obtain a **waiver, waiver for up to 21 credit hours,** on a course-by-course basis, upon petitioning to the **Physics** Graduate Affairs Committee.

Ph.D. students must take:

<u>PHYS 5011</u>	Introduction to Current Physics Research Seminar (Fa)	1
<u>PHYS 5111</u>	Research Techniques Through Laboratory Rotations (Sp)	1
<u>PHYS 5041</u>	Journal Club Seminar (Sp)	1
<u>PHYS 5073</u>	Mathematical Methods for Physics (Fa)	3
<u>PHYS 5103</u>	Advanced Mechanics (Fa)	3
<u>PHYS 5213</u>	Statistical Mechanics (Odd years, Fa)	3
<del>PHYS-5263L</del>	<del>Experiment and Data Analysis (Sp)</del>	<del>3</del>
<u>PHYS 5313</u>	<b>Advanced Electromagnetic Theory I (Fa)</b>	<b>3</b>
<u>PHYS 5413</u>	Quantum Mechanics I (Fa)	3

A minimum grade of B is required in the following core courses:

<u>PHYS 5073</u>	Mathematical Methods for Physics (Fa)	3
<u>PHYS 5103</u>	Advanced Mechanics (Fa)	3
<del>PHYS 5263L</del>	<del>Experiment and Data Analysis (Sp)</del>	<del>3</del>
<u>PHYS 5213</u>	<b>Statistical Mechanics (Odd years, Fa)</b>	<b>3</b>
<u>PHYS 5313</u>	Advanced Electromagnetic Theory I (Fa)	3
<u>PHYS 5413</u>	Quantum Mechanics I (Fa)	3

If a minimum grade of B is not obtained, the course may be repeated once. If the student cannot obtain a minimum of B on two attempts, he/she will not be allowed to continue in the Ph.D. program.

**Fifteen** ~~Thirteen~~ additional **semester** hours in elective physics graduate courses will be required, and they must be selected from the 5000- or 6000-level courses listed in the graduate catalog appropriate to the student's field of specialization and approved by the student's **dissertation** advisory committee. For the purposes of this degree requirement, any Astronomy (ASTR) graduate course listed in the Graduate Catalog and taught through the physics department will be considered a physics elective. Additional elective courses outside of the physics department may be taken with dissertation committee approval.

**Physics PhD students may also choose one of the following concentrations by meeting its requirements: Astrophysics, Biophysics, or Neuroscience. Students who do not choose one of the three concentrations will pursue the general Physics PhD requirements by default.**

#### **Astrophysics Concentration**

**Physics Ph.D. with Astrophysics Concentration students must also take:**

<u>ASTR 5033</u>	<b>Astrophysics I: Stars and Planetary Systems (Odd years, Fa)</b>	<b>3</b>
<u>ASTR 5043</u>	<b>Astrophysics II: Galaxies and the Large-Scale Universe (Even years, Sp)</b>	<b>3</b>

**Nine (9) additional hours in elective coursework appropriate to the student's field of specialization and approved by the student's research thesis advisory committee.**

#### **Biophysics Concentration**

**Physics Ph.D. with Biophysics Concentration students must also take:**

<u>BIOL 5313</u>	<b>Molecular Cell Biology (Sp)</b>	<b>3</b>
<u>PHYS 5613</u>	<b>Introduction to Biophysics and Biophysical Techniques (Sp, Fa)</b>	<b>3</b>

**Nine (9) additional hours in elective coursework appropriate to the student's field of specialization and approved by the student's research thesis advisory committee.**

#### **Neuroscience Concentration**

**Physics Ph.D. with Neuroscience Concentration students must also take:**

<u>BIOL 4793</u>	<b>Introduction to Neurobiology (Sp)</b>	<b>3</b>
<u>PSYC 4183</u>	<b>Behavioral Neuroscience (Fa)</b>	<b>3</b>

**Nine (9) additional hours in elective coursework appropriate to the student's field of specialization and approved by the student's research thesis advisory committee.**

Ph.D. students must also earn 18 hours of credit in Doctoral Dissertation, submit a dissertation, and defend it successfully in a comprehensive oral examination given by the dissertation committee. **The doctoral degree will be awarded to students who complete a minimum of 72-graduate semester credit hours beyond the bachelor's degree.**

Students should also be aware of Graduate School requirements with regard to [doctoral degrees](#).



Are Similar Programs available in the area?

**No**

Estimated Student Demand for Program **50**

Scheduled Program Review Date **2021-2022**

Program Goals and Objectives

**Program Goals and Objectives**

**The specific goals that we wish to accomplish in our program of graduate studies are the following:**

**1. Provide basic knowledge in core physics areas.**

**2. Allow our PhD student to get involved in research more quickly.**

**We assess our program periodically. Success of our program is judged based primarily on how well we accomplish the above goals.**

Learning Outcomes

**Learning Outcomes**

**1. Develop critical thinking and problem solving skills in the conduct of research.**

**2. Develop ability to communicate work to a broad range of audience.**

Description and justification of the request

<b>Description of specific change</b>	<b>Justification for this change</b>
<p><b>(1) The physics faculty recently voted to replace our course-based PhD candidacy exam with a research-based candidacy exam. The department believes this will help us recruit more students into our program, help us retain more students in our program, and allow our students to more quickly get involved in research.</b></p>	

Description of specific change	Justification for this change
(2) The physics faculty recently voted to reduce the number of required courses. The department believes this will allow our students to more quickly get involved in research.	
(3) The physics faculty are also requesting to delete a concentration. The concentration does not exist in this software tool (Program Management). However, the registrar's office informed us that ADHE has this concentration on file. The concentration name is: PhD in Physics with a Concentration in Space and Planetary Sciences. The concentration has never had a student in the program.	
(4) Current and future students will be given the opportunity to have Astrophysics, Biophysics, or Neuroscience concentration printed on their transcript, which will help them meet specific job requirements. In addition, these concentrations should allow the physics department to attract more students interested in Astrophysics, Biophysics, and Neuroscience to our PhD program.	

## Upload attachments

[PHYSPH - Employer Needs Surveys.pdf](#)

[PHYSPH-SPAC - Deletion - Ltr of Notification.docx](#)

[PHYSPH - Reconfig - Ltr of Notification.docx](#)

## Reviewer Comments

**Alice Griffin (agriffin) (12/14/16 4:41 pm):** Rollback: Deleting a concentration is considered a major change, please change your response to the reason for proposed change to "deletion-LON 5." It will change the approval workflow to include BOT and ADHE approval. This step can only be done by the submitter. Thank you.

**Alice Griffin (agriffin) (12/21/16 1:37 pm):** Attached email correspondence explaining recommended changes to proposal.

**Alice Griffin (agriffin) (12/21/16 1:37 pm):** Rollback: Please review attached email correspondence for recommended changes.

**Alice Griffin (agriffin) (01/19/17 4:23 pm):** Inserted proposed program codes for concentrations.

**Alice Griffin (agriffin) (01/23/17 12:10 pm):** Changed response to changes the total number of hours to the program. Also updated program review dates. And uploaded revised copies of the LONs in consultation with submitter.

**Lisa Kulczak (lkulcza) (01/30/17 10:40 am):** Added course lists/verified course listings in proposed concentrations.

**Lisa Kulczak (lkulcza) (01/30/17 10:42 am):** Removing extra space in text.

**Julio Gea-Banacloche (jgeabana) (01/30/17 3:43 pm):** Added clarification regarding timing of second attempt for the research-based qualifier.

**Alice Griffin (agriffin) (06/05/17 9:33 am):** Made some minor revisions to the catalog copy and the LON in consultation with the submitter.

**Alice Griffin (agriffin) (06/05/17 9:36 am):** Second attempt to upload revised LON.

**Alice Griffin (agriffin) (06/05/17 12:53 pm):** Added a general concentration per recommendation of Registrar's Office. This change is internal and not part of the off-campus approval process. It is a place-holder for students not wishing to pursue one of the concentrations.

Key: 356