Academic Policy Series	1622.20A

ADD, CHANGE OR DELETE UNIT, PROGRAM REQUIREMENTS, OR ACADEMIC POLICIES

Complete this form consistent with the instructions in Academic Policy 1622.20. Use the form to add, change, or delete a program or unit or to change program policies. Proposed additions and changes must be consistent with Academic Policies 1100.40 and 1621.10 and any other policies which apply.

SECTION I: Approvals

Department / Program Chair	Date Submitted	Graduate Council Chair	Date
College Dean	Date	Faculty Senate Chair	Date
Honors College Dean	Date	Provost	Date
Core Curriculum Committee	Date	Board of Trustees Approval/Notification Date	
University Course and Programs Committee	Date	Arkansas Higher Education Coordinating Board Approval/Notification Date	

SECTION II: Profile Data - Required Information and Name Change Information

Academic Unit: ☒ Major/Field of Study ☐ Minor ☐ Other Unit **ARSC** ☐ Policy

Level: ☒ Undergraduate ☐ Graduate ☐ Law Effective Catalog Year _____

Program changes are effective with the next available catalog. See Academic Policy Series 1622.20

Current Name **B.S. in Physics**

College, School, Division **ARSC** Department Code **PHYS**

Current Code (6 digit Alpha) **PHYSBS** Proposed Code (6 digit Alpha) _____
Prior approval from the Office of the Registrar is required.

☐ Interdisciplinary Program CIP Code _____
Prior assignment from Office of Institutional Research is required.

Proposed Name _____
When a program name is changed, enrollment of current students reflects the new name.

SECTION III: Add a New Program/Unit

☐ For new program proposals, complete Sections II and VII and use as a cover sheet for a full program proposal as described in 'Criteria and Procedures for Preparing Proposals for New Programs in Arkansas.' ADHE
http://www.adhe.edu/divisions/academicaffairs/Pages/aa_academicproposals.aspx

☐ Program proposal uses courses offered by another academic college, and that college dean's office has been notified. The signature of the dean of that academic college is required here: _____

SECTION IV: Eliminate an Existing Program/Unit

Code/Name _____ Effective Catalog Year _____

No new students admitted to program after Term: ___ Year: _____
Allow students in program to complete under this program until Term: ___ Year: _____

SECTION V: Proposed Changes to an Existing Program or Program Policies

Insert here a statement of the exact changes to be made: We are removing 4 general elective credits from the 8-semester plan so that it reflects the new 120-hour requirement for a baccalaureate degree. Also changing some language at the top of the beginning of the major requirements to reflect that 120 hours are required for the degree. There are no changes to the specific major course requirements to accommodate Act 747. There are two small modifications to the Astronomy and Electronics

concentrations to show the remaining number of physics/astronomy electives needed to total 40 hours of physics courses being required. Also, some language is being added to clarify what qualifies as 40 hours of physics coursework, because coursework other than PHYS (as required by the various concentrations) is allowed. And finally, due to a course change being submitted to convert PHYS 4621L to a variable credit course PHYS 462VL, this course change must be reflected in the PHYSBS professional concentration and 8-semester plan.

Check if either of these boxes apply and provide the necessary signature:

☐ Program change proposal adds courses offered by another academic college, and that college dean's office has been notified. The signature of the dean of that academic college is required here: _____

☐ Program change proposal deletes courses offered by another academic college, and that college dean's office has been notified. The signature of the dean of that academic college is required here: _____

Check all the boxes that apply and complete the required sections of the form:

☐ Change of Name and Code (Complete only sections I, II, V and VII.)
☐ Change Course Requirements: (Complete all sections of the form except "Proposed Name" in II, section III, and section IV.)
☐ Change Delivery Site/Method (Complete all sections of the form except "Proposed Name" in II, section III, and section IV.)
☐ Change Total Hours (Complete all sections of the form except "Proposed Name" in II, section III, and section IV.)
☐ Change in Program Policies

SECTION VI: Justification

Justify this change and state its likely effect on any other degree program (including those outside the school or college). Identify any program or program components (other than courses) to be eliminated if this program is implemented. (Program and course change forms must also be submitted for such related changes.)

The changes from 124 to 120 credit hours and the 4 general elective credits being removed to reflect compliance with Act 747. Additional language is being added to show that hours taken to fulfill one of the six concentration areas counts towards the 40 hours of physics coursework required for the major. And although students have always had to make up the shortfall in the number of physics hours still needed if pursuing the Astronomy or Electronics concentration (all the other concentrations specify 16 hours of coursework, which added to the 24 hours required of all PHYSBS students equals 40), by taking additional physics electives to reach the 40 hour physics coursework requirement, that is being made more clear by specifying those physics/astronomy electives within those two concentrations. The PHYS 4621L course is being converted to a variable credit course to allow students the option of completing more labs for a higher level of credit being earned. Students would be required to perform 3 labs for 1 credit, 6 for 2 credits and 9 for 3 credits. Labs to be chosen from are: Electron diffraction, charge-to-mass ratio e/m, gamma ray, pulsed field NMR, atomic spectroscoppy, x-ray diffraction, Franck-Hertz, molecular spectroscopy, thermionic emission, alpha particle, earth's field NMR, and optical pumping. References to PHYS 4621L must be modified to PHYS 462VL in the professional concentration requirements and 8-semester plan, accordingly.

SECTION VII: Catalog Text and Format

In the box below, insert the current catalog text which is to be changed, with changes highlighted with the color yellow. Include all proposed changes identified in Section V. Only changes explicitly stated in Section V will be considered for approval by the University Course and Programs Committee, the Graduate Council and the Faculty Senate. If you are proposing a new program, give proposed text with all of the elements listed below. If you are proposing modified text, include these elements as appropriate.

Include the following elements, in order, in the catalog text for proposed undergraduate program(s) or program changes:

- State complete major/program name
- Briefly define or describe the major/program or discipline.
- Identify typical career goals or paths for graduates. (Optional)
- State admission requirements (if any) for entry or entry into upper/advanced level of major/program.
- Identify location in catalog of university, college/school, and department/program requirements which the student must meet in addition to hours in the major, but do not restate these requirements.
- State course requirements in the major and any allied areas, giving number of hours and specific courses; specify electives or elective areas and give numbers of hours and courses in elective pools or categories; identify any other course requirements.
- State any other requirements (required GPA, internship, exit exam, project, thesis, etc.).
- Identify name and requirements for each concentration (if any).
- Specify whether a minor or other program component is allowed or required and provide details.
- State eight-semester plan requirements

For minors, state requirements in terms of hours, required courses, electives, etc.

For graduate program/units, include elements (as needed) parallel to those listed for undergraduate programs above.

For Law School program/units, prepare text consistent with current catalog style.

For centers, prepare text consistent with current catalog style.

Requirement for B.S. Degree with a Major in Physics: In addition to the university/state core requirements (see page 41) and the Fulbright College of Arts and Sciences Graduation Requirements (see page 134 under Fulbright College Academic Regulations and Degree Completion Program Policy), the following course requirements must be met. Bolded courses from the list below may be applied to portions of the University/state minimum core requirements.

The student must present a minimum of 40 semester hours in physics (Note: astronomy, biology, chemistry, and computer science courses as specified within the concentration requirements listed below can be applied to this 40 hours) including:

PHYS 2054, **PHYS 2074**, PHYS 2094, PHYS 3414, PHYS 3614, PHYS 4073, PHYS 4991 and courses in one of six concentrations:

Astronomy: PHYS 3544, ~~plus~~ 6 semester hours of ASTR courses numbered 3000 or above (3033, 4013, 4073), plus 6 additional hours numbered 3000 and above in physics or astronomy.~~.~~

Biophysics: PHYS 3113 and 13 semester hours including courses numbered 3000 and above in physics, astronomy, biology, and chemistry chosen with the adviser's permission.

Computational: PHYS 3113 and 13 semester hours including courses numbered 3000 and above in physics, astronomy, advanced computer science, or

Electronics: PHYS 3213, PHYS 4333, and ~~6~~ 10 semester hours numbered 3000 and above in physics or astronomy.

Optics: PHYS 3544, any 1 course selected from PHYS 4734 or PHYS 4774, and 8 semester hours numbered 3000 and above in physics or astronomy.

Professional: PHYS 3113, PHYS 4333, and 10 semester hours numbered 3000 and above in physics or astronomy.

For all six of the possible concentrations the following mathematics courses are required: MATH 2554, MATH 2564, MATH 2574, MATH 2584, and MATH 3423. CSCE 3513, CSCE 4423, or MEEG 2703 can be substituted for MATH 3423 with the adviser's approval. In addition, **CHEM 1103/1101L** and **CHEM 1123/1121L**, or an approved 8 hours of laboratory-based courses in CSCE 2004 and CSCE 2014 are required.

Majors must propose participation in a research experience project no later than the end of their junior year of study. A written report of the results must be submitted during Senior Seminar (PHYS 4991).

Physics B.S.

Eight-Semester Degree Program

Students wishing to follow the eight-semester degree plan should see page 41 in the Academic Regulations chapter for university requirements of the program as well as page 130 of this chapter for College requirements.

Physics offers six concentrations: astronomy, biophysics, computational, electronics, optics and professional. The eight-semester plan for each is listed below.

Core requirement hours may vary by individual, based on placement and previous credit granted. Once all core requirements are met, students may substitute a three-hour (or more) general elective in place of a core area. Well prepared students may skip BIOL 1543/1541L, and go immediately into the biology core courses. Students should consult their advisers.

Physics B.S. with Astronomy Concentration

Fall Semester Year 1

3 ENGL 1013 Composition I
4 †MATH 2554 Calculus I
3 University/state core US History requirement
4 †PHYS 2054 University Physics I
1 General Elective
15 Semester Hours

Spring Semester Year 1

3 ENGL 1023 Composition II
4 †MATH 2564 Calculus II
3 University/state core fine arts or humanities requirement
~~2~~ 1 General Electives
4 †PHYS 2074 University Physics II
~~16~~ 15 Semester Hours

Fall Semester Year 2

4 †PHYS 2094 University Physics III
4 CHEM 1103/1101L University Chemistry I and Lab
4 †MATH 2574 Calculus III
3 University/state core humanities or fine arts requirement (as needed)
~~1 General Elective~~
~~16~~ 15 Semester Hours

Spring Semester Year 2

4 ‡†PHYS 3614 Modern Physics
3 University/state core social science requirement
4 ‡†MATH 2584 Differential Equations
4 CHEM 1123/1121L University Chemistry II and Lab
15 Semester Hours
Fall Semester Year 3
4 ‡†PHYS/ASTR Group A
3 ‡†MATH 3423 Advanced Applied Math I
4 ‡†PHYS/ASTR Group A or General Elective
3 PHYS 3213 Electronics
14 Semester Hours
Spring Semester Year 3
4 ‡†PHYS 3414 Electromagnetic Theory
3 University/state core social science requirement
3 General Elective or ‡†PHYS/ASTR Group A (as needed)
3 General Elective
3 University/state core social science requirement
16 Semester Hours
Fall Semester Year 4
3 ‡†PHYS 4073 Introduction to Quantum Mechanics
4 ‡†PHYS 3544 Optics
3 ASTR 4073 Cosmology
6 General Electives
16 Semester Hours
Spring Semester Year 4
1 ‡†PHYS 4991 Senior Seminar
4 ‡†PHYS Optics Elective (4734 or 4774)
3 ASTR 4013 Astrophysics
~~8~~ 6 General Electives
~~16~~ 14 Semester Hours
~~124~~ 120 Total Hours
† Meets 40-hour advanced credit hour requirement. See College Academic Regulations on page 131 of this chapter
‡ Meets 24-hour rule (24 hours of 3000-4000 level courses in Fulbright College), in addition to meeting the 40-hour rule. See College Academic Regulations on page 131 of this chapter.
Group A: Any PHYS or ASTR classes numbered 3000 or above.
Physics B.S. with Biophysics Concentration
Fall Semester Year 1
3 ENGL 1013 Composition I
4 BIOL 1543/1541L Principles of Biology
4 †MATH 2554 Calculus I
4 †PHYS 2054 University Physics I
15 Semester Hours
Spring Semester Year 1
3 ENGL 1023 Composition II
4 †MATH 2564 Calculus II
3 BIOL 2533 Cell Biology*
4 †PHYS 2074 University Physics II
3 University/state core fine arts or humanities
17 Semester Hours
Fall Semester Year 2
4 †PHYS 2094 University Physics III
4 †MATH 2574 Calculus III
4 CHEM 1103/1101L University Chemistry I
3 University/state core humanities or fine arts requirement (as needed)
15 Semester Hours
Spring Semester Year 2
4 ‡†PHYS 3614 Modern Physics
4 CHEM 1123/1121L University Chemistry II
4 ‡†MATH 2584 Differential Equations
4 †BIOL 2013/2011L General Microbiology*
16 Semester Hours
Fall Semester Year 3
3 ‡† PHYS 3113 Analytical Mechanics
3 ‡†MATH 3423 Advanced Applied Math I
3 University/state core social science requirement
4 ‡†CHEM 3603/3601L Organic Chemistry I
~~1 General Elective~~
3 University/state core US History requirement
16~~4~~ Semester Hours
Spring Semester Year 3
4 ‡† PHYS 3414 Electromagnetic Theory
4 ‡CHEM 3613/3611L Organic Chemistry II
~~3 University/state core US History requirement~~
3 University/state core social science requirement

3 General Elective
~~17~~ 14 Semester Hours
Fall Semester Year 4
3 ‡†PHYS 4073 Introduction to Quantum Mechanics
3 ‡†BIOL 4003 Laboratory Techniques in Microbiology*
3 University/state core social science requirement
6 General Electives
15 Semester Hours
Spring Semester Year 4
3 ‡BIOL 3323 General Genetics
3 ‡BIOL 3023 Evolutionary Biology
1 ‡†PHYS 4991 Senior Seminar
~~9~~ 6 General Electives
~~16~~ 13 Semester Hours
~~124~~ 120 Total Hours
* Or another chemistry, biology, astronomy, or physics elective from PHYS/ASTR Group A (below).
† Meets 40-hour advanced credit hour requirement. See College Academic Regulations on page 131 of this chapter
‡ Meets 24-hour rule (24 hours of 3000-4000 level courses in Fulbright College), in addition to meeting the 40-hour rule. See College Academic Regulations on page 131 of this chapter.
Group A: Any PHYS or ASTR classes numbered 3000 or above.
Physics B.S. with Computational Concentration
Fall Semester Year 1
3 ENGL 1013 Composition I
3 †MATH 2554 Calculus I
3 University/state core fine arts or humanities requirement
4 †PHYS 2054 University Physics I
1-3 General Electives (as desired)
14-16 Total Hours
Spring Semester Year 1
3 ENGL 1023 Composition II
4 †MATH 2564 Calculus II
3 University/state core humanities or fine arts requirement (as needed)
3 University/state core US History requirement or General Elective
4 †PHYS 2074 University Physics II
17 Total Hours
Fall Semester Year 2
4 †PHYS 2094 University Physics III
4 †MATH 2574 Calculus III
3 General Elective or University/state core US History requirement (as needed)
4 CSCE 2004 Programming Foundations I
15 Total Hours
Spring Semester Year 2
4 ‡†PHYS 3614 Modern Physics
3 University/state core social science requirement
4 ‡†MATH 2584 Differential Equations
4 CSCE 2014 Programming Foundations II
15 Total Hours
Fall Semester Year 3
3 ‡† PHYS 3113 Analytical Mechanics
3 ‡†MATH 3423 Advanced Applied Math
3 Advanced Level Elective
3 University/state core social science requirement
3 General Electives
15 Total Hours
Spring Semester Year 3
4 ‡† PHYS 3414 Electromagnetic Theory
3 ‡†CSCE 3143 Data Structures (recommended) or PHYS/ASTR Group A or advanced level electives*
3 ‡†PHYS/ASTR Group A or advanced level electives*
3 University/state core social science requirement
3 General Elective
16 Total Hours
Fall Semester Year 4
3 ‡†CSCE 3313 Algorithms or (recommended) PHYS/ASTR Group A or advanced level electives*
4 ‡†PHYS/ASTR Group A or advanced level electives*
3 ‡†PHYS 4073 Introduction to Quantum Mechanics
~~6~~ 5 General Electives
~~16~~ 15 Total Hours
Spring Semester Year 4
4 ‡†PHYS/ASTR Group A or ‡†3000+ level Fulbright College elective (if needed) or advanced level electives*
1 ‡†PHYS 4991 Senior Seminar

8 †Advanced level electives
~~3 General Elective~~
16 Semester Hours
~~124~~ 120 Total Hours
* Nine hours of upper division computer science or mathematics courses can count toward the physics major.
† Meets 40-hour advanced credit hour requirement. See College Academic Regulations on page 131 of this chapter
‡ Meets 24-hour rule (24 hours of 3000-4000 level courses in Fulbright College), in addition to meeting the 40-hour rule. See College Academic Regulations on page 131 of this chapter.
Group A: Any PHYS or ASTR classes numbered 3000 or above.

Physics B.S. with Electronics Concentration
Fall Semester Year 1
3 ENGL 1013 Composition I
4 †MATH 2554 Calculus I
3 University/state core social science requirement
4 †PHYS 2054 University Physics I
1 General Elective
15 Total Hours
Spring Semester Year 1
3 ENGL 1023 Composition II
4 †MATH 2564 Calculus II
3 University/state core social science requirement
1 General Elective
4 †PHYS 2074 University Physics II
15 Total Hours
Fall Semester Year 2
4 †PHYS 2094 University Physics III
3 University/state core fine arts or humanities requirement
4 †MATH 2574 Calculus III
4 CHEM 1103/1101L University Chemistry I and Lab
~~1 General Elective~~
~~16~~ 15 Total Hours
Spring Semester Year 2
4 ‡†PHYS 3614 Modern Physics
3 ‡†PHYS 3213 Electronics
4 ‡†MATH 2584 Differential Equations
4 CHEM 1123/1121L University Chemistry II and Lab
~~1 General Elective~~
~~16~~ 15 Total Hours
Fall Semester Year 3
3 ‡†MATH 3423 Advanced Applied Math I
3 University/state core social science requirement
3 University/state core humanities or fine arts requirement (as needed)
6 General Electives
15 Total Hours
Spring Semester Year 3
4 ‡†PHYS 3414 Electromagnetic Theory
3 ‡†PHYS 4333 Thermal Physics
3 University/state core social science requirement
3 General Elective
3 General Elective or ‡†PHYS/ASTR Group A
16 Total Hours
Fall Semester Year 4
3 ‡†PHYS 4073 Introduction to Quantum Mechanics
3 ‡†PHYS/ASTR Group A
3 ‡†PHYS/ASTR Group A or General Elective (as needed)
6 General Electives
15 Total Hours
Spring Semester Year 4
3 ‡†PHYS 4713 Introduction to Solid State Physics
3 ‡†PHYS/ASTR Group A (as needed) or General Elective
1 ‡†PHYS 4991 Senior Seminar
~~9~~ 7 General Electives
~~16~~ 14 Semester Hours
~~124~~ 120 Total Hours
† Meets 40-hour advanced credit hour requirement. See College Academic Regulations on page 131 of this chapter
‡ Meets 24-hour rule (24 hours of 3000-4000 level courses in Fulbright College), in addition to meeting the 40-hour rule. See College Academic Regulations on page 131 of this chapter.
Group A: Any PHYS or ASTR classes numbered 3000 or above.

Physics B.S. with Optics Concentration
Fall Semester Year 1
3 ENGL 1013 Composition I

4 †MATH 2554 Calculus I
3 University/state core US History requirement
4 †PHYS 2054 University Physics I
1 General Elective
15 Semester Hours
Spring Semester Year 1
3 ENGL 1023 Composition II
4 †MATH 2564 Calculus II
3 University/state core fine arts or humanities requirement
4 †PHYS 2074 University Physics II
~~2~~ 1 General Electives
~~16~~ 15 Semester Hours
Fall Semester Year 2
4 †PHYS 2094 University Physics III
4 CHEM 1103/1101L University Chemistry I and Lab
4 †MATH 2574 Calculus III
3 University/state core humanities or fine arts requirement (as needed)
~~1 General Elective~~
1~~5~~6 Semester Hours
Spring Semester Year 2
4 ‡†PHYS 3614 Modern Physics
3 ‡†PHYS 3213 Electronics
4 ‡†MATH 2584 Differential Equations
4 CHEM 1123/1121L University Chemistry II and Lab
15 Semester Hours
Fall Semester Year 3
4 ‡†PHYS/ASTR Group A
3 ‡†MATH 3423 Advanced Applied Math I
4 ‡†PHYS/ASTR Group A or General Elective
3 University/state core social science requirement
14 Semester Hours
Spring Semester Year 3
4 ‡†PHYS 3414 Electromagnetic Theory
3 University/state core social science requirement
3 University/state core social science requirement
3 General Elective or ‡†PHYS/ASTR Group A (as needed)
3 General Elective
16 Semester Hours
Fall Semester Year 4
3 ‡†PHYS 4073 Introduction to Quantum Mechanics
4 ‡†PHYS 3544 Optics
9 General Electives
16 Semester Hours
Spring Semester Year 4
1 ‡†PHYS 4991 Senior Seminar
4 ‡†PHYS Optics Elective (4734 or 4774)
~~11~~ 9 General Electives
~~16~~ 14 Semester Hours
~~124~~ 120 Total Hours
† Meets 40-hour advanced credit hour requirement. See College Academic Regulations on page 131 of this chapter
‡ Meets 24-hour rule (24 hours of 3000-4000 level courses in Fulbright College), in addition to meeting the 40-hour rule. See College Academic Regulations on page 131 of this chapter.
Group A: Any PHYS or ASTR classes numbered 3000 or above.
Physics B.S. with Professional Concentration
Fall Semester Year 1
3 ENGL 1013 Composition I
3 ENGL 1013 Composition I
4 †MATH 2554 Calculus I
3 University/state core U.S. History requirement
4 †PHYS 2054 University Physics I
1 General Elective
15 Total Hours
Spring Semester Year 1
3 ENGL 1023 Composition II
4 †MATH 2564 Calculus II
3 University/state core social science requirement
1 General Elective
4 †PHYS 2074 University Physics II
15 Total Hours
Fall Semester Year 2
4 †PHYS 2094 University Physics III
3 University/state core social science requirement
4 †MATH 2574 Calculus III
3 CHEM 1103 University Chem. I (if needed) or Core from areas a, b, c or e (as

needed)
2 General Elective
16 Total Hours
Spring Semester Year 2
4 ‡†PHYS 3614 Modern Physics
3 ‡†PHYS 3213 Electronics
4 ‡†MATH 2584 Differential Equations
4 CHEM 1123/1121L University Chemistry II and Lab
15 Total Hours
Fall Semester Year 3
3 ‡†PHYS 3113 Analytical Mechanics
3 ‡†MATH 3423 Advanced Applied Math I
3 †Advanced Level Elective
3 University/state core fine arts or humanities requirement
3 University/state core social science requirement
15 Total Hours
Spring Semester Year 3
4 ‡†PHYS 3414 Electromagnetic Theory
3 ‡†PHYS 4333 Thermal Physics
3 University/state core humanities or fine arts requirement
6 General Electives
16 Total Hours
Fall Semester Year 4
3 ‡†PHYS 4073 Introduction to Quantum Mechanics
3 ‡†PHYS/ASTR Group A
1-3 ‡PHYS 462V~~1~~L Modern Physics Lab
~~9~~ 5-7 General Elective
~~16~~ 14 Total Hours
Spring Semester Year 4
3 ‡†PHYS/ASTR Group A
3 ‡†PHYS/ASTR Group A (as needed) or General Electives
1 ‡†PHYS 4991 Senior Seminar
~~9~~ 7 General Electives (to total ~~124~~ 120 hours)
~~16~~ 14 Semester Hours
~~124~~ 120 Total Hours
† Meets 40-hour advanced credit hour requirement. See College Academic Regulations on page 131 of this chapter
‡ Meets 24-hour rule (24 hours of 3000-4000 level courses in Fulbright College), in addition to meeting the 40-hour rule. See College Academic Regulations on page 131 of this chapter.
PHYS/ASTR Group A. Any PHYS or ASTR courses numbered 3000 or above.

SECTION VIII: Action Recorded by Registrar's Office

PROGRAM INVENTORY/DARS

PGRM _____ SUBJ _____ CIP _____ CRTS _____

DGRE _____ PGCT _____ OFFC&CRTY VALID _____

REPORTING CODES

PROG. DEF. _____ REQ. DEF.

Initials ____ Date _____

Distribution

Notification to:
(1) College (2) Department (3) Admissions (4) Institutional Research (5) Continuing Education (6) Graduate School
(7) Treasurer (8) Undergraduate Program Committee