

Program Change Request

Date Submitted: 10/29/20 11:28 am

Viewing: **SC-BS-PHYS : Physics, BS**

Last approved: 09/21/20 3:20 pm

Last edit: 12/07/20 3:26 pm

Changes proposed by: prubin

Catalog Pages
Using this Program
[Physics, BS](#)

Are you completing this form on someone else's behalf?

No

Effective Catalog: 2021-2022

Program Level: Undergraduate

Program Type: Bachelor's

Degree Type: Bachelor of Science

Title:
Physics, BS

Banner Title: Physics, BS

Registrar/OAPI Use
Only – SCHEV
Status Approved

Registrar's Office
Use Only –
Program Start Term

Registrar/OAPI Use
Only – SCHEV
Letter

Registrar/OAPI Use
Only – SACSCOC
Status

Concentration(s):

In Workflow

1. Registrar-
Programs:Workflow
Review (P.O.)
2. PHYS UG
Committee
3. PHYS Chair
4. SC Curriculum
Committee
5. SC Associate Dean
6. SC CAT Editor
7. Assoc Provost-
Undergraduate
8. Registrar-Programs:
Duration
9. Registrar-Programs

Approval Path

1. 10/30/20 9:08 am
Tory Sarro (vsarro):
Approved for
Registrar-
Programs:Workflow
Review (P.O.)
2. 11/01/20 7:12 pm
Philip Rubin
(prubin): Approved
for PHYS UG
Committee
3. 12/04/20 1:18 am
Paul So (paso):
Approved for PHYS
Chair

History

1. Nov 17, 2017 by
clmig-jwehrheim
2. Feb 20, 2018 by
Rebekah Zacharias
(rzachari)
3. Mar 6, 2018 by
Jennifer Bazaz
Gettys (jbazaz)
4. Mar 8, 2018 by
Jennifer Bazaz
Gettys (jbazaz)
5. Oct 23, 2019 by
Philip Rubin
(prubin)
6. Sep 21, 2020 by
Philip Rubin
(prubin)

	Associated Concentrations	Registrar's Office Use Only: Concentration Code
1	Applied and Engineering Physics	PHAE
2	Astrophysics	PHAP
3	Computational Physics	PHCP

Registrar/IRR Use Only – Concentration CIP Code

College/School: College of Science

Department / Academic Unit: Physics & Astronomy

Jointly Owned Program? No

Justification

What: Move PHYS 306 and PHYS 428 to the list of required physics and astronomy theory courses for the Astrophysics concentration for single majors.

Why: They should be required of these students, but were mistakenly listed among a list of choices.

Total Credits Required: Total credits: minimum 120

Registrar's Office Use Only - Program Code:

SC-BS-PHYS

Registrar/IRR Use Only – Program CIP Code 40.0801 - Physics, General.

Admission Requirements:

Admissions

University-wide admissions policies can be found in the [Undergraduate Admissions Policies](#) section of this catalog. To apply for this program, please complete the [George Mason University Admissions Application](#).

Program-Specific Policies:

Policies

Students must fulfill all [Requirements for Bachelor's Degrees](#) including the [Mason Core](#).

The intensive writing requirement is fulfilled by taking [PHYS 407](#) Senior Laboratory in Modern Physics ([Mason Core](#)), [PHYS 410](#) Computational Physics Capstone ([Mason Core](#)), or [ASTR 402](#) RS: Methods of Observational Astronomy ([Mason Core](#)), which are also capstone courses for the major.

For policies governing all undergraduate programs, see [AP.5 Undergraduate Policies](#).

Double Majors

Students considering a double major with physics should discuss this option with the respective undergraduate coordinators.

Note that at least 18 credits used to fulfill the Physics, BS cannot be used to fulfill another major or minor. Some course substitutions are allowed for double majors, but these should be discussed with a physics advisor in advance.

Alternative Introductory Sequence

Normally, students who intend to major in physics should take the physics introductory sequence:

PHYS 160	University Physics I (Mason Core)	3
PHYS 161	University Physics I Laboratory (Mason Core)	1
PHYS 260	University Physics II (Mason Core)	3
PHYS 261	University Physics II Laboratory (Mason Core)	1

Students who decide to major in physics after completing [PHYS 243](#) College Physics I ([Mason Core](#)), [PHYS 244](#) College Physics I Lab ([Mason Core](#)), [PHYS 245](#) College Physics II ([Mason Core](#)), and [PHYS 246](#) College Physics II Lab

([Mason Core](#)) are welcome, but are required to obtain written permission from the [Department of Physics and Astronomy](#) before a change of major can be approved.

Degree Requirements:

Students should refer to the [Admissions & Policies](#) tab for specific policies related to this program.

Students must complete a total of 75 credits in the major (69 credits if completing a second major), including at least 11 credits in mathematics, with a minimum GPA of 2.00.

Students must complete the coursework described below and either select a concentration or select the "BS without Concentration" option:

Physics Core Courses

PHYS 160	University Physics I (Mason Core)	3
PHYS 161	University Physics I Laboratory (Mason Core)	1
PHYS 251	Introduction to Computer Techniques in Physics	3
PHYS 260	University Physics II (Mason Core)	3
PHYS 261	University Physics II Laboratory (Mason Core)	1
PHYS 301	Analytical Methods of Physics	3
PHYS 303	Classical Mechanics	3
PHYS 305	Electromagnetic Theory 1	3
PHYS 307	Thermal Physics	3
PHYS 308	Modern Physics	3
PHYS 402	Introduction to Quantum Mechanics and Atomic Physics	3
PHYS 416	Undergraduate Physics Review	1
Total Credits		30

1Students double majoring in engineering and physics may substitute [ECE 305](#) Electromagnetic Theory for [PHYS 305](#) Electromagnetic Theory.

Mathematics

MATH 113	Analytic Geometry and Calculus I (Mason Core)	4
MATH 114	Analytic Geometry and Calculus II	4
MATH 213	Analytic Geometry and Calculus III	3
Total Credits		11

BS without Concentration

Mathematics/Computational Physics 6

Select 6 credits from the following:

MATH 203	Linear Algebra
MATH 214	Elementary Differential Equations
PHYS 325	Intermediate Methods of Experimental Physics

Intermediate Laboratory 6

PHYS 311	Instrumentation	
PHYS 312	Waves and Optics	
Research, Internship, or Independent Study		3
Select 3 credits from the following:		
PHYS 326	Problems in Physics II	
PHYS 405	Honors Thesis in Physics I	
PHYS 406	Honors Thesis in Physics II	
PHYS 408	Senior Research	
PHYS 409	Physics Internship	
Capstone		4
PHYS 407	Senior Laboratory in Modern Physics (Mason Core)	1
PHYS 410	Computational Physics Capstone (Mason Core)	1
Physics Theory		9-15
All students complete the following 9 credits:		
PHYS 306	Wave Motion and Electromagnetic Radiation	
PHYS 403	Quantum Mechanics II	
PHYS 428	Relativity	
Only students who are not completing a second major must select 6 additional credits from the following:		
ASTR 210	Introduction to Astrophysics	
ASTR 328	Stars	
ASTR 403	Planetary Science	
ASTR 404	Galaxies and Cosmology	
PHYS 331	Physics of Renewable Energy	
PHYS 370	Molecular Biophysics	
PHYS 412	Solid State Physics and Applications	
PHYS 440	Nuclear and Particle Physics	
PHYS 465	Planetary Atmospheres and Ionospheres	
PHYS 475	Atmospheric Physics	
Total Credits		28-34
1 Fulfills the writing intensive requirement.		

Applied and Engineering Physics Concentration (PHAE)

Mathematics/Computational Physics		3
PHYS 325	Intermediate Methods of Experimental Physics	
Intermediate Laboratory		6
PHYS 311	Instrumentation	
PHYS 312	Waves and Optics	
Physics Theory		9
PHYS 306	Wave Motion and Electromagnetic Radiation	
Select 6 credits from the following:		

PHYS 331	Physics of Renewable Energy
PHYS 370	Molecular Biophysics
PHYS 403	Quantum Mechanics II
PHYS 412	Solid State Physics and Applications

Capstone 4

Select 4 credits from the following:

PHYS 407	Senior Laboratory in Modern Physics (Mason Core) 1
PHYS 410	Computational Physics Capstone (Mason Core) 1

Practical Work 6-12

Students who are not completing a second major should select 12 credits from the following. Students who are completing a second major should select 6 credits:

PHYS 405	Honors Thesis in Physics I
PHYS 406	Honors Thesis in Physics II
PHYS 408	Senior Research
PHYS 409	Physics Internship
BENG 320	Bioengineering Signals and Systems
ECE 415	Power System Analysis
ECE 416	Electric Machines and Drives

Or other approved 300 or 400-level Volgenau School of Engineering courses

Total Credits 28-34

1 Fulfills the writing intensive requirement.

Astrophysics Concentration (PHAP)

Mathematics/Computational Physics 6

ASTR 401	Computer Simulation in Astronomy
MATH 214	Elementary Differential Equations

Intermediate Laboratory 6

PHYS 311	Instrumentation
PHYS 312	Waves and Optics

Research, Internship, or Independent Study 3

Select 3 credits from the following:

ASTR 405	Honors Thesis in Astronomy I
ASTR 406	Honors Thesis in Astronomy II
ASTR 408	Senior Research
ASTR 409	Astronomy Internship
PHYS 326	Problems in Physics II
PHYS 405	Honors Thesis in Physics I
PHYS 406	Honors Thesis in Physics II

[PHYS 408](#) Senior Research

[PHYS 409](#) Physics Internship

Capstone

4

Select 4 credits from the following:

4

[ASTR 402](#) RS: Methods of Observational Astronomy ([Mason Core](#)) 1

[PHYS 407](#) Senior Laboratory in Modern Physics ([Mason Core](#)) 1

[PHYS 410](#) Computational Physics Capstone ([Mason Core](#)) 1

Physics and Astronomy Theory

12-18

Students who are not completing a second major must complete the following:

[ASTR 210](#) Introduction to Astrophysics

[ASTR 328](#) Stars

[PHYS 306](#) Wave Motion and Electromagnetic Radiation

[PHYS 428](#) Relativity

Select two courses from the following:

[ASTR 403](#) Planetary Science

[ASTR 404](#) Galaxies and Cosmology

[ASTR 420](#) Exoplanets

[ASTR 480](#) The Interstellar Medium

Students who are completing a second major must complete the following:

[ASTR 210](#) Introduction to Astrophysics

[ASTR 328](#) Stars

Select 2 courses from the following:

Select 3 credits from the following:

[PHYS 306](#) Wave Motion and Electromagnetic Radiation

[PHYS 428](#) Relativity

Select 3 credits from the following:

[ASTR 403](#) Planetary Science

[ASTR 404](#) Galaxies and Cosmology

[ASTR 420](#) Exoplanets

[ASTR 480](#) The Interstellar Medium

Total Credits

35-41

1 Fulfills the writing intensive requirement.

Computational Physics Concentration (PHCP)

Mathematics/Computational Physics

15

[PHYS 325](#) Intermediate Methods of Experimental Physics

[MATH 203](#) Linear Algebra

[MATH 214](#) Elementary Differential Equations

Select 6 credits from the following:

[ASTR 401](#) Computer Simulation in Astronomy

CDS 302	Scientific Data and Databases	
CDS 303	Scientific Data Mining	
MATH 446	Numerical Analysis I	
MATH 447	Numerical Analysis II	
Intermediate Laboratory		3
PHYS 311	Instrumentation	
Research, Internship, or Independent Study		3
Select 3 credits from the following:		
PHYS 326	Problems in Physics II	
PHYS 405	Honors Thesis in Physics I	
PHYS 406	Honors Thesis in Physics II	
PHYS 408	Senior Research	
PHYS 409	Physics Internship	
Capstone		4
PHYS 410	Computational Physics Capstone (Mason Core)	1
Physics and Astronomy Theory		3-9
Students who are not completing a second major must select 9 credits of the following. Students who are completing a second major must select 3 credits from the following:		
ASTR 210	Introduction to Astrophysics	
ASTR 328	Stars	
ASTR 403	Planetary Science	
PHYS 306	Wave Motion and Electromagnetic Radiation	
PHYS 412	Solid State Physics and Applications	
Total Credits		28-
		34

1 Fulfills the writing intensive requirement.

Retroactive Requirements Updates:

Plan of Study:

Honors Information:

Honors in the Major

Physics majors who have maintained an overall GPA of at least 3.50 in physics courses and a GPA of 3.50 in all courses taken at George Mason University may apply to the physics honors program when they complete the first semester of their junior year.

To graduate with honors in physics, a student is required to maintain a minimum GPA of 3.00 in physics courses and successfully complete [PHYS 405](#) Honors Thesis in Physics I and [PHYS 406](#) Honors Thesis in Physics II with a GPA of at least 3.50 and a grade of at least 'A-' in [PHYS 406](#) Honors Thesis in Physics II. Please visit the department for details.

Program Outcomes

Additional Program Information

This information is required by the Office of Accreditation and Program Integrity.

Courses offered via distance (if applicable):

What is the primary delivery format for the program?
Face-to-Face Only

Does any portion of this program occur off-campus?

No

Are you working with a vendor / other collaborators to offer your program?

No

Related Departments

Could this program prepare students for any type of professional licensure, in Virginia or elsewhere?

No

Are you adding or removing a licensure component?

No

Additional SCHEV & SACSCOC Information

Are you changing the total number of credits required for this program?

No

Are you changing the delivery format in any way (e.g adding an online option)?

No

Are you adding/removing a licensure option which was approved by SCHEV?

No

Will any portion of this program be offered at an off-campus location?

No

Will this program change affect any specialized accreditation?

No

Is the content of the new program closely related to that of an existing approved program?

No

Is this new program considered to be "advancing the degree level of a currently approved program" (i.e. existing content is at lower degree level, new content is at the higher degree level)?

No

Is this new program considered to be "lowering the degree level of a currently approved program" (i.e. existing content is at higher degree level, new content is at the lower degree level)?

No

Does this change represent a repackaging of content in an existing approved degree/certificate program?

No

Percentage of total credits containing new course content, excluding gen ed courses for undergraduate program: ("New content" means content that is not currently included in an existing approved degree/certificate program.) Please choose a percentage (i.e. 0%-100%)

less than 25%

Are the total credits for the program increasing or decreasing by more than 3 credits?

No

Will any additional equipment/facilities be needed?

No

Will any additional faculty be required?

No

Will any additional financial resources be needed?

No

Will any additional library/learning resources needed?

No

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Green Leaf Program Designation

Is this a Green Leaf program? No

Does this program cover material which crosses into another department?

No

Additional Attachments

SCHEV Proposal

Executive Summary

Reviewer Comments

Additional Comments

Is this course required of all students in this degree program?

%wi_required.eshtml%

Key: 564