Program Change Request

Date Submitted: 06/25/19 12:10 pm

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

Last approved: 03/08/18 3:02 pm

Last edit: 06/25/19 12:09 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:	2020-2021
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	
Concentration(s):	

In Workflow

1. **PHYS UG Committee**
2. **PHYS Chair**
3. **SC Curriculum Committee**
4. SC Associate Dean
5. SC CAT Editor
6. Assoc Provost-Undergraduate
7. Registrar-Programs: Duration
8. Registrar-Programs

Approval Path

1. 05/15/19 1:04 pm Philip Rubin (prubin): Approved for PHYS UG Committee
2. 05/15/19 4:42 pm Paul So (paso): Approved for PHYS Chair
3. 06/25/19 9:58 am Jennifer Bazaz Gettys (jbazaz): Rollback to Initiator
4. 07/01/19 8:30 am Philip Rubin (prubin): Approved for PHYS UG Committee
5. 07/01/19 9:26 pm 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)

	Associated Concentrations	Registrar's Office Use Only: Concentration Code
1	Applied and Engineering Physics	PHAE
2	Astophysics	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 Recently approved new and modified courses require concentrations to be updated.

Total Credits Required: Total credits: minimum 120

Registrar's Office Use Only - Program Code: SC-BS-PHYS

Registrar/IRR Use Only – Program CIP Code

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** ~~PHYS 407 Senior Laboratory in Modern Physics (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:

Course List		
Code	Title	Credits
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

Course List		
Code	Title	Credits
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 (Mason Core)	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

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

Mathematics

Course List		
Code	Title	Credits
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

Course List		
Code	Title	Credits
Mathematics/Computational Physics		6
Select 6 credits from the following:		
PHYS 325	Intermediate Methods of Experimental Physics	
MATH 203	Linear Algebra	
MATH 214	Elementary Differential Equations	
Intermediate Laboratory		6

Code	Title	Credits
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 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)

Course List

Code	Title	Credits
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 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:		

Code	Title	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	
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)

Course List

Code	Title	Credits
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:		
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	
Select 2 courses from the following:		
ASTR 403	Planetary Science	
ASTR 404	Galaxies and Cosmology	
ASTR 420	**Exoplanets**	
ASTR 480	**The Interstellar Medium**	
PHYS 306	Wave Motion and Electromagnetic Radiation	
PHYS 428	Relativity	
Students who are completing a second major must complete the following:		
ASTR 210	Introduction to Astrophysics	
ASTR 328	Stars	
Additionally, select 3 credits from the following:		
PHYS 306	Wave Motion and Electromagnetic Radiation	
PHYS 428	Relativity	

Code	Title	Credits
Lastly, 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		31-37

1 Fulfills the writing intensive requirement.

Computational Physics Concentration (PHCP)

Course List

Code	Title	Credits
Mathematics/Computational Physics		15
PHYS 325	**Intermediate Methods of Experimental Physics**	
MATH 203	Linear Algebra	
MATH 214	Elementary Differential Equations	
Additionally, 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
~~Select 4 credits from the following:~~		
~~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		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.

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

Are you adding significant new content areas to the program?

No

Will this program change affect any specialized accreditation?

No

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

Adjust concentrations to accommodate recently approved new and modified courses. Also, add footnote indicators as needed.

Reviewer Comments **Jennifer Bazaz Gettys (jbazaz) (06/25/19 9:58 am):** Rollback: Per your request- thanks!

Additional Comments

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

%wi_required.eschtml%

Key: 564