Office Hours:
251 Science Building
Mon-Fri 8:00am - 4:30pm
(304) 696-6738
(304) 696-2494 (FAX)

Department of Physics
251 Science Building
Marshall University
One John Marshall Drive
Huntington, WV 25755

PHYSICS

The Physics Department offers a Bachelor of Science (B.S.) in Physics and a B.S. in Physics with several different Areas of Emphasis: Applied , Bio, or Medical Physics, and Medical Imaging. The Department also works closely with the College of Education and Professional Development, who offers a B.A. in Secondary Education through the Physics 9-Adult program; it is within this program where the Physics Department ensures students are well prepared to become teachers with a strong background in Physics. The Physics Department also provides an emphasis of study in Physics for the Master of Science (M.S.) in Physical and Applied Science (GS60) and in Physics (GS80 – Physics Major).

BS in Physics	For those interested in pure physics or physics-related fields.
AoE in Applied Physics	For those interested in applied physics or engineering fields.
AoE in Bio Physics	For those interested in biophysics or biotechnology fields.
AoE in Medical Physics	For those interested in medical school or a biochemical physics fields.
AoE in Medical Imaging	For those interested in medical imaging or medical physics.

Physics Majors/Minors and Dual/Double Majors Are Welcome!

In our Physics BS program, students can also easily obtain a Minor in Math, Chemistry, Biology, or Computer Information Technology depending upon your Area of Emphasis, or you can easily Double Major in Applied Mathematics and Physics. If you are interested in a physics major, or dual/double major in physics with any another field, or just interested in a physics minor, please contact the Physics Department (or the Chair of the Recruitment Committee Dr. Sean P. McBride: mcbrides@marshall.edu). We can help you get on track!

COURSE REQUIREMENTS

Math Courses Required by Physics

MTH 229	Calculus with Analytic Geometry I	5 hrs
MTH 230	Calculus with Analytic Geometry II	4 hrs
MTH 231	Calculus with Analytic Geometry III	4 hrs
§ MTH 335	Ordinary Differential Equations	3 hrs

§ AoE in Biophysics, Medical Physics, & Medical Imaging are not required to take MTH 335. BS in Physics and AoE in Applied Physics still requires MTH 335. Medical Imaging is required to take PHY 446, not MTH 335, and is also required to take STA 345.

†Physics major with Math minor, or Dual Math major of any kind with Physics, requires MTH 300.

General Education - Students have to fulfill the general education requirements required by the College of Science. (http://www.marshall.edu/gened/).

VISIT US AT http://www.marshall.edu/physics/

Updated 12-15-20, If you have questions or find inconsistencies, please contact Dr. Sean P. McBride (mcbrides@marshall.edu)

The Physics Minor

The minor is awarded to students who have completed the following courses with at least a C average: PHY 201 (or 211), 202, 203 (or 213), 204, and any two additional physics or physical science courses at the 300 - 400 level. The sum of these two additional physics classes must total 6 credits.

B.S. Degree in Physics and AoE Physics Requirements

Course Number	Course Title	Credit Hours	BS in Physics	Applied Physics	Bio Physics	Medical Physics	Medical Imaging
PHY 211	University Physics I (CR PHY 202, MTH 229)	4	*	*	*	*	*
PHY 202	General Physics Lab I (CR PHY 211 or PHY 201)	1	*	*	*	*	*
§ PHY 213	University Physics II (CR PHY 204, MTH 230)	4	*	*	*	*	*
PHY 204	General Physics Lab II (CR PHY 213 or PHY 203)	1	*	*	*	*	*
PHY 300	Electricity & Magnetism I (PR PHY 213/203 and MTH 231)	3	*	*	*	*	*
PHY 302	Electricity & Magnetism II (PR PHY 300)	3	*				*
PHY 304	Optics (PR PHY 213 or PHY 203, CR PHY 405 or PHY 505)	3	*	*	*	*	*
PHY 405	Optics Advanced Lab (CR PHY 304)	2	*	*	*	*	*
PHY 308	Thermal Physics (PR PHY213/203 and MTH 231)	3	*	*	*	*	*
PHY 320	Modern (PR PHY 213/203 CR PHY 421 & MTH 140/230)	3	*	*	*	*	*
PHY 421	Modern Physics Advanced Lab (CR PHY 320)	2	*	*	*	*	*
PHY 330	Mechanics (PR PHY 213/203 and MTH 231)	3	*	*	*	*	*
PHY 350	Biological Physics (PR: PHY 203/213 & 204, PR MTH 229)	3			*		
PHY 360	Medical Physics (PR: PHY 203/213 & 204, PR MTH 229)	3				*	*
PHY 425	Solid State Physics (CR/PR: PHY 320 or 442 or CHM 442)	3		*			
PHY 442	Quantum Mechanics I (PR PHY 330 and MTH 231)	3	*	*	*	*	*
PHY 443	Quantum Mechanics II (PR PHY 442 or CHM 442)	3	*				
PHY 445	Math Methods I (PR PHY 213/203 and MTH 231 or consent)	3	*	*	*	*	*
PHY 446	Math Methods II (PR PHY 445)	3	*	*	*	*	*
PHY 491/492	Capstone	2	*	*	*	*	*

§ C letter grade is required in PHY 211 & 202 prior to taking this course

Advanced Courses For BS Degree Physics Electives

The BS in Physics, Applied AoE, and Bio AoE require 5 additional hours of 300 – 400 level physics courses (the AoE in Medical Physics only requires 3 additional hours and Medical Imaging requires zero) . Additional electives are listed below (if one of the below courses is required in your AoE, then chose a different course). Availability of upper level physics electives often depends on level of interest and enrollment numbers. Let your advisor and physics department chair know what you are interested in taking as a physics elective as soon as possible.

Course Number	Course Title	Credit Hours
PHY 302	Electricity & Magnetism II (PR PHY 300)	3
PHY 314	Electronic Physics (PR: PHY 203 or 213 and 204)	3
PHY 340	Scientific Computing (PR: MTH 229/229H and CIT 163)	3
PHY 350	Biological Physics (PR: PHY 203 or 213 and 204, PR MTH 229)	3
PHY 360	Medical Physics (PR: PHY 203 or 213 and 204, PR MTH 229)	3
PHY 415	Electronics Lab (taken with Physics 314)	2
PHY 425	Solid State Physics (CR/PR: PHY 320 or 442 or CHM 442)	3
PHY 435	Computational Physics (PR: PHY 330, MTH 231, and PHY 445 or PHY 446)	3
PHY 443	Quantum Mechanics II (PR PHY 442 or CHM 442)	3
PHY 444	Advanced Lab (CR/PR: PHY 425, CR/PR: PHY 442)	2

Note: MTH 231 & PHY 213 are Typical Prerequisite/Corequisite courses for almost all 300 - 400 PHY courses.

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Physics Area of Emphasis (AoE) Courses Requirements

Course Number	Course Title	Credit Hours	Applied Physics	Bio Physics	Medical Physics	Medical Imaging
CHM 211	Principles of Chemistry I	3	*	*	*	
CHM 217	Principles of Chemistry I Lab	2	*	*	*	
CHM 212	Principles of Chemistry II	3	*	*	*	
CHM 218	Principles of Chemistry II Lab	2	*	*	*	
CHM 355	Organic Chemistry I	3			*	
CHM 356	Organic Chemistry II	3			*	
CHM 361	Intro Organic Chemistry Lab	3			*	
CHM 365	Introduction to Biochemistry	3			*	
BSC 120	Principles of Biology I	4		*	*	
BSC 121	Principles of Biology II	4		*	*	
BSC 227	Human Anatomy	4				*
BSC 228	Human Physiology	4				*
BSC 322	Principles of Cell Biology	4		*		
BSC 417	Biostatistics	3		*		
CIT 163	Programming Practicum with C++	3	*			
CIT 236	Data Structures	3	*			
CIT 238	Algorithms	3	*			
ENGR 111	Engineering Computations	3	*			
MI 201	Introduction to Radiography	3				*
MI 202	Patient Care in Imaging Science	3				*
MI 204	Radiographic Anatomy	3				*
MI 205	Imaging Procedures I	4				*
MI 206	Clinical Practice I	4				*
MI 207	Imaging Procedures II	4				*
MI 208	Pharmacology & Drug Administration for Imaging Science	2				*
MI 210	Clinical Practice II	4				*
STA 345	Probability & Statistics	3				*
	Additional 300 - 400 Level Courses Requirements		5 hrs	5 hrs	3 hrs	0 hrs

Minor in Computer Information Technology (CIT) *- Students must complete 15 hours of CIT designated courses, 12 of which must be at the 200 level or above.*

Minor in Biological Sciences *- A student may qualify for a minor in Biological Sciences by successfully completing BSC 120, 121, at least one BSC core course (BSC 302, 320, 322 or 324) and a minimum of 4 additional hours at the 300-400 level (BSC 417 is only 3 credits and it remains undetermined at the current time if it will towards the BSC minor, ask your advisor).*

Minor in Chemistry *- The Department of Chemistry awards a minor in chemistry to students who have successfully completed the following courses : CHM 211, 212, 217, 218, and any two additional courses chosen from CHM 345, 355, 356, 357, 358, or 448.*

Minor in Mathematics *–Awarded to students who successfully complete the following four courses: MTH 229, MTH 230, MTH 300, and one of the following: MTH 231, MTH 329, MTH 331, MTH 345, MTH 405, MTH 430, MTH 440, MTH 448, MTH 449, MTH 450, or MTH* 455.

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PHYSICS

Double Major in Physics and Mathematics
(or Major in Physics with a Minor in Math)

MATH REQUIREMENTS OUTSIDE OF PHYSICS

Required for Math Minor (also required for any Double Math/Physics major)

MTH 229	Calculus with Analytic Geometry I	5 hrs
MTH 230	Calculus with Analytic Geometry II	4 hrs
MTH 231	Calculus with Analytic Geometry III	4 hrs
MTH 300	Intro to Higher Math	4 hrs

Required for any Double Math/Physics Major

CS 110	Computer Science I	3 hrs
MTH 331	Linear Algebra	4 hrs

Applied Math Dual Major - Additional Courses (must take 2 of these 3 sequences)*

MTH 335 and (MTH 415 or MTH 416)	6 hrs
MTH 443 and (MTH 411 or MTH 442)	6 hrs
MTH 445 and MTH 446	6 hrs

**Applied Math is one of three BS Degrees offered by the Math Department, the others are pure Mathematics and Statistics. The Applied Math double major is the most common. A double major in Mathematics requires the same math credits as the Applied Math double major (38 credits). The statistics double major (47 credits) requires an additional 9 credits of Statistics classes. If interested in these double major options, talk with your physics advisor (flowcharts for these options do exist).*

When Are Courses Outside of Physics For Your AoE or Dual Math Major Typically Offered?

The below is only meant as a guide. Check with your advisor, the current edition of course catalog, and corresponding department to confirm (especially for summer term offerings). Report errors if you experience or find them. Physics core courses are typically offered as shown on any of the Physics Degree Flowcharts, check with your advisor and the current edition of course catalog to confirm.

Open Every Semester

MTH 229, 230, 231, 300, and 331
MTH 335, and 490/491
CHM 211, 212, 355, 356, and 361
BSC 120, 121, 227, and 228
BSC 322 & 417
BSC 320
STA 225 & 345
CIT 163 & 263
CS 110
CMM 207

Other Offerings

MTH 415/416 (even/odd spring)
MTH 442 (odd spring)
MTH 430 (odd fall)
MTH 411 & 431 (even spring)
MTH 427, 443, 445, 450 (every fall)
MTH 428, 446, and 452 (every spring)
CHM 203, 217 & 365 (fall)
CHM 218 (spring)

MI 201, 202, 204, 205, 206 (fall)
MI 207, 208, and 210 (spring)
ENGR 111 (spring)
CIT 236 & 365 (fall)
CIT 238 & 313 (spring)
STA 412 & 445 (every fall)
STA 413 & 446 (every spring)

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