

(For students admitted in 2019-20 under the 4-year degree)

## BSc in Physics

In addition to the requirements of their major programs, students are required to complete the University and School requirements for graduation. For details please refer to the respective sections on this website.

Some courses used to fulfill Major and/or School Requirements can also fulfill University Common Core Requirements. Students may reuse a maximum of 9 credits of these courses to count towards Common Core Requirements.

Students may use no more than 6 credits earned from courses offered in pure online delivery mode to satisfy the graduation requirements of a degree program. This 6-credit limit does not apply to credits obtained through the credit transfer procedures of the University.

For students graduating with an additional major, they must take all the requirements specified for that major, within which they must complete at least 20 single-counted credits. These 20 credits cannot be used to fulfill any other requirements for graduation except for the 120-credit degree requirement.

### Major Requirements

Students **MUST** take the following courses prior to enrollment into the major

#### Major Pre-requisite course(s)

			Credit(s) attained
PHYS		Note: PHYS 1111 <u>OR</u> PHYS 1112 <u>OR</u> PHYS 1312	3
PHYS	1111	General Physics I	3
PHYS	1112	General Physics I with Calculus	3
PHYS	1312	Honors General Physics I	3
PHYS		Note: PHYS 1114 <u>OR</u> PHYS 1314	3
PHYS	1114	General Physics II	3
PHYS	1314	Honors General Physics II	3

#### Required Course(s)

			Credit(s) attained
PHYS	1113	Laboratory for General Physics I	1
PHYS	1115	Laboratory for General Physics II	1
PHYS	2022	Modern Physics	3
PHYS	2023	Modern Physics Laboratory	1
PHYS	2080	Physics Seminar	1

PHYS/MATH		Note: PHYS 2124 <u>OR</u> MATH 2352 (Students taking the Physics and Mathematics Option may take either MATH 2352 or PHYS 2124. Other students can only take PHYS 2124 to fulfill the requirement.)	3-4
PHYS	2124	Mathematical Methods in Physics I	3
MATH	2352	Differential Equations	4
PHYS	3032	Classical Mechanics	3
PHYS		Note: PHYS 3033 <u>OR</u> PHYS 3053 (Students taking IRE Track or Honors Physics Option can only use PHYS 3053 fo fulfill the requirement.)	3-4
PHYS	3033	Electricity and Magnetism I	3
PHYS	3053	Honors Electricity and Magnetism I	4
PHYS		Note: PHYS 3036 <u>OR</u> PHYS 3037 (Students taking IRE Track or Honors Physics Option can only use PHYS 3037 to fulfill the requirement.)	3-4
PHYS	3036	Quantum Mechanics I	3
PHYS	3037	Honors Quantum Mechanics I	4
PHYS/MATH		Note: PHYS 3142 <u>OR</u> MATH 3312 (Students taking the Physics and Mathematics Option may take either MATH 3312 or PHYS 3142. Other students can only take PHYS 3142 to fulfill the requirement.)	3
PHYS	3142	Computational Methods in Physics	3
MATH	3312	Numerical Analysis	3
PHYS	3152	Methods of Experimental Physics I	3
PHYS	3153	Methods of Experimental Physics II	3
PHYS	4050	Thermodynamics and Statistical Physics	3
PHYS	4080	Physics Seminar and Tutorial II	1
PHYS/SCIE		Note: PHYS 4191 <u>OR</u> PHYS 4291 <u>OR</u> (SCIE 3500 AND SCIE 4500) (Students taking IRE Track can only use (SCIE 3500 AND SCIE 4500) to fulfill the requirement; those taking Honors Physics Option can only use PHYS 4291 to fulfill the requirement.)	4-6
PHYS	4191	Capstone Project	4
PHYS	4291	Capstone Research	6
SCIE	3500	IRE Research Project I	3
SCIE	4500	IRE Research Project II	3
PHYS		Note: PHYS 4811 <u>OR</u> PHYS 4812 <u>OR</u> PHYS 4813 (2 courses out of 3)	2
PHYS	4811	Contemporary Applications of Physics: Machine Learning in Physics	1
PHYS	4812	Contemporary Applications of Physics: Quantum Information Technology	1
PHYS	4813	Contemporary Applications of Physics: Atmospheric Physics - Making Sense of Weather and Climate	1
MATH		Note: [(MATH 1012 <u>OR</u> MATH 1013 <u>OR</u> MATH 1023) <u>AND</u> (MATH 1014 <u>OR</u> MATH 1024)] <u>OR</u> [MATH 1020]	4-7
MATH	1012	Calculus IA	4

MATH	1013	Calculus IB	3
MATH	1014	Calculus II	3
MATH	1020	Accelerated Calculus	4
MATH	1023	Honors Calculus I	3
MATH	1024	Honors Calculus II	3
MATH	2023	Multivariable Calculus	4
MATH		Note: MATH 2121 <u>OR</u> MATH 2131	4
MATH	2121	Linear Algebra	4
MATH	2131	Honors in Linear and Abstract Algebra I	4
LANG	3023	Science Communication in English (Physics)	3

## Track Study

### International Research Enrichment Track

Students in the IRE Track should also take PHYS 3053, PHYS 3037, SCIE 3500, and SCIE 4500 as specified in the major requirements.

#### Required Course(s)

			<b>Credit(s) attained</b>
PHYS/MATH		Note: PHYS 3031 <u>OR</u> (MATH 4023 <u>AND</u> MATH 4052)	3-6
PHYS	3031	Mathematical Methods in Physics II	3
MATH	4023	Complex Analysis	3
MATH	4052	Partial Differential Equations	3
PHYS	3034	Electricity and Magnetism II	3
PHYS	3090	Directed Studies in Physics II	1
PHYS	4051	Quantum Mechanics II	3

#### Elective Course(s)

			<b>Minimum credit(s) required</b>
PHYS/BIPH		Physics Electives [Course(s) from the specified elective list]	3
PHYS		Any PHYS courses at 3000-level or above	
PHYS	2021	Black Holes and the Early Universe	3
PHYS	2090	Directed Studies in Physics I	1
BIPH	2010	Introductory Biological Physics	3
BIPH	3010	Advanced Biological Physics	3
BIPH	4010	Principles of Quantitative Instrumentation	3

Student may opt to graduate with or without an option. Students who take an option MUST complete all requirements specified in addition to the major requirements.

## Option(s)

### Honors Physics Option

Students in the Honors Physics Option should also take PHYS 3053, PHYS 3037, and PHYS 4291 as specified in the major requirements.

#### Required Course(s)

			<b>Credit(s) attained</b>
PHYS/MATH		Note: PHYS 3031 <u>OR</u> (MATH 4023 <u>AND</u> MATH 4052)	3-6
PHYS	3031	Mathematical Methods in Physics II	3
MATH	4023	Complex Analysis	3
MATH	4052	Partial Differential Equations	3
PHYS	3034	Electricity and Magnetism II	3
PHYS	4051	Quantum Mechanics II	3

#### Elective Course(s)

			<b>Minimum credit(s) required</b>
PHYS/BIPH		Physics Electives [Course(s) from the specified elective list]	3
PHYS		Any PHYS courses at 3000-level or above	
PHYS	2021	Black Holes and the Early Universe	3
PHYS	2090	Directed Studies in Physics I	1
BIPH	2010	Introductory Biological Physics	3
BIPH	3010	Advanced Biological Physics	3
BIPH	4010	Principles of Quantitative Instrumentation	3

### Physics and Mathematics Option

#### Required Course(s)

			<b>Credit(s) attained</b>
PHYS		Note: PHYS 3034 <u>OR</u> PHYS 4051	3
PHYS	3034	Electricity and Magnetism II	3
PHYS	4051	Quantum Mechanics II	3
MATH	2033	Mathematical Analysis	4
MATH		Note: MATH 3033 <u>OR</u> MATH 3121 <u>OR</u> MATH 4223	3-4
MATH	3033	Real Analysis	4
MATH	3121	Abstract Algebra	3
MATH	4223	Differential Geometry	3

MATH	4023	Complex Analysis	3
MATH	4052	Partial Differential Equations	3