PHYSICS

Chair: Janet Seger
Department Office: Hixson-Lied Science Building, Room G81

Professors: M. Cherney, J. Seger; Professor Emeriti: S. Cipolla, T. Zepf;
Associate Professors: G. Duda, M. Nichols, D. Sidebottom;
Associate Professor Emeritus: R. Kennedy;
Assistant Professors: J. Gabel, T. McShane, S.J., P. Soto.

Department Description: This degree program provides a strong foundation for careers in the rapidly developing high-tech industries. For students who complete a degree in physics, the rewards are a deep understanding of nature, unusual flexibility in the choice of a career, and exceptional strength and stability in the job market.

Web Contact/Information: Additional information about this department may be found at http://physicsweb.creighton.edu. However, for definitive details, students are strongly encouraged to check the University's website for Bulletin changes at http://www.creighton.edu/Registrar.

PROGRAMS IN PHYSICS

Specific Requirements for Admission to the Physics Major: PHY 211 and PHY 212 or an "A" or "B" in PHY 211.

B.S., Major in Physics: 36 Credits

Course Requirements

(All of the following:)

PHY 211	General Physics I*	4 credits
PHY 212	General Physics II*	4 credits
PHY 301	Modern Physics	3 credits
PHY 302	Modern Physics Laboratory	1 credit
PHY 303	Electronics Laboratory	1 credit
PHY 331	Physical Optics	3 credits
PHY 332	Optics Laboratory	1 credit
PHY 471	Classical Mechanics	3 credits
PHY 481	Electricity and Magnetism	3 credits
PHY 491	Seminar	1 credit
PHY 531	Quantum Mechanics	3 credits
PHY 541	Thermodynamics and Statistical Mechanics	3 credits

Advanced Lecture Elective

(Three credits from the following:)

PHY 351	Physics in Medicine	3 credits
PHY 353	Introduction to Biological Physics	3 credits
PHY 522	Electric Circuits	3 credits
PHY 551	Mathematical Physics	3 credits
PHY 552	Computational Physics	3 credits
PHY 558	Relativity: The Special and General Theories	3 credits
PHY 559	Gravitation and Cosmology	3 credits
PHY 561	Nuclear Physics	3 credits
PHY 563	High Energy Nuclear Physics	1 credit
PHY 571	Condensed Matter Physics	3 credits
PHY 587	Laser Physics	3 credits
PHY 595	Special Topics	3 credits

Advanced Laboratory Elective

(Three credits from the following:)

PHY 497	Directed Independent Research	1-3 credits
PHY 562	Nuclear Instruments and Methods	2 credits
PHY 572	Condensed Matter Laboratory	1 credit

Requisite Courses: MTH 245, 246, 347; additional coursework in physics, mathematics, computer science, chemistry, biology, or other sciences is recommended. Choices will depend on the specific career plans and interests of the students.

*PHY 221/223 and PHY 222/224 can be substituted for the PHY 211/212 requirement.

B.S., Major in Applied Physical Analysis: 36 Credits

Course Requirements

(All of the following:)

PHY 211	General Physics I*	4 credits
PHY 212	General Physics II*	4 credits
PHY 471	Classical Mechanics	3 credits
PHY 591	Seminar in Engineering	1 credit
MTH 545	Differential Equations	3 credits
MTH 561	Mathematical Statistics I	3 credits
MTH 562	Mathematical Statistics II	3 credits

(One of the following:)

CSC 221	Computer Programming I	3 credits
PHY 553	Computational Physics	3 credits

(Three credits from the following:)

PHY 497	Directed Independent Research	3 credits
ERG 481	Senior Project in Energy Studies I	3 credits

(Nine credits from the following:)

CSC 222	Computer Programming II	3 credits
CSC 321	Data Structures	3 credits
CSC 414	Introduction to Computer Organization	3 credits
CSC 421	Algorithm Design and Analysis	3 credits
CSC 533	Programming Languages	3 credits
CSC 548	Software Engineering	3 credits
CSC 590	Special Topics	3 credits
ERG 211	Design and Rapid Prototyping Lab I	1 credit
ERG 212	Design and Rapid Prototyping Lab II	1 credit
ERG 241	Introduction to Energy Transfer	3 credits
ERG 251	History and Technology in the Modern World	2 credits
ERG 311	Design and Rapid Prototyping Lab III	1 credit
ERG 312	Design and Rapid Prototyping Lab IV	1 credit
MTH 529	Linear Algebra	3 credits
MTH 543	Numerical Analysis	3 credits
MTH 546	Partial Differential Equations	3 credits
MTH 551	Differential Geometry	3 credits
MTH 555	Chaotic Dynamical Systems	3 credits
MTH 563	Mathematical Statistics III	3 credits
MTH 571	Operations Research	3 credits
MTH 572	Fuzzy Logic	3 credits
MTH 573	Probabilistic Models	3 credits
MTH 575	Introductory Stochastic Processes	3 credits
PHY 301	Modern Physics	3 credits
PHY 303	Electronics Laboratory	1 credit
PHY 331	Physical Optics	3 credits
PHY 332	Optics Laboratory	1 credit
PHY 481	Electricity And Magnetism	3 credits
PHY 491	Seminar	1 credit
PHY 521	Electronics for Scientists	3 credits
PHY 522	Electric Circuits	3 credits
PHY 531	Quantum Mechanics	3 credits
PHY 541	Thermodynamics And Statistical Mechanics	3 credits
PHY 551	Mathematical Physics	3 credits
PHY 553	Computational Physics	3 credits
PHY 561	Nuclear Physics	3 credits
PHY 562	Nuclear Instruments And Methods	2 credits
PHY 571	Condensed Matter Physics	3 credits
PHY 572	Condensed Matter Laboratory	1 credit
PHY 587	Laser Physics	3 credits

Requisite courses: MTH 245, MTH 246, MTH 347.

*PHY 221/223 and PHY 222/224 can be substituted for the PHY 211/212 requirement.

B.S. Phy., Major in Physics: 48-50 Credits

Course Requirements

Students must complete the physics courses listed for the B.S., Major in Physics. In addition, they must complete the following courses:

(All of the following:)

Six additional credits of Advanced Lecture Elective courses		6 credits

(Six credits from the following:)*

MTH 529	Linear Algebra	3 credits
MTH 543	Numerical Analysis	3 credits
MTH 545	Differential Equations	3 credits
MTH 561	Mathematical Statistics I	3 credits

* Students can satisfy this requirement by instead choosing CHM 203/204 and CHM 205/206.

Additional coursework in mathematics, computer science, chemistry, or other sciences is recommended. Courses selected will depend on specific career goals.

Biological Physics Minor

Program Description: The Biological Physics minor provides an opportunity to apply the concepts and methods of the physicist to advance our understanding of the life sciences. Students pursuing careers in medicine or the life sciences can use this minor to improve their preparation for the interdisciplinary nature of modern science.

Contact: Chair, Department of Physics

(All of the following:)

BIO 211	General Biology: Molecular and Cellular	4 credits
PHY 211	General Physics I*	4 credits
PHY 212	General Physics II*	4 credits
PHY 301	Modern Physics	3 credits

(One of the following:)

PHY 351	Physics in Medicine	3 credits
PHY 353	Introduction to Biological Physics	3 credits

*PHY 221/223 and PHY 222/224 can be substituted for the PHY 211/212 requirement.

Physics Minor

Program Description: The Physics minor offers students the opportunity to obtain a thorough introduction to the theoretical and experimental methods extensively used by physical scientists and engineers. In addition to exploring the historical and philosophical development of physics from the Greeks to the modern era, the Physics minor emphasizes the development of practical quantitative problem-solving skills which are valuable for all students regardless of major.

Contact: Chair, Department of Physics

(All of the following:)		
PHY 211	General Physics I**	4 credits
PHY 212	General Physics II**	4 credits
PHY 301	Modern Physics	3 credits
PHY 302	Modern Physics Laboratory	1 credit
(Six credits from the following:)		
PHY 331	Physical Optics	3 credits
PHY 332	Optics Laboratory	1 credit
PHY 471	Classical Mechanics	3 credits
PHY 481	Electricity and Magnetism	3 credits
PHY 491	Seminar	1 credit
PHY 493	Directed Independent Readings*	1-3 credit(s)
PHY 495	Directed Independent Study*	1-3 credit(s)
PHY 497	Directed Independent Research*	1-3 credit(s)
PHY 531	Quantum Mechanics	3 credits
PHY 541	Thermodynamics and Statistical Mechanics	3 credits
PHY 562	Nuclear Instruments and Methods	2 credits
PHY 595	Special Topics	3 credits

*Only a total of two credits from PHY 493, 495 and 497 may be applied toward this minor.

**PHY 221/223 and PHY 222/224 can be substituted for the PHY 211/212 requirement.

Teacher Certification

Students who think they may teach Physics in secondary schools must consult with the Education Department, with the Physics Department, and with the appropriate agency in the state in which they intend to teach.

Certificate Programs in University College

This department does not offer a certificate program to students in University College.

For all PHY courses, please refer to page 437.