

DEPARTMENT OF PHYSICS

The Department of Physics (PHYS) is an undergraduate program emphasizing instruction in contemporary areas in basic and applied physics as articulated within the six concentrations detailed below. Each of these leads to the Bachelor of Science (B.S.) degree in physics, and require a minimum of 120 credit hours. A Minor in Physics is also offered requiring at least 27 credit hours in basic courses (PHYS: 116, 151, 152, 218, 247, 248, 252, 271, 272, 333, 353), with the department's approval. Currently, the department is housed in various offices within the Spearman Technology Building. The Chair is located in Room 147; additional faculty offices are located in Suite 106. Students are encouraged to peruse various physics websites that can offer them a more comprehensive view of the intellectual, professional, and employment opportunities that physics offers. Important sites include the department's web site, <http://physics.tsu.edu>; that of the American Physics Society (APS), <http://www.aps.org>; that of the National Society of Black Physicists (NSBP), <http://www.nsbp.org>; that of the National Society of Hispanic Physicists (NSHP), <http://www.nshp.org>. Through the department's web site, free online courses will be made available to the general public, as they are developed.

The study of physics will produce graduates with exceptional problem solving capabilities impacting all professional areas particularly those in the sciences, technology, engineering, and mathematics (STEM) fields. The successful graduate will possess advanced quantitative skills in mathematics and computation, and an understanding of the fundamental laws of nature from the classical through the quantum realm. It is the program's objective to produce competitive graduates who can either directly enter the workforce or continue onto graduate programs in any of the STEM areas.

In addition to the Concentrations (Tracks) defined below currently offered at TSU, articulation agreements are being presently developed between TSU and other institutions expanding the academic offerings available to physics majors. Of particular importance is the existing relationship with the University of Texas at Brownsville (TSU-UTB) which offers one of the most competitive programs in Astrophysics, by international standards. Their primary area of expertise is gravitational wave astronomy (supported through the Center for Gravitational Wave Astronomy, <http://cgwa.phys.utb.edu/>), which will continue to be an important area of research for many years to come. A course of study exploiting this TSU-UTB relationship can be designed, on an individual basis for any interested students.

Requirements for the B.S. in Physics are summarized below, and within each concentration area. Depending on the area of concentration, different levels of departmental review and permission are required. Students may elect either the two semester calculus based physics sequence "Physics for Engineers" (i.e. PHYS 245 and 246, with Labs PHYS 215 and 216) or the calculus based three semester sequence "University Physics I-III" (i.e. PHYS 152, 251, 252 with Labs 116, 217, and 218). The second is strongly recommended, particularly for students with weak advanced mathematics backgrounds (i.e. multidimensional calculus, vector calculus, linear algebra, etc.). Each declared physics major/minor will be assigned an advisor. All semester course loads must be approved by their advisor. In all cases, students must adhere to the course sequences (i.e. prerequisites and co-requisites) enumerated within the various concentrations. This is because the curriculum is structured in a mutually supporting manner (i.e. different courses build upon each other and prepare students for future courses, particularly those placing high demands in advanced mathematics). Physics majors are not required to have a minor, this is because the scope of our program offers significant immersion in advanced mathematics and scientific computing.

Students must earn grades of "C" or better in all courses specific to the major or minor (i.e. physics and mathematics courses). During the fifth semester, all students must take one semester of quantum mechanics and one semester of electricity and magnetism. The Concentration areas normally begin around the fifth semester, and have varying academic standards for admission and continuation, as indicated previously. There is no exit exam for seniors.

For each of the areas of concentration (i.e. Tracks), Degree plans for completing the B.S. in physics in four, five, and six years are provided. The exception to this is the track for Pre-Pharmaceutical Physical Sciences, which is only for the most competitive student able to assume a 19-20 credit limit each semester, for six consecutive semesters. The real intent of this track is to expand the professional and research based opportunities for the best students considering admission into the Pre-pharmacy program at TSU. Students accepted into this program cannot work off campus during the normal academic year; and they must provide evidence that they can adhere to a rigorous study plan. A four, five, six, year version of this track is also provided.

It is the intention of the physics program to offer online versions of all courses, as well as evening sections, when necessary. This should enable students to prosecute their studies, and graduate on time.

Students transferring to the University are cautioned that Physics credits transferred from other colleges and universities must be evaluated by the Department before being used to fulfill requirements for the major/minor in Physics. These credits may or

may not be acceptable. If these credits are judged to be unacceptable, students may be able to use them to fulfill core curriculum requirements, elective requirements, or both.

Concentration Areas

The six concentration areas leading to the B.S. in Physics are: Engineering Physics, Health Physics, Mathematical-Computational Physics, (Pre) Medical – Radiation Physics, Physics Education, and Pharmaceutical-Physical Sciences. All of the Concentrations emphasize the same basic curriculum through the first four semesters. Admission requirements for the different concentrations are indicated below.

Engineering Physics

The objective of this concentration is to train students in the fundamental and applied aspects of nanophysics and nano-engineering. Current technological trends emphasize the importance of new materials engineered at the molecular level impacting the next generation of electronic devices and advanced medical therapies. Competency in this area requires both theoretical and computational understanding of quantum physics. This concentration requires a minimum of 121 credit hours. Approval for this Concentration requires an overall GPA of 2.7 or better in all physics and mathematics coursework through the first five semesters. The department is developing close ties with leading graduate programs in engineering physics that may facilitate the transfer of successful majors into these M.S./Ph.D. granting institutions.

Health Physics

This concentration provides core training in nuclear physics, radiation detection and protection, with some additional emphasis on environmental health physics. Health Physicists are in great demand, particularly with the recognition that nuclear energy is becoming a more important, non-fossil fuel, alternative. The proper monitoring of safe working environments at medical, industrial, and government laboratory facilities requires professionals with knowledge of the complex nuclear processes underlying the various technologies. Successful graduates will be able to enter the work force upon graduation, or continue onto elite graduate programs. Acceptance into this concentration requires approval from the Director of Health Physics. Students with an overall GPA of 3.0 or better in all physics and mathematics coursework through the first five semesters are preferred. The department is developing close ties with leading graduate programs in health physics/sciences (i.e. UT-Austin, Texas A & M –College Station, The University of Texas Health Science Center, <http://www.uthouston.edu/>; etc..) that may facilitate the transfer of successful majors into these M.S./Ph.D. granting institutions. The number of credit hours required is 125.

Mathematical-Computational Physics

This concentration emphasizes a high level of training in advanced mathematical and computational physics. Students in this concentration are expected to continue onto the Ph.D. in physics at the elite universities; however, some may be eligible for immediate employment in industry and government in areas demanding computational modeling capabilities. Evidence of continued and increasing intellectual maturity is required for admission into this concentration. A senior level thesis is required (for two semesters), as well as participation in student led, senior year workshop/seminars. The number of credit hours required is 121.

(Pre) Medical – Radiation Physics

The objective of this Concentration is to produce graduates who can enter the workforce or continue onto graduate programs in medical physics or other radiation oriented programs. Traditionally, medical physics is a graduate program. The present concentration prepares students for entry into such graduate programs. This is the reason for the prefix “Pre”. TSU is one of the few undergraduate programs in this area. The requirements for admission are the same as those for the Health Physics concentration. The credit load required is 129. This program offers a solid background to aspiring professionals in medical physics and radiology.

Physics Education

This track will produce exceptional high school physics teachers. Students take 100 credit hours of core and basic physics courses, and 23 credit hours within the College of Education (total credits 123). Students must consult with the College of Education (COE) to determine their requirements. The present concentration is modeled after its counterpart in mathematics which recommends the Education courses EDCI: 310,328,340,350,464, and Reading courses 400 and 402. These courses are offered as possible examples. The specific Education courses are determined by COE.

Pre-Pharmaceutical-Physical Sciences

This is an exciting new (honors-level) concentration exclusively intended for entering (or transferring) students with advanced standing in calculus (i.e. A.P. Calculus) sufficient for being excused from having to take any calculus courses at TSU. Students will complete all core courses and designated physics and mathematics courses within three years (20 semester hours for each of the six semesters matriculated). The program emphasizes a full five semester load of physics (including quantum physics), and heavy loads in biology and chemistry courses. The objective of this program is to produce students who might want to pursue advanced degrees in pharmaceutical sciences (i.e. computational drug design, etc.), pharmacology, quantum chemistry, molecular biophysics, etc.. Admission to this concentration is highly selective. All eligible students will qualify for full scholarship and a living allowance. Admitted students will be expected to maintain a B average in all science, math, and computer science courses, and an overall average of C+ in all courses. The credit load is 120 credit hours over three years. Students may elect to spread the load over four years, if desired.

Questions may be directed to the Department Office at (713)-313-7980.

LISTING OF FACULTY IN THE DEPARTMENT

<p>Bessis, Daniel Professor Director of the Mathematical Physics Program B.S., Ecole Nationale Supérieure de l'Aéronautique, Paris, France B.S., Mathematics, Sorbonne, France M.S., Mathematical Physics, University of Orsay, France Ph.D., Mathematical Physics, Sorbonne, France</p>	<p>Perotti, Luca Visiting Assistant Professor Laurea, Università degli Studi di Milano M.S., University of Pittsburgh Ph.D., University of Pittsburgh</p>
<p>Chu, Rambis K. H. Associate Professor B.S., Texas Southern University M.S., University of Houston – University Park Ph. D., University of Houston – University Park</p>	<p>Stefanova, Elena A. Visiting Assistant Professor Director of the Health Physics and Pre-Medical Physics Programs M.S., University of Sofia “St. Kliment Ohridsky” Ph.D., Bulgarian Academy of Science</p>
<p>Handy, Carlos R. Professor and Chairperson Director of the Center for Optimization Studies in the Applied Sciences (COSAS) B.A., Columbia College M.A., Columbia University M. Ph., Columbia University Ph.D., Columbia University</p>	<p>Tsenov, Boris G. Adjunct Faculty M.S., Engineering Physics, University of Sofia “St. Kliment Ohridsky”</p>
<p>Harvey, Mark C. Visiting Assistant Professor B. S., Virginia State University M. S. Hampton University Ph. D., Hampton University</p>	<p>Tymczak, Christopher J. Associate Professor Director of the Computational Physics Program B.S., Pennsylvania State University M.S., Clemson University Ph.D., Texas A&M University</p>
<p>Lee, Young Visiting Assistant Professor Director of the Physics Education Program B.S., M.S., Yonsei University Ph.D., University of Houston</p>	

PHYSICS COURSES

PHYS 101	Principles of Physical Science (4) Survey of the physical sciences for non-science majors, including introductory physics, astronomy, and chemistry. Demonstrated math proficiency in basic algebra and geometry required. Three hours of lecture, and one hour of demonstrations per week.
PHYS 116	University Physics Laboratory I (1) Laboratory, Demonstration, and Recitation course in support of PHYS 152. One three hour session per week.
PHYS 151	Computational Modeling of Physical Systems (1) Mandatory for students majoring or minoring in physics. Key physics experiments are used to develop intuitive abilities in advanced mathematics (i.e. differential equations, multidimensional calculus, vector analysis, vector calculus, linear algebra, and scientific programming). Prerequisite: MATH 136 (Precalculus). Three hour laboratory per week.
PHYS 152	University Physics I (3) First of three calculus based introductory physics courses. Emphasis on Newton's laws and their applications to three dimensional motion of objects, gravity, fluids. Prerequisite: PHYS 151 or MATH 241. Three hours lecture.
PHYS 162	Fundamentals of Scientific Programming (3) Introduction to scientific programming languages such as Fortran 90, C, and their more recent versions. Three hours lecture per week including computational laboratory.
PHYS 205	Physics of Music (4) Overview of physics principles impacting the acoustics of musical instruments and the human voice. For non-science majors. Three hours of lecture and one hour demonstration, per week.
PHYS 213	College Physics Laboratory I (1) Laboratory, Demonstration, and Recitation course in support of PHYS 237. One three hour session per week.
PHYS 214	College Physics Laboratory II (1) Laboratory, Demonstration, and Recitation course in support of PHYS 238. One three hour session per week.
PHYS 215	Physics for Engineers Laboratory I (1) Laboratory, Demonstration, and Recitation course in support of PHYS 245. One three hour session per week.
PHYS 216	Physics for Engineers Laboratory II (1) Laboratory, Demonstration, and Recitation course in support of PHYS 246. One three hour session per week.
PHYS 217	University Physics Laboratory II (1) Laboratory, Demonstration, and Recitation course in support of PHYS 251. One three hour session per week.
PHYS 218	University Physics Laboratory III (1) Laboratory, Demonstration, and Recitation course in support of PHYS 252. One three hour session per week.

PHYS 332	Introduction to Modern Physics Topics in modern physics, including special theory of relativity, introduction to quantum physics, and applications to atomic and nuclear structure. Three hours of lecture per week.. Prerequisites: PHYS 251, PHYS 252, PHYS 217, and PHYS 218.	(3)
PHYS 333	Electricity and Magnetism I Maxwell's equations and their impact on electrostatics and magnetostatics, including dielectric and magnetic phenomena. Three lecture hours per week. Prerequisites: PHYS 248, 252.	(3)
PHYS 334	Electricity and Magnetism II Continuation of PHYS 333 focusing on the full set of Maxwell's equations and their consequences for electromagnetic radiation processes and their interaction with matter. Prerequisite: PHYS 333.	(3)
PHYS 336	Thermodynamics and Statistical Physics Study of the laws of thermodynamics, Carnot engines, etc., and their statistical physics formulations. Three lecture hours per week. Prerequisite: PHYS 251.	(3)
PHYS 337	Mechanics II Lagrangian -Hamiltonian formulations of classical mechanics. Three lecture hours. Prerequisites: PHYS 252, 272.	(3)
PHYS 344	Electronics Recommended for students interested in an experimental physics based senior thesis. Theory and practical operation of modern electronics. One hour lecture and three hours of laboratory per week. Prerequisites: PHYS 218 and PHYS 252.	(4)
PHYS 353	Quantum Mechanics I The foundations of quantum mechanics via the Schrodinger representation: bound states, quantum tunneling, spin, perturbation theory, etc. Three lecture hours per week. Prerequisites: PHYS 271, 252.	(3)
PHYS 360	Advanced Undergraduate Laboratory Exposure to the fundamental experiments that shaped modern physics. One three hour laboratory per week. Prerequisite: PHYS 353.	(1)
PHYS 361	Introduction to Atomic and Radiation Physics Introduction to atomic and nuclear structure, radiation, radioactive decay, chemical and biological effects of radiation, dosimetry, radiation protection. Three lecture hours. Prerequisites: Either PHYS 238, 246 or 252. Students should also have demonstrated competencies in basic integral calculus, differential equations, and linear algebra. Corequisite: PHYS 353 or 329.	(3)
PHYS 365	Environmental Radioactivity Seminar Focus on natural and manmade environmental radionuclide sources, radiation biology, protection, and pathways for environmental contamination. Ninety minute lecture per week.	(1)
PHYS 366	Nuclear Physics I Study of radioactivity decay law, radioactive dating, nuclear radiation detection, alpha-beta-gamma decay, etc. Three lecture hours and One demonstration hour per week. Prerequisites: PHYS 247 or MATH 251, PHYS 353, PHYS 361.	(4)
PHYS 370	Nuclear Physics Laboratory Basic nuclear physics experiments indispensable to radiation detection and measurement. Three hour lab per week. Corequisite: PHYS 374.	(3)

PHYS 374	Radiation Detection I	(4)
	Comprehensive study of varying types of nuclear detection and measurement equipment, counting statistics and error prediction, etc. Four hours lecture-demonstration per week. Corequisites: PHYS 366 and 370.	
PHYS 390	Engineering Physics: Intro. to Nanoscience and Nanotechnology	(3)
	Introduction to the basic physics principles and techniques governing nanostructures and their applications. Three lecture hours per week. Prerequisite: PHYS 353. Corequisite: PHYS 360.	
PHYS 411	Senior Seminar/Workshop I	(1)
	Student led, faculty supervised, seminars developed in a workshop format reviewing recent research developments. One three hour session per week. Prerequisite: Advanced Standing.	
PHYS 412	Senior Seminar/Workshop II	(1)
	Continuation of student led seminars developed in a workshop format reviewing recent research developments. One three hour session per week. Prerequisite: Advanced Standing.	
PHYS 415	Senior Thesis I	(1)
	Physics majors with senior standing work on a research topic with a TSU or adjunct faculty. One two hour meeting per week.	
PHYS 416	Senior Thesis II	(1)
	Continuation of PHYS 415.	
PHYS 419	Nuclear Physics for Life Sciences Laboratory	(1)
	Introduction to basic experiments in nuclear detection and radiation monitoring for Life Science students. Three hour laboratory per week. Prerequisites: PHYS 361, 365.	
PHYS 421	Nuclear Magnetic Resonance for Life Sciences Laboratory	(1)
	Nuclear magnetic resonance based experiments for life sciences students. Three hour laboratory per week. Prerequisites: PHYS 361, 365.	
PHYS 423	Nuclear Magnetic Resonance Laboratory	(1)
	Comprehensive experiments in nuclear magnetic resonance for physics majors. Three hour laboratory per week. Prerequisite: PHYS 353.	
PHYS 424	Radiation Biology and Nuclear Medicine for Life Sciences Laboratory	(1)
	Experiments (for non-physics majors) measuring the effect of radiation on living cells. Three hour laboratory per week. Corequisite: PHYS 452.	
PHYS 426	Radiation Biology and Nuclear Medicine Laboratory	(1)
	Experiments (for physics majors) measuring the effect of radiation on living cells. Three hour laboratory per week. Corequisite: PHYS 454.	
PHYS 433	Quantum Mechanics II	(3)
	Continuation of PHYS 353 emphasizing the time dependent features of the Schrodinger representation: time dependent perturbation theory, Heisenberg representations, etc. Three hour lecture per week.	
PHYS 451	Computational Physics II	(3)
	Introduction to advanced (parallel) computer methods for many body physics, quantum chemistry, nanophysics, and materials science problems. Three lecture hours per week. Corequisite: PHYS 433.	

- PHYS 452** **Radiation Biology for Life Sciences Students** **(3)**
 Study of the different types of electromagnetic radiation and the impact on organisms, including beneficial diagnostics and treatment properties. Prerequisites: PHYS 361, 365. Corequisite: PHYS 424. Three lecture hours per week.
- PHYS 454** **Radiation Biology (similar course offered within Biology)** **(3)**
 For physics majors. Study of the different types of electromagnetic radiation and the impact on organisms, including beneficial diagnostics and treatment properties. Prerequisites: PHYS 361, 365. Corequisite: PHYS 426. Three lecture hours per week.
- PHYS 458** **Medical Imaging** **(3)**
 The physics of x-ray computed tomography (CT), magnetic resonance imaging (MRI), nuclear medicine, ultrasound, etc., and their application. Three lecture hours per week. Prerequisites: PHYS 334, 353.
- PHYS 467** **Nuclear Physics II** **(2)**
 Continuation of PHYS 366, with emphasis on the nuclear reactions, neutron physics, and applications of nuclear physics. Two lecture hours per week. Prerequisites: PHYS 353, 366.
- PHYS 471** **Intermediate Nuclear Physics Laboratory** **(1)**
 Health physics applications and spectroscopy. Corequisite: PHYS 475. Three hour session per week.
- PHYS 472** **Nuclear Electronics Laboratory** **(1)**
 Study of pulse processing and shaping, linear and logic pulse functions, multichannel pulse analysis and the NIM and CAMAC Instrumentation Standards. Prerequisites: PHYS 471, 475. Three hour session per week alternating between lecture and lab format.
- PHYS 475** **Radiation Detection II** **(4)**
 Instrumentation for gamma-radiation, charged particle, and slow/fast neutron detection; background and detector shielding; etc.. Four hours lecture per week. Prerequisites: PHYS 366, 374. Corequisite: 471.
- PHYS 477** **Radiation Protection and Dosimetry I** **(4)**
 Radiation biology, dosimetry, radiation sources of exposure, health physics instrumentation, standards and regulations. Four lecture hours per week. Prerequisite: PHYS 361.
- PHYS 478** **Radiation Protection and Dosimetry II** **(4)**
 Continuation of PHYS 477 focusing on radiation protection, practice, environmental monitoring and specialty health physics areas. Four lecture hours per week. Prerequisite: PHYS 477.
- PHYS 481** **Engineering Physics: Material Science** **(3)**
 Study of the theoretical and computational formulations for studying quantum materials. Three lecture hours per week. Corequisite: PHYS 451.
- PHYS 482** **Engineering Physics: Nanobiophysics** **(3)**
 A first principle's, physics based approach for understanding the dynamics between based nanostructures and bio-chemical molecular structures. Three lecture hours per week. Prerequisites: PHYS 433, 451.
- PHYS 483** **Independent Study** **(1-4)**
 Detailed study of an advanced topic in physics under the guidance of an instructor. Departmental permission required. May be enrolled for up to 4 semester credit hours. Prerequisites: senior standing and consent of the chair

PHYS 484	<p>Topics in Physics (3)</p> <p>Different advanced topics offered, depending on faculty/student interests in all branches of physics: particle physics, astrophysics, space physics, quantum computing, etc. May be repeated for credit as topics vary. Prerequisites: senior standing and consent of the chair. Three semester hours per week.</p>
PHYS 485	<p>Professional Development (Online) Course: Basic Concepts of Atomic and Radiation Physics I (1)</p> <p>Introduction to atomic and nuclear structure, radiation, radiation detection, dosimetry, protection, etc. For professionals with advanced math competency. Two week sessions, two hour classes each day.</p>
PHYS 486	<p>Professional Development (Online) Course: Basic Concepts of Atomic and Radiation Physics II (1)</p> <p>Introduction to atomic and nuclear structure, radiation, radiation detection, dosimetry, protection, etc. For professionals with advanced math competency. Two week sessions, two hour classes each day.</p>
PHYS 487	<p>Professional Development (Online) Course: Basic Concepts of Atomic and Radiation Physics III (1)</p> <p>Introduction to atomic and nuclear structure, radiation, radiation detection, dosimetry, protection, etc. For professionals with advanced math competency. Two week sessions, two hour classes each day.</p>
PHYS 488	<p>Professional Development (Online) Course: Radiation Protection and Dosimetry I (3)</p> <p>Radiation biology, dosimetry, radiation sources of exposure, standards and regulations, radiation protection practices. For professionals with advanced math competency. Five weeks, two hours per day. Combination of lectures (online) and labs/demonstrations.</p>
PHYS 489	<p>Professional Development (Online) Course: Radiation Protection and Dosimetry II (3)</p> <p>Radiation biology, dosimetry, radiation sources of exposure, standards and regulations, radiation protection practices. For professionals with advanced math competency. Five weeks, two hours per day. Combination of lectures (online) and labs/demonstrations.</p>
PHYS 490	<p>Professional Development (Online) Course: Nuclear Instrumentation (3)</p> <p>Training in nuclear detection and measurement instrumentation. Five weeks, two hours per day. For professionals with advanced math competency. Lectures and Lab/Demonstrations.</p>
PHYS 491	<p>Professional Development (Online) Course: Nuclear Physics Laboratory I (2)</p> <p>Basic experiments exploiting Geiger Muller counters. Two weeks, three hours per day. For professionals with advanced math competency. Lectures and Lab/Demonstrations.</p>
PHYS 492	<p>Professional Development (Online) Course: Nuclear Physics Laboratory II (2)</p> <p>Basic experiments in radiation protection and radiation biology. Two weeks, three hours per day. For professionals with advanced math competency. Lectures and Lab/Demonstrations.</p>
PHYS 493	<p>Professional Development (Online) Course: Nuclear Physics Laboratory III (2)</p> <p>Experiments emphasizing Nuclear Instrument Module (NIM) equipment, including basic nuclear electronics experiments. Two weeks, three hours per day. For professionals with advanced math competency. Lectures and Lab/Demonstrations.</p>
PHYS 494	<p>Professional Development (Online) Course: Intro. to Nuclear Physics I (1)</p> <p>Basic nuclear structure. Two weeks, two hours per day. For professionals with advanced math competency.</p>
PHYS 495	<p>Professional Development (Online) Course: Intro. to Nuclear Physics II (1)</p> <p>Basic nuclear structure. Two weeks, two hours per day. For professionals with advanced math competency.</p>
PHYS 496	<p>Professional Development (Online) Course: Intro. to Nuclear Physics III (1)</p> <p>Basic nuclear structure. Two weeks, two hours per day. For professionals with advanced math competency.</p>

Bachelor of Science Degree in Physics
FOUR-YEAR DEGREE IN HEALTH PHYSICS
 Degree Plan - Total Credits: 125

First Year			
First Semester		Second Semester	
CS 120 Introduction to Programming C++	3	PHYS 116 University Physics Lab I	1
MATH 241 Calculus I	4	PHYS 152 University Physics I	3
ENG 131 Freshman English I	3	MATH 242 Calculus II	4
CHEM 111, 131 General Chemistry & Lab I	4	ENG 132 Freshman English II	3
SC 135 or 136 Business & Professional Comm Public Address	3	PHYS 162 Fundamentals of Scientific Programming	3
PHYS 151 Computational Modeling of Physical Systems	1	MUSIC 131 or ART 131 Introduction to Music or Drawing and Composition I	3
	18 hrs		17 hrs

Second Year			
Third Semester		Fourth Semester	
PHYS 217 University Physics Lab II	1	PHYS 218 University Physics Lab III	1
PHYS 247 Math Methods I	3	PHYS 248 Math Methods II	3
PHYS 251 University Physics II	3	PHYS 252 University Physics III	3
PHYS 271 COMP PHYS I	3	PHYS 272 Mechanics I	3
ENG 2xx Any 200 Level ENG may be selected	3	MATH 250 Linear Algebra	3
HIST 231 or POLS 231 American Political Systems I	3	HIST 231 or POLS 231 American Political Systems I	3
	16 hrs		16 hrs

Third Year			
Fifth Semester		Sixth Semester	
PHYS 333 Electricity and Magnetism I	3	PHYS 334 Electricity and Magnetism II	3
PHYS 353 Quantum Mechanics I	3	PHYS 336 Thermodynamics and Stat. Phys.	3
PHYS 361 Intro to Atomic and Radiation Physics	4	PHYS 366 Nuclear Physics I	4
PHYS 365 Environmental Radioactivity Seminar	1	PHYS 370 Nuclear Physics Lab I	1
MATH 251 Diff Equations	3	PHYS 374 Radiation Detection I	4
HIST 232 or POLS 232 American Political Systems II	3		
	17 hrs		15 hrs

Fourth Year			
Seventh Semester		Eighth Semester	
PHYS 415 Senior Thesis	1	PHYS 416 Senior Thesis	1
PHYS 467 Nuclear Physics II	3	PHYS 472 Nuclear Electronics Lab	1
PHYS 471 Intermediate Nuclear Physics Lab	2	PHYS 478 Radiation Protection and Dosimetry II	4
PHYS 475 Radiation Detection II	4	ECON 231 Principles of Economics	3
PHYS 477 Radiation Protection and Dosimetry I	4	HIST 232 or POLS 232 American Political Systems II	3
	14 hrs		12 hrs

Bachelor of Science Degree in Physics
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 Degree Plan - Total Credits: 125

First Year			
First Semester		Second Semester	
CS 120 Introduction to Programming C++	3	PHYS 116 University Physics Lab I	1
MATH 241 Calculus I	4	PHYS 152 University Physics I	3
ENG 131 Freshman English I	3	MATH 242 Calculus II	4
CHEM 111, 131 General Chemistry & Lab I, Survey of Life Science	4	SC 135 or 136 Business & Professional Comm Public Address	3
PHYS 151 Computational Modeling of Physical Systems	1	PHYS 162 Fundamentals of Scientific Programming	3
	15 hrs		14 hrs

Second Year			
Third Semester		Fourth Semester	
PHYS 217 University Physics Lab II	1	PHYS 218 University Physics Lab III	1
PHYS 247 Math Methods I	3	PHYS 248 Math Methods II	3
PHYS 251 University Physics II	3	PHYS 252 University Physics III	3
PHYS 271 COMP PHYS I	3	PHYS 272 Mechanics I	3
ENG 132 Freshman English II	3	MATH 250 Linear Algebra	3
	13 hrs		13 hrs

Third Year			
Fifth Semester		Sixth Semester	
PHYS 333 Electricity and Magnetism I	3	MUSIC 131 or ART 131 Introduction to Music or Drawing and Composition I	3
PHYS 353 Quantum Mechanics I	3	ECON 231 Principles of Economics	3
MATH 251 Diff Equations	3	ENG 2xx Any 200 Level ENG	3
HIST 231 or POLS 231 American Political Systems I	3	PHYS 336 Thermodynamics and Stat. Phys.	3
	12 hrs		12 hrs

Fourth Year			
Seventh Semester		Eighth Semester	
PHYS 361 Intro to Atomic and Radiation Physics	4	PHYS 334 Electricity and Magnetism II	3
PHYS 365 Environmental Radioactivity Seminar	1	PHYS 366 Nuclear Physics I	4
HIST 231 or POLS 231 American Political Systems I	3	PHYS 370 Nuclear Physics Lab I	1
HIST 232 or POLS 232 American Political Systems II	3	PHYS 374 Radiation Detection I	4
	11 hrs		12 hrs

Fifth Year			
Ninth Semester		Tenth Semester	
PHYS 415 Senior Thesis	1	PHYS 416 Senior Thesis	1
PHYS 467 Nuclear Physics II	3	PHYS 472 Nuclear Electronics Lab	1
PHYS 471 Intermediate Nuclear Physics Lab	2	PHYS 478 Radiation Protection and Dosimetry II	4
PHYS 475 Radiation Detection II	4	HIST 232 or POLS 232 American Political Systems II	3
PHYS 477 Radiation Protection and Dosimetry I	4		
	14 hrs		9 hrs

Bachelor of Science Degree in Physics
SIX-YEAR DEGREE IN HEALTH PHYSICS
Degree Plan - Total Credits: 125

First Year				
First Semester			Second Semester	
CS 120	Introduction to Programming C++	3	PHYS 116	University Physics Lab I
MATH 241	Calculus I	4	PHYS 152	University Physics I
ENG 131	Freshman English I	3	MATH 242	Calculus II
PHYS 151	Computational Modeling of Physical Systems	1	PHYS 162	Fundamentals of Scientific Programming
		11 hrs		
			11 hrs	

Second Year				
Third Semester			Fourth Semester	
PHYS 217	University Physics Lab II	1	CHEM 111, 131	General Chemistry & Lab I, Survey of Life Science
PHYS 247	Math Methods I	3	SC 135 or 136	Business & Professional Comm Public Address
PHYS 251	University Physics II	3	MATH 250	Linear Algebra
PHYS 271	COMP PHYS I	3		
		10 hrs		
			10 hrs	

Third Year				
Fifth Semester			Sixth Semester	
ENG 132	Freshman English II	3	PHYS 272	Mechanics I
MUSIC 131 or ART 131	Introduction to Music or Drawing and Composition I	3	PHYS 218	University Physics Lab III
HIST 231 or POLS 231	American Political Systems I	3	PHYS 248	Math Methods II
			PHYS 252	University Physics III
		9 hrs		
			10 hrs	

Fourth Year				
Seventh Semester			Eighth Semester	
PHYS 333	Electricity and Magnetism I	3	PHYS 336	Thermodynamics and Stat. Phys.
PHYS 353	Quantum Mechanics I	3	PHYS 334	Electricity and Magnetism II
MATH 251	Diff Equations	3	HIST 231 or POLS 231	American Political Systems I
ENG 2xx	Any 200 Level ENG may be selected	3	ECON 231	Principles of Economics
		12 hrs		
			12 hrs	

Fifth Year				
Ninth Semester			Tenth Semester	
PHYS 361	Intro to Atomic and Radiation Physics	4	PHYS 366	Nuclear Physics I
PHYS 365	Environmental Radioactivity Seminar	1	PHYS 370	Nuclear Physics Lab I
HIST 232 or POLS 232	American Political Systems II	3	PHYS 374	Radiation Detection I
			HIST 232 or POLS 232	American Political Systems II
		8 hrs		
			12 hrs	

Sixth Year				
Ninth Semester			Tenth Semester	
PHYS 415	Senior Thesis	1	PHYS 416	Senior Thesis
PHYS 467	Nuclear Physics II	3	PHYS 472	Nuclear Electronics Lab
PHYS 471	Intermediate Nuclear Physics Lab	2	PHYS 478	Radiation Protection and Dosimetry II
PHYS 475	Radiation Detection II	4		
PHYS 477	Radiation Protection and Dosimetry I	4		
		14 hrs		
			6 hrs	

Bachelor of Science Degree in Physics
 FOUR-YEAR DEGREE IN PRE-MEDICAL/RADIATION PHYSICS
 Degree Plan - Total Credits: 129

First Year				
First Semester			Second Semester	
CS 120	Introduction to Programming C++	3	PHYS 116	University Physics Lab I
MATH 241	Calculus I	4	PHYS 152	University Physics I
ENG 131	Freshman English I	3	MATH 242	Calculus II
CHEM 111, 131	General Chemistry & Lab I	4	ENG 132	Freshman English II
SC 135 or 136	Business & Professional Comm Public Address	3	PHYS 162	Fundamentals of Scientific Programming
PHYS 151	Computational Modeling of Physical Systems	1	MUSIC 131 or ART 131	Introduction to Music or Drawing and Composition I
		18 hrs		
			17 hrs	

Second Year				
Third Semester			Fourth Semester	
PHYS 217	University Physics Lab II	1	PHYS 218	University Physics Lab III
PHYS 247	Math Methods I	3	PHYS 248	Math Methods II
PHYS 251	University Physics II	3	PHYS 252	University Physics III
PHYS 271	COMP PHYS I	3	PHYS 272	Mechanics I
ENG 2xx	Any 200 Level ENG may be selected	3	MATH 250	Linear Algebra
HIST 231 or POLS 231	American Political Systems I	3	HIST 231 or POLS 231	American Political Systems I
		16 hrs		
			16 hrs	

Third Year				
Fifth Semester			Sixth Semester	
PHYS 333	Electricity and Magnetism I	3	PHYS 330	Intro. to Med. Physics
PHYS 353	Quantum Mechanics I	3	PHYS 336	Thermodynamics and Stat. Phys.
PHYS 361	Intro to Atomic and Radiation Physics	4	PHYS 366	Nuclear Physics I
PHYS 365	Environmental Radioactivity Seminar	1	PHYS 370	Nuclear Physics Lab I
MATH 251	Diff Equations	3	PHYS 374	Radiation Detection I
HIST 232 or POLS 232	American Political Systems II	3		
		17 hrs		
			15 hrs	

Fourth Year				
Seventh Semester			Eighth Semester	
ECON 231	Principles of Economics	3	PHYS 426	Rad. BIOL and Nucl. Med. Lab
PHYS 467	Nuclear Physics II	3	PHYS 454	Rad. BIOL and Nucl. Med.
PHYS 471	Intermediate Nuclear Physics Lab	2	PHYS 478	Radiation Protection and Dosimetry II
PHYS 475	Radiation Detection II	4	PHYS 458	Medical Imaging
PHYS 477	Radiation Protection and Dosimetry I	4	HIST 232 or POLS 232	American Political Systems II
		16 hrs		
			14 hrs	

Bachelor of Science Degree in Physics
 FIVE-YEAR DEGREE IN PRE-MEDICAL/RADIATION PHYSICS
 Degree Plan - Total Credits: 129

First Year				
First Semester			Second Semester	
CS 120	Introduction to Programming C++	3	PHYS 116	University Physics Lab I
MATH 241	Calculus I	4	PHYS 152	University Physics I
ENG 131	Freshman English I	3	MATH 242	Calculus II
CHEM 111, 131	General Chemistry & Lab I, Survey of Life Science	4	SC 135 or 136	Business & Professional Comm Public Address
PHYS 151	Computational Modeling of Physical Systems	1	PHYS 162	Fundamentals of Scientific Programming
		15 hrs		
			14 hrs	

Second Year				
Third Semester			Fourth Semester	
PHYS 217	University Physics Lab II	1	PHYS 218	University Physics Lab III
PHYS 247	Math Methods I	3	PHYS 248	Math Methods II
PHYS 251	University Physics II	3	PHYS 252	University Physics III
PHYS 271	COMP PHYS I	3	PHYS 272	Mechanics I
ENG 132	Freshman English II	3	MATH 250	Linear Algebra
		13 hrs		
			13 hrs	

Third Year				
Fifth Semester			Sixth Semester	
PHYS 333	Electricity and Magnetism I	3	MUSIC 131 or ART 131	Introduction to Music or Drawing and Composition I
PHYS 353	Quantum Mechanics I	3	ECON 231	Principles of Economics
MATH 251	Diff Equations	3	ENG 2xx	Any 200 Level ENG
HIST 231 or POLS 231	American Political Systems I	3	HIST 231 or POLS 231	American Political Systems I
		12 hrs		
			12 hrs	

Fourth Year				
Seventh Semester			Eighth Semester	
PHYS 361	Intro to Atomic and Radiation Physics	4	PHYS 336	Thermodynamics and Stat. Phys.
PHYS 365	Environmental Radioactivity Seminar	1	PHYS 366	Nuclear Physics I
HIST 232 or POLS 232	American Political Systems II	3	PHYS 370	Nuclear Physics Lab I
			PHYS 374	Radiation Detection I
			PHYS 330	Intro. to Med. Physics
		8 hrs		
			15 hrs	

Fifth Year				
Ninth Semester			Tenth Semester	
PHYS 477	Radiation Protection and Dosimetry I	4	PHYS 426	Radi. BIOL & Nucl. Med. Lab
PHYS 467	Nuclear Physics II	3	PHYS 454	Rad. Bio. & Nucl. Med. Lab
PHYS 471	Intermediate Nuclear Physics Lab	2	PHYS 478	Radiation Protection and Dosimetry II
PHYS 475	Radiation Detection II	4	PHYS 458	Medical Imaging
			HIST 232 or POLS 232	American Political Systems II
		13 hrs		
			14 hrs	

Bachelor of Science Degree in Physics
SIX-YEAR DEGREE IN PRE-MEDICAL/RADIATION PHYSICS
Degree Plan - Total Credits: 129

First Year				
First Semester			Second Semester	
CS 120	Introduction to Programming C++	3	PHYS 116	University Physics Lab I
MATH 241	Calculus I	4	PHYS 152	University Physics I
ENG 131	Freshman English I	3	MATH 242	Calculus II
PHYS 151	Computational Modeling of Physical Systems	1	PHYS 162	Fundamentals of Scientific Programming
		11 hrs		
			11 hrs	

Second Year				
Third Semester			Fourth Semester	
PHYS 217	University Physics Lab II	1	CHEM 111, 131	General Chemistry & Lab I, Survey of Life Science
PHYS 247	Math Methods I	3	SC 135 or 136	Business & Professional Comm Public Address
PHYS 251	University Physics II	3	MATH 250	Linear Algebra
PHYS 271	COMP PHYS I	3		
		10 hrs		
			10 hrs	

Third Year				
Fifth Semester			Sixth Semester	
ENG 132	Freshman English II	3	PHYS 272	Mechanics I
MUSIC 131 or ART 131	Introduction to Music or Drawing and Composition I	3	PHYS 218	University Physics Lab III
HIST 231 or POLS 231	American Political Systems I	3	PHYS 248	Math Methods II
			PHYS 252	University Physics III
		9 hrs		
			10 hrs	

Fourth Year				
Seventh Semester			Eighth Semester	
PHYS 333	Electricity and Magnetism I	3	PHYS 336	Thermodynamics and Stat. Phys.
PHYS 353	Quantum Mechanics I	3	PHYS 330	Intro. to Med. Physics
MATH 251	Diff Equations	3	HIST 231 or POLS 231	American Political Systems I
ENG 2xx	Any 200 Level ENG may be selected	3	ECON 231	Principles of Economics
		12 hrs		
			12 hrs	

Fifth Year				
Ninth Semester			Tenth Semester	
PHYS 361	Intro to Atomic and Radiation Physics	4	PHYS 366	Nuclear Physics I
PHYS 365	Environmental Radioactivity Seminar	1	PHYS 370	Nuclear Physics Lab I
HIST 232 or POLS 232	American Political Systems II	3	PHYS 374	Radiation Detection I
			HIST 232 or POLS 232	American Political Systems II
		8 hrs		
			12 hrs	

Sixth Year				
Ninth Semester			Tenth Semester	
PHYS 467	Nuclear Physics II	3	PHYS 426	Rad. BIOL and Nucl. Med. Lab
PHYS 471	Intermediate Nuclear Physics Lab	2	PHYS 454	Rad. BIOL and Nucl. Med.
PHYS 475	Radiation Detection II	4	PHYS 478	Radiation Protection and Dosimetry II
PHYS 477	Radiation Protection and Dosimetry I	4	PHYS 458	Medical Imaging
		13 hrs		
			11 hrs	

Bachelor of Science Degree in Physics
 FOUR-YEAR DEGREE IN MATH-COMP. PHYSICS
 Degree Plan - Total Credits: 121

First Year			
First Semester		Second Semester	
CS 120 Introduction to Programming C++	3	PHYS 116 University Physics Lab I	1
MATH 241 Calculus I	4	PHYS 152 University Physics I	3
ENG 131 Freshman English I	3	MATH 242 Calculus II	4
CHEM 111, 131 General Chemistry & Lab I, Survey of Life Science	4	ENG 132 Freshman English II	3
SC 135 or 136 Business & Professional Comm Public Address	3	PHYS 162 Fundamentals of Scientific Programming	3
PHYS 151 Computational Modeling of Physical Systems	1	MUSIC 131 or ART 131 Introduction to Music or Drawing and Composition I	3
	18 hrs		17 hrs

Second Year			
Third Semester		Fourth Semester	
PHYS 217 University Physics Lab II	1	PHYS 218 University Physics Lab III	1
PHYS 247 Math Methods I	3	PHYS 248 Math Methods II	3
PHYS 251 University Physics II	3	PHYS 252 University Physics III	3
PHYS 271 COMP PHYS I	3	PHYS 272 Mechanics I	3
ENG 2xx Any 200 Level ENG may be selected	3	MATH 250 Linear Algebra	3
HIST 231 or POLS 231 American Political Systems I	3	HIST 231 or POLS 231 American Political Systems I	3
	16 hrs		16 hrs

Third Year			
Fifth Semester		Sixth Semester	
PHYS 333 Electricity and Magnetism I	3	PHYS 332 Modern Physics	3
PHYS 353 Quantum Mechanics I	3	PHYS 336 Thermodynamics and Stat. Phys.	3
PHYS 337 Mechanics II	3	PHYS 360 Advanced Undergraduate Laboratory	1
MATH 251 Diff Equations	3	HIST 232 or POLS 232* American Political Systems II	3
HIST 232 or POLS 232 American Political Systems II	3	PHYS 334 Electricity and Magnetism II	3
	15 hrs		13 hrs

Fourth Year			
Seventh Semester		Eighth Semester	
PHYS 411 Senior Seminar/Workshop I	1	PHYS 412 Senior Seminar/Workshop II	1
PHYS 415 Senior Thesis I	1	PHYS 416 Senior Thesis II	1
PHYS 433 Quantum Mechanics II	3	Electives in Phys, Math, Comp. Sc., Chemistry	10
PHYS 451 Computational Physics II	3		
Electives in Phys, Math, Chem., Comp. Sc.	3		
ECON 231 Principles of Economics	3		
	14 hrs		12 hrs

Bachelor of Science Degree in Physics
 FIVE-YEAR DEGREE IN MATH-COMP. PHYSICS
 Degree Plan - Total Credits: 121

First Year			
First Semester		Second Semester	
ENG 131 Freshman English I	3	PHYS 116 University Physics Lab I	1
MATH 241 Calculus I	4	PHYS 152 University Physics I	3
PHYS 151 Computational Modeling of Physical Systems	1	MATH 242 Calculus II	4
CHEM 111, 131 General Chemistry & Lab I	4	ENG 132 Freshman English II	3
		PHYS 162 Fundamentals of Scientific Programming	3
	12 hrs		14 hrs

Second Year			
Third Semester		Fourth Semester	
PHYS 217 University Physics Lab II	1	PHYS 218 University Physics Lab III	1
PHYS 247 Math Methods I	3	PHYS 248 Math Methods II	3
PHYS 251 University Physics II	3	PHYS 252 University Physics III	3
PHYS 271 COMP PHYS I	3	HIST 231 or POLS 231 American Political Systems I	3
HIST 231 or POLS 231 American Political Systems I	3	ENG 2xx Any 200 Level ENG may be selected	3
	13 hrs		13 hrs

Third Year			
Fifth Semester		Sixth Semester	
PHYS 333 Electricity and Magnetism I	3	PHYS 272 Mechanics I	3
PHYS 337 Mechanics II	3	MATH 250 Linear Algebra	3
MUSIC 131 or ART 131 Introduction to Music or Drawing and Composition I	3	CS 120 Introduction to Programming C++	3
SC 135 or 136 Business & Professional Comm Public Address	3	HIST 231 or POLS 231 American Political Systems I	3
	12 hrs		12 hrs

Fourth Year			
Seventh Semester		Eighth Semester	
PHYS 353 Quantum Mechanics I	3	PHYS 334 Electricity and Magnetism II	3
ECON 231 Principles of Economics	3	PHYS 336 Thermodynamics and Stat. Phys.	3
HIST 232 or POLS 232 American Political Systems II	3	PHYS 332 Modern Physics	3
MATH 251 Diff Equations	3	PHYS 360 Advanced Undergraduate Laboratory	1
	12 hrs		10 hrs

Fifth Year			
Ninth Semester		Tenth Semester	
PHYS 411 Senior Seminar/Workshop I	1	PHYS 412 Senior Seminar/Workshop II	1
PHYS 415 Senior Thesis I	1	PHYS 416 Senior Thesis II	1
PHYS 433 Quantum Mechanics II	3	Electives in Phys, Math, Chem., Comp. Sc.	10
PHYS 451 Computational Physics II	3		
Electives in Phys, Math, Chem., Comp. Sc.	3		
	11 hrs		12 hrs

Bachelor of Science Degree in Physics
SIX-YEAR DEGREE IN MATH-COMP. PHYSICS
Degree Plan - Total Credits: 121

First Year			
First Semester		Second Semester	
ENG 131	Freshman English I	3	PHYS 116 University Physics Lab I
MATH 241	Calculus I	4	PHYS 152 University Physics I
PHYS 151	Computational Modeling of Physical Systems	1	PHYS 162 Fundamentals of Scientific Programming
			ENG 132 Freshman English II
		8 hrs	10 hrs

Second Year			
Third Semester		Fourth Semester	
CHEM 111, 131	General Chemistry & Lab I	4	HIST 231 or POLS 231 American Political Systems I
MATH 242	Calculus II	4	ENG 2xx Any 200 Level ENG may be selected
HIST 231 or POLS 231	American Political Systems I	3	MATH 250 Linear Algebra
		11 hrs	9 hrs

Third Year			
Fifth Semester		Sixth Semester	
PHYS 217	University Physics Lab II	1	PHYS 218 University Physics Lab III
PHYS 247	Math Methods I	3	PHYS 248 Math Methods II
PHYS 251	University Physics II	3	PHYS 252 University Physics III
PHYS 271	COMP PHYS I	3	PHYS 272 Mechanics I
		10 hrs	10 hrs

Fourth Year			
Seventh Semester		Eighth Semester	
PHYS 333	Electricity and Magnetism I	3	CS 120 Introduction to Programming C++
PHYS 337	Mechanics II	3	HIST 232 or POLS 232 American Political Systems I
SC 135 or 136	Business & Professional Comm Public Address	3	MUSIC 131 or ART 131 Introduction to Music or Drawing and Composition I
MATH 251	Diff. Equations	3	
		12 hrs	9 hrs

Fifth Year			
Ninth Semester		Tenth Semester	
PHYS 353	Quantum Mechanics I	3	PHYS 334 Electricity and Magnetism II
ECON 231	Principles of Economics	3	PHYS 336 Thermodynamics and Stat. Phys.
Electives	Electives in Phys, Math, Chem.	3	PHYS 332 Modern Physics
Electives	in Phys, Math, Chem., Comp. Sc.	3	PHYS 360 Advanced Undergraduate Laboratory
		12 hrs	10 hrs

Sixth Year			
Ninth Semester		Tenth Semester	
PHYS 411	Senior Seminar/Workshop I	1	PHYS 412 Senior Seminar/Workshop II
PHYS 415	Senior Thesis I	1	PHYS 416 Senior Thesis II
PHYS 433	Quantum Mechanics II	3	Electives in Phys, Math, Chem, Comp. Sc..
PHYS 451	Computational Physics II	3	
Electives	in Phys, Math, Chem., Comp. Sc.	6	
		11 hrs	9 hrs

Bachelor of Science Degree in Physics
FOUR-YEAR DEGREE IN ENGINEERING PHYSICS
 Degree Plan - Total Credits: 121

First Year			
First Semester		Second Semester	
CS 120 Introduction to Programming C++	3	PHYS 116 University Physics Lab I	1
MATH 241 Calculus I	4	PHYS 152 University Physics I	3
ENG 131 Freshman English I	3	MATH 242 Calculus II	4
CHEM 111, 131 General Chemistry & Lab I	4	ENG 132 Freshman English II	3
SC 135 or 136 Business & Professional Comm Public Address	3	PHYS 162 Fundamentals of Scientific Programming	3
PHYS 151 Computational Modeling of Physical Systems	1	MUSIC 131 or ART 131 Introduction to Music or Drawing and Composition I	3
	18 hrs		17 hrs

Second Year			
Third Semester		Fourth Semester	
PHYS 217 University Physics Lab II	1	PHYS 218 University Physics Lab III	1
PHYS 247 Math Methods I	3	PHYS 248 Math Methods II	3
PHYS 251 University Physics II	3	PHYS 252 University Physics III	3
PHYS 271 COMP PHYS I	3	PHYS 272 Mechanics I	3
ENG 2xx Any 200 Level ENG may be selected	3	MATH 250 Linear Algebra	3
HIST 231 or POLS 231 American Political Systems I	3	HIST 231 or POLS 231 American Political Systems I	3
	16 hrs		16 hrs

Third Year			
Fifth Semester		Sixth Semester	
PHYS 333 Electricity and Magnetism I	3	PHYS 332 Modern Physics	3
PHYS 353 Quantum Mechanics I	3	PHYS 336 Thermodynamics and Stat. Phys.	3
PHYS 337 Mechanics II	3	PHYS 360 Advanced Undergraduate Laboratory	1
MATH 251 Diff Equations	3	PHYS 390 Eng. Phys	3
HIST 232 or POLS 232 American Political Systems II	3	PHYS 334 Electricity and Magnetism II	3
	15 hrs		13 hrs

Fourth Year			
Seventh Semester		Eighth Semester	
PHYS 411 Senior Seminar/Workshop I	1	PHYS 412 Senior Seminar/Workshop II	1
PHYS 481 Eng. Phys	3	PHYS 482 Eng. Phys	3
PHYS 433 Quantum Mechanics II	3	PHYS 484 Topics in Phys.	3
PHYS 451 Computational Physics II	3	Elective In Phys, Chem, Comp. Sc., Biol., Math	3
HIST 232 or POLS 232 American Political Systems II	3	ECON 231 Principles of Economics	3
	13 hrs		13 hrs

Bachelor of Science Degree in Physics
 FIVE-YEAR DEGREE IN ENGINEERING PHYSICS
 Degree Plan - Total Credits: 121

First Year			
First Semester		Second Semester	
ENG 131 Freshman English I	3	PHYS 116 University Physics Lab I	1
MATH 241 Calculus I	4	PHYS 152 University Physics I	3
PHYS 151 Computational Modeling of Physical Systems	1	MATH 242 Calculus II	4
CHEM 111, 131 General Chemistry & Lab I	4	ENG 132 Freshman English II	3
		PHYS 162 Fundamentals of Scientific Programming	3
	12 hrs		14 hrs

Second Year			
Third Semester		Fourth Semester	
PHYS 217 University Physics Lab II	1	PHYS 218 University Physics Lab III	1
PHYS 247 Math Methods I	3	PHYS 248 Math Methods II	3
PHYS 251 University Physics II	3	PHYS 252 University Physics III	3
PHYS 271 COMP PHYS I	3	HIST 231 or POLS 231 American Political Systems I	3
HIST 231 or POLS 231 American Political Systems I	3	ENG 2xx Any 200 Level ENG may be selected	3
	13 hrs		13 hrs

Third Year			
Fifth Semester		Sixth Semester	
PHYS 333 Electricity and Magnetism I	3	PHYS 272 Mechanics I	3
PHYS 337 Mechanics II	3	MATH 250 Linear Algebra	3
MUSIC 131 or ART 131 Introduction to Music or Drawing and Composition I	3	PHYS 332 Modern Physics	3
SC 135 or 136 Business & Professional Comm Public Address	3	PHYS 390 Eng. Phys	3
	12 hrs		12 hrs

Fourth Year			
Seventh Semester		Eighth Semester	
PHYS 353 Quantum Mechanics I	3	PHYS 334 Electricity and Magnetism II	3
MATH 251 Diff Equations	3	PHYS 336 Thermodynamics and Stat. Phys.	3
CS 120 Introduction to Programming C++	3	PHYS 360 Advanced Undergraduate Laboratory	1
HIST 232 or POLS 232 American Political Systems II	3	HIST 232 or POLS 232 American Political Systems II	3
	12 hrs		10 hrs

Fifth Year			
Ninth Semester		Tenth Semester	
PHYS 411 Senior Seminar/Workshop I	1	PHYS 412 Senior Seminar/Workshop II	1
PHYS 433 Quantum Mechanics II	3	PHYS 482 Eng. Phys.	3
PHYS 451 Computational Physics II	3	PHYS 484 Topics in Phys.	3
PHYS 481 Eng. Phys.	3	ECON 231 Principles of Economics	3
		Elective In Phys, Chem, Comp. Sc., Biol.	3
	10 hrs		13 hrs

Bachelor of Science Degree in Physics
SIX-YEAR DEGREE IN ENGINEERING PHYSICS
Degree Plan - Total Credits: 121

First Year			
First Semester		Second Semester	
ENG 131 Freshman English I	3	PHYS 116 University Physics Lab I	1
MATH 241 Calculus I	4	PHYS 152 University Physics I	3
PHYS 151 Computational Modeling of Physical Systems	1	PHYS 162 Fundamentals of Scientific Programming	3
		ENG 132 Freshman English II	3
	8 hrs		10 hrs

Second Year			
Third Semester		Fourth Semester	
CHEM 111, 131 or BIOL 143 General Chemistry & Lab I, Survey of Life Science	4	HIST 231 or POLS 231 American Political Systems I	3
MATH 242 Calculus II	4	ENG 2xx Any 200 Level ENG may be selected	3
HIST 231 or POLS 231 American Political Systems I	3	MATH 250 Linear Algebra	3
	11 hrs		9 hrs

Third Year			
Fifth Semester		Sixth Semester	
PHYS 217 University Physics Lab II	1	PHYS 218 University Physics Lab III	1
PHYS 247 Math Methods I	3	PHYS 248 Math Methods II	3
PHYS 251 University Physics II	3	PHYS 252 University Physics III	3
PHYS 271 COMP PHYS I	3	MUSIC 131 or ART 131 Introduction to Music or Drawing and Composition I	3
	10 hrs		10 hrs

Fourth Year			
Seventh Semester		Eighth Semester	
PHYS 333 Electricity and Magnetism I	3	PHYS 272 Mechanics I	3
PHYS 337 Mechanics II	3	HIST 232 or POLS 232 American Political Systems II	3
SC 135 or 136 Business & Professional Comm Public Address	3	PHYS 332 Modern Physics	3
	9 hrs		9 hrs

Fifth Year			
Ninth Semester		Tenth Semester	
		PHYS 334 Electricity and Magnetism II	3
PHYS 353 Quantum Mechanics I	3	PHYS 336 Thermodynamics and Stat. Phys.	3
CS 120 Introduction to Programming C++	3	PHYS 360 Advanced Undergraduate Laboratory	1
MATH 251 Diff Equations	3	PHYS 390 Eng. Phys.	3
HIST 232 or POLS 232 American Political Systems II	3		
	12 hrs		10 hrs

Sixth Year			
Ninth Semester		Tenth Semester	
PHYS 411 Senior Seminar/Workshop I	1	PHYS 412 Senior Seminar/Workshop II	1
PHYS 433 Quantum Mechanics II	3	PHYS 482 Eng. Phys.	3
PHYS 451 Computational Physics II	3	PHYS 484 Topics in Phys.	3
PHYS 481 Eng. Phys.	3	ECON 231 Principles of Economics	3
Elective In Phys, Chem, Comp. Sc., Biol., Math	3		
	13 hrs		10 hrs

Bachelor of Science Degree in Physics
 THREE-YEAR DEGREE IN PRE-PHARMACEUTICAL PHYSICAL SCIENCES
 Degree Plan - Total Credits: 123

First Year					
First Semester			Second Semester		
CS 120	Introduction to Programming C++	3	PHYS 116	University Physics Lab I	1
PHAR 111	Pharmacy Orientation	1	PHYS 152	University Physics I	3
ENG 131	Freshman English I	3	PHYS 161	Fundamentals of Scientific Programming	3
CHEM 111, 131	General Chemistry & Lab I	4	ENG 132	Freshman English II	3
SC 135 or 136	Business & Professional Comm Public Address	3	CHEM 112, 132	General Chemistry & Lab II	4
PHYS 151	Computational Modeling of Physical Systems	1	BIOL 112, 132	Biological Science II	4
BIOL 111, 131	Biological Science I	4	PHAR 112	Pharmacy Orientation	1
MATH 241	Calculus I	4			
		23 hrs			19 hrs

Second Year					
Third Semester			Fourth Semester		
PHYS 217	University Physics Lab II	1	PHYS 218	University Physics Lab III	1
PHYS 247	Math Methods	3	PHYS 248	Math Methods I	3
PHYS 251	University Physics II	3	PHYS 252	University Physics III	3
PHYS 271	COMP PHYS I	3	PHYS 272	Mechanics I	3
ENG 2xx	Any 200 Level ENG may be selected	3	MATH 250	Linear Algebra	3
HIST 231 or POLS 231	American Political Systems I	3	HIST 231 or POLS 231	American Political Systems I	3
MUSIC 131 or ART 131	Introduction to Music or Drawing and Composition I	3	ECON 231	Principles of Economics	3
PHAR 211	Pharmacy Applications	1	PHAR 212	Medical Terminology	1
		20 hrs			20 hrs

Third Year					
Fifth Semester			Sixth Semester		
PHYS 333	Electricity and Magnetism I	3	PHYS 330	Electricity and Magnetism II or Intro. to Med. Physics*	3
PHYS 353	Quantum Mechanics I	3	PHYS 336	Thermodynamics and Stat. Phys.	3
MATH 251	Diff Equations	3	PHYS 360	Advanced Undergraduate Laboratory	1
HIST 232 or POLS 232	American Political Systems II	3	PHYS 332	Modern Physics	3
CHEM 211, 231	General Chemistry & Lab I, Survey of Life Science	4	HIST 232 or POLS 232	American Political Systems II	3
BIOL 344	Vertebrate Anatomy and Hist	4	CHEM 212, 232	General Chemistry & Lab I, Survey of Life Science	4
			BIOL 347	Microbiology	4
		20 hrs			21 hrs

Bachelor of Science Degree in Physics
 FOUR-YEAR DEGREE IN PRE-PHARMACEUTICAL PHYSICAL SCIENCES
 Degree Plan - Total Credits: 123

First Year				
First Semester			Second Semester	
PHYS 151	Computational Modeling of Physical Systems	1	PHYS 116	University Physics Lab I
ENG 131	Freshman English I	3	PHYS 152	University Physics I
BIOL 111, 131	Biological Science I	4	PHYS 161	Fundamentals of Scientific Programming
CHEM 111, 131	General Chemistry & Lab I	4	CHEM 112, 132	General Chemistry & Lab I
SC 135 or 136	Business & Professional Comm Public Address	3	CS 120	Introduction to Programming C++
MATH 241	Calculus I	4	PHAR 111	Pharmacy Orientation
		19 hrs		15 hrs

Second Year				
Third Semester			Fourth Semester	
PHYS 217	University Physics Lab II	1	PHYS 218	University Physics Lab III
PHYS 247	Math Methods I	3	PHYS 248	Math Methods II
PHYS 251	University Physics II	3	PHYS 252	University Physics III
PHYS 271	COMP PHYS I	3	PHYS 272	Mechanics I
BIOL 112, 132	Biological Science II	4	MATH 250	Linear Algebra
			ENG 132	Freshman English II
		14 hrs		16 hrs

Third Year				
Fifth Semester			Sixth Semester	
PHYS 333	Electricity and Magnetism I	3	PHYS 330	Intro. to Med. Physics
PHYS 353	Quantum Mechanics I	3	PHYS 332	Modern Physics
MATH 251	Diff Equations	3	HIST 231 or POLS 231	American Political Systems I
PHAR 112	Pharmacy Orientation	1	MUSIC 131 or ART 131	Introduction to Music or Drawing and Composition I
ENG 2xx	Any 200 Level ENG may be selected	3	PHAR 211	Pharmacy Applications
HIST 231 or POLS 231	American Political Systems I	3		
		16 hrs		13 hrs

Fourth Year				
Seventh Semester			Eighth Semester	
BIOL 344	Vertebrate Anatomy and Hist	4	PHYS 336	Thermodynamics and Stat. Phys.
PHAR 212	Medical Terminology	1	PHYS 360	Advanced Undergraduate Laboratory
HIST 232 or POLS 232	American Political Systems II	3	HIST 232 or POLS 232	American Political Systems II
CHEM 211, 231	Organic Chemistry & Lab I	4	CHEM 212, 232	Organic Chemistry & Lab II
ECON 231	Principles of Economics	3	BIOL 347	Microbiology
		15 hrs		15 hrs

Bachelor of Science Degree in Physics
 FIVE-YEAR DEGREE IN PRE-PHARMACEUTICAL PHYSICAL SCIENCES
 Degree Plan - Total Credits: 123

First Year				
First Semester			Second Semester	
PHYS 151	Computational Modeling of Physical Systems	1	PHYS 116	University Physics Lab I
ENG 131	Freshman English I	3	PHYS 152	University Physics I
BIOL 111, 131	Biological Science I	4	PHYS 161	Fundamentals of Scientific Programming
CS 120	Introduction to Programming C++	3	ENG 132	Freshman English II
MATH 241	Calculus I	4	CHEM 111, 131	General Chemistry & Lab I
		15 hrs		
			14 hrs	

Second Year				
Third Semester			Fourth Semester	
PHYS 217	University Physics Lab II	1	PHYS 218	University Physics Lab III
PHYS 247	Math Methods I	3	PHYS 248	Math Methods II
PHYS 251	University Physics II	3	PHYS 252	University Physics III
PHYS 271	COMP PHYS I	3	PHYS 272	Mechanics I
SC 233; 135 or 136	Business & Professional Comm Public Address	3	MATH 250	Linear Algebra
		13 hrs		
			13 hrs	

Third Year				
Fifth Semester			Sixth Semester	
PHYS 333	Electricity and Magnetism I	3	PHAR 112	Pharmacy Orientation
PHYS 353	Quantum Mechanics I	3	ENG 2xx	Any 200 Level ENG may be selected
MATH 251	Diff Equations	3	HIST 231 or POLS 231	American Political Systems I
CHEM 112, 132	General Chemistry & Lab II	4	BIOL 112, 132	Biological Science II
PHAR 111	Pharmacy Orientation	1		
		14 hrs		
			11 hrs	

Fourth Year				
Seventh Semester			Eighth Semester	
BIOL 344	Vertebrate Anatomy and Hist	4	PHYS 330	Intro. to Med. Physics
PHAR 211	Pharmacy Applications	1	PHYS 332	Modern Physics
HIST 231 or POLS 231	American Political Systems I	3	PHAR 212	Medical Terminology
MUSIC 131 or ART 131	Introduction to Music or Drawing and Composition I	3	HIST 232 or POLS 232	American Political Systems II
			CHEM 211, 231	Organic Chemistry & Lab I
		11 hrs		
			14 hrs	

Fifth Year				
Ninth Semester			Tenth Semester	
ECON 231	Principles of Economics	3	PHYS 336	Thermodynamics and Stat. Phys.
CHEM 212, 232	Organic Chemistry & Lab II	4	PHYS 360	Advanced Undergraduate Laboratory
HIST 232 or POLS 232	American Political Systems II	3	BIOL 347	Microbiology
		10 hrs		
			8 hrs	

Bachelor of Science Degree in Physics
SIX-YEAR DEGREE IN PRE-PHARMACEUTICAL PHYSICAL SCIENCES
Degree Plan - Total Credits: 123

First Year				
First Semester			Second Semester	
PHYS 151	Computational Modeling of Physical Systems	1	PHYS 116	University Physics Lab I
ENG 131	Freshman English I	3	PHYS 152	University Physics I
BIOL 111, 131	Biological Science I	4	PHYS 161	Fundamentals of Scientific Programming
CS 120	Intro. to Programming C++	3	BIOL 112, 132	Biological Science II
MATH 241	Calculus I	4		
		15 hrs		11 hrs

Second Year				
Third Semester			Fourth Semester	
PHYS 217	University Physics Lab II	1	PHYS 218	University Physics Lab III
PHYS 247	Math Methods I	3	PHYS 248	Math Methods II
PHYS 251	University Physics II	3	PHYS 252	University Physics III
PHYS 271	COMP PHYS I	3	PHYS 272	Mechanics I
		10 hrs		10 hrs

Third Year				
Fifth Semester			Sixth Semester	
PHYS 333	Electricity and Magnetism I	3	ENG 132	Freshman English II
MATH 250	Linear Algebra	3	SC 233; 135 or 136	Business & Professional Comm Public Address
CHEM 111, 131	General Chemistry & Lab I	4	CHEM 112, 132	General Chemistry & Lab II
		10 hrs		10 hrs

Fourth Year				
Seventh Semester			Eighth Semester	
PHYS 353	Quantum Mechanics I	3	PHYS 336	Thermo. and Stat. Phys.
MATH 251	Diff Equations	3	PHYS 332	Modern Physics
PHAR 111	Pharmacy Orientation	1	HIST 231 or POLS 231	American Political Systems I
ENG 2xx	Any 200 Level ENG may be selected	3	PHAR 112	Pharmacy Orientation
		10 hrs		10 hrs

Fifth Year				
Ninth Semester			Tenth Semester	
ECON 231	Principles of Economics	3	HIST 232 or POLS 232	American Political Systems II
HIST 231 or POLS 231	American Political Systems I	3	PHYS 330	Intro. to Med. Physics
MUSIC 131 or ART 131	Introduction to Music or Drawing and Composition I	3	BIOL 344	Vert. Anatomy and Hist
PHAR 211	Pharmacy Applications	1	PHAR 212	Medical Terminology
		10 hrs		11 hrs

Sixth Year				
Ninth Semester			Tenth Semester	
CHEM 211, 231	Organic Chemistry & Lab I	4	PHYS 360	Advanced Undergraduate Laboratory
HIST 232 or POLS 232	American Political Systems II	3	BIOL 347	Microbiology
			CHEM 212, 232	Organic Chemistry & Lab II
		7 hrs		9

Bachelor of Science Degree in Physics
 FOUR-YEAR DEGREE IN PHYSICS EDUCATION
 Degree Plan - Total Credits: 124

First Year					
First Semester			Second Semester		
CS 120	Introduction to Programming C++	3	PHYS 116	University Physics Lab I	1
MATH 241	Calculus I	4	PHYS 152	University Physics I	3
ENG 131	Freshman English I	3	MATH 242	Calculus II	4
CHEM 111, 131	General Chemistry & Lab I	4	ENG 132	Freshman English II	3
SC 135 or 136	Business & Professional Comm Public Address	3	PHYS 162	Fundamentals of Scientific Programming	3
PHYS 151	Computational Modeling of Physical Systems	1	MUSIC 131 or ART 131	Introduction to Music or Drawing and Composition I	3
		18 hrs			17 hrs

Second Year					
Third Semester			Fourth Semester		
PHYS 217	University Physics Lab II	1	PHYS 218	University Physics Lab III	1
PHYS 247	Math Methods I	3	PHYS 248	Math Methods II	3
PHYS 251	University Physics II	3	PHYS 252	University Physics III	3
PHYS 271	COMP PHYS I	3	PHYS 272	Mechanics I	3
ENG 2xx	Any 200 Level ENG may be selected	3	MATH 250	Linear Algebra	3
MATH 243	Calculus III	4	HIST 231 or POLS 231	American Political Systems I	3
		17 hrs			16 hrs

Third Year					
Fifth Semester			Sixth Semester		
PHYS 333	Electricity and Magnetism I	3	PHYS 332	Modern Physics	3
PHYS 353	Quantum Mechanics I	3	PHYS 336	Thermodynamics and Stat. Phys.	3
MATH 345	Applied Math and Stat. for Technology	3	PHYS 360	Advanced Undergraduate Laboratory	1
MATH 251	Diff Equations	3	HIST 232 or POLS 232	American Political Systems II	3
HIST 231 or POLS 231	American Political Systems I	3	ED	Education Courses	6
		15 hrs			16 hrs

Fourth Year					
Seventh Semester			Eighth Semester		
PHYS 411	Senior Seminar/Workshop I	1	HIST 232 or POLS 232	American Political Systems II	3
ECON 231	Principles of Economics	3	ED	Education Courses	9
ED	Education Courses	9			
		13 hrs			12 hrs

Bachelor of Science Degree in Physics
 FIVE-YEAR DEGREE IN PHYSICS EDUCATION
 Degree Plan - Total Credits: 124

First Year			
First Semester		Second Semester	
PHYS 151 Computational Modeling of Physical Systems	1	PHYS 116 University Physics Lab I	1
MATH 241 Calculus I	4	PHYS 152 University Physics I	3
ENG 131 Freshman English I	3	MATH 242 Calculus II	4
CHEM 111, 131 or BIOL 143 General Chemistry & Lab I, Survey of Life Science	4	ENG 132 Freshman English II	3
		PHYS 162 Fundamentals of Scientific Programming	3
	12 hrs		14 hrs

Second Year			
Third Semester		Fourth Semester	
PHYS 217 University Physics Lab II	1	CS 120 Introduction to Programming C++	3
PHYS 247 Math Methods I	3	MATH 250 Linear Algebra	3
PHYS 251 University Physics II	3	SC 135 or 136 Business & Professional Comm Public Address	3
PHYS 271 COMP PHYS I	3	MUSIC 131 or ART 131 Introduction to Music or Drawing and Composition I	3
MATH 243 Calculus III	4		
	14 hrs		12 hrs

Third Year			
Fifth Semester		Sixth Semester	
HIST 231 or POLS 231 American Political Systems I	3	PHYS 218 University Physics Lab III	1
ED Education Courses	3	PHYS 248 Math Methods II	3
ENG 2xx Any 200 Level ENG may be selected	3	PHYS 252 University Physics III	3
MATH 251 Diff Equations	3	PHYS 272 Mechanics I	3
		ED Education Courses	3
	12 hrs		13

Fourth Year			
Seventh Semester		Eighth Semester	
PHYS 333 Electricity and Magnetism I	3	PHYS 332 Modern Physics	3
PHYS 353 Quantum Mechanics I	3	PHYS 336 Thermodynamics and Stat. Phys.	3
MATH 345 Applied Math and Stat. for Technology	3	PHYS 360 Advanced Undergraduate Laboratory	1
HIST 231 or POLS 231 American Political Systems I	3	HIST 232 or POLS 232 American Political Systems II	3
	12 hrs		10 hrs

Fifth Year			
Ninth Semester		Tenth Semester	
PHYS 411 Senior Seminar/Workshop I	1	HIST 232 (3) or POLS 232 (3) American Political Systems II	3
ECON 231 Principles of Economics	3	ED Education Courses	9
ED Education Courses	9		
	13 hrs		12 hrs

Bachelor of Science Degree in Physics
SIX-YEAR DEGREE IN PHYSICS EDUCATION
Degree Plan - Total Credits: 124

First Year			
First Semester		Second Semester	
PHYS 151 Computational Modeling of Physical Systems	1	PHYS 116 University Physics Lab I	1
MATH 241 Calculus I	4	PHYS 152 University Physics I	3
CHEM 111, 131 or BIOL 143 General Chemistry & Lab I, Survey of Life Science	4	MATH 242 Calculus II	4
		PHYS 162 Fundamentals of Scientific Programming	3
	9 hrs		11 hrs

Second Year			
Third Semester		Fourth Semester	
PHYS 217 University Physics Lab II	1	CS 120 Introduction to Programming C++	3
PHYS 247 Math Methods II	3	MATH 250 Linear Algebra	3
PHYS 251 University Physics II	3	ENG 131 Freshman English I	3
MATH 243 Calculus III	4		
	11 hrs		9 hrs

Third Year			
Fifth Semester		Sixth Semester	
HIST 231 or POLS 231 American Political Systems I	3	PHYS 218 University Physics Lab III	1
ENG 132 Freshman English II	3	PHYS 248 Math Methods II	3
PHYS 271 COMP PHYS I	3	PHYS 252 University Physics III	3
		PHYS 272 Mechanics I	3
	9 hrs		10 hrs

Fourth Year			
Seventh Semester		Eighth Semester	
PHYS 333 Electricity and Magnetism I	3	MUSIC 131 or ART 131 Introduction to Music or Drawing and Composition I	3
PHYS 353 Quantum Mechanics I	3	SC 135 or 136 Business & Professional Comm Public Address	3
MATH 345 Applied Math and Stat. for Technology	3	ENG 2xx Any 200 Level ENG may be selected	3
		ED Education Courses	3
	9 hrs		12 hrs

Fifth Year			
Ninth Semester		Tenth Semester	
MATH 251 Diff Equations	3	PHYS 332 Modern Physics	3
ED Education Courses	3	PHYS 336 Thermodynamics and Stat. Phys.	3
HIST 231 or POLS 231 American Political Systems I	3	PHYS 360 Advanced Undergraduate Laboratory	1
		ED Education Courses	6
	9 hrs		13 hrs

Sixth Year			
Ninth Semester		Tenth Semester	
PHYS 411 Senior Seminar/Workshop I	1	HIST 232 or POLS 232 American Political Systems II	3
ECON 231 Principles of Economics	3	ED Education Courses	6
HIST 232 or POLS 232 American Political Systems II	3		
ED Education Courses	6		
	13 hrs		9 hrs