

# School of Natural and Social Sciences

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## School of Natural and Social Sciences

Dean, Richard L. Sutherland

## Department of Chemistry and Physical Science

Department Chair, Joseph H. Lechner

### Physics

Joseph H. Lechner, PhD

Richard L. Sutherland, PhD

### Program Objectives

The courses and curriculum of the physics program are designed to achieve the following student outcomes:

- explain the roles of observations, laws, hypotheses, and experiments in the scientific method of investigation;
- appreciate the strengths and the limitations of science;
- appreciate the contributions of great scientists in the fields of classical mechanics, electricity and magnetism, nuclear/particle physics, optics, relativity, thermodynamics, and wave mechanics;
- reach logical solutions to problems by evaluating information, applying principles, performing calculations, and interpreting results;
- demonstrate the skills of observation, measurement, record keeping, time management, and teamwork in the laboratory;
- perform laboratory work in accordance with accepted safety regulations;
- correctly operate common laboratory instruments and equipment;
- design and execute a scientific investigation, and evaluate the outcome of an experiment by converting raw data to final results, including analysis of error and uncertainty;
- effectively communicate the results of a scientific investigation orally and in writing; and
- appreciate the harmony between scientific knowledge and biblical teachings.

### Departmental Programs

#### Bachelor of Science in Physical Science Education

##### *Required Courses*

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
CHE3024 Organic Chemistry I with Laboratory	4
CHE3014 Quantitative Chemistry with Laboratory	4
PHY2014G General Physics I with Laboratory	4
PHY2024 General Physics II with Laboratory	4
aPHY2032 Introduction to Optics with Laboratory	2
aPHY3014 Introduction to Modern Physics with Laboratory	4
PHY4002 Content Teaching Methods in Physical Science	2
ESS1034G Earth Science with Laboratory	4
ESS1044G Astronomy with Laboratory	4
ESS1054G Meteorology with Laboratory	4

##### *Required Cognate Courses*

MAT1013G Trigonometry (or pass Trigonometry proficiency exam)	0-3
MAT1023G Precalculus Mathematics (or ACT Mathematics subscore of 25 or above)	0-3
MAT1034G Calculus I	4
MAT2063G Introduction to Statistics	3
Required Education Courses	49
Total	108-114 Hours

Note: Students who wish to teach in senior high school, in multi-age education, or in vocational settings must complete general education and professional education courses which are listed in the School of Education and Professional Studies section of this catalog.

## Allied Health Programs

### Physical Science Minor

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
PHY2014G General Physics I with Laboratory	4
PHY2024 General Physics II with Laboratory	4
Select one of the following:	4
ESS1034G Earth Science with Laboratory	
ESS1044G Astronomy with Laboratory	
ESS1054G Meteorology with Laboratory	
<b>Total</b>	<b>20 Hours</b>

### Pre-Engineering Program

Mount Vernon Nazarene University offers a pre-engineering curriculum. After satisfactorily completing the courses listed below, a student may transfer to an engineering program at another university. Please consult the catalog from the program to which you expect to transfer. Typical pre-engineering requirements include:

ENG1043G Freshman Expository Writing	3
ENG1053G Research Writing	3
CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
MAT2063G Introduction to Statistics	3
MAT1034G Calculus I	4
MAT2034 Calculus II	4
MAT3034 Calculus III	4
MAT3043 Differential Equations	4
PHY2014G General Physics I with Laboratory	4
PHY2024 General Physics II with Laboratory	4
PHI2003G Introduction to Philosophy	3
Any general education (G) History course	3
<b>Total</b>	<b>47 Hours</b>

### Allied Health Professions Programs Pre-Medical/Pre-Dentistry Programs

Mount Vernon Nazarene University offers educational programs designed to prepare the student for admission to a variety of health professional schools. The term *medical* is used to include all the clinical professions in which doctoral degrees are awarded; most comments about

medical school also apply to schools of dentistry, optometry, podiatry, osteopathic medicine, veterinary medicine, and chiropractic medicine.

Medical schools recognize the value of a liberal arts education. They seek students with diverse interests and backgrounds. While no single pattern is required, a strong foundation in natural sciences, broad exposure to humanities, and well-developed communication skills are essential. Although the minimum college requirement for most medical schools is three years, nearly all prefer a four-year program. Standard medical school entrance requirements include:

#### *English/Communication*

Freshman Expository Writing and Research Writing are required. Communication courses are strongly recommended.

#### *Biology*

General Zoology and Comparative Vertebrate Anatomy are required. Genetics, Invertebrate Zoology, and Vertebrate Physiology are recommended.

#### *Chemistry*

General Chemistry I and II with their laboratories, and Organic Chemistry I and II are required. Quantitative Chemistry and Biochemistry are recommended.

#### *Mathematics*

Intermediate Algebra and Trigonometry are prerequisites for required laboratory science courses. Precalculus, Statistics and Calculus I are recommended.

#### *Physics*

General Physics I and II are required.

Although it is possible to complete these minimum entrance requirements while majoring in any academic discipline, most successful medical school applicants choose a major in science. The University offers degree programs in biology and chemistry that meet all medical school entrance requirements.

Many factors besides formal course work are essential for successful entrance to medical school. Mount Vernon Nazarene University has a Pre-Medical Committee consisting of six faculty members who advise and assist students to plan clinical experiences, prepare for entrance examinations, secure medical school application materials, and obtain a committee recommendation letter.