

# Science, AS, and Options

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## ABOUT THE PROGRAM

The AS in Science provides the math and science foundation necessary to pursue later specialization, graduate study, and professional schools. All students in the AS in Science must choose one of four options: Biology, Chemistry, Earth Systems and Environmental Science, or Physics. Each option prepares students for transfer to a complementary four-year degree program. Students in the Biology, Chemistry, or Earth Systems and Environmental Science options transfer to four-year science programs (biochemistry, biology, chemistry, earth and environmental science, etc.), teacher education programs, pharmacy schools, or engineering programs (biomedical, chemical, environmental). Students in the Physics option usually transfer to colleges offering bachelor's degrees in engineering (civil, electrical, mechanical, etc.) or in the physical sciences. Enrichment programs are offered to encourage students to continue their education beyond the bachelor degree by attending graduate or other professional programs (e.g., medical school, physical assistant programs, physical therapy programs).

**NOTE:** This degree program was previously called the AS in Liberal Arts and Sciences.

## Learning Outcomes

Upon successful completion of the Science program requirements, students will be able to:

1. Identify and apply the fundamental concepts and methods of a life or physical science.
2. Apply the scientific method to explore natural phenomena, including hypothesis development, observation, experimentation, measurement, data analysis, and data presentation.
3. Interpret and draw appropriate inferences from quantitative representation such as formulas, graphs, or tables and represent quantitative problems expressed in natural language in a mathematical format.
4. Use algebraic, numerical, graphical, or statistical methods to solve mathematical problems and to apply mathematical methods in a scientific field.

# SCIENCE

## Associate in Science Degree | Transfer Degree

### Department of Chemistry, Earth Sciences, and Environmental Sciences

#### Program Description

##### Science: Chemistry Option

A student interested in the AS in Science has to choose one of four options: Biology, Chemistry, Earth Systems and Environmental Science, or Physics. Each option prepares students for transfer to a complementary four-year degree program. Students in the Chemistry and the Earth Systems and Environmental Science options transfer to four-year science programs (biochemistry, biology, chemistry, earth and environmental science, etc.), teacher education programs, pharmacy schools, or engineering programs (biomedical, chemical, environmental). Enrichment programs are offered to encourage students to continue their education beyond the bachelor degree by attending graduate or other professional programs (e.g., medical school, physician assistant programs, physical therapy programs).

#### Learning Outcomes

Upon successful completion of the Science program requirements, students will be able to:

1. Identify and apply the fundamental concepts and methods of a life or physical science.
2. Apply the scientific method to explore natural phenomena, including hypothesis development, observation, experimentation, measurement, data analysis, and data presentation.
3. Interpret and draw appropriate inferences from quantitative representation such as formulas, graphs, or tables and represent quantitative problems expressed in natural language in a mathematical format.
4. Use algebraic, numerical, graphical, or statistical methods to solve mathematical problems and to apply mathematical methods in a scientific field.

Upon successful completion of the Chemistry option requirements, students will be able to:

1. Demonstrate their knowledge in general, organic and analytical chemistry by identifying, analyzing, and solving the problems.
2. Interpret experimental outcomes, carry out organic syntheses, interpret instrumental analysis data and possess working knowledge of lab safety.

3. Write lab reports using the experimental data, perform computations, analyze graphs and utilize software programs such as "Chem Draw".
4. Apply chemistry principles by participating with faculty on research projects, by gaining industrial experience through department administered internships, or by giving oral presentations at STEM conferences.
5. Gain experience in operating the following instrumentation: FT-IR, NMR, GC/MS, and HPLC, Ion Chromatograph, Spectrophotometer, UV/Vis Spectrophotometer, 3D printers.

#### SCIENCE CURRICULUM (PATHWAYS)

60 Credits required for AS Degree

Curriculum Coordinator: Dr. Soosairaj Therese and Dr. Sunej Hans

#### Required Core

- A. English Composition (6 Credits)
- B. Mathematical and Quantitative Reasoning
  - MTH 28<sup>1,2</sup> College Algebra and Elementary Trigonometry (3 Credits)
- C. Life and Physical Science
  - CHM 11<sup>1</sup> General College Chemistry I (4 Credits)

#### SUBTOTAL 14

#### Flexible Core

- A. World Cultures and Global Issues (3 Credits)
- B. U.S. Experience in its Diversity (3 Credits)
- C. Creative Expression (3 Credits)
- D. Individual and Society (3 Credits)
- E. Scientific World
  - CHM 12<sup>1</sup> General College Chemistry II (4 Credits)
  - MTH 30<sup>1,2</sup> Pre-Calculus Mathematics (4 Credits)

Restricted Elective Select one course from Area A-E.<sup>2</sup> (3 Credits)

#### SUBTOTAL 19

#### Major Requirements

- MTH 31 Analytic Geometry and Calculus I (4 Credits)
- MTH 32 Analytical Geometry and Calculus II (5 Credits)
- FYS 11<sup>3</sup> First Year Seminar (1 credit)
- Free Electives<sup>2</sup> (0 - 7 Credits)

### Chemistry Option Requirements

- CHM 31 Organic Chemistry I (5 Credits)
- CHM 32 Organic Chemistry II (5 Credits)
- Choose two of the five courses below:  
BIO 11 General Biology I AND/OR  
BIO 34 /CHM 34 Biofuels and Bioproducts  
AND/OR CHM 21 Introduction to Chemical  
Processes AND/OR CHM 33 Quantitative  
Analysis AND/OR PHY 11 Physics I (8 Credits)

**TOTAL 27**

<sup>1</sup> This program has obtained a waiver to require STEM variant courses in Required Core Area B and Area C and Flexible Core Area E. If students transferring into this program complete different courses in these areas, they will be certified as having completed the Common Core requirements, but it may not be possible for them to finish their degree within the regular number (60) of credits.

<sup>2</sup> Students who place out of MTH 28 and/or MTH 30 will take elective course(s) to complete 60 total degree credits. In such cases, major/option courses can be used to satisfy appropriate core requirements.

<sup>3</sup> Students transferring into the program with 24 or more degree or equated credits will be exempt from FYS 11, and can take 1 credit of elective to satisfy this requirement.

**Students are encouraged to check the Transfer Planning website for information on articulation agreements.**

