

PRE-PROFESSIONAL HEALTH

ASSOCIATE OF SCIENCE (AS) - 60 CREDITS

About this program

The Pre-Professional Health AS offers students the opportunity to complete an Associate of Science degree that aligns with the course requirements for most professional health degree programs at medical, pharmacy, veterinary, dentistry and chiropractic schools. This degree also works well for students interested in chemistry or biochemistry. Students should consult with an advisor and science faculty member and review the degree requirements of their intended transfer institution when choosing their electives for this degree.

Program outcomes

1. Understand fundamental chemical and biological concepts.
2. Demonstrate competence in general lab skills.
3. Apply critical thinking skills and quantitative tools to evaluate data and other scientific information.
4. Acquire basic inquiry skills including developing testable hypotheses and carrying out experimental procedures to test them.
5. Analyze scientific studies in light of their environmental, economical, social, ethical and cultural implications.
6. Effectively communicate their own and others' data and analyses in oral and written formats, using computers where necessary to create compelling visual aids for posters and presentations.

Curriculum overview

Crds	Requirement type
34	Required courses
14	Restricted electives in courses
3	Restricted electives in MnTC Goal Areas
9	Restricted electives in course types
60	Total

Developmental courses note: A student may be required to enroll in developmental courses in reading, writing and math. A student's scores on the Accuplacer assessment will determine enrollment in developmental courses. The purpose of developmental courses is to prepare students for the demands of a college-level curriculum. *Credits may vary.*

Accreditation: Minnesota State Community and Technical College is accredited by the Higher Learning Commission, a regional accreditation agency recognized by the U.S. Department of Education. The Higher Learning Commission 230 South LaSalle Street, Suite 7-500 Chicago, IL 60604-1411 <http://www.ncahigherlearningcommission.org> Phone: 312.263.0456 / 800.621.7440

Curriculum requirement details

Required courses

Course	Crds
BIOL1122 - General Biology I	4
BIOL1123 - General Biology II	4
CHEM1111 - General Inorganic Chemistry I	5
CHEM1112 - General Chemistry II	5
CHEM2224 - Organic Chemistry I	5
CHEM2225 - Organic Chemistry II	5
COMM1120 - Introduction to Public Speaking	3
ENGL1101 - College Writing	3

Other requirements or restricted electives

3 credits from one or more of these Courses:

Course title	Credits
MATH1207 - Elementary Statistics	3
MATH1213 - Introduction to Statistics	4

3 credits from one or more of these Courses:

Course title	Credits
PSYC1200 - General Psychology	3
PSYC2222 - Lifespan Development	3
SOC1111 - Introduction to Sociology	3

4 credits from one or more of these Courses:

Course title	Credits
MATH1114 - College Algebra	4
MATH1115 - Functions/Trigonometry	4
MATH1134 - Calculus I	5

4 credits from one or more of these Courses:

Course title	Credits
BIOL2220 - General Microbiology	4
BIOL2240 - Genetics	4

3 credits from these Goal Areas:

- 6. The Humanities and Fine Arts

9 credits from these Course Types:

- General Education w/MnTC Goals

Course summaries

BIOL1122 - General Biology I (4 credits)

Meets MnTC Goal Areas 2 and 3. This course is an introduction to the structure and function of living systems with an emphasis on cellular and molecular biology. Fundamental concepts include the chemical basis of life, cell structure and function, cell division, metabolism, classical and molecular genetics, and biotechnology. This course includes a laboratory component incorporating experimental design, microscopic work, and cellular and molecular biology techniques. Along with BIOL1123, this course is part of a two-semester sequence of general biology that can be taken in any order.

Prerequisites:

- Assessment into ENGL 1101 or college level writing equivalent.

BIOL1123 - General Biology II (4 credits)

Meets MnTC Goal Areas 3 and 10. This course is an introduction to living organisms, emphasizing evolution, biological diversity and ecology. Topics will include mechanisms of evolution, classification and diversity of life, structure and function of organisms, and interaction of organisms at all levels of an ecosystem. This course includes a laboratory component incorporating field activities, microscopic work, dissection and plant systems. Along with BIOL1122, this course is part of a two-semester sequence of general biology that can be taken in any order.

Prerequisites:

- Assessment into ENGL 1101 or college level writing equivalent.

CHEM1111 - General Inorganic Chemistry I (5 credits)

Meets MnTC Goal Areas 2 and 3. This course is the first of a two-course series (CHEM1111 and CHEM1112). Students will learn the general chemistry principles: atomic structure, stoichiometry, solutions, bonding, thermochemistry, electronic structure, periodic properties of the elements, intermolecular forces and properties of solids, liquids and gases. The course includes a lab.

Prerequisites:

- MATH1020

OR

- Instructor permission for students who do not score high enough on the placement exam for placement into Chem1111 but wish to enroll in Chem1111. Students with this permission must co-register for Chem 0095.

CHEM1112 - General Chemistry II (5 credits)

Meets MnTC Goal Areas 2 and 3. This course is the second of a two-course series (CHEM1111 and CHEM1112) intended for science majors. Students will learn the general chemistry principles: intermolecular forces, properties of solids and liquids, solution chemistry, kinetics, chemical equilibrium, acid-base equilibrium, solubility equilibrium, thermodynamics, electrochemistry, nuclear chemistry, and possibly coordination chemistry and an introduction to environmental chemistry. The course includes a lab. Students completing the two-semester sequence will be competent in all the areas listed in General Chemistry I & II of the Minnesota State Chemistry Transfer Pathway.

Prerequisites:

- CHEM1111
- MATH1114

CHEM2224 - Organic Chemistry I (5 credits)

Meets MnTC Goal Areas 2 and 3. This course is the first course of a two-course series (CHEM2224 and CHEM2225). Students will learn organic chemistry principles including introduction to the classification, structure, nomenclature, reactions and reaction mechanisms of carbon compounds. The following topics will be included: structure and properties of organic compounds, nomenclature, structural representation and interpretation, isomerism, acid base properties of organic molecules, reaction representation and interpretation, reactions of organic molecules (mechanistic representations, proton transfer, nucleophilic substitution, elimination, electrophilic addition and free radical), reaction considerations and basic principles of spectroscopy. The course includes a lab, which will include techniques for the purification, synthesis and characterization of organic compounds and the study of organic reactions. Green chemistry techniques will be practiced whenever possible.

Prerequisites:

- CHEM1112

CHEM2225 - Organic Chemistry II (5 credits)
 Meets MnTC Goal Areas 2 and 3. This course is the second of a two-course series (CHEM2224 and CHEM2225). Students will learn the reactions and characteristics of various organic chemistry groups. The following topics will be included: functional groups, nomenclature and preparation, structure and reactivity, reaction representation and interpretation, reaction considerations and spectroscopy. The course includes a lab which will include purification, synthesis and characterization of organic compounds and the study of organic reactions. Green chemistry techniques will be practiced whenever possible.

Prerequisites:

- CHEM2224

COMM1120 - Introduction to Public Speaking (3 credits)
 Meets MnTC Goal Area 1. This course clarifies the process of oral communication, clarifies the basic principles of public speaking and allows the student to increase the application of these principles while both speaking and listening.

Prerequisites:

- Assessment into ENGL 1101

ENGL1101 - College Writing (3 credits)
 Meets MnTC Goal Area 1. This is an introductory writing course designed to prepare students for later college and career writing. The course focuses on developing fluency through a process approach, with particular emphasis on revision. Students will consider purpose and audience, read and discuss writing and further develop their own writing processes through successive revisions to produce polished drafts. Course work will include an introduction to argumentative writing, writing from academic sources and a short research project.

Prerequisites:

- Completion of ELL1080, ENGL0096, or ENGL0097 with a grade of C or higher OR placement into college-level English.

MATH1207 - Elementary Statistics (3 credits)
 Meets MnTC Goal Areas 2 and 4. This course will investigate descriptive and inferential statistical concepts including measures of central tendency, measures of variation, measures of position, frequency tables, statistical graphs, probability distributions, hypothesis tests, confidence intervals, regression and correlation. TI calculators, MINITAB or EXCEL may be used for data analysis.

MATH1213 - Introduction to Statistics (4 credits)
 Meets MnTC Goal Areas 2 and 4. Topics include data summary, frequency distributions, plots, graphs, measures of central tendency, variation, probabilities, probability distributions and confidence intervals. Hypothesis testing of means, proportions and variances will be conducted using the z-test, t-test, chi-square test, f-test and ANOVA. Optional topics may include nonparametric statistics, sampling and simulation.

PSYC1200 - General Psychology (3 credits)
 Meets MnTC Goal Areas 5 and 9. This is a comprehensive introductory overview of psychology that studies human behavior and mental processes. Topics include (but are not limited to) research methods, the history of psychology, neuroscience and behavior, developmental psychology, sensation and perception, motivation and emotion, health psychology, learning and memory, personality, social psychology, psychopathology and treatments, and states of consciousness such as sleep and dreams.

PSYC2222 - Lifespan Development (3 credits)
 Meets MnTC Goal Areas 5 and 9. This course is a study of human development from the lifespan perspective, including theories, stages and influences of development. The course views the individual from conception to death through physical, cognitive, social and emotional development.

SOC1111 - Introduction to Sociology (3 credits)
 Meets MnTC Goal Areas 2, 5 and 7. This course is an introduction to the study of societies and the social factors that influence individual and group behavior. The course incorporates sociological and other critical thinking models for the investigation of various components of social life: culture, socialization, social organization, social stratification, social institutions, populations dynamics and social change.

MATH1114 - College Algebra (4 credits)
 Meets MnTC Goal Areas 2 and 4. This course includes rational, polynomial, exponential, logarithmic, inverse and quadratic functions. The course also includes equations, inequalities, complex numbers and systems of linear equations. Additional topics may include matrices and determinants.

MATH1115 - Functions/Trigonometry (4 credits)
 Meets MnTC Goal Areas 2 and 4. This course includes trigonometric functions, right triangle trigonometry, radian measure and circular functions, identities, equations, inverse functions, oblique triangles, complex numbers, vectors, polar coordinates and conic sections.

MATH1134 - Calculus I (5 credits)
 Meets MnTC Goal Areas 2 and 4. This course includes limits and continuity, derivatives, definite and indefinite integrals of algebraic, trigonometric, exponential and logarithmic functions, and applications of the derivative and definite integral.

BIOL2220 - General Microbiology (4 credits)

Meets MnTC Goal Area 3. This course provides an overview of the structure and function of microorganisms, including archaea, bacteria, viruses, fungi and parasites. Students will examine the molecular diversity, genetics, physiology and ecology of these organisms in relation to microbial evolution, industrial and applied applications, and host-pathogen interactions. Lecture is accompanied by laboratory experiences, including aseptic technique, differential staining procedures, cultural and physical characteristics, biochemical testing, microbial control, microbiology of water and soil, and identification of unknown cultures.

BIOL2240 - Genetics (4 credits)

Meets MnTC Goal Area 3. This course is a study of the basis of heredity with emphasis on modern molecular and classical Mendelian genetics. It is open to all students but is recommended for students majoring in biology and health-related areas. This course includes a laboratory which explores molecular and classical genetic techniques.



PRE-PROFESSIONAL HEALTH

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Program Plan — "Pre-professional Health"

Locations: Fergus Falls, Moorhead

1st Fall Term (16 credits)

Courses

Course	Crds
BIOL1122 - General Biology I	4
CHEM1111 - General Inorganic Chemistry I	5
ENGL1101 - College Writing	3

4 credits in one or more of the following:

MATH1114 - College Algebra	4
MATH1115 - Functions/Trigonometry	4
MATH1134 - Calculus I	5

1st Spring Term (12 credits)

Courses

Course	Crds
BIOL1123 - General Biology II	4
CHEM1112 - General Chemistry II	5

3 credits in one or more of the following:

MATH1207 - Elementary Statistics	3
MATH1213 - Introduction to Statistics	4

2nd Fall Term (16 credits)

Courses

Course	Crds
CHEM2224 - Organic Chemistry I	5
COMM1120 - Introduction to Public Speaking	3

3 credits in one or more of the following:

Goal Area 6. The Humanities and Fine Arts

5 credits in one or more of the following:

General Education w/MnTC Goals

2nd Spring Term (16 credits)

Courses

Course	Crds
CHEM2225 - Organic Chemistry II	5

3 credits in one or more of the following:

PSYC1200 - General Psychology	3
PSYC2222 - Lifespan Development	3
SOC1111 - Introduction to Sociology	3

4 credits in one or more of the following:

BIOL2220 - General Microbiology	4
BIOL2240 - Genetics	4

4 credits in one or more of the following:

General Education w/MnTC Goals