Science and Mathematics

Associate of Science Degree

These curricula emphasize the physical and biological sciences and mathematics, as well as the liberal arts. They are designed for transfer to baccalaureate programs in mathematics and the sciences and are appropriate for students who plan careers in mathematics, biology, chemistry, physics, teaching, medicine, dentistry, allied health and other scientific programs. All programs include general education courses and advanced mathematics and science courses appropriate to the transfer major.

Options within the Science and Mathematics program include Biology, Chemistry and Mathematics. Students should consult with an academic advisor to select the curriculum which is appropriate for their transfer and career goals, as well as preparation for medical, dental and chiropractic schools. Transfer to science majors in four-year curricula which are more specialized, such as pharmacy and astronomy, can be accomplished with these programs with careful advisement.

Students may consult with the Biology and Chemistry chair for specific information and assignment to an academic advisor for options in Chemistry and Biology. Students interested in the Mathematics options may consult with the Mathematics chair.

Due to continual program revisions mandated by the accrediting agencies and/or changes in state-mandated requirements, students should consult with their academic advisors when selecting courses.

Premedical, Predental, Preveterinary Majors

Students preparing for medical, dental or veterinary medical schools should select the Chemistry major or the Biology major, preprofessional/biotechnology track. These schools require General Biology I and II, General Chemistry I and II, Organic Chemistry I and II, General Physics I and II, and mathematics, generally through Calculus I or further, to support these. Since there are prerequisites for these courses, it is important to see an academic advisor early in the process to plan the entire sequence of courses. Chiropractic, occupational therapy, physical therapy and physician's assistant programs should major in Biology and confer with an academic advisor to select the correct track and selection of courses.

Students with a previous non-science degree who plan to take only the science courses necessary for these schools should also see an advisor since proper sequencing can save time in the completion of the courses. Additionally, by transferring general education courses from the previous degree, a student can complete an A.S. degree of Chemistry or Biology without taking any additional courses. For further information, contact the Department of Biology and Chemistry.

Pharmacy

Pharmacy programs are often separate schools within a university. The appropriate major to prepare for pharmacy is Chemistry with appropriately selected courses. Students should consult with an academic advisor to select the correct sequencing of courses.

Degrees

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  - AS Science and Mathematics - Biology Option, Track 1: Traditional (p. 2)
  - AS Science and Mathematics - Biology Option, Track 2: Health Related (p. 2)
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  - AS Science and Mathematics - Biology Option, Track 4: Environmental (p. 3)
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Biology

An Option within Science and Mathematics

(P2160)

Note: Biology majors requiring developmental courses in Mathematics must complete MAT-016 Intermediate Algebra or MAT-026 Intermediate Algebra Express prior to taking courses in Biology and Chemistry.

Biology is one of the most rapidly developing sciences today. A tremendous rate of expansion in the understanding of life processes, along with unprecedented growth in medical and environmental technologies, has resulted in a growing need for trained professionals in new, as well as traditional, fields. This curriculum, with each of its five tracks, reflects this expanding science and its related technologies. It is a liberal arts program with emphasis on the sciences and mathematics. Students planning to transfer to baccalaureate programs or professional schools take courses that either parallel those required in the first two years of most baccalaureate programs in biology or those required for entry into the most popular professional programs.

Because of the complexity of career options and the diversity in requirements of baccalaureate and professional schools, it is recommended that students work closely with their academic advisors. Students who are preparing for medical, dental or veterinary medical schools should see an academic advisor in the Department of Biology and Chemistry immediately to plan their courses and sequencing of courses. The appropriate major is either Biology, preprofessional/biotechnology track, or Chemistry. Students who have a previous non-science degree should be able to complete either of these degrees by transferring general education courses and taking only the sciences required for the medical schools. College programs may differ widely in course offerings for various biology majors. In order to achieve maximum transfer of credits, it is absolutely essential that students speak to their academic advisors and consult the transfer institution regarding specific curriculum requirements.

Articulation Agreements

Students should check with the Transfer Office about articulation agreements with this program.

Students considering a career in teaching should read about the County College of Morris Teacher Education Specialization in Biology.

The following are tracks within the major for purposes of advisement. Dissection is required in certain mandated courses.

Traditional

Track 1 is the traditional curriculum which, because of its general scope, is anticipated to continue to satisfy the needs of the majority of students. Students in this program can continue in virtually any direction, although in certain circumstances they may have to make up credits upon transferring.

Traditional - Track 1

General Education Foundation		
Communication		6
ENG-111	English Composition I	
ENG-112	English Composition II	
Math-Science-Technology		11
MAT-123	Precalculus	
Biology Elective		
Math-Science-Technology Elective		
Social Science		3
Choose from General Education course list (Social Science)		
Humanities		3
Choose from General Education course list (Humanities)		
Social Science or Humanities		3
Choose from General Education course list (Social Science or Humanities)		
General Education Electives		6
Choose from General Education course list		
General Education Foundation Credits		32
Biology Traditional Core		
BIO-121	General Biology I	4
BIO-122	General Biology II	4
CHM-125	General Chemistry I - Lecture	3
CHM-126	General Chemistry I - Laboratory	1
CHM-127	General Chemistry II - Lecture	3
CHM-128	General Chemistry II - Laboratory	1
Biology Elective		4
MAT-130	Probability and Statistics (OR)	4
MAT-131	Analytic Geometry and Calculus I	
Free Electives		4
Biology Traditional Core Credits		28
Total Credits		**60**

Students should consult with their academic advisors when selecting free electives.

Science courses completed by students prior to entering the Biology option must be less than seven years old. If the science courses exceed the seven-year limit, students can prove their competency by testing or they must retake the courses.

Health Related

Track 2 is intended for those students who are preparing to transfer directly to professional schools including chiropractic, occupational therapy and physician's assistant programs. However, this program is not suitable for students wishing to apply to programs in medicine, dentistry, optometry or podiatry, which require a more traditional selection of courses. This track has a more narrow selection of courses than Tracks 1 and 3, and, thus, may restrict transfer options.

Health Related - Track 2

General Education Foundation		
Communication		6
ENG-111	English Composition I	
ENG-112	English Composition II	
Math-Science-Technology		11
MAT-123	Precalculus	
Biology Elective		
Math-Science-Technology Elective		
Social Science		3
Choose from General Education course list (Social Science)		
Humanities		3
Choose from General Education course list (Humanities)		
Social Science or Humanities		3
Choose from General Education course list (Social Science or Humanities)		
General Education Electives		6
Choose from General Education course list		
General Education Foundation Credits		32
Biology Health Related Core		
BIO-121	General Biology I	4
BIO-122	General Biology II	4
CHM-125	General Chemistry I - Lecture	3
CHM-126	General Chemistry I - Laboratory	1
CHM-127	General Chemistry II - Lecture	3
CHM-128	General Chemistry II - Laboratory	1
BIO-101	Anatomy and Physiology I	4
BIO-102	Anatomy and Physiology II	4
MAT-130	Probability and Statistics (OR)	4
MAT-131	Analytic Geometry and Calculus I	
Biology Health Related Core Credits		28
Total Credits		**60**

Students should consult with their academic advisors when selecting the Biology elective.

Science courses completed by students prior to entering the Biology option must be less than seven years old. If the science courses exceed the seven-year limit, students can prove their competency by testing or they must retake the courses.

Preprofessional/Biotechnology

Track 3 is intended to meet the needs of those whose math and science skills are above average and who hope to transfer to the more competitive baccalaureate programs, professional schools or medical, veterinary or dental schools. Biotechnology is the most rapidly growing sector in the field of biology and is a major industry in New Jersey. This area of science applies our current understanding of living organisms (plants, animals, microbes) and systems (tissues, cells, biological molecules) to products and processes that can help improve society and the overall health of the planet. In this track, students will study modern biotechnology methods and instrumentation through a combination of theoretical knowledge and practical training.

Preprofessional/Biotechnology - Track 3

GENERAL EDUCATION FOUNDATION		
COMMUNICATION		6
ENG-111	English Composition I	
ENG-112	English Composition II	
MATH-SCIENCE-TECHNOLOGY		11
MAT-123	Precalculus	
Biology Elective		
Math-Science-Technology Elective		
SOCIAL SCIENCES		3
Choose from General Education course list (Social Sciences)		
HUMANITIES		3
Choose from General Education course list (Humanities)		
SOCIAL SCIENCES or HUMANITIES		3
Choose from General Education course list (Social Sciences or Humanities)		
GENERAL EDUCATION ELECTIVES		6
Choose from General Education course list		
GENERAL EDUCATION FOUNDATION Credits		32
BIOLOGY: BIOTECHNOLOGY CORE		
BIO-121	General Biology I	4
BIO-122	General Biology II	4
CHM-125	General Chemistry I - Lecture	3
CHM-126	General Chemistry I - Laboratory	1
CHM-127	General Chemistry II - Lecture	3
CHM-128	General Chemistry II - Laboratory	1
CHM-231	Organic Chemistry I - Lecture	3
CHM-232	Organic Chemistry I - Laboratory	1
CHM-233	Organic Chemistry II - Lecture	3
CHM-234	Organic Chemistry II - Laboratory	1
MAT-131	Analytic Geometry and Calculus I	4
BIOLOGY: BIOTECHNOLOGY CORE Credits		28
Total Credits		**60**

Students should consult with their academic advisors when selecting free electives.

Science courses completed by students prior to entering the Biology option must be less than seven years old. If the science courses exceed the seven-year limit, students can prove their competency by testing or they must retake the courses.

Environmental

Track 4 is designed to meet the needs of those who clearly are interested in a career in the environmental field. These programs are becoming increasingly more specialized in the array of courses required in the first two years.

Environmental - Track 4

General Education Foundation		
Communication		6
ENG-111	English Composition I	
ENG-112	English Composition II	
Math-Science-Technology		11
MAT-123	Precalculus	
Biology Elective		
Math-Science-Technology Elective		
Social Science		3
Choose from General Education course list		
Humanities		3
Choose from General Education course list		
Social Science or Humanities		3
Choose from General Education course list (social science or humanities)		
General Education Electives		6
Choose from General Education course list		
General Education Foundation Credits		32
Environmental Science Core		
BIO-121	General Biology I	4
BIO-122	General Biology II	4
BIO-202	Ecology	4
CHM-125	General Chemistry I - Lecture	3
CHM-126	General Chemistry I - Laboratory	1
CHM-127	General Chemistry II - Lecture	3
CHM-128	General Chemistry II - Laboratory	1
MAT-130	Probability and Statistics	4
Free Electives		4
Environmental Science Core Credits		28
Total Credits		**60**

Students should consult with their academic advisors when selecting free electives.

Science courses completed by students prior to entering the Biology option must be less than seven years old. If the science courses exceed the seven-year limit, students can prove their competency by testing or they must retake the courses.

Nutrition

Track 5 is designed to meet the needs of students who are interested in a career in nutrition (e.g., health and wellness, fitness or sports-related nutrition). The track is intended for those students who are preparing to transfer directly to a four-year school with

programs that offer a Registered Dietitian (RD) credential or Dietetic Technician, Registered (DTR) certification.

Nutrition - Track 5

General Education Foundation		
Communication		6
ENG-111	English Composition I	
ENG-112	English Composition II	
Math-Science-Technology		11
MAT-124	Statistics	
BIO-133	Human Biology	
CHM-117	Introductory Chemistry Lecture	
CHM-118	Introductory Chemistry Laboratory	
Social Science		3
ECO-211	Principles of Economics I Macroeconomics	
Humanities		3
Choose from General Education course list		
Social Science or Humanities		3
Choose from General Education course list		
General Education Electives		6
PSY-113	General Psychology	
Humanities, Social Science, Communication or Language		
General Education Foundation Credits		32
Biology Nutrition Core		
BIO-121	General Biology I	4
BIO-122	General Biology II	4
BIO-215	Microbiology	4
HOS-100	Serv-Safe Food Handling	1
HOS-105	Food Science and Nutrition	3
CHM-210	Essentials of Organic Chemistry	4
Free Electives		8
Biology Nutrition Core Credits		28
Total Credits		**60**

Students should consult with their academic advisors when selecting free electives.

Science courses completed by students prior to entering the Biology option must be less than seven years old. If the science courses exceed the seven-year limit, students can prove their competency by testing or they must retake the courses.

Chemistry

An Option within Science and Mathematics

(P2152)

Note: Chemistry majors requiring developmental courses in Mathematics must complete MAT-016 Intermediate Algebra or MAT-026 Intermediate Algebra Express prior to taking courses in Biology and Chemistry.

Chemistry is a versatile subject area and the pursuit of a career in chemistry can be a most intellectually satisfying experience. No other basic science touches and shapes as many aspects of modern society as chemistry. From soft contact lenses and synthetic blood to alternative fuel sources and advances in medicine and biotechnology, the study of chemistry has provided the solution to complex problems and has improved the quality of all phases of human life.

The fact that chemists at all levels of education find a market for their skills and knowledge in every employment area is further demonstration of the scope of the science of chemistry. Chemists provide the backbone for manufacturing industries, such as pharmaceuticals, laboratories, environmental protection and for government positions in regulatory agencies.

Chemistry and biochemistry are the strongest preparation for professional schools in the health-related disciplines, such as medicine, dentistry and pharmacy, as well as the fields of environmental science, polymers and geology.

The Chemistry program at County College of Morris is designed to provide students with a strong foundation in all areas of modern chemistry. The core courses required for the A.S. degree prepare the student to transfer and attain a B.S. or B.A. degree, to attend health-related professional schools in medicine, dentistry, pharmacy, physical therapy and chiropractic, or to start a career in chemistry. The degree is also applicable for those students interested in the applications of chemistry to environmental problems. Students who are preparing for medical, dental or veterinary schools should see an academic advisor in the Department of Biology and Chemistry early in the process to plan their courses and sequencing of courses. Students who have a previous non-science degree should be able to complete this program by transferring general education courses and taking only the sciences required for medical schools.

The department is staffed with a dedicated teaching faculty that continue to keep their knowledge up-to-date. Some faculty members have industrial or medical experience, which allows them to better apply real-world examples in class. State-of-the-art equipment is used in laboratory courses to maximize the students' practical hands-on experience.

Students should consult with their advisors to ensure the proper sequencing of required and elective courses. Correct advisement is absolutely necessary to assure transfer-ability.

Articulation Agreements

Students should check with the Transfer Office about articulation agreements with this program.

Students considering a career in teaching should read about the County College of Morris Teacher Education Specialization in Chemistry.

General Education Foundation		
Communication		
ENG-111	English Composition I	3
ENG-112	English Composition II	3
Math-Science-Technology		11
MAT-123	Precalculus	4
Biology or Physics Elective		
Math/Science/Technology Elective		
Social Science		3

Choose from General Education course list		
Humanities		3
Choose from General Education course list		
Social Science or Humanities		3
Choose from General Education course list		
General Education Electives		6
Choose from General Education course list		
General Education Foundation Credits		32
Chemistry Core		
CHM-125	General Chemistry I - Lecture	3
CHM-126	General Chemistry I - Laboratory	1
CHM-127	General Chemistry II - Lecture	3
CHM-128	General Chemistry II - Laboratory	1
CHM-231	Organic Chemistry I - Lecture	3
CHM-232	Organic Chemistry I - Laboratory	1
CHM-233	Organic Chemistry II - Lecture	3
CHM-234	Organic Chemistry II - Laboratory	1
Biology or Physics Elective		4
MAT-131	Analytic Geometry and Calculus I	4
Restricted Elective		4
Chemistry Core Credits		28
Total Credits		60

Students should consult with their academic advisors when selecting free and restricted electives.

Science courses completed by students prior to entering the Chemistry option must be less than seven years old. If the science courses exceed the seven-year limit, students can prove their competency by testing or they must retake the courses.

Mathematics

An Option within Science and Mathematics

(P2150)

Articulation Agreements

Students should check with the Transfer Office about articulation agreements with this program.

Students considering a career in teaching should read about the County College of Morris Teacher Education Specialization in Mathematics.

General Education Foundation

Communication		6
ENG-111	English Composition I	
ENG-112	English Composition II	
Math-Science-Technology		11
Restricted Laboratory Science		
Technology Elective		
Restricted Laboratory Science		
Social Science		3
Choose from General Education course list		
Humanities		3
Choose from General Education course list		
Social Science or Humanities		3
Choose from General Education course list		
General Education Electives		6
Choose from General Education course list		
General Education Foundation Credits		32
Mathematics Core		
MAT-131	Analytic Geometry and Calculus I	4
MAT-132	Analytic Geometry and Calculus II	4
MAT-230	Calculus III	4
MAT-228	Linear Algebra	3
Free Electives		6
Restricted Electives (7CR)		
MAT-225	Discrete Mathematics	4
or MAT-244	Ordinary Differential Equations	
ENR-125	Computer Programming for Engineers	3
or MAT-114	Introduction to Data Science	
Mathematics Core Credits		28
Total Credits		**60**

Students should consult with their academic advisors when selecting the Math and free electives.

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Courses

BIO-101. Anatomy and Physiology I. 4 Credits.
RECI 15 hrs LECT 45 hrs LAB 45 hrs
The structure and function of the human organism are studied. Special emphasis is given to interrelationships of organs and organ systems. Cellular morphology and function are included for an appreciation of the adult form. The student is introduced to basic chemistry, the cell, basic tissues, the integumentary, the skeletal, muscular and nervous systems. Dissection is required as part of the laboratory syllabus. All remedial courses must be completed prior to taking this course.
Prerequisites: Placement basis or MAT-016 or MAT-026
Additional Fees: Course fee applies.

BIO-102. Anatomy and Physiology II. 4 Credits.
LECT 45 hrs LAB 45 hrs
A continuation of Anatomy and Physiology I. The circulatory, respiratory, digestive, urinary, endocrine and reproductive systems are studied. Dissection is required as part of the laboratory syllabus. All remedial courses must be completed prior to taking this course.
Prerequisites: BIO-101 (Minimum grade of C)
Additional Fees: Course fee applies.

BIO-118. Biomedical Ethics. 3 Credits.
LECT 45 hrs
This course introduces students to major ethical issues in areas of biomedicine in contemporary society. The focal point of the course is a process for ethical reasoning and ethical decision making.Students identify ethical problems, assess information relevant to decisions, identify stakeholders affected by decisions, recognize competing values, consider options, make decisions and realize the consequences of decisions. The process is applied to issues in such fields as genetics, death and dying, reproduction, public policy and medical decision making. This course does not fulfill a laboratory science requirement.

BIO-121. General Biology I. 4 Credits.
LECT 45 hrs LAB 45 hrs
This course is an introduction to the biological sciences, which will explore foundational principles of biology, such as the fundamentals of chemistry, cell structure and function, metabolism, cellular reproduction, DNA replication, gene expression and genetics.
Prerequisites: Placement basis or MAT-016 or MAT-026
Corequisites: ENG-111 or ENG-111CL or ENG-111CW
Additional Fees: Course fee applies.

BIO-122. General Biology II. 4 Credits.
LECT 45 hrs LAB 45 hrs
This course is a continuation of General Biology I. Topics include evolution, biological diversity, plant structure and function, animal systems, development, and reproduction and concepts of ecology. Dissection is required as part of the laboratory.
Prerequisites: BIO-121 or BIO-180 (Minimum grade of C)
Additional Fees: Course fee applies.

BIO-127. Biology of Environmental Concerns. 4 Credits.
LECT 45 hrs LAB 45 hrs
Designed for the non-science major. A survey of environmental issues from a variety of perspectives. The course provides an awareness of environmental problems, a knowledge of cause-and-effect relationships of diverse activities on this planet and a basis for making informed judgments about the potential solutions to environmental problems. Major topics include the roots of our environmental problems, introductory concepts in ecology, human population dynamics and control, food resources and world hunger, renewable and non-renewable energy resources, mineral resources and solid waste, wild plant and animal resources, water resources, air pollution, water pollution, pesticides and pest control, economics, politics and the environment, worldviews, ethics, and the environment. This course fulfills the general education laboratory science requirement. This course requires field exercises that may include moderate physical activity.
Additional Fees: Course fee applies.

BIO-129. Introduction to Botany. 4 Credits.
LECT 45 hrs LAB 30 hrs
Botany includes studying the effects of the environment on plant growth and development, plant morphology and physiology, and plant classification. Students apply theory by propagating, maintaining and studying plants using the Landscape and Horticultural Technology laboratories and greenhouse facilities.
Additional Fees: Course fee applies.

BIO-132. Concepts in Biology. 4 Credits.
LECT 45 hrs LAB 45 hrs
Designed for the non-science major. A basic introduction to the study of biological science. Topics include the hierarchy of organization, life processes, cell theory, human genetics, theories of evolution, biochemistry and some principles of ecology. This course fulfills the general education laboratory science requirement.
Additional Fees: Course fee applies.

BIO-133. Human Biology. 4 Credits.
LECT 45 hrs LAB 45 hrs
Designed for the non-science majors or for those students enrolled in Curriculum 2160, Nutrition Track. It is an introduction to the body systems and the factors that affect human physiology. Lectures include basic anatomy and physiology of the major systems plus discussion topics emphasizing nutrition, exercise, sexuality, genetic engineering and recent advances in biotechnology. This course fulfills the general education laboratory science requirement.
Corequisites: ENG-111 or ENG-111CL or ENG-111CW
Additional Fees: Course fee applies.

BIO-177. Biology of Environmental Concerns Honors. 4 Credits.
LECT 45 hrs LAB 45 hrs
Designed for the non-science major. A survey of environmental issues from a variety of perspectives. The course provides an awareness of environmental problems, a knowledge of cause-and-effect relationships of diverse activities on this planet and a basis for making informed judgments about the potential solutions to environmental problems. Major topics include the roots of our environmental problems, introductory concepts in ecology, human population dynamics and control, food resources and world hunger, renewable and non-renewable energy resources, mineral resources and solid waste, wild plant and animal resources, water resources, air pollution, water pollution, pesticides and pest control, economics, politics and the environment, worldviews, ethics, and the environment. This course fulfills the general education laboratory science requirement. This course requires field exercises that may include moderate physical activity. GPA of 3.3 or higher, CCM Honors student, or permission of CCM Honors is required to take this course.
Prerequisites: Permission of department chair
Additional Fees: Course fee applies.

BIO-180. General Biology I - Honors. 4 Credits.
LECT 45 hrs LAB 45 hrs
Fall Semester only. This is an introduction to the biological sciences through a study of principles and concepts basic to the major discipline of biology. Topics include fundamentals of chemistry, cell structure and function, the nature of biological molecules, energetics, synthesis and the morphology and physiology of animals and plants. Dissection is required as part of the laboratory syllabus. Lecture and laboratory use an investigatory approach which will emphasize both written and oral communication skills.
Prerequisites: Placement basis or MAT-016 or MAT-026 and a petition granted by CCM Honors is needed to register for this course.
Corequisites: ENG-111 or ENG-111CL or ENG-111CW
Additional Fees: Course fee applies.

BIO-181. General Biology II - Honors. 4 Credits.
LECT 45 hrs LAB 45 hrs
Spring Semester only. A continuation of BIO-180 General Biology I Honors. Topics include homeostasis, animal reproduction, embryonic development, animal physiology, genetics, ecology and evolution. Dissection is required as part of the laboratory syllabus. All remedial courses must be completed prior to taking this course. GPA of 3.3 or higher, CCM Honors student, or permission of CCM Honors is required to take this course.
Prerequisites: BIO-180 or BIO-121 and a petition granted by CCM Honors is needed to register for this course.
Additional Fees: Course fee applies.

BIO-201. Genetics. 4 Credits.
LECT 45 hrs LAB 45 hrs
Spring Semester only. Provides the student with a broad knowledge of genetics from the molecular to the organismal level. Topics covered include the molecular and Mendelian concepts of heredity and their relationship to cell function, development, population changes and evolution,and biotechnology. Laboratory exercises emphasize a variety of techniques and skills used in genetic research and testing.
Prerequisites: BIO-121 and BIO-122 or BIO-180 and BIO-181 (Minimum grade of C required for all prerequisites)
Additional Fees: Course fee applies.

BIO-202. Ecology. 4 Credits.
LECT 45 hrs LAB 45 hrs
This course introduces the basic fundamentals of ecology - the study of the interrelationships between organisms and their environment. Topics include an introduction to ecosystem structure and function, abiotic factors in ecosystems, energy flow and mineral cycling, population and evolutionary ecology, community ecology, a comprehensive survey of aquatic and terrestrial ecosystems, and human ecology. Laboratories and field trips are designed to introduce students to techniques used in basic ecological research.This course requires field exercises that may include moderate physical activity.
Prerequisites: Minimum grade of C required for BIO-121 and BIO-122 or BIO-180 and BIO-181
Additional Fees: Course fee applies.

BIO-215. Microbiology. 4 Credits.
LECT 45 hrs LAB 45 hrs
A comprehensive study of microorganisms, including viruses, bacteria, fungi, protozoa and algae. Topics covered include microbial anatomy, physiology, genetics, ecology and methods of control. Research methods and modern immunological concepts also are discussed. Laboratory exercises in basic microbiological techniques and the study of living microorganisms are designed to supplement the theory presented.
Prerequisites: BIO-101 or BIO-121 or BIO-180 (minimum grade of C) and CHM-117 or CHM-125 (minimum grade of C)
Corequisites: ENG-111 or ENG-111CL or ENG-111CW
Additional Fees: Course fee applies.

BIO-223. Cell and Molecular Biology. 4 Credits.
LECT 45 hrs LAB 45 hrs
A comprehensive study of biological molecules and their functions. Emphasis will be placed on the mechanism and regulation of macromolecule synthesis. Laboratory exercises will focus on instrumentation and techniques used in biological research.
Prerequisites: BIO-121 Minimum grade of C required for all prerequisites
Additional Fees: Course fee applies.

BIO-228. Internship Work Experience - Biology. 3 Credits.
COOP 135 hrs
This comprehensive course provides selected students enrolled in the Biology Major with job-oriented laboratory training and practical work experience in a paid or unpaid work environment prior to career employment. The course requires a detailed description of the proposed internship, workplace attendance, regular communication with the faculty advisor, an oral presentation, a written final report, and a closing interview describing the student's work experience. Students work a minimum of 135 hours. Students desiring to participate in this experience should make their interest known to the department chairperson by the end of their second semester. This course is treated as a free elective for Biology majors.
Prerequisites: Permission of department chair.

BIO-229. Internship Work Experience. 2 Credits.
COOP 90 hrs
This intermediate-level course is a free elective for Biology majors providing pre-professional work experience and laboratory training in a paid or unpaid work environment. Students work a minimum of 90 hours. Course completion requires a detailed description of the proposed internship, workplace attendance, frequent communication with the faculty advisor, a written final report, and a closing interview describing the student's work experience. Students should inquire with the department chairperson by the end of their second semester for registration.
Prerequisites: Permission of department chair.

BIO-230. Nternship Work Experience - Biology Internship 1 Credit. 1 Credit.
COOP 45 hrs
This introductory course provides Biology Majors with career-oriented work experience and laboratory training and in a paid or unpaid work environment prior to career employment. The course requires a detailed description of the proposed internship, workplace attendance, frequent communication with the faculty advisor, and a written final report describing the student's work experience. Students desiring to participate in this free elective should make their interest known to the department chairperson by the end of their second semester. Students work a minimum of 45 hours.
Prerequisites: Permission of department chair.

BIO-233. Independent Study in Biology. 3 Credits.
LECT 45 hrs
An opportunity for selected students to participate in biological research under close supervision of the biology faculty. Interested students should make their interest known early in the prior semester to the department chair, who will familiarize the students with criteria for selection and the steps to be taken to gain entrance to this course. This course does not fulfill any of the science requirements in biology but is offered as a free elective.
Prerequisites: Permission of department chair
Additional Fees: Course fee applies.

BIO-274. Pathophysiology. 3 Credits.
LECT 45 hrs
Pathophysiology is a course which studies the physiological alterations associated with common disease processes which affect human beings across the lifespan. Common diseases of the major organ systems are covered as well as such general issues as infection, neoplasm, inflammation, fluid and electrolyte imbalance, trauma, and shock.
Prerequisites: BIO-101 and BIO-102 and CHM-117 Minimum grade of C required for all prerequisites.

BIO-295. Special Topics in Biology. 4 Credits.
LECT 45 hrs LAB 30 hrs
An examination of selected topics or issues in biology. Topics may differ each time the course is offered. Students should consult the department chair for further information.
Prerequisites: An introductory course in Biology and permission of department chair
Additional Fees: Course fee applies.

CHM-105. Forensic Science. 4 Credits.
LECT 45 hrs LAB 45 hrs
Designed for the non-science major. An introduction to the applications of the physical and biological sciences in analyzing and evaluating physical evidence as related to crime and the law.
Additional Fees: Course fee applies.

CHM-117. Introductory Chemistry Lecture. 3 Credits.
RECI 15 hrs LECT 45 hrs
An introduction to the basic concepts of inorganic, organic and biochemistry. The emphasis is on the relationship of these concepts to physiological chemistry and living systems. All remedial courses listed must be completed prior to taking this course.
Prerequisites: Placement basis or MAT-016 (minimum grade of C) or MAT-026
Additional Fees: Course fee applies.

CHM-118. Introductory Chemistry Laboratory. 1 Credit.
LAB 45 hrs
Laboratory experiments illustrate principles studied in CHM 117 (Introductory Chemistry Lecture).
Prerequisites: Placement basis or MAT-016 (minimum grade of C) or MAT-026
Corequisites: CHM-117
Additional Fees: Course fee applies.

CHM-125. General Chemistry I - Lecture. 3 Credits.
RECI 15 hrs LECT 45 hrs
A study of the fundamental principles of chemistry and their application to chemical reactions. Topics include the structure of the atom, concepts of matter, mass relationships for pure substances and chemical reactions, solutions, electronic structure, the chemical bond, nuclear reactions and gases.
Prerequisites: Placement College Level Math test or MAT-110 (minimum grade of C)
Corequisites: CHM-126.

CHM-126. General Chemistry I - Laboratory. 1 Credit.
LAB 45 hrs
Laboratory experiments illustrate principles studied in CHM-125.
Prerequisites: Placement College Level Math test or MAT-110 (minimum grade of C)
Corequisites: CHM-125
Additional Fees: Course fee applies.

CHM-127. General Chemistry II - Lecture. 3 Credits.
RECI 15 hrs LECT 45 hrs
A continuation of General Chemistry I with emphasis on chemical equilibrium and energy changes in chemical reactions. Also included are acids, bases, buffers, chemical thermodynamics, kinetics, qualitative analysis and electrochemistry.
Prerequisites: CHM-125 (minimum grade of C)
Corequisites: CHM-128.

CHM-128. General Chemistry II - Laboratory. 1 Credit.
LAB 45 hrs
Laboratory experiments illustrate principles studied in CHM-127.
Prerequisites: CHM-125 and CHM-126 (minimum grade of C required for both)
Corequisites: CHM-127
Additional Fees: Course fee applies.

CHM-210. Essentials of Organic Chemistry. 4 Credits.
LECT 45 hrs LAB 45 hrs
This course is the study of the basic principles of structure, reactivity and nomenclature in organic chemistry. The laboratory develops basic work skills in the types of experiments performed in a typical organic chemistry laboratory with emphasis on the safe handling of laboratory chemicals and the proper presentation of experimental results.
Prerequisites: CHM-117 and CHM-118 or CHM-125 and CHM-126 (minimum grade of C for all prerequisites)
Corequisites: ENG-111 or ENG-111CL or ENG-111CW
Additional Fees: Course fee applies.

CHM-212. Biochemistry. 4 Credits.
LECT 45 hrs LAB 45 hrs
An introduction to physiological chemistry. Lectures cover amino acids, proteins, lipids, nucleic acids, carbohydrates, molecular genetics, energetics and metabolic pathways. Lab reinforces concepts covered in lecture. All remedial courses listed must be completed prior to taking this course.
Prerequisites: CHM-117 (minimum grade of C) or CHM-125 (minimum grade of C)
Corequisites: ENG-111 or ENG-111CL or ENG-111CW
Additional Fees: Course fee applies.

CHM-218. Analytical Chemistry - Instrumental Analysis. 4 Credits.
LECT 45 hrs LAB 45 hrs
Spring Semester only. This survey course covers theory and applications of modern instrumentation utilized to solve problems in chemical analysis. Laboratory work involves hands-on experience utilizing instruments such as gas (GC), liquid (HPLC) and ion chromatography; spectrophotometric methods including visible, ultraviolet, infrared (FTIR) and atomic absorption; ICP and other methods, including ion selective electrode methods; and electrophoretic methods including capillary electrophoresis (HPCE). Emphasis is placed on the comparison of methods, the collection and interpretation of laboratory data, technical report writing and record keeping. All remedial courses listed must be completed prior to taking this course.
Prerequisites: ENG-111 or ENG-111CL or ENG-111CW and CHM-127 or equivalent (minimum grade of C)
Additional Fees: Course fee applies.

CHM-229. Internship Work Experience - Chemistry. 3 Credits.
COOP 135 hrs
This comprehensive course provides selected students enrolled in the Chemical Technology or Chemistry Major with job-oriented laboratory training and practical work experience in a paid or unpaid work environment prior to career employment. Students work a minimum of 135 hours. The course requires a detailed description of the proposed internship, workplace attendance, regular communication with the faculty advisor, an oral presentation, a written final report, and a closing interview describing the student's work experience. Students desiring to participate in this experience should make their interest known to the department chairperson by the end of their second semester. This course is a technical elective for Chemical Technology majors and a free elective for Chemistry majors.
Prerequisites: Permission of department chair.

CHM-230. Internship Work Experience - Chemistry 2 Credits. 2 Credits.
COOP 90 hrs
This intermediate-level course provides Chemical Technology or Chemistry majors with career-oriented laboratory training and practical work experience in a paid or unpaid work environment. The course requires a detailed description of the proposed internship, workplace attendance, frequent communication with the faculty advisor, a written final report, and a closing interview describing the student's work experience. Students work a minimum of 90 hours. Chemical Technology majors can take this course as a technical elective and Chemistry majors may take it as a free elective. Students desiring to participate in this experience should make their interest known to the department chairperson by the end of their second semester.
Prerequisites: Permission of department chair.

CHM-231. Organic Chemistry I - Lecture. 3 Credits.
LECT 45 hrs
This course is an introduction to the chemistry of carbon compounds.Topics include a study of the fundamental concepts of structure and stereochemistry, physical properties of organic compounds and a functional approach to the interpretation of organic reactions. This course is designed for majors in Biology, Chemistry, Pharmacy, and for students preparing for medical, dental and veterinary schools.
Prerequisites: CHM-127 (minimum grade of C) and CHM-128 (minimum grade of C)
Corequisites: CHM-232 and ENG-111 or ENG-111CL or ENG-111CW.

CHM-232. Organic Chemistry I - Laboratory. 1 Credit.
LAB 45 hrs
This course performs laboratory experiments to illustrate principles taught in CHM 231, which stress techniques involved in the analysis, synthesis, and purification of typical organic compounds.
Prerequisites: CHM-127 (minimum grade of C) and CHM-128 (minimum grade of C)
Corequisites: CHM-231 and ENG-111 or ENG-111CL or ENG-111CW
Additional Fees: Course fee applies.

CHM-233. Organic Chemistry II - Lecture. 3 Credits.
LECT 45 hrs
A continuation of the study of organic compounds with further study of functional groups, reaction mechanisms including nucleophilic substitution and elimination reactions, and infrared and nuclear magnetic resonance spectroscopy. All remedial courses listed must be completed prior to taking this course.
Prerequisites: CHM-231 (minimum grade of C) and CHM-232 (minimum grade of C)
Corequisites: CHM-234.

CHM-234. Organic Chemistry II - Laboratory. 1 Credit.
LAB 45 hrs
Laboratory experiments involve the multi-step synthesis of organic compounds, which illustrate the principles of CHM-233, using macroscale and microscale techniques. All remedial courses listed must be completed prior to taking this course.
Prerequisites: CHM-231 (minimum grade of C) and CHM-232 (minimum grade of C)
Corequisites: CHM-233
Additional Fees: Course fee applies.

CHM-235. Independent Study in Chemistry. 3 Credits.
LECT 45 hrs
This course is an opportunity for selected students to participate in independent research under close supervision of a Chemistry faculty member. Interested students should make their interest known early in the prior semester to the department chair who will detail the criteria for selection.
Prerequisites: Permission of department chair
Additional Fees: Course fee applies.

CHM-236. Internship Work Experience - Chemistry Credits. 1 Credit.
COOP 45 hrs
This introductory course offers interested students enrolled in the Chemical Technology or Chemistry Major with preprofessional laboratory training and practical work experience in a paid or unpaid work environment prior to career employment. The course requires a detailed description of the proposed internship, workplace attendance, frequent communication with the faculty advisor, and a written final report describing the student's work experience. Students desiring to participate in this experience should make their interest known to the department chairperson by the end of their second semester. Students work a minimum of 45 hours.
Prerequisites: Permission of department chair.

CHM-295. Special Topics in Chemistry. 4 Credits.
LECT 45 hrs LAB 45 hrs
An examination of selected topics or issues in chemistry. Topics may differ each time the course is offered. Students should consult the department chair for further information.
Prerequisites: An introductory course in Chemistry and permission of department chair
Additional Fees: Course fee applies.

CHM-296. Special Topics in Chemistry. 3 Credits.
LECT 45 hrs
An examination of selected topics or issues in chemistry. Topics may differ each time the course is offered. Students should consult the department chair for further information.
Prerequisites: An introductory course in Chemistry and permission of department chair.

MAT-006. Elements of Algebra. 0 Credits.
RECI 15 hrs LECT 30 hrs
Elements of Algebra integrates the fundamental operations of arithmetic and introductory Algebra. It is intended for students whose placement examination indicates a need for a review of arithmetic and basic Algebra skills. Topics include operations on whole numbers, fractions, decimals, percent and signed numbers, linear equations and inequalities in one variable, operations on polynomials, factoring, integer exponents, and graphing. The course incorporates a Support Lab where students will receive personal assistance with problems or questions assigned as homework to supplement the lectures.
Prerequisites: Appropriate score on a placement test or High School transcript evaluation (Multiple Measures) for recent graduates - Must be completed prior to taking this course.
Additional Fees: Course fee applies.

MAT-007. Foundations of Algebra. 0 Credits.
LECT 30 hrs
This course integrates selected topics of arithmetic and introductory algebra, including operations on whole numbers, fractions, decimals, percent and signed numbers, linear equations and inequalities in one variable, operations on polynomials, factoring, integer exponents, and graphing. Students are required to complete a series of laboratory assignments, which are designed to reinforce concepts based on the placement test results.
Prerequisites: Appropriate score on a placement test or High School transcript evaluation (Multiple Measures) for recent graduates - Must be completed prior to taking this course.

MAT-009. Basic Mathematics Ia. 0 Credits.
LECT 15 hrs
Three (3) hours per day for one week. This is an intensive one-week review of topics typically found on the computation placement test. A passing grade satisfies the Basic Mathematics requirement.
Prerequisites: Appropriate score on a placement test.

MAT-00B. Prereq Albegra 1A. 3 Credits.
LECT 45 hrs
Awardrd by taking college placement test.

MAT-00R. Prereq Elem Alg. Recitation. 0 Credits.
LECT hrs
Awarded by taking the college placement test.

MAT-010. Basic Algebra 1A. 0 Credits.
LECT 15 hrs
This is an intensive review of topics typically found on the basic algebra placement test. A passing grade satisfies the Basic Algebra requirement.
Prerequisites: Appropriate score on a placement test.

MAT-016. Intermediate Algebra. 0 Credits.
LECT 45 hrs
A second-level preparatory algebra course designed to prepare students for credit-level mathematics courses. Covered are selected topics, including systems of linear equations, polynomials, factoring, rational expressions, radicals and solving quadratic equations.
Prerequisites: MAT-006, MAT-007 MAT-010 or High School transcript evaluation (Multiple Measures) for recent graduates - Must be completed prior to taking this course.

MAT-026. Intermediate Algebra Express. 0 Credits.
RECI 15 hrs LECT 15 hrs
This is an intensive review of Intermediate Algebra in an express format (an alternative to MAT-016) designed for students who require a second-level preparatory Algebra before taking college level Mathematics courses. Covered are selected topics including systems of linear equations, polynomials, factoring, rational expressions, radicals and solving quadratic equations
Prerequisites: Appropriate score on a placement test or appropriate multiple measures placement.

MAT-110. College Algebra. 3 Credits.
LECT 45 hrs
An intensive course designed to prepare students for mathematics courses such as Calculus with Applications to Business and Economics and Precalculus. It covers selected algebra topics including exponents; rational expressions; polynomials, radicals, relations and functions; exponential and logarithmic functions, systems of equations.
Prerequisites: MAT-016, MAT-026 (grade C or better) or equivalent - Must be completed prior to taking this course.
Additional Fees: Course fee applies.

MAT-113. Applied Calculus. 4 Credits.
LECT 60 hrs
A study of topics which provides a basis for continuing courses in mathematics and the physical sciences. This course includes trigonometric, exponential and logarithmic functions; analytic geometry; differentiation and integration.
Prerequisites: MAT-110 or MAT-123 or equivalent
Additional Fees: Course fee applies.

MAT-114. Introduction to Data Science. 3 Credits.
LECT 45 hrs
Introduction to Data Science will provide students with data literacy skills in order to understand techniques in data manipulation, visualization and interpretation. This project based course will allow students to utilize a toolkit of statistical software to perform data science methods. Ethical issues related to data privacy, authenticity and security will be addressed alongside an introduction to artificial intelligence.
Prerequisites: MAT-016 or MAT-120 or equivalent.

MAT-117. Mathematical Analysis for Business and Economics. 3 Credits.
LECT 45 hrs
Mathematical topics used in business and economics with emphasis on applications. Covered are polynomials, linear and quadratic models, systems of equations, matrix algebra, and linear programming including the Simplex Method.
Prerequisites: MAT-016, MAT-026 (grade of C or better) or equivalent- Must be completed prior to taking this course.
Additional Fees: Course fee applies.

MAT-118. Calculus With Application to Business And Economics. 3 Credits.
LECT 45 hrs
A course covering functions, derivatives and integration, with special consideration of applications to the business and economics areas. Partial differentiation is introduced.
Prerequisites: MAT-110 (grade of C or better) or equivalent
Additional Fees: Course fee applies.

MAT-120. Mathematics for Liberal Arts. 4 Credits.
LECT 60 hrs
A course addressed to liberal arts students. Topics include the history of mathematics, probability, statistics, geometry, number theory, algebra, graphs and functions, and a choice of selected topics.
Prerequisites: MAT-006, MAT-007, MAT-010 or equivalent-Must be completed prior to taking this course.
Additional Fees: Course fee applies.

MAT-123. Precalculus. 4 Credits.
LECT 60 hrs
An intensive one-semester course to prepare students for Analytic Geometry and Calculus, including absolute values; relations; functions; equations; inequalities; polynomial, rational, trigonometric, inverse trigonometric, exponential and logarithmic functions; trigonometric equations and identities; and graphs.
Prerequisites: MAT-110 (grade of C or better) or equivalent
Additional Fees: Course fee applies.

MAT-124. Statistics. 3 Credits.
LECT 45 hrs
The fundamental principles of statistical methods. Descriptive statistics, correlation, regression, probability, binomial and normal distributions, sampling, elementary hypothesis testing, confidence intervals and ethical issues in statistics are included.STUDENTS WILL ONLY RECEIVE CREDIT FOR EITHER MAT-124 OR MAT-130.
Prerequisites: MAT-016, MAT-026, MAT-120 or equivalent-Must be completed prior to taking this course.
Additional Fees: Course fee applies.

MAT-130. Probability and Statistics. 4 Credits.
LECT 60 hrs
The fundamental principles of statistical methods. Descriptive statistics, correlation, regression, probability, binomial and normal distributions, sampling, hypothesis testing, confidence intervals and ethical issues in statistics are included. An introduction to the use of statistical software to analyze data will be emphasized.
Prerequisites: MAT-016, MAT-060 or MAT-120 or equivalent
Additional Fees: Course fee applies.

MAT-131. Analytic Geometry and Calculus I. 4 Credits.
LECT 60 hrs
The first semester of a three-semester sequence. Analytic geometry in the plane, differentiation and applications, and integration are covered.
Prerequisites: MAT-123 (grade of C or better) or equivalent - Must be completed prior to taking this course.

MAT-132. Analytic Geometry and Calculus II. 4 Credits.
LECT 60 hrs
A continuation of Analytic Geometry and Calculus I, which covers the calculus of inverse trigonometric functions, methods of integration, analytic geometry in the plane including polar coordinates and conic sections, hyperbolic functions, sequences and series, and parametric equations.
Prerequisites: MAT-131 (grade of C or better) or equivalent.

MAT-140. Math for Radiographers. 1 Credit.
LECT 15 hrs
This course discusses the math skills that are crucial in the healthcare environment. It teaches the basis measurements, calculations, percents, ratios, and proportions, scientific notation, metric conversions, basis algebraic principles and basic geometric principles used in Radiology. It reviews whole numbers, fractions, decimals and exponents. Radiology units and numeric prefixes are also discussed.
Prerequisites: MAT-016 or MAT-026 and admission to the Radiography program - Must be completed prior to taking this course.
Corequisites: RAD-100, RAD-104 and RAD-107.

MAT-183. Probability and Statistics Honors. 4 Credits.
LECT 60 hrs
An introduction to the principles of statistical methods. The course will integrate spreadsheet software to cover such topics as descriptive statistics, correlation, regression, probability, binomial and normal distributions, sampling, elementary hypothesis testing and confidence intervals. This course will also cover ethical issues in statistics. Comprehensive case studies will be covered throughout the semester. An introduction to the use of statistical software to analyze large data sets will be emphasized. GPA of 3.3 or higher, CCM Honors student or permission of CCM Honors is required to take this course.
Prerequisites: Permission of department chair or honors advisor
Additional Fees: Course fee applies.

MAT-221. Internship Experience - Quantitative An alysis (45-100 Hours). 1 Credit.
COOP 45 hrs
This course provides students with job training and practical experience in a work environment prior to permanent employment, amounting to between 45-100 hours in duration. Students will gain experience working with industry partners and developing both technology and soft skills required to work in a quantitative discipline such as a mathematician, statistician, or data scientist. Students will engage in the data science process that should consist of quantitative or statistical analysis in an industry setting. Students desiring to participate in this experience should make their intention known to the Department Chairperson or the Faculty Coordinator prior to the beginning of semester.
Prerequisites: CMP-131 or MAT-114 or MAT-130 or permission from department Chairperson.

MAT-222. Internship Experience - Quantitative Ana lysis (90-200 Hours). 2 Credits.
COOP 90 hrs
This course provides students with job training and practical experience in a work environment prior to permanent employment, amounting to between 90-200 hours in duration. Students will gain experience working with industry partners and developing both technology and soft skills required to work in a quantitative discipline such as a mathematician, statistician, or data scientist. Students will engage in the data science process that should consist of quantitative or statistical analysis in an industry setting. Students desiring to participate in this experience should make their intention known to the Department Chairperson or the Faculty Coordinator prior to the beginning of semester.
Prerequisites: CMP-131 or MAT-114 or MAT-130 or permission from department Chairperson.

MAT-223. Internship Experience - Quantitative Ana lysis (135-300 Hours). 3 Credits.
COOP 135 hrs
This course provides students with job training and practical experience in a work environment prior to permanent employment, amounting to between 135-300 hours in duration. Students will gain experience working with industry partners and developing both technology and soft skills required to work in a quantitative discipline such as a mathematician, statistician, or data scientist. Students will engage in the data science process that should consist of quantitative or statistical analysis in an industry setting. Students desiring to participate in this experience should make their intention known to the Department Chairperson or the Faculty Coordinator prior to the beginning of semester.
Prerequisites: CMP-131 or MAT-114 or MAT-130 or permission from department Chairperson.

MAT-225. Discrete Mathematics. 4 Credits.
LECT 60 hrs
This is a 4-credit course in discrete mathematics. It is offered to math & computer science majors in their first two years of study. The course outline shows it is an exposition of real-world and modern mathematics. Discrete Mathematics covers a breadth of unique topics in number theory, graph theory, set theory, probability and statistics, and propositional logic.
Prerequisites: MAT-131
Additional Fees: Course fee applies.

MAT-228. Linear Algebra. 3 Credits.
LECT 45 hrs
Selected topics including matrices and determinants, vectors and vector spaces, linear transformations, eigenvalues and eigenvectors, with applications from a variety of disciplines.
Prerequisites: MAT-131 (grade of C or better) or equivalent.

MAT-230. Calculus III. 4 Credits.
LECT 60 hrs
A continuation of Analytic Geometry and Calculus II which includes analytic geometry in three dimensions, functions of several variables, partial derivatives, multiple integrals, vectors and an introduction to vector analysis.
Prerequisites: MAT-132 (grade of C or better) or equivalent.

MAT-232. Differential Equations. 3 Credits.
LECT 45 hrs
Ordinary differential equations and methods of solution. Introduction to classical equations and their solutions, with some applications to geometry, physics and engineering.
Prerequisites: MAT-132 (grade of C or better) or equivalent.

MAT-244. Ordinary Differential Equations. 4 Credits.
LECT 60 hrs
A course in methods for solving ordinary differential equations. Introduction to classical equations and their solutions, physical applications, Laplace Transforms, numerical solutions, and Fourier Series.
Prerequisites: MAT-132 (grade of C or better) or equivalent.

MAT-ELE. Mathematics Elective. 3-4 Credits.
LECT 45 hrs
Pseudo course holder for Stu Planner.