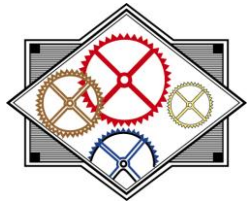
SCIENCE DEPARTMENT


Arts & Communications


Business, Management Marketing & Technology


Health Science


Engineering/Manufacturing & Industrial Technology


Human Services


Natural Resources & Agriscience

VPAA – Meets Visual, Performing & Applied Arts Requirement
OLE – Meets Online Learning Experience Requirement
GR/MMC – Meets Graduation Requirements based on Michigan Merit Curriculum
SMR – Senior Math Related

BIOLOGY I – D020 **REQUIRED CLASS** 9, 10 1.0 credit

Biology I follow the Michigan Merit Curriculum as determined by the MI Department of Education. Students develop science literacy through inquiry, application of knowledge and reflection. Students delve into the wonders of the science of life through lecture, labs and other hands-on activities. This course aims to provide students with the information and perspective

BIOLOGY II (GR/MMC) – D030 11, 12 1.0 credit

PREREQUISITE: Passed Biology I, Enrolled or Passed Chemistry or Physics, and science teacher recommendation.

This course is a laboratory class designed to develop, through direct experience, an understanding of how science works. Students are taught to utilize their backgrounds in biology while using the scientific method to investigate and solve problems. In-depth study of the following areas form the basis for many laboratory activities: cell processes, genetics, and behavior. (A chapter on reproductive health is included in the textbook. If parents wish to review this material, they may do so by contacting the school.)

AP BIOLOGY (OLE) (GR/MMC) – D040 11, 12 1.0 credit

PREREQUISITE: Passed Biology I, Enrolled or Passed Chemistry or Physics, and science teacher recommendation.

Advanced Placement Biology is an introductory college level biology course. The curriculum, textbook and laboratory activities are equivalent or similar to those used in college. Students may earn college credit by successful achievement on the AP exam as determined by College Board. The course aims to provide students with the conceptual framework, factual knowledge and analytical skills necessary to deal critically with the rapidly changing science of biology. Any student interested in the medical field or just interested in the science of life should enroll in this course.

PHYSIOLOGY (OLE) (GR/MMC) – D050 11, 12 .5 credit

Physiology is the study of the structure and function of the human body. Emphasis is on normal homeostasis and imbalances that lead to disease. This is a lab-based course, with many hands-on activities that generate interest among students. All students can benefit by knowing how their bodies function and how disease impacts lives. This course is especially recommended for those interested in health care.

ENVIRONMENTAL SCIENCE (OLE) (GR/MMC) – D060 11, 12 .5 credit

Environmental science explores Earth's natural systems, as well as how human activity affects the environment; students will apply the scientific method to investigate natural flows of chemicals, water and energy in terrestrial, aquatic, and atmospheric systems, and how humans impact these natural flows and systems. Students will learn methods for helping to make Earth a sustainable environment through stewardship and sound science. Students will be encouraged to discuss environmental problems and concerns through current events, projects and laboratories.

PHYSICAL SCIENCE (OLE) (GR/MMC) – D070 9 1.0 credit

Physical Science develops the concepts and applications of chemistry and physics. The course is designed to include laboratory experiences and to integrate with other disciplines.

EARTH SCIENCE (OLE) (GR/MMC) - D080 10, 11, 12 1.0 credit

PREREQUISITE: One year of science

This course studies the interrelationships of astronomy, oceanography, geology, environmental problems and meteorology. It is recommended for students who have a desire for a better understanding of earth science. Laboratory experiences are stressed.

CHEMISTRY – D130 **REQUIRED CLASS** 10, 11, 1.0 credit

PREREQUISITE: Algebra I or equivalent math course with a recommended grade of "C" or better.

This class deals with the composition of materials and the changes that they may undergo. The concepts, laws, and theories explaining the properties and behavior of elements and compounds are discussed. Laboratory experiences are an essential part of this course. This college prep class focuses on a broad spectrum of chemistry topics that include: Atomic Theory, Nuclear Chemistry, Organic Chemistry, Naming, The Periodic Table, Bonding, Reactions, Thermochemistry, Acid Base Chemistry, States of Matter, Kinetics and Equilibrium.

HONORS CHEMISTRY (OLE) (GR/MMC) (SMR) – D140 10, 11, 12 1.0 credit

PREREQUISITE: Science teacher recommendation (strong math skills essential).

This accelerated class of lecture and laboratory deals with the composition of materials and the changes that they may undergo. The concepts, laws, and theories explaining the properties and behavior of elements and compounds are discussed. A quantitative approach to atomic and molecular structure and its relationship to the properties of matter is provided. Laboratory experiences are an essential part of this course. Chemistry should be taken by all college-preparatory students who are considering careers in science, engineering, or medicine.

AP CHEMISTRY (OLE) (GR/MMC) (SMR) – D160 11, 12 1.0 credit

PREREQUISITE: Science teacher recommendation and successful completion of Chemistry

AP Chemistry is a college level chemistry course. This course differs qualitatively from the usual first secondary school course in chemistry with respect to the kind of textbook used, the topics covered, the emphasis on chemical calculations and mathematical formulation of principles, and the kind of laboratory work done by the students. For some students, an AP Chemistry courses enables them to undertake, as freshmen, second-year work or to register for courses in other fields where general biology, chemistry, and physics is a prerequisite. For other students, the course fills the laboratory science requirement and frees time for other courses.

ANALYTICAL CHEMISTRY (OLE) (GR/MMC) – D180 11, 12 .5 credit

PREREQUISITE: One year of chemistry

Also called Forensic Science, this is a lab-based CSI course. Chemistry, biology, earth science, and physics are combined to solve mysteries and answer questions brought into a court of law. As we learn the concepts of forensic science, students are required to apply what they have learned to the unique circumstances of a crime situation. The level of sophistication that forensic science has brought to criminal investigations is awesome. Once all the drama of a forensic science case is put aside, what remains is an academic subject emphasizing science and technology.

In this semester course, students will become more familiar with blood, fingerprints, hair and fibers, drugs and poisons, and human remains. This course is available to juniors and seniors who are currently enrolled in chemistry or have had chemistry.

ORGANIC CHEMISTRY (GR/MMC) – D190 11, 12 .5 credit

PREREQUISITE: Passed on year of chemistry with a "C" or better

This is a semester class for those students who have successfully completed chemistry or AP Chemistry. Organic Chemistry is usually a second year college class and typically a "weeder" course. This semester class will cover the fundamentals of organic chemistry that are taught in a first semester college organic course. Topics include but are not limited to: Structure and Bonding, Polar Covalent Bonds, Acids and Bases, Stereochemistry, Nomenclature, and Reactions. Organic Chemistry is needed for many science related majors and opens the doors to many careers in medicine, research, nursing, animal science, dietary science, engineering, pharmacy, forensics etc.

PHYSICS (OLE) (GR/MMC) (SMR) – D210 11, 12 1.0 credit

This class deals with the natural world of matter and energy. Areas of physics covered include: classical mechanics, electricity & magnetism, waves, sound, optics, and nuclear physics. Conceptual knowledge of physics and physics problem solving will be assessed with homework, labs and tests. An understanding of Algebra is necessary for success in the class; any trigonometry needed should be covered in the class. The course is strongly recommended for college bound students. Recommended that students take co-current with Algebra II or higher.

HONORS PHYSICS (OLE) (GR/MMC) (SMR) – D220 11, 12 1.0 credit

This is an accelerated first year physics class that also covers the natural world of matter and energy. Concepts are covered in more depth along with additional topics in modern physics (i.e. relativity, quantum mechanics, and string theory). The mathematics required is more rigorous than that of regular physics. Extensive laboratories are performed with in depth analysis. This course is strongly recommended for college bound students planning to study in a STEM program. Recommended that students take co-current with Algebra II or higher.

AP PHYSICS C – MECHANICS (GR/MMC) – D235 12 1.0 credit

PREREQUISITE: Successful completion of a first year Physics

A.P. Physics C – Mechanics similar to a college-level, calculus-based physics course. It is to be taken following first year algebra-based physics. The class is devoted to fundamental topics in classical Newtonian mechanics. The amount of calculus necessary for success is taught in the class. Students coming out of the courses should have a strong conceptual understanding of physics and well-developed skills in performing and analyzing laboratory experiments. They should also be able to apply their understanding to approach and solve problems that are essentially new to them. College based labs are included in the instruction and a variety of statistical analysis techniques are used. This is a very rigorous academic class which challenges students' intellect as well as their work ethic. It is most beneficial for those going into engineering or any science/mathematics related field.

AP PHYSICS (OLE) (GR/MMC) (SMR) – D240 11, 12 1.0 credit

PREREQUISITE: Science teacher recommendation and successful completion of Physics

AP Physics is a college level physics course. It is to be taken following first year algebra-based physics. The majority of the class is devoted to fundamental topics in classical physics and is mainly focused on calculus-based Newtonian mechanics. The calculus necessary for success is taught in class. Other areas that may be covered, depending on time constraints, are fluid mechanics, waves, thermodynamics, and electricity and magnetism. College based labs are included in the instruction and a variety of statistical analysis techniques are used. This is a very rigorous academic class which challenges students' intellect as well as their work ethic. It is most beneficial for those going into engineering or any science/mathematics related field.

ASTRONOMY (OLE) (GR/MMC) – D250 11, 12 .5 credit

PREREQUISITE: Two years of science (Biology I must be one of the two requirements)

Astronomy is a branch of science dealing with that part of the universe which lies beyond the Earth's atmosphere. The course addresses the location, motion and nature of the objects in space. Topics of study include the universe, the evolution of our solar system, the laws of nature, and the past, present, and future of the space program.

ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE (OLE) (GR/MMC) – D270 11, 12 1.0 credit

Advanced Placement Environmental Science is a full-year, elective course for students with a strong interest in environmental science. Students will be challenged to analyze and interpret data and apply concepts to the solution of environmental problems. In addition, students will learn more about the environment in which they live in and the effect of man on the environment. Laboratory investigations will also be included to enhance the students' understanding of the concepts developed.

ACCELERATED CHEMISTRY – AC (UCMST) (GR/MMC) – D800 9 1.0 credit

Accelerated Chemistry is an integrated laboratory-based course investigating the chemical concepts of atomic and molecular structure, and properties of matter and stoichiometry as they relate to inorganic and organic chemistry. There a full research component in which students will investigate and present a topic of interest using methods consistent with science professionals

BIOCHEMISTRY AND FOUNDATION OF RESEARCH (UCMST) (GR/MMC) – D810 10 1.0 credit

Biochemistry and Foundation of Research is the application of advanced chemical concepts as they relate to biological themes. The curriculum integrates organic chemistry, microbiology, and biochemistry topics with human physiology and genetics. There is a full research component in which students will develop their own experiment and include research to back up claims. Experimental data is evaluated and presented using methods consistent with science professionals.

ACCELERATED ADVANCED BIOLOGY – AC (UCMST) (GR/MMC) – D820 10 1.0 credit

PREREQUISITE: Successful completion of MST Accelerated Chemistry

MST Advanced Biology is designed to provide students opportunities for scientific inquiry as they develop foundational biological concepts. The course emphasizes the chemistry of biology at an organismal and cellular level while allowing students to coordinate laboratory skills with knowledge that can be utilized to pursue chosen research projects. Major topics of study include bio-energenics and cellular reproduction to illustrate how living things obtain and utilize free energy for growth, maintaining homeostasis, and for reproduction. Genetics, protein synthesis and DNA replication emphasize the means by which living systems store information, retrieve information and transmit information. Bio-geochemical cycles and cellular communication explore means by which biological systems interact. Evolution and natural selection are examined as the primary forces creating life's diversity and its unity. The Advanced Biology curriculum is integrated with Foundations of Research. These two classes are foundational as preparation for AP Biology and AP Chemistry.

ADVANCED PLACEMENT PHYSICS B (UCMST) (GR/MMC) – D830 11 1.0 credit

Knowledge of algebra and basic trigonometry is required for the course; the basic ideas of calculus may be introduced in connection with physical concepts, such as acceleration and work. Understanding of the basic principles involved and the ability to apply these principles in the solution of problems is one of the major goals of the course. Consequently, the course will utilize guided inquiry and student-centered learning to foster the development of critical thinking skills. This course includes topics in both classical and modern physics. Newtonian mechanics, fluid mechanics, thermal physics, electricity, magnetism, waves and optics, are the major topics covered. This course will also include a hands-on laboratory component comparable to introductory college-level physics laboratories, student-conducted laboratory investigations representing a variety of topics covered in the course. Each student will complete a lab notebook or portfolio of lab reports.

ADVANCED PLACEMENT BIOLOGY (UCMST) (OLE) (GR/MMC) – D840 12 1.0 credit

Advanced Placement Science topics are offered in biology, chemistry and physics. These courses are offered as preparation for the Advanced Placement Examinations, but provide an excellent, exciting opportunity for mastery and in-depth coverage of interesting science topics even if students do not choose to take the AP exam. Seniors elect two of the three subject areas. Integrated within each of these topic areas are opportunities for independent senior research projects.

ADVANCED PLACEMENT CHEMISTRY (UCMST) (OLE) (GR/MMC) (SMR) - D850 12 1.0 credit

Advanced Placement Science topics are offered in biology, chemistry and physics. These courses are offered as preparation for the Advanced Placement Examinations, but provide an excellent, exciting opportunity for mastery and in-depth coverage of interesting science topics even if students do not choose to take the AP exam. Seniors elect two of the three subject areas. Integrated within each of these topic areas are opportunities for independent senior research projects.

ADVANCED PLACEMENT PHYSICS C MECHANICS (UCMST) (OLE) (GR/MMC) (SMR) – D860 12 1.0 credit

This course will utilize guided inquiry and student centered learning to foster the development of critical thinking and problem solving skills. Introductory differential and integral calculus will be used throughout the course. Newton's laws of motion; work, energy and power; systems of particles and linear momentum; circular motion and rotation; and oscillations and gravitation will be the major topics of study. This course will also include a hands-on laboratory component comparable to introductory university-level physics laboratories, student-conducted laboratory investigations representing a variety of topics covered in the course. Each student will complete a lab notebook or portfolio of lab reports.