



## Course Descriptions for Academy Mathematics

### **Magnet Advanced Algebra – 1 year**

*Prerequisite: Algebra I*

This course is designed to continue the study of topics treated in Algebra I. New topics include complex numbers, fundamental concepts of analysis, of algebraic and transcendental functions, and analysis of conic sections, sequences and series. Graphing calculators are used extensively to enhance the understanding of realistic applications through mathematical modeling and to aid in the investigation and study of functions, equations, and inequalities.

### **Magnet Geometry – 1 year**

*Prerequisite: Magnet Advanced Algebra*

This course is designed to provide a sequence of topics, which ensures thorough treatment of standard geometry skills and concepts. Opportunities are provided for the students to gain an appreciation of the structure of geometry, to develop powers of spatial visualization, and to appreciate the need for clarity and precision of language in mathematics. The course develops the logic of geometry, helping students to justify conclusions based on geometric definitions, theorems and postulates. In addition to the development of geometry, the course includes trigonometry, constructions, and coordinate geometry.

### **Magnet Precalculus I – 1 semester**

*Prerequisites: Magnet Advanced Algebra and Magnet Geometry*

This course is designed to prepare the student for Advanced Placement Calculus. Topics of study include sequences and series, trigonometry, limits, continuity, and mathematical induction. Graphing utilities are used extensively to enhance the understanding of realistic applications through mathematical modeling and to aid in the investigation and study of functions, equations and inequalities.

### **Magnet Precalculus II – 1 semester**

*Prerequisite: Magnet Precalculus I*

This course is designed to prepare students to work with algebraic and transcendental functions represented in a variety of ways: graphical, numerical, analytical, or verbal. Connections will be made among these representations. Topics include polar and parametric equations, the binomial theorem, vectors, and an introduction to calculus.

### **Magnet Data Analysis – 1 semester (Weighted Course)**

*Prerequisites: Magnet Precalculus I & II*

Students study problems of statistics in society. Topics include experimental design, sampling, probability, hypothesis testing, simulation, and experimentation with chaotic phenomena. Experiences with appropriate microcomputer software and graphing calculators are included. Students who enroll in this class may not also enroll in AP Statistics.

## Course Descriptions for Academy Mathematics (*Continued*)

### **Magnet Mathematical Modeling – 1 semester (Weighted Course)**

*Prerequisites: Magnet Precalculus I & II*

Students are introduced to the world of applied mathematics through the study of the process of mathematical modeling. This process which connects mathematics to the real world, involves four steps: 1) identification of a "real world" problem, 2) the reduction of the problem to an equation or mathematical model, 3) the performance of a mathematical solution, and finally, 4) the interpretation of the solution within the context of the problem. An appreciation for the power and beauty of mathematics is pursued through the application of mathematical modeling to a variety of problems including, but not limited to, political science, economics, sports, ecology, biological and physical sciences.

### **Magnet Multivariable Calculus – 1 semester (Weighted Course)**

*Prerequisite: AP Calculus BC*

Differential and integral calculus of several variables are the focal points of this college-level course, which extends the AP Calculus BC experience to three dimensions, including three-dimensional analytic geometry.

### **Magnet Differential Equations – 1 semester (Weighted Course)**

*Prerequisite: AP Calculus BC*

Students study various methods (classical, inverse differential operators, LaPlace transforms, and power series) to solve many types of differential equations such as: first order, second and higher order linear equations with constant coefficients, systems of linear equations, and special linear equations with variable coefficients.

### **Magnet Computer Architecture – 1 semester (Weighted Course)**

*Prerequisite: AP Computer Science*

Students apply structured programming techniques and data structures learned in AP Computer Science as they explore the internal organization of advanced computer systems. Programs are designed to reinforce basic curriculum objectives with an emphasis on program development in an Intel Microprocessor environment. Students write programs on various computer systems in Object Oriented Java, as well as C++ and assembly language. Interfacing between the low-level assembly language programs and high level C++ and Java will be emphasized.

### **Other recommended math courses:**

**AP Statistics**

**AP Computer Science**

**AP Calculus AB OR: AP Calculus BC**



OCEAN LAKES HIGH SCHOOL  
**MATHEMATICS & SCIENCE ACADEMY**



## Course Descriptions for Academy Science

### **Magnet Chemistry – 1 year (9<sup>th</sup> grade)**

*Prerequisite: Algebra I*

This course emphasizes the composition, structure, properties, and reactions of matter. Inductive laboratory investigations are introduced which demonstrate the empirical foundation of chemical theory. Algebra is used extensively in problem solving. Students are required to take the Chemistry End-of-Course SOL test.

### **Magnet Molecular Biology – 1 year (10<sup>th</sup> grade: Weighted Course)**

*Prerequisite: Magnet Chemistry*

This course includes topics typically taught in a college-level biology course. It emphasizes the study of the cell, its structure and function, its chemical composition, and its genetic expression. Inquiry-based laboratory investigations, field studies, experimental techniques with technological applications and research projects are employed to foster student analysis of biological issues and their interdisciplinary implications in a changing technological society.

### **Magnet Physics – 1 year (11<sup>th</sup> grade: Weighted Course)**

*Prerequisites: Magnet Chemistry, Magnet Molecular Biology, and Magnet Advanced Algebra*

This course covers mechanics, thermodynamics, electricity and magnetism, waves and optics, and modern physics. These fundamental topics are investigated conceptually, mathematically and experimentally, including inductive laboratory experiences. Algebra and trigonometry are used extensively in problem solving. Technology appropriate to the learning process is chosen including computer simulations, Internet access, and graphing calculator techniques. Technological applications of physical principles are emphasized throughout. Students may opt to take AP Physics B to meet the program requirements, if the coordinator grants permission to do so.

### **Magnet Human Anatomy – 1 semester (Weighted Course)**

*Prerequisites: Magnet Chemistry and Magnet Molecular Biology*

This course explores topics and laboratory experiences in human anatomy: major body systems, histology, cytology and system interactions. Inquiry-based laboratories, practical hands-on experiences under controlled conditions, and research projects are included. Current developments in medicine, allied health careers, and anatomical research are significant parts of the program.

### **Magnet Human Physiology – 1 semester (Weighted Course)**

*Prerequisite: Magnet Human Anatomy*

This course explores the form and function of the human body's parts, separately or synergistically. Topics include human gross physiology, human cellular physiology, and human molecular physiology. Inquiry-based laboratories, experimental design and application, research projects, and current developments in physiology are used to increase student understanding of related issues and their relationship with human health and development.

## Course Descriptions for Academy Science (*Continued*)

### **Magnet Astronomy – 1 semester (Weighted Course)**

*Prerequisite: Magnet Precalculus*

This course is designed to give students an in-depth understanding of the universe. The course is focused on organizing facts into logical hypothesis, testing that hypothesis, and coming up with a feasible conclusion. The course requires investigating new and historical astronomy, utilizing the newest technology, and the use of deductive reasoning. This course is designed for students interested in mathematics, physics, earth processes, and of course, astronomy.

### **Magnet Meteorology – 1 semester (Weighted Course)**

*Prerequisites: Magnet Chemistry and Magnet Physics*

In this course students use the scientific method to explain the natural aspects of the Earth's atmosphere. Students explore how and why the Earth's atmosphere is constantly changing and relate these changes to weather forecasting. Topics include: composition and structure of the atmosphere, interrelationships among energy, temperature and heat, seasonal and daily variations, atmospheric physics, wind patterns, and weather systems.

### **Magnet Analytical Chemistry – 1 semester (Weighted Course)**

*Prerequisite: Magnet Chemistry*

This course introduces students to qualitative and quantitative techniques used in the science laboratory. The course covers the techniques of titration, gravimetric analysis, and qualitative analysis and gives students extensive practical exposure to these techniques in the laboratory. The course introduces the student to basic statistical data analysis and the use of spreadsheet applications in data analysis. It gives students interested in the fields of chemistry, biology, medical and health studies and research, agriculture, and chemical and biological engineering a foundation on which to build and prepares them for college requirements in these fields.

### **Magnet Organic Chemistry – 1 semester (Weighted Course)**

*Prerequisite: AP Chemistry*

This course introduces students to the chemistry of carbon compounds. The course covers the basic structures and reactions associated with organic chemistry. The course is laboratory based, emphasizing the basic quantitative and qualitative procedures used in organic chemistry. Students interested in future pursuits in fields of biology, chemistry, medical and health studies and research, agriculture, and chemical engineering will want to take this course as a foundation for college courses.

### **Magnet Microbiology – 1 semester (Weighted Course)**

*Prerequisite: Magnet Molecular Biology*

Through an extensive inquiry-based laboratory course, students examine how the field of microbiology has developed from its beginnings to its current high-tech state. Topics include: fundamentals of microbiology, metabolism, growth and genetics of microbes, infectious diseases, and environmental and applied microbiology.

## Course Descriptions for Academy Science (*Continued*)

### **Magnet Biochemistry – 1 semester (Weighted Course)**

*Prerequisites: Magnet Chemistry, Magnet Molecular Biology, and AP Chemistry*

Through an intensive inquiry-based laboratory course, students will integrate the concepts of chemistry with the biological basis of life to fully understand the foundation of life at the molecular level. This course emphasizes the study of carbohydrates, lipids, proteins, nucleic acids and their role in metabolic functions.

### **Magnet Physical Geology – 1 semester**

*Prerequisite: Magnet Chemistry*

Students use the scientific method to explain the natural processes of the Earth. They explore how and why the Earth's interior and exterior are constantly changing and relate these changes to major geological issues. Topics include: classifying and identifying rocks and minerals, geological processes, plate tectonics, weathering and erosion, geologic and topographic maps, and geological timeline.

### **Other recommended science courses:**

**AP Chemistry**

**AP Physics C**

**AP Biology**

**AP Environmental Science**

***SPECIAL NOTE:*** *Weighted courses have college-level objectives, textbooks, and supplementary materials.*



## Course Descriptions for Academy Technology

### **Magnet Foundations of Technology – 1 semester (Required Course)**

Magnet Technology Foundations is designed as the beginning high school course in technology education. Students acquire foundations in technological material, energy and information, applying processes associated with the technological thinker. Laboratory activities engage the student in creating new ideas and innovations, building systems and analyzing technological products to learn why and how technology works. The course provides students with essential core strategies for acquiring and using technological knowledge.

### **Magnet Electrical Engineering – 1 semester**

*Prerequisite: Magnet Foundations of Technology*

This course is designed for those individuals interested in electronics and microcomputer troubleshooting. Students study, design and construct electronic circuits. These circuits are interfaced with a computer and controlled using Q-basic programming. Students disassemble and reassemble microcomputers while identifying and solving computer problems, performing preventative maintenance and resolving conflicts between hardware and software.

### **Magnet Multimedia Communications – 1 semester**

*Prerequisite: Magnet Foundations of Technology*

This course provides students with the ability to document research and make presentations. A multimedia approach is utilized through 3ds Max software to introduce students to three-dimensional design. The class focuses on the fundamental principals of building mathematical models in three-dimensional space. The course enables students to tie in with other disciplines like math, science, and engineering. It will give students in chemistry the ability to animate cell division and other chemical reactions. Students in engineering will have the ability to add motion and action to machines.

### **Magnet Materials of Science – 1 semester**

*Prerequisite: Magnet Foundations of Technology*

Students do background research and experiment with solid state (engineering) materials. The scope of the research includes the chemical and physical properties of polymer, metal, ceramic and composite materials. Students utilize a wide array of technologies related to the application of engineering materials. A research journal is used to record data from research and experiments. The students utilize this information as they solve design problem abstracts.



## Course Descriptions for Academy English

### **Magnet Honors English – 1 year (9<sup>th</sup> Grade)**

The Magnet Honors English 9 course focuses on developing the students' critical and analytical skills. The course is organized around four strands: oral language, reading/literature, writing, and research. Students will develop an oral presentation based upon a scientific, mathematical, or technological career. Included in the report will be charts and graphs based on the data collected. Within the reading/literature strand, emphasis is placed upon nonfiction, specifically biographies, journal articles and formal and informal essays related to science, math, technology, art, music, culture, and social changes. A particular focus of the writing and research strands is the writing of two short research papers, one of which relates to a scientific, mathematical, or technological career. All instructional activities will encourage students to establish and make connections across the disciplines.

In addition, this course provides an in-depth study of the five genres focusing on attitude, tone, and perspective; the epic form; the development of drama; the devices of satire; and the elements of nonfiction.

The students will continue to experience the writing process with an emphasis on essay writing. Based on the study of the rhetoric of language, the students will write for a variety of audiences and purposes. Writing assignments will include personal narratives, dialogues, poetry, essays, scripts, and research. The study of grammar, usage, and mechanics is integrated with student writing.

### **Magnet Honors English – 1 year (10<sup>th</sup> grade)**

The Magnet Honors English 10 course focuses on further developing the students' critical and analytical skills while providing a literary perspective on man and his relationship to the universe. The course is organized around four strands: oral language, reading/literature, writing, and research. Within the oral language strand, small groups of students will prepare and present a grant proposal. Within the reading/literature strand an emphasis is placed upon science fiction and how it either predicts or reflects the history of major scientific and technological advances; and emphasis is placed upon nonfiction, specifically primary and secondary accounts of individuals and their contributions throughout the history of math, science, and industry. A particular focus of the writing and research strand is critical biography.

All instructional activities will encourage students to establish and make connections across the disciplines.

In addition, students will respond to literature by examining several universal questions: "Who am I?" "Who are we?" "Why are we here?" "What do we yearn to find?" "Why do we struggle?" "Where are we going?" They will gain new insights into themselves as they discuss open-ended questions and varying perspectives.

Students will develop a style, expressing more precisely their increasingly complex thoughts. From multiple points of view they will write with greater economy and clarity of a variety of audiences and for diverse purposes. Elements of syntax, usage, and mechanics become integrated with the reading, writing, and discussion activities.

## Course Descriptions for Academy English (*Continued*)

### **Honors English 11 or AP English: Language and Composition – 1 year**

*Prerequisite: Magnet Honors English 10*

#### **Honors English 11**

The honors program is organized into thematic and historical units through which students strengthen their critical thinking skills by extensive discussion and writing activities. The literature studied is taken from core texts and selected paperbacks and is comprised of British classics. Students write for diverse audiences and purposes. Emphasis is placed on the writing of literary analysis, fully documented research reports, and commentaries on novels, plays, and poems.

**OR:**

#### **AP English: Language and Composition**

This is a college-level course designed in accordance with the requirements of the College Board. Through this course, the students become skilled readers of prose written in a variety of periods, disciplines, and rhetorical contexts, and learn to become flexible writers who can compose in a variety of modes and for a variety of purposes. The writing assignments include expository, analytical, and argumentative essays. As the students read, they become aware of how authors from different periods and disciplines match their rhetorical choices to particular aims. The course culminates in the Advanced Placement examination given in May of each year. Students who enroll in this course should have command of standard English grammar.

### **Honors English 12 or AP English: Literature and Composition – 1 year**

*Prerequisite: Honors English 11 or AP English: Language and Composition*

#### **Honors English 12**

The honors program is organized into thematic and historical units through which students strengthen their critical thinking skills by extensive discussion and writing activities. The literature studied is taken from core texts and selected paperbacks and is comprised of British classics. Students write for diverse audiences and purposes. Emphasis is placed on the writing of literary analysis, fully documented research reports, and commentaries on novels, plays, and poems.

**OR:**

#### **AP English: Literature and Composition**

This is a college-level course designed in accordance with the requirements of the College Board. This course involves intensive study of numerous authors, genres, and historical periods. Extensive composition and discussion require students to demonstrate their sensitivity to the language and structure of a piece of writing as well as to develop their own power and precision in organizing and expressing thoughts. The course culminates in the Advanced Placement examination given in May of each year.