Advance Program for Young Scholars
2021 Course Descriptions

Information about the Admissions Policy and Eligibility Requirements can be found on pages 6 - 7.

ALGEBRA 1

This course will serve as a foundation for students' higher-level math courses. In Algebra I, students learn skills and concepts that are necessary for subsequent math courses. The pace will be fast, and expectations will be high. The course will cover material comparable to what is seen in a traditional high school classroom, closely matching the academic standards posted by the Louisiana Department of Education. Daily activities will include lectures/discussions of topics, independent/group activities to practice concepts, feedback from the instructor and teaching assistant, and MathXL assignments.

Students completing this course will be able to use their algebra and critical thinking skills to model real life situations through a variety of tools. Topics to be covered will include linear equations and inequalities in one and two variables, solving systems of equations, functions and transformations, quadratic equations, zeros and factors of polynomials, exponents and exponential functions, piecewise-defined functions, and rational expressions and equations. ***Admission Requirements:*** *To view our Admissions Policy visit http://advance.nsula.edu/eligibility/.*

ALGEBRA 2

In this course, students will engage in an in-depth study of functions. Quadratic, polynomial, rational, radical, exponential, periodic, and logarithmic functions will be explored graphically and algebraically. Conic sections, matrices, and parametric equations will also be introduced. Algebra 2 emphasizes mathematics as a language through which real world problems will be addressed, analyzed, and solved. A graphing calculator, preferably a TI-83 or TI-84 Plus, is required for this course. ***Admission Requirements:*** *Visit http://advance.nsula.edu/eligibility/ to view our Admissions Policy. Students must have completed algebra 1 and geometry in school or at ADVANCE.* ***Note:*** *This course may be eligible for articulated college credit at Northwestern State. See Articulation Agreement under Academics.*

ARCHITECTURE: FROM BUILDING TO BIOSPHERE

Architects and landscape architects are licensed design professionals who examine, imagine, and create the spaces and structures all around us in today's world. This applied STEAM course emphasizes visual, written, and verbal communication through a rigorous variety of assignments and projects. In recent years, the design of the physical world, the visual arts, and the digital world have become increasingly intertwined in design career paths. Find out how history, technology, art, materials science, and ecology all impact the planning and design of the built environment. Discover how hands-on and digital skill sets bring ideas to life. We will learn about the rich legacy of design and regional planning in Louisiana- Native American settlement, French and Spanish heritage, the Army Corps, and the possible futures of the Mississippi River. Studio project sessions will introduce students to the design college standards of instruction, presentation, and experimentation. The instructor is an award-winning, licensed design practitioner with 6 years of professional experience and has studied and worked in Louisiana, New York, and abroad. ***Admission Requirements:*** *To view our Admissions Policy visit http://advance.nsula.edu/eligibility/. Previous enrollment in an art class and/or geometry will be helpful, not required.* ***Note:*** *Projects may be used to supplement college admissions portfolios.*

BIOLOGY

What are some properties of living matter that separate it from non-living matter? Are all physical and chemical reactions the same inside vs. outside of a living matter? Can we take control of these physical and chemical reactions so that we can become "faster, higher, stronger"? What other factors may contribute to the properties of living things? If you want to know the answers to some or all of these questions, enroll in biology. This course will help participants build upon a foundation of life's defining characteristics and use analytical skills to develop an in-depth appreciation of fundamental principles of biology through stimulating classroom

instruction, hands-on experience, as well as social activities. Topics to be covered will include: cells and cellular components, genes and their role in life, diversity of life forms and evolution, anatomy and physiology, and basic tools to explore biological systems. By taking this course, participants will expand their scientific knowledge base as they make connections across concepts and become more informed citizens by exploring current events through a scientific lens. Laboratory work will be an integrated part of the class, including conducting experiments and analyzing the results. ***Admission Requirements:*** *To view our Admissions Policy visit http://advance.nsula.edu/eligibility/. Students must have completed algebra 1 in school or at ADVANCE.* ***Lab Fee:*** *There is an additional $50 lab fee for this course that must be included with the final payment.* ***Note:*** *This course may be eligible for articulated college credit at Northwestern State. See Articulation Agreement under Academics.*

BRAIN AND BEHAVIOR BUFFET - 2B BUFFET: WHERE WE SERVE AUTHENTIC PSYCHOLOGY

Psychology is the science of behavior and mental processes. To understand the psychology of human beings, the students will be learning some physiology first, including brain structure and function, five senses and function, Endocrine system, and how drugs affect both physiology and psychology of human beings.

The Brain and Behavior Buffet course (2B Buffet) is designed to trigger students' minds with questions about who are they, how do they behave, why do they behave in a certain way, can they change their behavior, can they change their personality, can they learn new things easily, and can they memorize material quickly? 2B Buffet will serve the students with a special menu of topics including the brain, human nature, state of consciousness, motivation, emotion, learning, memory, intelligence, personality, human development, psychological disorders, and therapies. 2B Buffet will be spiced by classic psychology experiments, fields of psychology, and research in psychology. 2B Buffet will be incomplete if students will not taste three different kinds of dessert; how to relax, how to have hope, and how to be positive! ***Admission Requirements:*** *To view our Admissions Policy visit http://advance.nsula.edu/eligibility.* ***Note:*** *This course may be eligible for articulated college credit at Northwestern State. See Articulation Agreement under Academics.*

CHEMISTRY

Have you ever wondered how a car battery works? What makes a plastic cup different from one made of glass? Where helium balloons go when they float away? Why baking soda and vinegar combine into a volcano, but baking powder just makes a mess?

These questions and more can be answered through the science of chemistry. From reactions to electrochemistry, from gas laws to molecular structure, students will learn and apply the equivalent of a year-long sequence in chemistry through both written assignments and lab work. Major topics covered will include: chemical nomenclature and structure, the periodic table and periodic trends, reaction classification and stoichiometry, ideal gases and intermolecular forces, and nuclear, thermo-, and electrochemistry. Additionally, students will practice practical knowledge and skills for science disciplines, such as unit conversions, scientific notation, and significant figures, both as lecture topics and applications in a variety of laboratory sessions. ***Admission Requirements:*** *Visit http://advance.nsula.edu/eligibility/ to view our Admissions Policy. Students must have completed algebra 1 and either physical science or biology in school or at ADVANCE.* ***Lab Fee:*** *There is an additional $50 lab fee for this course that must be included with the final payment.* ***Note:*** *This course may be eligible for articulated college credit at Northwestern State. See Articulation Agreement under Academics.*

THE CONSTITUTIONAL CONVENTION AND ERA OF ALEXANDER HAMILTON

In the 1780s the infant United States was on brink of destruction. Economically, politically, and diplomatically weak – the world's "ugly duckling" foundered principally because of the inefficiencies and weakness of the national government. No one recognized the perilous situation more than the Caribbean immigrant, soldier, economist, and founding father Alexander Hamilton. A veteran of the American Rebellion, Hamilton became instrumental in the efforts to give the central government more power. In the spring of 1787 Hamilton and delegates from twelve of the states gathered in Philadelphia and produced a new federal constitution. But was the radical document the best solution for the nation? Did it take power away from the states as well as the people? And where were the protections for individual rights and liberties?

Our class will be not only an extended study of Hamilton but the times he lived in. Why should we study a person who died more than two centuries ago? Can his life and the struggles of the early nation teach us about modern society? Finally, what did the musical *Hamilton* get right and wrong about the gentleman on the ten-dollar bill? The course will combine reading, with classroom lessons, movies, documentaries, and gaming activities. Students will be assigned to play real delegates who attended the 1787 Convention, and role play in discussions based on your representative's background and experience.

Delegates of the states – time is of the essence! Make your way to Philadelphia and prepare to debate the new framework of government. Will you support the new federal union or stay on the side of the confederation? ***Admission Requirements:*** *Visit http://advance.nsula.edu/eligibility/ to view our Admissions Policy.* ***Note:*** *This course may be eligible for articulated college credit at Northwestern State. See Articulation Agreement under Academics.*

CREATIVE WRITING

In Creative Writing, students will be challenged to write daily, producing a body of work that will include poems in numerous styles, and at least one completed short story, as well as personal narratives.

In class the students will be given exercises to stimulate and develop their writing skills and their critical thinking about both writing and reading literature. These exercises and the longer assignments that evolve from them should be enjoyable for any student who likes to write or thinks he or she might have things to say and experiences to communicate. We will use both a poetry text and a fiction text to create a body of shared examples and models, and to analyze and enjoy the craft of exemplary writers. We will spend a lot of time talking about these models and about the work each student produces. Some of our discussion will take place within the framework of a more formal 'workshop,' in which every student will offer critiques of every other student's work. We will explore craft, as well as the more elusive idea of art, and focus on the enrichment of the astonishing human gift of language. We will read aloud to one another, and produce an anthology of work completed in the class. ***Admission Requirements:*** *To view our Admissions Policy visit http://advance.nsula.edu/eligibility/.* ***Note:*** *This course may be eligible for articulated college credit at Northwestern State. See Articulation Agreement under Academics.*

GEOMETRY

The ADVANCE geometry course is designed for students with high interest and ability in mathematics. Students will examine concepts of plane geometry, including definitions, points, lines, planes, angles, triangles, quadrilaterals, polygons, theorems, and postulates associated with those concepts. In addition to the above, students will also study solids such as cylinders, spheres, cones, and polyhedra. Various teaching methods will be used, including instructional technology, so students should have basic computer skills at minimum. Students must bring a scientific calculator with them to ADVANCE (with the capability for calculating sine, cosine, and tangent abbreviated as sin, cos, and tan). A TI-30XIIS is preferred, but any scientific calculator is acceptable. ***Admission Requirements:*** *Visit http://advance.nsula.edu/eligibility/ to view our Admissions Policy. Students must have completed algebra 1 in school or ADVANCE.*

MARVEL COMICS AND FILM STUDIES

This course will provide an introduction to film and Marvel comics of the 1960s to present through an examination of films and TV shows based on Marvel comics, with a focus on comparing the source material to the film adaptations of Marvel Studios, Fox, Sony, and others.

Why have Marvel comics remained so successful for the past six decades? Why are the Marvel Studios films so critically and popularly acclaimed today? Our class will parse answers to this challenging line of inquiry, and students will hone their skills of text-based analysis, criticism, and argumentation.

Through discussion of the texts, as well as critical and creative writing, students will learn and apply aspects of film theory, technique and history, principles of screenwriting, fundamentals of visual composition, and basic features of film and comic storytelling, including some original compositions in both media.

In addition, the course will culminate in a creative, collaborative project of adapting a Marvel storyline to screenplay, including some storyboards and proof-of-concept filming, giving students first-hand experience with the elements they have studied. ***Admission Requirements:*** *To view our Admissions Policy visit http://advance.nsula.edu/eligibility/.* ***Note:*** *This course may be eligible for articulated college credit at Northwestern State. See Articulation Agreement under Academics.*

MYTHOLOGY

The old religions of Greece, Rome, and the Nordic tribes still run through our modern culture. While few still practice these religions, they have left their mark on the names of our months and days of the week, on our ideas of heroism, nobility, and justice, and on the stories of love and family that we create for ourselves now. This course will study the gods, goddesses, heroes, and epics of the Greco-Roman and Norse traditions. We will read them both in their original incarnation and in the adaptations and reinventions of later eras -- from Ovid to Shakespeare to Rick Riordan. And no study of the tales we repeatedly tell ourselves would be complete without a look at German fairy tales, which we will study in a new, more accurate translation of the original folk tales revealing a few fascinating changes the Brothers Grimm made in their versions, especially with their "helpless" princesses. ***Admission Requirements:*** *To view our Admissions Policy visit http://advance.nsula.edu/eligibility/.* ***Note:*** *This course may be eligible for articulated college credit at Northwestern State. See Articulation Agreement under Academics.*

PHYSICS

Why does the Earth orbit the Sun? What causes ocean tides? What is electricity? Physics attempts to explain these and many other questions using only a few basic principles.

The course will cover topics in Mechanics, Electricity, and Magnetism. Specific topics include motion in one and two dimensions, force and Newton's Laws, energy conservation, momentum conservation, torque and rotational motion, periodic motion including springs, static and dynamic charge, circuits, magnetism, optics and properties of light. Students will perform hands-on, inquiry-based lab activities using Pasco® equipment and computer interfaces. Students must bring a graphing calculator, either a TI-83 or TI-84, a ruler and a composition notebook to ADVANCE. ***Admission Requirements:*** *To view our Admissions Policy visit http://advance.nsula.edu/eligibility/. Students must have completed algebra 1 and algebra 2 either in school or at ADVANCE. Geometry is strongly recommended and trigonometry would be helpful, but is not required. Students who have had calculus will be accommodated and thus expected to incorporate calculus into their assignments where appropriate.*

LEARNING PYTHON THROUGH GAME PROGRAMMING

Although this course cannot cover creating PS4 equivalent video games, if you aspire to move from game player to game creator, it all starts with learning the fundamentals of programming and game-programming basics. Python is a language that is easy to learn and introduces graphics from the very beginning. The topics covered will include types, variables, standard I/O, branching, looping, strings, arrays, functions, graphics, and importing files. This course will accept students with no previous programming experience as well as students with some knowledge of a programming language. Students who enrolled in Python at ADVANCE in previous summers can continue incorporating graphics into their programs. We will use a different online text for each level so that all students will be challenged, and no students will be left behind. ***Admission Requirements:*** *Visit http://advance.nsula.edu/eligibility/ to view our Admissions Policy. Students must have completed algebra 1 in school or at ADVANCE.*

THINK LIKE AN ENGINEER

Engineers use math and science to solve problems. From steam engines and steel to catalytic converters and nanomedicine, modern engineers have applied scientific principles to construct reliable industrial processes, build solutions to complex societal and economic problems, and improve the standard of human life to its best in history.

In this course, students will learn to see the world as engineers do: made up of systems that can be understood and problems that can be solved by applying scientific, mathematical, and economic principles. You will learn the basics of those principles and practice problem solving on everything from cooking eggs to building bridges. You will deconstruct everyday items to see how they work (then put them back together!). We will tour Natchitoches' power plant and wastewater treatment facility. And we will discuss engineering successes since the days of the ancient Romans.

By the end of the course, you will have solved problems from the major engineering fields – chemical, mechanical, aerospace, electrical, biological/biomedical, civil, and environmental – and learned how professionals in those fields think. Your curiosity about the world around you will be at an all-time high, and your brain will never be the same! ***Admission Requirements:*** *To view our Admissions Policy visit http://advance.nsula.edu/eligibility/. Students must have completed algebra 1 and geometry in school or at ADVANCE. Chemistry would be helpful, but is not required.*

ADMISSIONS POLICY

All applicants must provide the following documents with their application:

1. A copy of the applicant's most recent report card.

2. A copy of the applicant's most recent state standardized test scores. If scores have been misplaced, many schools provide that information on school transcripts, and transcripts may be submitted to ADVANCE.

Louisiana applicants:

Louisiana applicants who earn LEAP achievement levels of Advanced or Mastery in the subject area that corresponds to the desired ADVANCE class and submit a satisfactory report card will be accepted to the program program.

Louisiana applicants who earn LEAP achievement levels of Basic, Approaching Basic, or Unsatisfactory in the subject area that corresponds to the desired ADVANCE class will be required to submit two examples of outstanding schoolwork, and a teacher must email the ADVANCE office stating why they recommend the student as a candidate for the program.

Texas applicants:

Texas applicants who earn STAAR performance standards of Masters or Meets in the subject area that corresponds to the desired ADVANCE class and submit a satisfactory report card will be accepted to the program.

Texas applicants who earn STAAR performance standards of Approaches or Did Not Meet in the subject area that corresponds to the desired ADVANCE class will be required to submit two examples of outstanding schoolwork, and a teacher must email the ADVANCE office stating why they recommend the student as a candidate for the program.

Applicants from other states:

Contact the ADVANCE office at 318-357-4500 or palmerh@nsula.edu.

FOR STUDENTS WHO HAVE TAKEN AN ACT OR SAT

If applicants have taken an ACT or SAT and their scores meet those shown in the chart below, they may submit those scores along with a copy of their most recent report card with their application. Applicants will be notified if state standardized test scores and teacher recommendations are needed.

The left side of the chart below indicates qualifying scores for students who took an ACT or SAT while in the 7th grade. If students achieve the required scores while in 7th grade, they do not have to retake the test to apply to ADVANCE in future years.

The right side of the chart indicates qualifying scores for students who took an ACT or SAT while in 8th – 11th grades.

Students qualify for specific courses based on their scores on subsections of the ACT or SAT. For example, *Students who submit ACT scores and wish to enroll in a math, science, or technology course at ADVANCE should qualify with either their ACT math or science score. Students who wish to enroll in a humanities course should qualify with either their ACT English or reading score.

**Students who submit SAT scores and wish to enroll in a math, science, or technology course at ADVANCE should qualify with their SAT math score. Students who wish to enroll in a humanities course should qualify with their SAT EBRW score.

Abbreviations for the ACT qualifying scores include E = English; M = Math; R = Reading; S = Science.
Abbreviations for the SAT qualifying scores include EBRW = Evidence-Based Reading and Writing; M = Math.

ADVANCE QUALIFYING SCORES	
IF TEST TAKEN IN GRADE 7	IF TEST TAKEN IN GRADES 8, 9, 10, or 11
Students must meet at least one of the following: ***ACT** E > 20 M > 18 R > 20 S > 20 Or a combination of: M > 17 and E > 19 M > 17 and R > 19	Students must meet at least one of the following: ***ACT** E > 22 M > 20 R > 22 S > 22 Or a combination of: M > 19 and E > 21 M > 19 and R > 21
****SAT** EBRW > 510 M > 500	****SAT** EBRW > 540 M > 520