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LSU STEM PATHWAY COURSE CATALOG 2023-24

Course Title	Code	Course Title	Code
Advanced Robotics (LSU Partnership)	150731	Interactive Digital Media Capstone (LSU Partnership)	040245
Pilot: Advanced Film & TV Production (LSU Partnership)	080024	Introduction to Aquaponics (middle school)	Generic
Pilot: Aquaponics Design (LSU Partnership)	TBD	Introduction to Biomedical Sciences (LSU Partnership)	090811
Basic Film & TV Production (LSU Partnership)	080023	Introduction to Computational Thinking (LSU Partnership)	061140
Pilot: Bioinformatics (LSU Partnership)	090813	Introduction to Computing (middle school)	Generic
Biomedical Capstone (LSU Partnership)	090812	Introduction to Engineering Design (LSU Partnership)	110801
Coding for the Web (LSU Partnership)	040244	Introduction to Robotics (LSU Partnership)	150780
Comparative Anatomy & Physiology (LSU Partnership)	312095	Introduction to STEM Pathways and Careers (LSU Partnership)*	061139
Cybersecurity (LSU Partnership)	040217	Motion Graphics	080816
Pilot: Cybersecurity II (LSU Partnership)	TBD	Principles of Engineering (LSU Partnership)	110864
Data Manipulation and Analysis (LSU Partnership)	080532	Programming for Digital Media (LSU Partnership)	040243
Digital Image (LSU Partnership)	080021	Programming for STEM/Engineering (LSU Partnership)	144300
Digital Storytelling (LSU Partnership)	040241	Sound Design (LSU Partnership)	080020
Engineering Design & Development (LSU Partnership)	110861	Step Into STEM (middle school)	Generic
Engineering Economy (LSU Partnership)	144200	Survey of Computer Science*	061179
Pilot: Environmental Sustainability and Management (LSU Partnership)	TBD	Pilot: Survey of Drones (LSU Partnership)	TBD
Forensic Science (LSU Partnership)	312096	Pilot: Video Game Design (LSU Partnership)	080022
Interactive Computing (LSU Partnership)	061180		

*High school course available in middle school (for high school credit)

Modules	Code	Modules	Code
Elementary School STEM Modules	N/A	Middle School STEM Modules	N/A

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Advanced Robotics	
HS Code: 150731	**Dual Enrollment:** No
Suggested Grade Level: 11th or 12th	I**ndustry Based Credentials:** None
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Pre-Engineering **Jumpstart 2.0 Pathways:** N/A
Description:	This course will bring students into the world of competitive robotics. After completing Introduction to Robotics, students who are interested in joining a competition robotics team can join the advanced robotics course. Curriculum will expose students to advanced building and programming techniques suitable for competition. Students are required to attend at least one weekend competition as part of the course.
Student Prerequisite: Introduction to Robotics preferred	**Teacher Prerequisite:** Introduction to Robotics preferred

Advanced Film & TV Production (PILOT)	
HS Code: 080024	**Dual Enrollment:** No
Suggested Grade Level: 10th or above	I**ndustry Based Credentials:** Novac Digital Media Portfolio (A)* *Requires multiple courses to earn
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Digital Design & Emergent Media; **Jumpstart 2.0 Pathways:** Arts, AV Tech & Communication
Description:	This course expands upon the filming and production skills developed in the Basic course. Students will do in-depth projects in various film and television styles (narrative film, video journalism, documentary, broadcast, etc.) and will develop their skills in videography, editing, and production skills to develop a portfolio of video work.
Student Prerequisite: Basic Film and TV required	**Teacher Prerequisite:** Basic Film & TV Production training and/or prior videography/video production experience

Aquaponics Design (High School)	
HS Code: TBD	**Dual Enrollment:** No
Suggested Grade Level: 9th or above	I**ndustry Based Credentials:** None
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Environmental Protection & Sustainability *(Coming 2024-25)* **Jumpstart 2.0 Pathways:** None
Description:	This course serves as an introduction to aquaponics and aquaponic design at the high school level. Students will use problem-based learning to explore how to raise fish and grow various plants in a single system. They will learn about system design and how to engineer system solutions. Students will develop fish and plant management techniques as they learn about water chemistry and plant/ fish needs. They will also gather and utilize data as they research the best parameters for plant/ fish growth and harvest. Students will then harvest the plants and fish and develop a marketing plan for their harvest as they learn food safety skills.
Student Prerequisite: None	**Teacher Prerequisite:** None

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Basic Film & TV Production	
HS Code: 080023	**Dual Enrollment:** No
Suggested Grade Level: 10th or above	I**ndustry Based Credentials:** Adobe Certified Professional - Premiere Pro (B)**,Novac Digital Media Portfolio (A)* *Requires multiple courses to earn **Can be combined with Adobe Photoshop to create (A) credential
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Digital Design & Emergent Media **Jumpstart 2.0 Pathways:** Arts, AV Tech & Communication
Description:	This course serves as an introduction to the filming and production skills required to create audiovisual media in the realm of film and television. Students will learn the differences between various film and television styles (narrative film, video journalism, documentary, broadcast, etc.) and will learn proper videography, editing, and production skills through hands-on projects.
Student Prerequisite: None	**Teacher Prerequisite:** Prior videography/video production experience is beneficial.

Bioinformatics (PILOT)	
HS Code: 090813	**Dual Enrollment:** No
Suggested Grade Level: 11th or 12th	I**ndustry Based Credentials:** None
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Biomedical Sciences **Jumpstart 2.0 Pathways:** Human Service
Description:	This course introduces bioinformatics to high school students, emphasizing searching and retrieving biological data, sorting the data, and finally analyzing the sorted data to draw meaningful conclusions. This course involves hands-on activities and projects on computers/laptops and teaches students how to relate the outcome of each activity to a real-life biological scenario. While moving through this course, students are introduced to cutting-edge bioinformatics resources and tools so that by the end of the course they are prepared to either pursue advanced college-level computational biological studies, or apply the knowledge gained in this course to tackle common bioinformatic tasks at a university-level biology research lab.
Student Prerequisite: None	**Teacher Prerequisite:** None

Biomedical Capstone	
HS Code: 090812	**Dual Enrollment:** No
Suggested Grade Level: 12th	I**ndustry Based Credentials:** None
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Biomedical Sciences **Jumpstart 2.0 Pathways:** Health Sciences
Description:	This course is for seniors in the Biomedical Academy. Students spend time interning for a wide range of biomedically focused local companies, businesses, and organizations. Students in this course will gain work experience and become more familiar with several possible career paths and opportunities available to them so that they can make informed decisions on how to best achieve their biomedical professional goals. It is recommended that students have access to

	their own transportation.
Student Prerequisite: Introduction to Biomedical Science, Comparative Anatomy and Physiology	**Teacher Prerequisite:** None

Coding for the Web	
HS Code: 040244	**Dual Enrollment:** No
Suggested Grade Level: 10th or above	I**ndustry Based Credentials:** CIW JavaScript Specialist (B), Novac Digital Media Portfolio (A)* *Requires multiple courses to earn
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Digital Design & Emergent Media **Jumpstart 2.0 Pathways:** Arts, AV Tech & Comm; Business Management; Information Technology
Description:	Coding for the web is an introductory course focusing on the foundational programming concepts in web development, such as: functions, loops, conditional statements, async functions, lambdas, as well as analyzing and solving problems like a programmer. Though this course uses HTML5, CSS3, JSS, and ES6, this is not a “web design” course. Students will have the skills, knowledge, and experience to create web applets by the end of the course. The main goal of this course is to develop students that have the ability to think critically about how to solve problems using computational thinking and good old-fashioned troubleshooting.
Student Prerequisite: None	**Teacher Prerequisite:**

Comparative Anatomy & Physiology	
HS Code: 312095	**Dual Enrollment:** No
Suggested Grade Level: 9th or 10th	I**ndustry Based Credentials:** None
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Biomedical Sciences **Jumpstart 2.0 Pathways:** Agriculture, Food & Natural Resources; Health Sciences
Description:	This course engages students in rigorous study of the body’s physiological systems and then compares these systems across many species in the animal kingdom (both vertebrates and invertebrates). Course assignments range from formal assessments to hands-on dissections and labs. Additionally, this course places an emphasis on public speaking through scientific presentations and independent research to enhance scientific reading and writing skills. Students will also learn to read and interpret published scientific articles to examine evolutionary relationships between species, making connections that will be built on in later bioinformatics studies.
Student Prerequisite: None	**Teacher Prerequisite:**

Cybersecurity I	
HS Code: 040217	**Dual Enrollment:** No

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Suggested Grade Level: 9th or above	**Industry Based Credentials:** CompTIA IT Fundamentals (B)
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Computing **Jumpstart 2.0 Pathways:** Universal Safety Course
Description:	This course is designed to foster interest in Information Technology and networking careers. Through hands-on projects, students learn to install and administer operating systems, to have computers communicate with each other and to detect and repair vulnerabilities in systems and networks. This course also covers connections of computing and society, including ethics, security, and privacy in on-line communication. Students taking this course will be expected to take the CompTIA IT Fundamentals certification exam.
Student Prerequisite: None	**Teacher Prerequisite:** None

Cybersecurity II		
HS Code: TBD	**Dual Enrollment:** CSC 1011 (LSU E)	**Cr. Hr:** 3
Suggested Grade Level: 11th or above	**Industry Based Credentials:** TBD	
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** TBD **Jumpstart 2.0 Pathways:** TBD	
Description:	Description will be forthcoming.	
Student Prerequisite: Cybersecurity I and BOR and LSU DE eligibility criteria for DE	**Teacher Prerequisite:** Cybersecurity I	

Data Manipulation and Analysis	
HS Code: 080532	**Dual Enrollment:** No
Suggested Grade Level: 10th or above	**Industry Based Credentials:** None
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Biomedical Sciences; Computing; Digital Design & Emergent Media; Pre-Engineering; Cyber.org Cybersecurity **Jumpstart 2.0 Pathways:** Business Management; Health Sciences; Information Tech; Manufacturing; Transportation, Distribution & Logistics
Description:	This course introduces students to the emerging field of Data Science. Instructional units cover the standard practices for effective data manipulation, analysis, and interpretation as well as necessary concepts in the three disciplines involved (mathematics, statistics, and computing.) Numerous examples of typical scenarios are provided. The emphasis on this course is in the application of the concepts rather than the theory. In the second semester, students will work in teams on large projects in which they will use programming to analyze large datasets and create models. The students will summarize their findings for each project in a written report and will also present them orally.
Student Prerequisite: a prior programming course	**Teacher Prerequisite:** prior programming experience

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Digital Image		
HS Code: 080021	**Dual Enrollment:** ART2050 (LSU A&M)	**Cr. Hr:** 3
Suggested Grade Level: 10th or above	**Industry Based Credentials:** Adobe Certified Professional - Photoshop (B)*, Novac Digital Media Portfolio (A)** *Can be combined with Adobe Premiere Pro to create (A) credential **Requires multiple courses to earn	
Tops University Credit: Art	**Jumpstart K-16 STEM Pathways:** Digital Design & Emergent Media **Jumpstart 2.0 Pathways:** Universal Computer Literacy Course	
Description:	This course is based on hands-on training in the use of computer hardware and software to create digital graphics with Photoshop and Illustrator. As the student develops familiarity with these industry standard programs and graphic tools, 2D animation and design projects will be overseen by mentors. The 2D animation partition of the class focuses on rigging, planar tracking, rotoscoping and motion tracking in order to develop seamless continuity of character animation and dynamic set development.	
Student Prerequisite: BOR and LSU DE eligibility criteria apply	**Teacher Prerequisite:**	

Digital Storytelling	
HS Code: 040241	**Dual Enrollment:** No
Suggested Grade Level: 9th	**Industry Based Credentials:** Novac Digital Media Portfolio (A)* *Requires multiple courses to earn
Tops University Credit: Art	**Jumpstart K-16 STEM Pathways:** Digital Design & Emergent Media; **Jumpstart 2.0 Pathways:** Arts, AV Tech & Communication; Business Management; Hospitality and Tourism; Human Service; Information Technology
Description:	This is a project-based learning (PBL) inspired course that utilizes a PBL assessment guide in addition to thoughtful integrated learning. Throughout the course, experimentation, and the practice of storytelling through the lenses of multiple mediums allows students to develop narrative reasoning skills, while simultaneously giving them a realm to be creative and challenged. The course was created in response to the demand from “entertainment” industries for individuals skilled in content creation and transfer of thinking. The purpose of this course is to get our students to become creators rather than just consumers. The course focuses on content creation, specifically in the realms of: Visual, Auditory, Videographic, and Interactive Storytelling. The course also focuses on Digital Literacy, and how to become a responsible denizen. At any point throughout the course, students use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.
Student Prerequisite: None	**Teacher Prerequisite:**

Engineering Design and Development	
HS Code: 110861	**Dual Enrollment:** No

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Suggested Grade Level: 10th	**Industry Based Credentials:** Autodesk Inventor (A)
Tops University Credit: Art	**Jumpstart K-16 STEM Pathways:** Pre-Engineering; **Jumpstart 2.0 Pathways:** Architecture and Construction; Manufacturing
Description:	The primary intent of the course is to provide the student with the skills necessary to understand, interpret, and create engineering drawings and working sketches. The student will learn to create 3D models and engineering drawings using Inventor. In addition to developing spatial reasoning and technical drawing skills, students will work on technical writing skills and certain soft skills through journal article reflections, work ethic lessons, and oral presentations on various topics throughout the semester. The course will culminate with a 6-8 week long final project where students will work on teams to identify a problem, design a unique solution using Inventor, create a prototype on a 3D Printer, and then test the solution.
Student Prerequisite: Preferred concurrent enrollment in Geometry	**Teacher Prerequisite:** None

Engineering Economy		
HS Code: 144200	**Dual Enrollment:** IE3201 (LSU A&M)	**Cr. Hr:** 3
Suggested Grade Level: 11th or 12th	**Industry Based Credentials:** None	
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Pre-Engineering **Jumpstart 2.0 Pathways:** None	
Description:	The Engineering Economy course is designed to teach students about the time value of money, cash flows occurring at different times with different amounts, and equivalence at different interest rates. These concepts will be used to evaluate engineering project proposals using well-accepted economic analysis techniques, such as present worth, future worth, capitalized cost, life-cycle costing, annual worth, rate of return, or benefit/cost analysis. Additionally, techniques such as replacement/retention studies, breakeven analysis, and payback analysis help make informed decisions about future uses of existing assets and systems.	
Student Prerequisite: BOR and LSU DE eligibility criteria apply	**Teacher Prerequisite:** None	

Environmental Sustainability and Management (Pilot)	
HS Code: TBD	**Dual Enrollment:** No
Suggested Grade Level: 9th or 10th	**Industry Based Credentials:** None
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Environmental Protection and Sustainability *(Coming 2024-25)* **Jumpstart 2.0 Pathways:** None
Description:	This course provides an introduction to the economic, social, and environmental aspects of sustainability, including the knowledge and skills needed to provide solutions to combat environmental issues such as coastal erosion and decarbonization, and prepare the workforce needed to implement those solutions. Students will explore the interconnectedness between human infrastructures and natural systems (including the impacts on the environment like the burning of fossil fuels and runoff from fertilizers),

	ecology, resource availability and use, and economic and human impacts. Lastly, students will examine systems in place to promote sustainability and determine their impacts on the ecosystem. This class will utilize inquiry and project-based lessons throughout the curriculum and will include an introduction to field and laboratory techniques.
Student Prerequisite: None	**Teacher Prerequisite:** None

Forensic Science	
HS Code: 312096	**Dual Enrollment:** No
Suggested Grade Level: 10th or 11th	I**ndustry Based Credentials:** N/A
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Biomedical **Jumpstart 2.0 Pathways:** Human Services; Law & Public Safety
Description:	This lab-intensive course allows students to pursue an in-depth study of forensic science as a tool for collecting evidence and crime scene analysis. Areas of study include physical evidence, properties of matter and the analysis of glass, drugs, forensic toxicology, the microscope, forensic serology, DNA, trace evidence, fire investigation, investigation of explosives, fingerprints, ballistics, forensic anthropology, casts and impressions, document examination and computer forensics.
Student Prerequisite:	**Teacher Prerequisite:**

Interactive Computing	
HS Code: 061180	**Dual Enrollment:** No
Suggested Grade Level: 10th or above	I**ndustry Based Credentials:** No
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Computing **Jumpstart 2.0 Pathways:** Arts, AV Tech & Communication; Information Technology
Description:	This course focuses on the nuances of programming for interacting with the real world in two representative areas: autonomous robots and the front end of web applications. Students learn how to iteratively approximate a software model to the realities of the physical hardware, how to write test suites and how to systematically debug their programs. Through fun and engaging projects, the students learn problem solving skills, such as programming robots to navigate mazes and play soccer, developing on-line pages to read sensors and control actuators in greenhouses, and automating devices at home with Internet of Things (IoT) technologies.
Student Prerequisite: a prior programming course	**Teacher Prerequisite:** prior programming experience

Interactive Digital Media Capstone	
HS Code: 040245	**Dual Enrollment:** No
Suggested Grade Level: 11th or above	I**ndustry Based Credentials:** Novac Digital Media Portfolio (A)* *Requires multiple courses to earn

Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Digital Design and Emergent Media **Jumpstart 2.0 Pathways:** Arts, AV Tech & Communication
Description:	Interaction design & experience design incorporating digital media assets with programming to create interactive experiences. This is an advanced projects course to synthesize media and digital storytelling from other production courses into emergent media projects. Capstone Projects are faculty facilitated, student led teams creating a digital media artifact from conception to presentation. Example works might include a 2D or 3D video game; a student-developed social network web application; a movie or animation; interactive informational kiosk for a museum or library; a concert of student-created digital media performances.
Student Prerequisite:	**Teacher Prerequisite:** Prior experience in media production is required, experience with coding is beneficial.

Introduction to Aquaponics (Middle School)	
HS Code: N/A, Use generic MS elective code	**Dual Enrollment:** N/A
Suggested Grade Level: 6th, 7th	I**ndustry Based Credentials:** N/A
Tops University Credit: N/A	**Jumpstart K-16 STEM Pathways:** N/A **Jumpstart 2.0 Pathways:** N/A
Description:	Students will use problem-based learning to explore raising fish and growing plants in the same system then market and sell the product locally. Students will learn the basics of water chemistry and plant/ fish biology, data management, nutrition, food safety and research and development in the process.
Student Prerequisite: None	**Teacher Prerequisite:** None

Introduction to Biomedical Sciences	
HS Code: 090811	**Dual Enrollment:** No
Suggested Grade Level: 9th	I**ndustry Based Credentials:** None
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Biomedical Sciences **Jumpstart 2.0 Pathways:** Agriculture, Food & Natural Resources; Health Science
Description:	This modular course covers a large variety of fields in biomedicine. Each module is designed to take two to three weeks and provide students with opportunities to develop their public speaking and science literacy skills, as well as learn how to cooperate in a group efficiently and professionally. Topics include but are not limited to sports medicine, pharmacology, psychology, nutrition, veterinary medicine, bioinstrumentation, biomedical engineering, forensic anthropology, parasitology, and speech pathology. Modules can be selected based on student interest, availability of potential guest speakers, or timing of field trips.
Student Prerequisite:	**Teacher Prerequisite:**

Introduction to Computational Thinking	
HS Code: 061140	**Dual Enrollment:** No

Suggested Grade Level: 9th	**Industry Based Credentials:** None
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Biomedical Sciences; Computing; Digital Design & Emergent Media; Pre-Engineering; Cyber.org Cybersecurity **Jumpstart 2.0 Pathways:** All except Health Sciences
Description:	This course introduces students to the basic ideas of computational thinking and artistic design, as students create images and learn to utilize the Cartesian plane. Students will use an open source, Web-based programming environment to create code for simple drawings, animations and simulations, through which they learn how to use abstraction, decomposition and pattern recognition to model problems and arrive at an algorithmic solution. Program code is presented with a dual purpose: as the main way to interact with a computer and as a proxy to organize ideas explicitly and communicate them to other people. Many examples are drawn from Algebra I and Geometry, so that students can visualize and manipulate the mathematical concepts in a more concrete form. The creativity and programming of images requires critical analysis, aesthetic awareness, and an understanding of decomposition of complex objects into geometric components. Students are encouraged to develop their own ideas while learning the elements and principles of visual design. Students are also taught the foundations in programming graphics, slideshow animations, and drawing using code. The curriculum of this course focuses on integrating computational thinking into the content areas: Art, English, science, math, and social studies. The course builds cross curricular connections into core disciplines through the techniques of science diagramming, ELA story illustration, recreating historical moments, and photo elicitation to help students explore culture.
Student Prerequisite: None	**Teacher Prerequisite:** None

Introduction to Computing (PILOT)	
HS Code: N/A, Use generic MS elective code	**Dual Enrollment:** N/A
Suggested Grade Level: 6th	**Industry Based Credentials:** N/A
Tops University Credit: N/A	**Jumpstart K-16 STEM Pathways:** N/A **Jumpstart 2.0 Pathways:** N/A
Description:	Students practice basic computer skills and learn about effective use of computer applications through fun and engaging activities. Students are also exposed to age-appropriate computational thinking principles and have opportunities to design and develop animations, games, art, and stories while learning the basics of programming in several kid-friendly platforms.
Student Prerequisite: None	**Teacher Prerequisite:** None

Introduction to Engineering		
HS Code: 110801	**Dual Enrollment:** ENGR1050 (LSU A&M)	**Cr. Hr:** 2
Suggested Grade Level: 9th	**Industry Based Credentials:** None	
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Pre-Engineering **Jumpstart 2.0 Pathways:** Agriculture, Food & Natural Resources; Architecture and Construction; Manufacturing	

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Description:	This course introduces the profession, ethics, and diversity of the field of engineering to students in their freshman year of high school. The course will allow students to explore the 10 primary concentrations within engineering by listening to guest speaker lectures, working on an interactive project with a team, and presenting the results of their project to the class. The majors are: Biological Engineering, Civil Engineering, Environmental Engineering, Chemical Engineering, Computer Engineering/ Electrical Engineering, Computer Science, Construction Management, Industrial Engineering, Mechanical Engineering, and Petroleum Engineering. Specifically, this course will emphasize that the engineer is a team worker who needs strong skills in technical problem solving, engineering design, ethical decision making, and communicating to diverse audiences.

Student Prerequisite: For DE Only: 1. 2.5 High School GPA 2. Counselor Recommendation Form	**Teacher Prerequisite:** None

Introduction to Robotics	
HS Code: 150780	**Dual Enrollment:** No
Suggested Grade Level: 10th	I**ndustry Based Credentials:** None
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Pre-Engineering; Computing **Jumpstart 2.0 Pathways:** Information Technology; Manufacturing
Description:	This beginning robotics course uses VEX EDR Robotics parts and VEXCode software to introduce the student to basic programming as well as problem solving strategies. This course will involve students in the development, building and programming of robots to accomplish various tasks. Students will work hands-on in teams to design, build, program and document their progress. Topics may include motor speed, gear ratios, torque, sensors, program loops, project documentation and decision-making.
Student Prerequisite: None	**Teacher Prerequisite:** None

Introduction to STEM Pathways and Careers	
HS Code: 061139	**Dual Enrollment:** No
Suggested Grade Level: 7th, 8th, or 9th	I**ndustry Based Credentials:** None
Tops University Credit: None	**Jumpstart K-16 STEM Pathways:** Biomedical Science, Computing, Digital Design and Emergent Media, Pre-Engineering; Cyber.org Cybersecurity **Jumpstart 2.0 Pathways:** Universal Basic Career Readiness
Description:	This year-long course is offered to middle school students for high school credit and serves as a universal course elective for the LSU STEM Pathways as well as Jumpstart. The course explores four main pathways of STEM education and possible careers in the fields of 1) Computing and Computer Science, 2) Pre-Engineering, 3) Digital Design and Emergent Media, and 4) Biomedical Sciences. The course exposes students to these overarching concepts: ● To expand awareness of various careers and occupational pathways related to STEM. ● To stimulate the understanding of higher order thinking processes such as the engineering design process, the scientific method, and computational thinking.

	• To develop foundational knowledge and skills in the Jumpstart K-16 STEM Pathways: Jumpstart 2.0 Pathways: and careers as related to STEM, and utilize the knowledge and skills in their current educational setting. • To increase interest in the four core areas of STEM related to this class through project-based activities that are also standards based.
Student Prerequisite: None	**Teacher Prerequisite:** None

Motion Graphics		
HS Code: 080016	**Dual Enrollment:** ART2220 (LSU A&M)	**Cr. Hr:** 3
Suggested Grade Level: 10th or above	**Industry Based Credentials:** Novac Digital Media Portfolio (A)* *Requires multiple courses to earn	
Tops University Credit: N/A	**Jumpstart K-16 STEM Pathways:** Digital Design and Emergent Media **Jumpstart 2.0 Pathways:**	
Description:	This course is based on hands-on training in the use of computer hardware and software to create digital graphics with Photoshop and Illustrator. As the student develops familiarity with these industry standard programs and graphic tools, 2D animation and design projects will be overseen by mentors. The 2D animation partition of the class focuses on rigging, planar tracking, rotoscoping and motion tracking in order to develop seamless continuity of character animation and dynamic set development.	
Student Prerequisite: Digital Image For DE: 3. Min grade of "C-" in ART 2050 4. 2.5 High School GPA 5. Counselor Recommendation Form	**Teacher Prerequisite:** Training in Digital Image	

Principles of Engineering	
HS Code: 110864	**Dual Enrollment:** No
Suggested Grade Level: 10th	**Industry Based Credentials:** None
Tops University Credit: Physical Science	**Jumpstart K-16 STEM Pathways:** Pre-Engineering **Jumpstart 2.0 Pathways:** Agriculture, Food & Natural Resources; Architecture and Construction; Information Technology; Manufacturing
Description:	The course continues to build on the Introduction to Engineering course. Students will spend approximately 3 weeks exploring each discipline through concept lectures and hands-on projects. Through these lectures and projects students will learn concepts such as, but not limited to, electrical circuitry, computer programming on Arduino's, Rube Goldberg machines, biomechanics, and pneumatics/hydraulic systems. Students will work in teams to develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges. Students will also hone their 21st century skills by documenting their work and communicating their solutions to their peers and members of the professional community.
Student Prerequisite: Introduction to Engineering	**Teacher Prerequisite:** Introduction to Engineering Preferred

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Programming for Digital Media		
HS Code: 040243	**Dual Enrollment:** CSC 2700 (LSU A&M)	**Cr. Hr:** 3
Suggested Grade Level: 10th or above	**Industry Based Credentials:** CIW JavaScript Specialist (B), Novac Digital Media Portfolio (A)* *Requires multiple courses to earn	
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Digital Design and Emergent Media **Jumpstart 2.0 Pathways:** Arts, AV Tech & Communication; Information Technology	
Description:	Programming Digital Media introduces a broad array of topics related to digital media through project-oriented programming of graphics, audio, and hardware applications. The motivation for this course is to provide a basic introduction to computer programming using subjects that are relevant or appealing to students who are new to technological fields of study, with little to no prior programming experience. The course is presented in five segments, introducing coding, covering three distinct areas in digital media, plus a final integration project of these areas. There is a strong emphasis on computer programming tasks throughout, and the hands-on exercise of digital media tools in class is required. After an introduction to coding concepts, the first media topic introduces real-time graphics rendering and user interaction. The second introduces sound design. The third introduces basic electronics and physical computing. Finally, communication mechanisms are used allowing the disparate elements of graphics, sound, and hardware to be composed into interactive projects.	
Student Prerequisite: BOR and LSU DE eligibility criteria apply	**Teacher Prerequisite:**	

Programming for STEM		
HS Code: 144300	**Dual Enrollment:** No	
Suggested Grade Level: 11th - 12th	**Industry Based Credentials:** No	
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Computing, Pre-Engineering **Jumpstart 2.0 Pathways:** Information Technology	
Description:	This course expands the practice of software development in a variety of settings, so that students acquire a broad set of programming skills and a deeper understanding of software engineering principles. Students learn to plan, design, and implement relatively large programming projects that require background research and teamwork. Topics include simulations, games, and interactive on-line applications. Robust program design and sound software engineering practices are emphasized throughout the course.	
Student Prerequisite: a prior programming course	**Teacher Prerequisite:** prior programming experience	

Sound Design		
HS Code: 080020	**Dual Enrollment:** MUS 2745 (LSU A&M)	**Cr. Hr:** 3
Suggested Grade Level: 10th or above	**Industry Based Credentials:** Avid Pro-Tools (B)*, Novac Digital Media Portfolio (A)**	

	*LSU course uses Presonus Studio-One software (local company) - currently no IBC. Some strong teachers could teach the course using Pro-tools by Avid which has. a basic credential **Requires multiple courses to earn
Tops University Credit: Art	**Jumpstart K-16 STEM Pathways:** Digital Design and Emergent Media **Jumpstart 2.0 Pathways:** Arts, AV Tech & Communication
Description:	Sound Design introduces students to a broad range of topics and concepts in electronic and computer music. This course covers principles of digital audio, sound design, synthesis, Digital Audio Workstations, and sound art composition. Assignments and activities include listening, analysis, discussion, and hands-on recording and composition exercises.
Student Prerequisite: BOR and LSU DE eligibility criteria apply	**Teacher Prerequisite:**

Step Into STEM	
HS Code: N/A, Use generic MS elective code	**Dual Enrollment:** N/A
Suggested Grade Level: 6th	I**ndustry Based Credentials:** N/A
Tops University Credit: N/A	**Jumpstart K-16 STEM Pathways:** N/A **Jumpstart 2.0 Pathways:** N/A
Description:	Students will use project and problem-based learning to solve challenges related to the 4 main STEM Pathways of Engineering, Biomedical Science, Digital Design, and Computing. As students meet these challenges, they will learn more about various STEM careers as well as learn some of the same skills used in those careers to solve problems. Student solutions are shared with others in the school and local community. Project examples include creating a computer game, designing an outdoor school environment to meet the needs of the school and ecosystem, designing a solution to a flood related problem in the community, and telling a digital story about a cause they are involved with.
Student Prerequisite:	**Teacher Prerequisite:**

Survey of Computer Science	
HS Code: 061179	**Dual Enrollment:** No
Suggested Grade Level: 8th or 9th	I**ndustry Based Credentials:** No
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Computing **Jumpstart 2.0 Pathways:** Information Technology; Law & Public Safety
Description:	This course introduces the basics of computing using fun and engaging activities instead of formally describing the concepts. This course follows the framework of Big Ideas adopted in the AP Computer Science Principles (CSP) course, but it has more emphasis on exploration and experimentation, and less emphasis on problem-solving and formal analysis than a regular CSP course. To prepare students for the rigors of other courses in the Pathways, this course models ways to adopt a productive disposition that fosters creativity and perseverance, with a focus on developing students' interest in computing and identification with the computing professions.

	This course can be taken in middle school for high school credit
Student Prerequisite: None	**Teacher Prerequisite:** None

Survey of Drones (Pilot)	
HS Code: TBA, use 110795 for now	**Dual Enrollment:** No
Suggested Grade Level: 11th or 12th	I**ndustry Based Credentials:** FAA Part 107: Small Unmanned Aircraft Operation (B)
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Pre-Engineering **Jumpstart 2.0 Pathways:** TBD
Description:	This course is designed as a senior capstone course and uses the fundamental skills learned in LSU's pathways pre engineering courses to design, assemble, and program drones for use in indoor racing. Students will learn the fundamentals of frame design, electronics, and programming necessary to design their own drone. Students will work hands-on to design drone parts in Inventor, prototype the parts using a 3D printer, solder the electrical components of the drone, and program the microcontroller all will formally document their progress. Topics may include computer aided design, 3D printing, signal transmission, flight controller programming, motor design, aerodynamics, torque, sensors, project documentation, and racing using first person viewing goggles. We will obtain the FAA Drone pilots license during the first semester. For the second semester, students are broken into teams consisting of a driver, a builder, and a programmer to design their own drones.
Student Prerequisite: None	**Teacher Prerequisite:** None

Video Game Design	
HS Code: 080022	**Dual Enrollment:** No
Suggested Grade Level: 10th or 11th	I**ndustry Based Credentials:** Novac Digital Media Portfolio (A)* *Requires multiple courses to earn
Tops University Credit: Elective	**Jumpstart K-16 STEM Pathways:** Digital Design & Emergent Media; **Jumpstart 2.0 Pathways:** Arts, AV Tech & Communication
Description:	This is a project-based learning (PBL) inspired course that utilizes a PBL assessment guide in addition to thoughtful integrated learning. Video game design requires knowledge and skill in a variety of component areas of study: coding, sound design, storytelling, 2D and 3D graphics, photography, film, game engines. By the end of the course, students will produce a substantial video game experience using the game engine available through the school (the curriculum is geared toward Unity). The purpose of this course is to encourage students to become creators rather than just consumers.
Student Prerequisite:	**Teacher Prerequisite:**

Elementary School STEM Training Modules	
HS Code: N/A	**Dual Enrollment:** N/A

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Suggested Grade Level: Pre-K to 5th	**Industry Based Credentials:** N/A
Tops University Credit: N/A	**Jumpstart K-16 STEM Pathways:** N/A **Jumpstart 2.0 Pathways:** N/A
Description:	The elementary cohort's purpose is to empower teachers with the tools and training they need to effectively engage all students in STEM driven, project-based learning while also meeting their curricular needs. Teachers are trained in project-based STEM modules that are aligned to curricular standards in core content areas or computer science/ digital literacy in the PK-5 levels. The modules can be used in class as stand-alone units, incorporated into current curriculum, or used in before/ after school programs. Modules encourage exploration of and preparation for students to enter the STEM Pathways beginning at the middle school levels and beyond. A list of modules available for the training sessions is linked. Teachers at the Pk-1, 2-3, and 4-5 grade bands will be trained in at least 8 of the available modules for each grade band.
Student Prerequisite: None	**Teacher Prerequisite:** None

Middle School STEM Training Modules	
HS Code: N/A	**Dual Enrollment:** N/A
Suggested Grade Level: 6th to 8th	**Industry Based Credentials:** N/A
Tops University Credit: N/A	**Jumpstart K-16 STEM Pathways:** N/A **Jumpstart 2.0 Pathways:** N/A
Description:	The middle school STEM modules training will provide teachers with the tools and training they need to effectively engage all students in STEM driven, project-based learning while also meeting their curricular needs. Teachers are trained in project-based STEM modules that are aligned to curricular standards in core content areas or computer science/ digital literacy in the 6-8 levels. The modules can be used in class as stand-alone units, incorporated into current curriculum, or used in before/ after school programs. Modules encourage exploration of and preparation for students to enter the STEM Pathways beginning at the middle school levels and beyond.
Student Prerequisite: None	**Teacher Prerequisite:** None