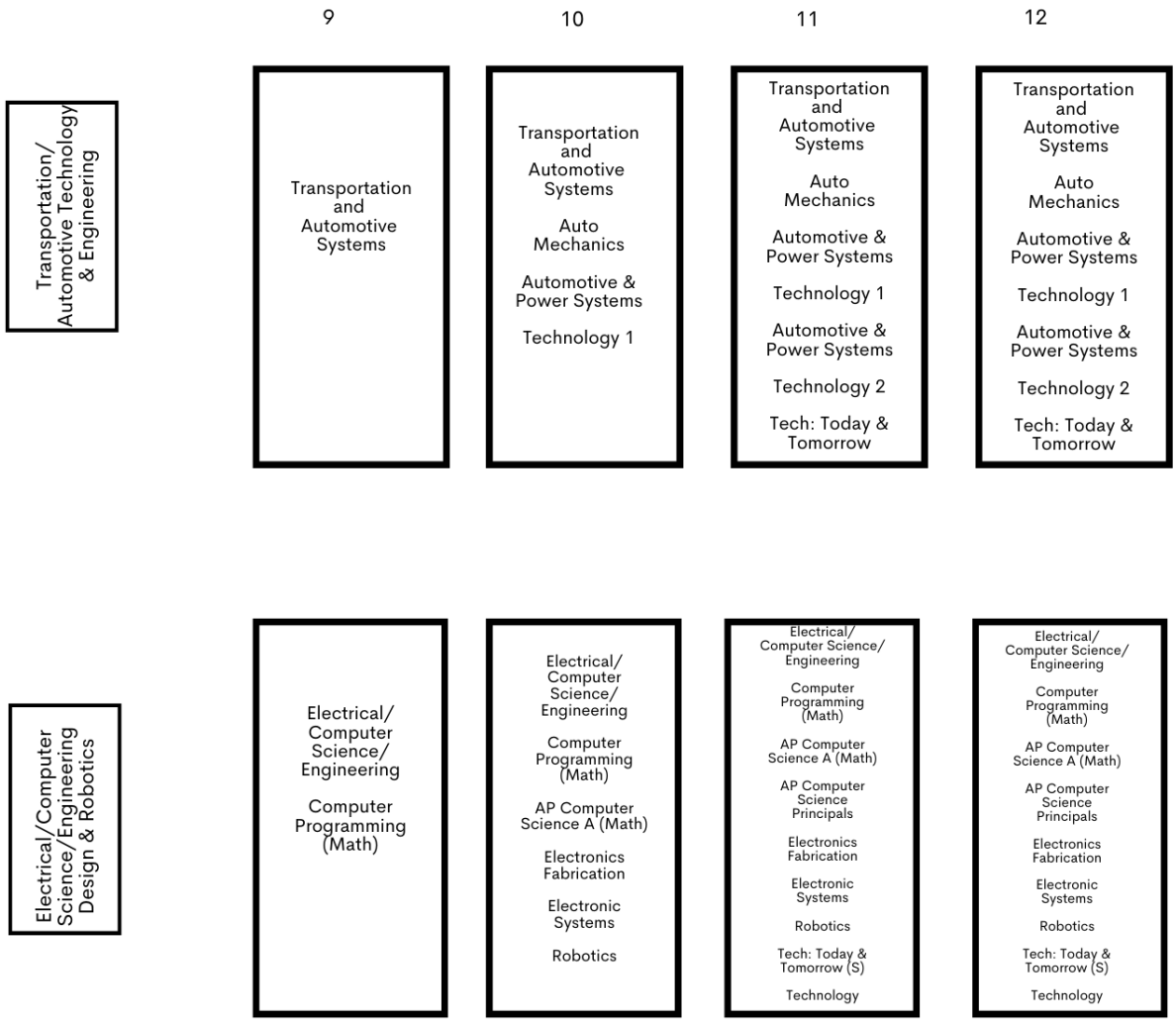
Course Sequence for Technology By Concentration/Areas of Interest*

	9	10	11	12
Engineering/Design (Mechanical)	Technology & Design 1 Intro to CAD	Technology & Design 1 Technology & Design 2 Intro to CAD Engineering & Product Design CAD 2 Robotics	Technology & Design 1 Technology & Design 2 Technology & Design 3 (S) Intro to CAD Engineering & Product Design CAD 2 Robotics Tech: Today & Tomorrow (S)	Technology & Design 1 Technology & Design 2 Technology & Design 3 (S) Intro to CAD Engineering & Product Design CAD 2 Robotics Tech: Today & Tomorrow (S)
Architecture/Civil Engineering	Intro to CAD	Intro to CAD Architecture CAD 2 Interior Design (S	Intro to CAD Architecture CAD 2 nterior Design (S) Engineering & Product Design CAD 2 Tech: Today & Tomorrow (S)	Intro to CAD Architecture CAD 2 nterior Design (S) Engineering & Product Design CAD 2 Tech: Today & Tomorrow (S) Independent Study
Graphic Design	Visual/Graphic Communication 1	Visual/Graphic Communication 1 Visual/Graphic Communication 2	Visual/Graphic Communication 1 Visual/Graphic Communication 2	Visual/Graphic Communication 1 Visual/Graphic Communication 2 Independent Study Production Graphics
Wood Working/ Construction/Stage Theatre	Wood Technology 1 Stage Craft 1 Interior Design (S)	Wood Technology 1 Wood Technology 2 Stage Craft 1 Stage Craft 2 Interior Design (S)	Wood Technology 1 Wood Technology 2 Stage Craft 1 Stage Craft 2 Interior Design (S) Tech: Today & Tomorrow (S)	Wood Technology 1 Wood Technology 2 Stage Craft 1 Stage Craft 2 Interior Design (S) Tech: Today & Tomorrow (S) Independent Study

Course Sequence for Technology By Concentration/Areas of Interest*



Technology Department

TECHNOLOGY & DESIGN 1 (728) **Prerequisite: None.**	**5 Credits** **Full Year** **Grades 9-12**
Through a series of "real-world" contextualized design problems, students will develop the knowledge and skills that will enable them to better understand the connection between science, technology, engineering, and design. Students will develop and apply knowledge and hard/soft skills that will enable them to design, develop, build, test, and present solutions to technological issues in science and technology. This course is highly recommended for students interested in STEM careers, especially mechanical engineering and physical science.	

TECHNOLOGY & DESIGN 2 (729) **Prerequisite: Successful completion of Technology and Design 1 or demonstration of comparable proficiencies.**	**5 Credits** **Full Year Grades 10-12**
Technology and Design 2 provides students with a more in-depth understanding of how engineering/design ideas are generated, proposals developed, models/prototypes/products fabricated, and ideas presented. Students will become familiar with metallic and composite materials, CAD fundamentals, CNC/CAM makerspace tools and machines, control technologies, and the patent process. An emphasis in the class will be on inventions/innovations, and the development of solutions to "real-world" problems and issues. **As a dual enrollment course, students who earn a minimum grade of "C" in this course are eligible to receive dual enrollment credit for Fundamentals of Engineering Design 101 at NJIT.**	

VISUAL/GRAPHIC COMMUNICATIONS 1 (718) **Prerequisite: None.**	**5 Credits** **Full Year** **Grades 9-12**
Visual/Graphic Communications provides students with a comprehensive understanding of the tools, techniques, and processes that allow one to effectively communicate ideas in a variety of visual and graphic modes. Using a "graphic design" approach, students work with a variety of tools including cameras, film scanners, computer software, (Photoshop, Illustrator, InDesign) and printers/presses to produce photographs, page layouts, web page layouts, silkscreen prints, and other printed media.	

VISUAL/GRAPHIC COMMUNICATIONS 2 (738) **Prerequisite: Successful completion of Visual/Graphic Communications 1.**	**5 Credits** **Full Year** **Grades 10-12**
Through a series of hands-on, design-oriented projects, students will become familiar with the Graphic Design process, design-oriented software, and the connection between photography, text layout, advertising, and print media. Students will develop advanced levels of knowledge and proficiency with Adobe Photoshop, Illustrator, and InDesign and use a variety of printing techniques (screen printing, dye-sublimation, etc.) to produce products/design solutions to personal, school, and community problems and situations.	

PRODUCTION GRAPHICS (734) **Prerequisite: Successful completion of Visual/Graphic Communications 2.**	**5 Credits** **Full Year** **Grades 11-12**
Production Graphics focuses on the techniques and processes necessary to design, layout, prepare, and produce print media. Students utilize software (Illustrator, Photoshop, In Design, etc.) to create posters, logos, newsletters, and a variety of other graphic designs. Students will learn about type styles, the process for preparing photographs for publication, and the various ways products are printed (screen printing, offset lithography, etc.). Students are expected to prepare a portfolio of work from the class.	

TRANSPORTATION AND AUTOMOTIVE SYSTEMS (714) **Prerequisite: None.**	**5 Credits** **Full Year** **Grades 9-12**
Transportation and Automotive Systems provides students with an overview of transportation-related technologies and systems. Through hands-on projects and assignments, students will become familiar with the design processes related to various types of vehicles and their impact on the consumer and society. In addition, the course provides students with the basic knowledge needed to maintain automobiles in the 21st century, including the use of contemporary computer-assisted diagnostic equipment. Alternative fueled vehicles and power sources will be covered in the course. Students perform lab assignments on their own vehicle or school-provided cars. Career awareness and consumer knowledge are integrated throughout the course.	

AUTO MECHANICS (724) **Prerequisite: Successful completion of Transportation and Automotive Systems or demonstration of comparable proficiencies.**	**5 Credits** **Full Year** **Grades 10-12**
Auto Mechanics takes students deeper into the workings of today's automotive vehicles. Classroom and lab experiences integrate technical and academic coursework with hands-on lab/shop experiences throughout the year. Students rebuild engines and learn about diagnosing on-board vehicle computer systems. Additional areas of study include: servicing and operation of brakes, electrical/electronic systems, steering/suspension, automatic and manual transmission/transaxles, climate control, and basic body repair/maintenance. Students are encouraged to service their own vehicles or may service school cars.	

AUTOMOTIVE & POWER SYSTEMS TECHNOLOGY 1 (731) **Prerequisite: Successful completion of Transportation and Automotive Systems or demonstration of comparable proficiencies.**	**5 Credits** **Full Year** **Grades 10-12**
This course provides students with the opportunity to delve into current and future automotive and power system technologies that improve or increase performance and/or efficiency. Through classroom and lab experiences that integrate technical and academic coursework with hands-on lab/shop experiences, students will become familiar with electronic/computer control, electric/hybrid drive systems, chassis/suspension design and related "green energy and power" technologies. In addition to basic maintenance and troubleshooting, students will have the opportunity to design, build, test, and evaluate alternative designs and concepts in the energy, power, and transportation/automotive fields.	

AUTOMOTIVE & POWER SYSTEMS TECHNOLOGY 2 (741) **Prerequisite: Successful completion of Automotive & Power Systems Technology 1 or demonstration of comparable proficiencies.**	**5 Credits** **Full Year** **Grades 11-12**
This capstone course will provide students with the opportunity to apply the technical and academic content and lab/work skills related to automotive and power system technologies developed in lower level classes. Students will be challenged to design, develop, fabricate, and maintain automotive and power systems that address a wide range of situations and scenarios, including, but not limited to the Shell Ecomarathon, Solar Decathlon, electric vehicle design, and national competitions related to energy, power, and transportation. Students will also have the opportunity to work on automotive and green energy projects of interest to them.	

INTRODUCTION TO COMPUTER ASSISTED DESIGN (715) **Prerequisite: None.**	**5 Credits** **Full Year** **Grades 9-12**
This course provides students with an introduction to the CAD and rendering softwares used to produce 2 and 3-dimensional drawings of ideas, concepts and solutions. Through a series of hands-on experiences, students will become familiar with the sketching, scale drawing, print reading, visualization, and dimensioning techniques used by engineers, architects and designers. AutoCAD software will be used throughout the course. Students will also be introduced to 3-D printing technology to generate effective prototypes and models of designs. The course will prepare students to specialize in either Architecture CAD 2 ***OR*** Engineering and Product Design in Level 2.	

ARCHITECTURE CAD 2 (735) **Prerequisite: Successful completion of Architecture CAD 1 or demonstration of comparable proficiencies.**	**5 Credits** **Full Year** **Grades 10-12**
Architecture CAD 2 provides students interested in architecture with knowledge and experience related to broad and open-ended design scenarios. The course combines CAD skills learned in Architecture CAD 1 with a series of visualization activities and an overview of the “real world” design process. Students will develop materials that can be used in their college application portfolio. The course will also appeal to students interested in the building trades and interior design.	

ELECTRICAL/COMPUTER SCIENCE ENGINEERING (709) **Prerequisite: None.**	**5 Credits** **Full Year** **Grades 9-12**
Students will become familiar with the soft and hard skills that will lead to success in the electrical/computer science/engineering areas. Through a series of design-related problems focusing on electricity/electronic fundamentals, materials and properties, basic coding, robotics, and radio control, students will become familiar with the engineering design process, documentation techniques, team skills, sketching/rendering, time-management skills, tool and machine safety and use,	

algorithmic thinking, and fabrication/troubleshooting skills. This course provides a solid foundation for AP Computer Science Principles and AP Computer Science A.

ELECTRONIC SYSTEMS (725) **Prerequisite: A minimum grade of C in Electrical/Computer Science/Engineering or demonstration of comparable proficiencies.**	**5 Credits** **Full Year** **Grades 10-12**
Electronics Systems provides students with a comprehensive overview of DC electricity fundamentals and an introduction to digital electronics. Students, through a series of lab experiences and design projects, will become familiar with voltage, current, and power, as well as digital circuit, analysis, design, and application. This course is recommended for students interested in engineering, computers, and/or physics-related careers.	

ENGINEERING & PRODUCT DESIGN CAD 2 (745) **Prerequisite: Successful completion of ENGINEERING & PRODUCT DESIGN CAD 1 or demonstration of comparable proficiencies.**	**5 Credits** **Full Year** **Grades 10-12**
Engineering and Product Design CAD 2 provides students interested in engineering and computer modeling careers with the knowledge and skills to develop intricate computer models/animations of solutions to technological problems. The course combines prerequisite CAD skills with open-ended design scenarios. Included in the course will be the use of CIM and CAM techniques to produce additive and subtractive models. At the conclusion of this course, students will be eligible to sit for the Autodesk Inventor/Fusion badging certificate. **As a dual enrollment course, students who earn a minimum grade of "C" in this course are eligible to receive dual enrollment credit for MET 103 Engineering Graphics & Intro to CAD from NJIT.**	

INDEPENDENT STUDY IN TECHNOLOGY (746, 747) **Prerequisite: A minimum grade of B in one of the specified technology sequences is a good predictor for success in this course or demonstration of comparable proficiencies.**	**5 Credits** **Semester** **Grades 11-12**
This course is offered to students who have successfully completed both Level 1 and Level 2 courses in one of the following areas: Architecture/Engineering CAD, Automotive Mechanics, Technology and Design, Fashion, Visual/Graphic Communication or Woods/Stagecraft. The student must contract with a sponsoring technology teacher in one of the areas specified. The nature and detail of the work to be completed by the student must be mutually agreed upon prior to the beginning of the course. This course is for students who intend to enter design-related competitions and/or develop a college admissions portfolio.	

ROBOTICS (750) **Prerequisite: Successful completion of Technology & Design 1, Electrical/Computer Science/Engineering or demonstration of comparable proficiencies.**	**5 Credits** **Full Year** **Grades 10-12**
This course presents an overview of robotics in practice and includes the following topics: motion planning, mobile mechanisms, sensors, control mechanisms and programming. Students in this	

course will become familiar with electronic, mechanical and pneumatic systems common to robots and the techniques used to program controllers and robots. This class will focus on the application of course topics through the planning, development, programming, and testing of solutions to a series of design problems. Students are expected to participate in a state/national robotics competition as part of the course.

WOOD TECHNOLOGY 1 (717) **Prerequisite: None.**	**5 Credits** **Full Year** **Grades 9-12**
Wood Technology 1 is an introductory course that provides students with the opportunity to learn the skills and processes associated with various types of woodworking. Through hands-on projects that use woodworking tools and techniques, students develop competence with woodworking safety, project planning and layout, basic project construction, joinery, manufacturing production, and construction systems. Students plan and construct projects aligned with their interests and abilities.	

WOOD TECHNOLOGY 2 (727) **Prerequisite: Successful completion of Wood Technology 1.**	**5 Credits** **Full Year** **Grades 10-12**
Wood Technology 2 is an advanced-level course that provides students with the opportunity to expand their woodworking skills through hands-on design and guided instruction. In addition to developing more advanced woodworking techniques, students enhance initial skills acquired in Wood Technology 1. Students develop advanced techniques for laying out and planning projects, constructing projects, performing joinery techniques, and mass-producing products. Students also have the opportunity to be involved in a local construction service project.	

STAGECRAFT 1 (723) **Prerequisite: None.**	**5 Credits** **Full Year** **Grades 9-12**
Stagecraft 1 is intended for students who have an interest in stage/set design and construction and/or lighting/sound management. Students will learn the fundamentals of set/scenery design and theater layout. Students learn how to safely construct scenery and sets and to operate the various types of lighting and sound equipment associated with theatrical productions. After-school participation with school productions is not required for the class.	

STAGE CRAFT 2 (733) **Prerequisite: Successful completion of Stage Craft 1 *or* demonstration of comparable proficiencies.**	**5 Credits** **Full Year** **Grades 10-12**
Stage Craft 2 provides students interested in theater set design and construction and/or theater lighting an opportunity to expand the skills learned in StageCraft 1. Through a series of hands-on design projects, students will acquire the knowledge and skills necessary to manage and organize a production. This course is for the student who has a serious interest in theater arts. After-school participation with school productions is not required for this class.	

AP COMPUTER SCIENCE PRINCIPLES (752) **Prerequisite: None.**	**5 Credits** **Full Year** **Grades 11-12**

AP Computer Science Principles introduces students to the central ideas of computer science and instills the central ideas and practices of computational thinking. The course is designed to be an equivalent of a first semester introductory college computing course and will provide students with an overview of knowledge and practices that will enable students to develop creative computational artifacts and analyze computational data, information or knowledge.

Rather than focus on a specific programming language, this course focuses on using technology and programming in an iterative process similar to what artists, writers, computer scientists, and engineers use to bring ideas to life. Through class instruction and individual, as well as collaborative application of concepts, principles, and understandings to a series of design scenarios/problems, students will develop the language, knowledge, skills, and aptitudes to address computational-related issues.

Major areas of study include: creativity and computing, abstraction, data and information, algorithms, programming, the internet, and the global impact of computing.

TECHNOLOGY & DESIGN 3 (748) **Prerequisite: Successful completion of Technology and Design 2 or demonstration of comparable proficiencies.**	**2.5 Credits** **Semester** **Grades 11-12**

Technology and Design 3 provides students with an opportunity to expand on the concepts and skills developed in Technology and Design 2. The student must contract with a sponsoring technology teacher in Tech and Design. Students will develop and refine technology, design, and engineering skills through the leading/directing of collaborative teams that focus on a local, state, and/or national design scenario, project, and competition. Students in Technology & Design 3 are expected to be deeply committed to a specific project/competition (must be approved by the teacher) and utilize the class to independently research, design, develop, build, test, evaluate, and present their design ideas.

TECHNOLOGY: TODAY AND TOMORROW (751) **Prerequisite: None.**	**2.5 Credits** **Semester** **Grades 11-12**

Technology: Today and Tomorrow is a semester elective for juniors and seniors who want to expand their understanding of how technology shapes and is shaped by culture and society. In an interesting, multi-media manner, with extensive hands-on projects/assignments, this course will provide students with an interactive opportunity to explore the major modern areas of technology, engineering, and design that impact the daily lives of most people and/or promise to do so in the future. Topics in the course include: 1) Tools, Machines, and Materials that Changed the World: From Monster Machines to Nanotechnology, 2) The Evolution of Energy, Power, and Transportation Technologies: Getting Lean and Green, 3) The Evolution of Buildings and Structures: How Tall and Far Can They Go?, 4) The Evolution of Communications: How Computers, Cell Phones, and 3-D Imagery are Changing the World, 5) Space – The Final Frontier: Are <u>You</u> Ready to Go?, 6) Biotechnology and its Impact on Society, 7) The Military and its Role in Technology Transfer, 8) All This Stuff – Where Does It All Go? 9) Big Disasters: Learning from Colossal Engineering Failures, and 10) Amazing Inventions and Inventors.

INDEPENDENT STUDY IN TECHNOLOGY (746, 747) **Prerequisite: A minimum grade of B in one of the specified technology sequences is a good predictor for success in this course or demonstration of comparable proficiencies.**	**2.5 Credits** **Semester** **Grades 11-12**
This course is offered to students who have successfully completed both Level 1 and Level 2 courses in one of the following areas: Architecture/Engineering CAD, Automotive Mechanics, Technology and Design, Fashion, Visual/Graphic Communication or Woods/Stagecraft. The student must contract with a sponsoring technology teacher in one of the areas specified. The nature and detail of the work to be completed by the student must be mutually agreed upon prior to the beginning of the course. This course is for students who intend to enter design-related competitions and/or develop a college admissions portfolio. Students can obtain the application for the Independent Study from their school counselor. The deadline for students to complete the application for an Independent Study is the last day of school in June.	