Course Title	Prerequisite	Credit	Grade Level
Computer Animation and Design	None	0.5	9-12
Drafting and Design 1	None	0.5	9-12
Drafting and Design 2	Drafting and Design 1	0.5	9-12
Architectural Drawing	Drafting and Design 1	1.0	10-12
Machine Shop	Drafting and Design 1	1.0	10-12
Technical Drawing	Drafting and Design 2	0.5	10-12
Technical Mechanics	Machine Shop	0.5	10-12
Quality Control	Technical Mechanics	0.5	11-12
Advanced Computer Animation	Computer Animation and Design	0.5	11-12
Advanced Drafting	Technical Drawing or Architectural Drawing	0.5	11-12

Computer Animation and Design (0.5 credit)

Level: 9-12   Prerequisite: None

Students will develop 3-dimensional designs and environments that they will render and animate for animation development. Projects include environment and logo design, character development, and interior design to produce a virtual room for project environment. Prototyping and modeling techniques for 3D printing are also covered so students can develop a physical character. The final project consists of a rendered animation that ties in audio and video software development to create a 10 second video for advertising and storyline development.

Drafting and Design 1 (0.5 credit)

Level: 9-12   Prerequisite: None

Drafting and Design provides the foundation for careers in engineering, architecture and technology. Knowledge gained in Drafting and Design I is essential to success in technical careers such as engineering and manufacturing. This course will introduce the student to drafting fundamentals, such as equipment usage, freehand lettering, working drawings, dimensioning theory, and an application of various geometric constructions. Drafting techniques emphasize the concepts of shape and size through multi-view and pictorial drawings as they are used in mechanical and architectural drawings. Approximately half of the work is done using computer-aided design equipment (CAD).

Drafting and Design 2 (0.5 credit)

Level: 9-12   Prerequisite: Drafting and Design 1

Students will expand their understanding of mechanical drafting by exploring more concepts within AutoCAD software.   Students will learn to set up prototype drawings, create symbol libraries, develop sectioned views and generate 3D models.   Introduction to 3D printing and CNC machine integration through the export of their designs. With the use of these machines, students will be able to develop any idea into a physical object.

Architectural Drawing   (1.0 credit)
College of DuPage dual credit: ARCH 1101 – Basic Architectural Drawing (2 credit hours) and ARCH 1211 – Basic CADD/AutoCAD (3 credit hours-see introduction for more information)

Level: 10-12   Prerequisite: Drafting and Design 1

This course is designed to acquaint students with fundamentals relative to residential construction and principles of architectural drafting. The students explore these areas through required drawings that involve: foundation details, frame and masonry wall construction, stair layouts, door and window construction, fireplace details, roof construction and other problems that lead to a general understanding of architectural principles. A standard set of working drawings will be made using CAD for the final project.

Machine Shop (1.0 credit)
College of DuPage dual credit: MANUFACTURING TECH 1151 – Machine Shop I (3 credit hours-see introduction for more information)

Level: 10-12   Prerequisite: Drafting and Design 1

This course is designed for students with little background in the use of metal-working machine tools, basic principles and operations on engine lathes, vertical milling machines, surface grinders, and precision measurement will be emphasized.

Technical Drawing (0.5 credit)
College of DuPage dual credit: MANUFACTURING TECH 1101 – Industrial Design/CAD (3 credit hours-see introduction for more information)

Level: 10-12   Prerequisite: Drafting and Design 2

This course emphasizes freehand sketching, illustrating, manufacturing, and engineering principles. Drafting instruments will be used in solving problems relating to the following: detail and working drawing, pictorial drawing, AutoDesk Fusion and Inventor software, threaded fasteners, springs, gears, and cams. Technical Drawing provides an excellent foundation for those students interested in engineering, industrial design, or manufacturing through descriptive designs. Students will also use the CNC machine, and 3D Printer to develop products from their design.

Technical Mechanics (0.5 credit)
College of DuPage dual credit: MANUFACTURING TECH 1104 – Technical Mechanics (2 credit hours-see introduction for more information)

Level: 10-12   Prerequisite: Machine Shop

Students will analyze, problem solve, and apply calculations and standards for design and maintenance of a mechanical system. Students will work to solve mechanical issues and use math and communication skills to understand technical manuals, work in a team environment, and display technical metal cutting competencies. Students who successfully complete this course will have displayed an ability and interest in manufacturing and engineering.

Quality Control (0.5 credit)
College of DuPage dual credit: MANUFACTURING TECH 1180 – Quality Control (3 credit hours-see introduction for more information)

Level: 11-12   Prerequisite: Technical Mechanics

An introduction to quality control and the development of the concept of total quality control engineering, process improvement, and quality information systems. The course will include a broad overview of total quality control and its scope throughout the business organization. Upon successful completion of this course, students will have an understanding of how quality works and how monitoring the process will assure a product or service provided to a customer remains defect free.

Advanced Computer Animation (0.5 credit)

Level: 11-12   Prerequisite: Computer Animation and Design

This course is available to the qualified and responsible computer animation and design student. It offers an opportunity to intensively discover projects that best suit the student's interest. Projects are developed by the student and approved by staff for each student to develop their knowledge and skills. Projects include exploratory modeling and animation techniques, advanced techniques for 3D printing, and detailed animation concepts for video game or entertainment purposes.
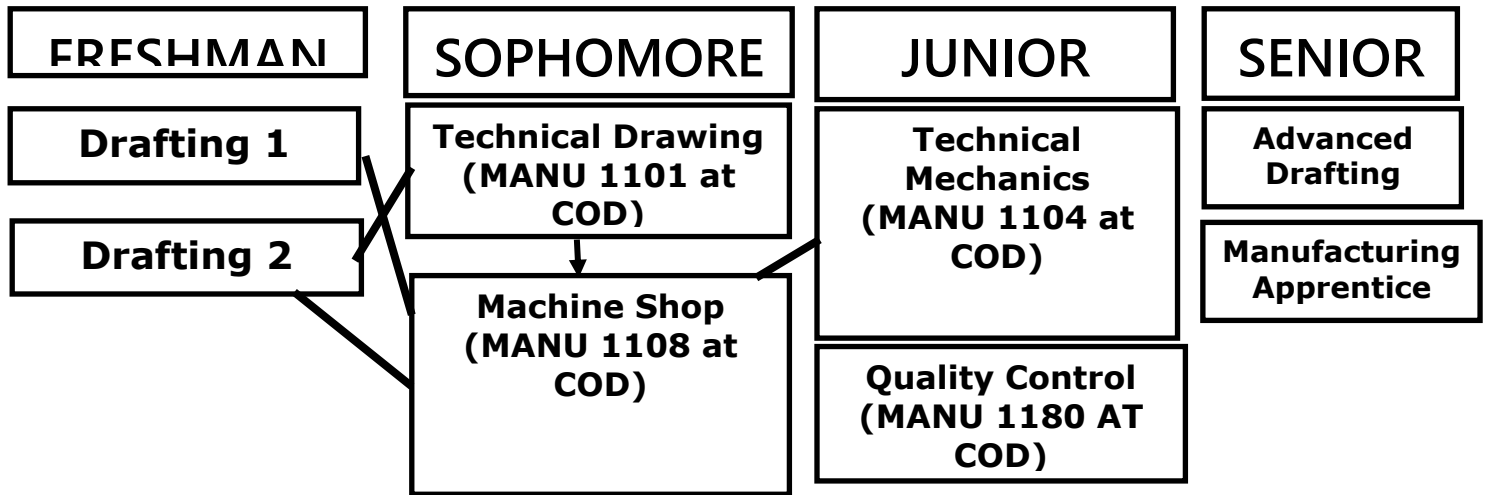
Advanced Drafting (0.5 credit)

Level: 11-12   Prerequisite: Technical Drawing or Architectural Drawing

This option is open to the qualified and the responsible junior or senior drafting student. This course offers an opportunity for the mature individual to intensively explore areas that best suit the student's interest. Based from prior classes, students integrate software and machinery to design, develop, and produce personal projects. Students are allowed access to mill, lathe, CNC, and 3D printing machinery to produce their desired product.

MANUFACTURING PATHWAY

West Chicago Community High School has partnered with College of DuPage and local businesses in an effort to develop a manufacturing pathway. This pathway allows students to obtain up to 11 credits from COD and get a head start on earning industry certificates in high demand manufacturing areas. Students who complete this pathway could then choose whether they want to continue taking courses toward a Certification at College of DuPage, whether they want to apply to attend a 4-year college, or whether they want to start work right away with a local business (students would have to apply and be accepted for any of those options).

FRESHMAN	SOPHOMORE	JUNIOR	SENIOR
Drafting 1	**Technical Drawing (MANU 1101 at COD)**	**Technical Mechanics (MANU 1104 at COD)**	**Advanced Drafting**
Drafting 2	**Machine Shop (MANU 1108 at COD)**	**Quality Control (MANU 1180 AT COD)**	**Manufacturing Apprentice**

Manufacturing Pathway will allow students to pursue certificates in:

- Manufacturing Technology
- Automated Manufacturing Systems
- Drafting/Design
- Manufacturing Skills Standards (MSSC)
- CNC Operations