

Machining Program of Study

Manufacturing, Engineering, Technology and Trades



A program of study serves as a guide, along with other career planning materials, as learners continue along a career path. Courses listed are only recommended coursework and should be individualized to meet each learner's educational and career goals.

Ultimately, a program of study should be customized with course titles and appropriate high school graduation requirements as well as college entrance requirements. Additional career exploration opportunities should also be offered at upper elementary grade levels to promote higher engagement and learner focus in subsequent years. Student Success Plans outlining career goals should be utilized through the advisement process.

Requires on-the-job training or industry-recognized credential

- CNC Machine Operator
- CNC Machine Programmer
- Automotive Machinist
- Die Maker
- Industrial Machinery Mechanics
- Machine Tool Setter
- Maintenance Machinist
- Millwrights
- Mold Maker
- Pattern Maker
- Precision Machinist
- Tool room Machinists
- Toolmakers

Requires an associate degree

- Industrial Engineering Technicians
- Mechanical Engineering Technicians

Requires a bachelor's degree

- Industrial Engineering
- Industrial Maintenance Manager
- Maintenance Project Engineer
- Manufacturing Operations Manager
- Manufacturing Engineering

Sample occupations



Course examples

Beginning Machining (13203A007)

Beginning Machining courses enable students to create metal parts using various machine tools and equipment. Course content may include interpreting specifications for machines using blueprints, sketches, or descriptions of parts and preparing and using lathes, milling machines, shapers, and grinders with skill, safety, and precision.

Computer Integrated Manufacturing (21010A001)

Computer Integrated Manufacturing courses involve the study of robotics and automation. Building on computer solid modeling skills, students may use computer numerical control (CNC) equipment to produce actual models of their three-dimensional designs. Course topics may also include fundamental concepts of robotics, automated manufacturing, and design analysis.

Introduction to Technology and Engineering (Industrial)* (21052A002)

Introduction to Technology and Engineering is composed of the following areas: Production, Transportation, Communication, Energy Utilization, and Engineering Design, but is not limited to these areas only. This course will cover the resources, technical processes, industrial applications, material sciences, technological impact, and occupations encompassed by that system.

Machine Shop Technology (113203A005)

This course introduces students to the basic mechanical and technical skills common to most fields in the fabrication of metal parts in support of other manufacturing activities. Topics include shop safety, hand and power tool use, the operation and maintenance of precision metal working equipment, precision measurement, quality control, exploring the manufacturing process, instrumentation, and blueprint reading.

Machine Shop Technology II (13203A006)

This course builds on the skills and concepts introduced in Machine Shop Technology I. Additional skill-building activities include automated manufacturing; the use of end mills, surface grinders, and drill presses; and basic welding procedures.

Machine Tool Technology Workplace Experience (13148A001)

Machine Tool Technology Workplace Experience courses provide students with work experience in fields related to manufacturing systems and/or research. Goals are typically set cooperatively by the student, teacher, and employer (although students are not necessarily paid). These courses may include classroom activities as well, involving further study of the field or discussion regarding experiences that students encounter in the workplace.

Production Technology (22151A001)

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Students are exposed to many career opportunities in the production field through a variety of learning activities. Experiences in manufacturing include product design; materials and processes; tools and equipment, including computers; safety procedures; corporate structure; management; research and development; production planning; and mass production, marketing, and servicing. In construction, students are exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

Full sequence

	Grade	English	Math	Science	Social Studies	Required Courses, Electives, and Learner Activities	Career and Technical Courses
Middle School	7	ELA 7	Math 7	Science 7	Social Studies 7		Career Exploration
	8	ELA 8	Math 8	Science 8	Social Studies 8		Employability Skills
Secondary	9	ELA 9	Algebra I	NGSS-Aligned Science 9	U.S. History	All programs of study should meet local and state high school graduation requirements and college entrance requirements. Participation in a Career and Technical Student Organization is also important for developing appropriate skills and competencies.	Introduction to Technology and Engineering or Foundations of Technology
	10	ELA 10	Geometry	NGSS-Aligned Science 10	American Government		Beginning Machining
	11	ELA 11	Algebra II	Chemistry*	World History or Economics		Machine Shop Technology I* or Computer-Integrated Manufacturing*
	12	Transitional English or English Composition*	TM Technical Math, TM STEM, College Algebra*, Calculus*†	Physics*	Psychology*		Machine Shop Technology II* or Machine Tool Technology Workplace Experience
Postsecondary	13	English Composition† or Oral Communication†	Technical Math or College Algebra** or Calculus**†	General Physics**† or General Chemistry**†	Social Science†	All programs of study should meet learner’s career goals with regard to required degrees, licenses, certifications, or journey worker status. Participation in student organizations is also important for developing appropriate skills and competencies.	Continue required courses in learner’s chosen area of specialization to complete the desired certification and/ or credential.
	14						
	15	Continue courses in learner’s chosen area of specialization.					
	16						

A program of study:

- Incorporates state academic standards.
- Addresses academic and technical knowledge and skills, including employability skills.
- Aligns with the needs of industries in the economy of the state, region, Tribal community, or local area.
- Progresses in specificity.
- Has multiple entry and exit points that incorporate credentialing.
- Culminates in the attainment of a recognized postsecondary credential.

* AP/Dual Credit Opportunities

** May have already been met with an appropriate dual credit agreement

† Postsecondary course affiliated with Illinois Articulation Initiative Code

Additional opportunities

Early career opportunities learning about work

- Career Planning
- Career Fairs
- Industry Speakers
- Informational Interviews
- Career Presentations
- Worksite Tours
- Cooperative Education
- Job Shadow
- Simulated Skill Development
- Other

Credit Transfer and WBL opportunities

- Dual Enrollment/Dual Credit
- Advanced Placement
- Articulated Credit
- Career-Related Service Learning
- School-Based Enterprise
- Student-Led Enterprise
- Project-Based Learning
- Internships
- Apprenticeships (i.e., youth, pre-registered, non-registered, research)
- Other

Industry-recognized credentials

- Certification
- License
- Other

Student organizations

- Business Professionals of America
- Educators Rising
- Future Business Leaders of America
- Family, Career and Community Leaders of America
- National FFA Organization (Illinois Association FFA)
- Future Health Professionals
- Illinois Distributive Education Clubs of America
- Science Olympiad
- Skills USA Illinois
- Technology Student Association
- Other
- Team-Based Challenge