

**Career Technical Credit Transfer (CT²)
Mechanical Engineering Technology Career Technical Assurance Guide (CTAG)
April 28, 2008**

The following courses or Career-Technical Assurance Numbers (CTANs) are eligible for transfer between career-technical education, adult workforce education, and post-secondary education.

CTMET004 – Manufacturing Processes	3 Semester/4 Quarter Hours
Advising Notes: Prerequisites: None.	
CTMET005 – CADD (formerly 001 and 002)	3 Semester/4 Quarter Hours
Advising Notes: Prerequisites: Engineering Drawing or Engineering Graphics. The prerequisite shall be waived if the course (content) appears to address these concepts within the course (content). Outcome #8 shall be viewed as an introduction to 3D. As long as 3D concepts are introduced in the course (content) this outcome is considered met.	
Note: Hours assigned to CTANs are “relative values,” which are used to help determine the equivalency of submitted coursework or content. Once approved by a validation panel as a CT² course, students will be given what the receiving institution is offering as credit for its approved course.	

The CTAG illustrates the learning outcomes that are equivalent or common in introductory technical courses. These courses and their associated learning outcomes were adapted from the Electrical Engineering Transfer Assurance Guides (TAGs) and the Technical Competency Profile (TCP) for Engineering Technologies, and have been amended to satisfy the CT² transfer initiative mandated by H.B. 66. In some cases, completers must also hold certain licenses and/or credentials or have satisfied specific external validators. Pertinent to H. B. 66 legislation, industry standards and certifications provide documentation of student learning. Recognized industry standards are expectations established by business, industry, state agencies, or professional associations that defines training program curricular requirements, establishes certification or licensure criteria, and often serves as the basis for program accreditation.

Institutional Requirements and Credit Conditions:

1. Once colleges or universities courses have been approved as equivalent under CT², students from approved CT² Career-Technical Institutions will receive the credit hour value for courses offered at the matriculating post-secondary institution.
2. Admission requirements of individual institutions and/or programs are unaffected by the implementation of CT² outcomes.
3. Institutional residency requirements may affect the amount of transfer credit.
4. Candidates for graduation from collegiate or university programs may have to satisfy additional degree requirements associated with the basic related or general education studies.
5. The institution must have a comparable program and/or offer comparable courses before students can matriculate.

In order to provide for seamless movement of students from career-technical institutions to two- and four-year colleges and universities the learning outcomes in each Mechanical Engineering CTAN, as well as their associated credit hours, have been amended to match the learning outcomes in the Mechanical Engineering Technology Transfer Assurance Guide (TAG). Thus, the learning outcomes for two of the Mechanical Engineering CTAG courses match the learning outcomes in two TAG courses (TAG courses are known as Ohio Articulation Numbers [OANs]). The two affected CTANs are CADD and Manufacturing Processes.

CTMET004 - MANUFACTURING PROCESSES

Subject Codes-

Ohio Board of Regents Subject code valid at the T (technical) level

143601	MANUFACTURING ENGINEERING	(NEW) A PROGRAM THAT PREPARES INDIVIDUALS TO APPLY SCIENTIFIC AND MATHEMATICAL PRINCIPLES TO THE DESIGN, DEVELOPMENT, AND IMPLEMENTATION OF MANUFACTURING SYSTEMS. INCLUDES INSTRUCTION IN MATERIALS SCIENCE AND ENGINEERING, MANUFACTURING PROCESSES, PROCESSENGINEERING, ASSEMBLY AND PRODUCT ENGINEERING, MANUFACTURING SYSTEMS DESIGN, AND MANUFACTURING COMPETITIVENESS
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Career-Technical Adult Education Subject codes

170006	Manufacturing Technologies Combined with specialization competencies utilizing business and industry technical standards and a math, science, ELA, technology, and business process framework, develops technical literacy in manufacturing systems, leading to pathways in manufacturing operations, product design and material production and post-secondary articulation.
172303	Manufacturing Occupations Specialized one-year program to prepare a semi-skilled worker for entry-level positions in diverse manufacturing occupations not specifically addressed in the OCAP, TCPs, or ITACs.

Learning Outcomes

Outcomes that are bolded and marked by an asterisk are essential and must be taught Submitted course work must include proof of laboratory component.

Prerequisites: None

- 1. Demonstrate an understanding of the interrelationships between material properties and manufacturing processes. ***
- 2. Distinguish between different manufacturing processes such as forgings, extrusions, castings, forming, and finishing.***
- 3. Distinguish between different fabrication processes such as welding, fasteners, and adhesives.***
- 4. Apply empirical data to determine speeds and feeds to optimize production efficiencies.***
- 5. Demonstrate appropriate safety procedures and methods in a manufacturing setting.***
- 6. Demonstrate proficiency in the use of measurement instruments.***
7. Tour local manufacturing facilities.

CTMET005 [formerly CTMET001 and 002] - COMPUTER AIDED DRAFTING AND DESIGN (CADD)

Subject Codes-

Ohio Board of Regents Subject code valid at the T (technical) level

151302	CAD/CADD DRAFTING AND/OR DESIGN TECHNOLOGY/TECHNICIAN	(NEW) A PROGRAM THAT PREPARES INDIVIDUALS TO APPLY TECHNICAL SKILLS AND ADVANCED COMPUTER SOFTWARE AND HARDWARE TO THE CREATION OF GRAPHIC REPRESENTATIONS AND SIMULATIONS IN SUPPORT OF ENGINEERING PROJECTS. INCLUDES INSTRUCTION IN ENGINEERING GRAPHICS, TWO-DIMENSIONAL COMPUTER-AIDED DRAFTING (CAD), COMPUTER-AIDED DESIGN (CADD), AND AUTO-CAD TECHNIQUES.
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Career-Technical Adult Education Subject code

171300	Drafting Occupations Specialized learning experiences that include theory and laboratory work, as each relates to the planning, preparation, and interpretation of mechanical, and/or architectural drawings and sketches using various CAD software.
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Learning Outcomes

Outcomes that are bolded and marked by an asterisk are essential and must be taught. Submitted course work must include proof of laboratory components.

Prerequisites: Prerequisite: Engineering Drawing or Engineering Graphics.

The prerequisite shall be waived if the course (content) appears to address these concepts within the course (content). Outcome #8 shall be viewed as an introduction to 3D. As long as 3D concepts are introduced in the course (content) this outcome is considered met.

1. **Demonstrate an in-depth proficiency of a commercial CAD system.***
2. **Draw a variety of components utilizing orthographic drawings.***
3. **Detail, dimension and specify tolerances on engineering drawings.***
4. **Utilize and apply the principles of sections to draw sectional views.***
5. **Understand the principles of primary auxiliary views.***
6. **Prepare an assembly drawing, details of the assembly, and a bill of materials.***
7. **Draw a multiple sheet/multiple part working drawing.***
8. **Use PC based CAD programs to create 3D solid models***
9. Gain an appreciation of the ANSI Y14.5M-1982 graphics standard by identifying and understanding the symbols and terminology.
10. Understand the standard engineering symbols and prepare engineering diagrams.
11. Prepare electrical connection wiring diagrams.
12. Introduce Geometric Dimension & Tolerancing (GD&T)

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- Jim Gerald
- Carl Hilgarth
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Collins Career Center
Great Oaks Institute of Technology
Sinclair Community College
Ohio Hi Point Career Center
Shawnee State University
Youngstown State University
Rhodes State College
Apollo Career Center
Miami University- Hamilton
Stark State College
Sinclair Community College
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Apollo Career Center
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