



Mechanical Design Technology

Program No: 10-606-1

Associate Degree in Applied Science

Degree Completion Time: Four Terms

In general, an academic year consists of two terms; however, degree completion time may vary based on student scheduling needs and class availability.

2012-2013

Catalog No.	Class Title	Credit(s)
Term 1		
10606101	Drafting Mechanical I/CAD I	3.00
10606103	Drafting Mechanical II/CAD II	3.00
10606105	Drafting Mechanical III/CAD III	3.00
10606160	Manufacturing Processes & Applications OR 10606104 Developing Manufacturing Skills AND 10606160C1 Mfg Processes Lecture C1	3.00
10804118	Intermediate Algebra with Applications	4.00
	Total	16.00
Term 2		
10606106	Geometric Dimensioning and Tolerancing	3.00
10606107	Drafting Mechanical IV/CAD IV	3.00
10606134	Statics	4.00
10606140	Drafting Parametric Using Solidworks	3.00
10804114	College Technical Mathematics 1B	2.00
10806154	General Physics 1	4.00
	Total	19.00
Term 3		
10606117	Machine Elements	3.00
10606118	Kinematics	3.00
10606130	Strength of Materials	4.00
10606196	Drafting Mechanical V/CAD V	3.00
10606199	Intro Current Mfg Trends	3.00
10809196	Introduction to Sociology OR 10809195 Economics	3.00
	Total	19.00
Term 4		
10606112	Tool Design Basic	3.00
10606125	Design Problems	3.00
10801195	Written Communication	3.00
10801196	Oral/Interpersonal Communication	3.00
10809198	Introduction to Psychology	3.00
	Total	15.00
	Program Total	69.00

Note: Program start dates vary; check with your counselor for details.

Curriculum and program acceptance requirements are subject to change.

About the Career

Mechanical design technicians, under the direction of engineering staff members, help develop and test products, calculate strength and cost of materials, make drawings to scale, and work on prototypes and product improvement. Students work on acquiring high-level drafting skills and utilize Computer-Aided Drafting (CAD) software. They learn to construct and revise engineering working drawings and tooling drawings; research and apply information for parts and materials; and specify appropriate tolerances, materials, and other engineering data. Mechanical designers work on teams that focus on continuous improvement, Six Sigma initiatives, and lean manufacturing efforts.

Careers

- CAD Technician
- Design/Layout Drafter
- Mechanical Designer
- Drafter
- Engineering Technician
- Research and Development Technician

Admissions Steps

- Application
- Application Fee
- Entrance Assessment Scores
- Transcripts
- Program Advising Session
- Functional Abilities Statement of Understanding Form

Program Outcomes

You'll learn to:

- Assist engineers in the design process.
- Solve design problems correctly using established and accepted methods and equations.
- Prepare detail and assembly drawings for documentation of mechanical parts and machines using CAD (Computer-Aided Design) software using ASME Y14.5M-2009 Standard.
- Design mechanical parts according to customer specifications for manufacturability and/or cost.
- Analyze engineering problems related to strength and size requirements of machine components.
- Understand the principles of statistical process control, lean manufacturing, and Six Sigma as they relate to and are used in industry.
- Function effectively on both self-directed and team-oriented projects.

Approximate Costs

- \$126 per credit (resident)
- \$182 per credit (out-of-state resident)
- Other fees vary by program (books, supplies, materials, tools, uniforms, health-related exams, etc.)

Special Note

Program can also be completed by attending evenings.

Functional Abilities

Functional abilities are the basic duties that a student must be able to perform with or without reasonable accommodations. At the postsecondary level, students must meet these requirements, and they cannot be modified. Please view the Functional Abilities Statement of Understanding on the www.gotoltc.edu website (Future Students, Academics, Areas of Study, Mechanical Design Technology).

Entrance Assessment Scores

Accuplacer	ACT
Arithmetic - 100	Mathematics - 20
Reading - 74	Reading - 18
Sentence Skills - 86	English - 18
Elem. Algebra - 55	Elem. Algebra - NA

Transfer agreements are available with the following institutions:

Capella University
Concordia University
Franklin University
Herzing University
Lakeland College
Marian College

Milwaukee School of Engineering
Ottawa University
Silver Lake College
University of Phoenix
Upper Iowa University
UW-Green Bay

UW-Oshkosh
UW-Stout

IMPORTANT: For more information on these agreements, visit gotoltc.edu/transfer.

10606101 Drafting Mechanical 1/CAD 1

...provides the learner with the skills to operate AutoCAD's drawing editor, viewing commands; apply coordinate entry methods, AutoCAD file commands; utilize draw commands, modify commands; create and edit text, prints & plots; apply geometric construction to solve a drawing problem; utilize selection sets, duplicating modify commands, layers & objects properties, blocks; apply principles of orthographic and multi projection.

10606103 Drafting Mechanical 2/CAD 2

...provides the learner with the skills to create two-dimensional section views, create two-dimensional auxiliary views, create prints/plots from paper space and utilize the X-reference command.

COREQUISITE: 10606101 Drafting Mechanical 1/CAD 1

10606105 Drafting Mechanical 3/CAD 3

...provides the learner with the skills to create a solid model from a three-dimensional wireframe, create solid primitives, create a solid model from a two-dimensional closed profile, utilize Boolean operations, utilize modify options to existing solid models, create a multiview drawing from a solid model, modify and set dimension attributes, apply dimensioning symbols, and apply ASME Y14.5M-2009 standards for dimensioning and tolerancing.

COREQUISITE: 10606103 Drafting Mechanical 2/CAD 2

10606106 Geometric Dimensioning and Tolerancing

...provides the learner with the skills to apply and interpret geometric tolerancing (ASME 14.5M-2009) to part drawings, including form, profile, orientation, runout, and positional tolerances.

10606107 Drafting Mechanical 4/CAD 4

...provides the learner with the skills to create different types of assembly drawings, utilize copy and paste, utilize SAT & STL files, apply tolerances, apply weld symbols, and use fasteners in assemblies.

COREQUISITE: 10606105 Drafting Mechanical 3/CAD 3

10606112 Tool Design Basic

...provides the basic principles needed to design the tools commonly used in manufacturing. Principal topics include drill jigs, milling fixtures, and gages. The classroom work is done on CAD, and students are encouraged to research and select standard components from tooling company catalogs.

PREREQUISITE: 10606107 Drafting Mechanical IV/CAD IV; 10606160 Manufacturing Processes & Applications or 10606104 Developing Manufacturing Skills and 10606160C1 Manufacturing Processes Lecture C1

10606117 Machine Elements

...introduces the student to the various components found on machinery, including shafts, bearings, power transmissions, gears, and the selection of standard machine elements from manufacturers' catalogs, and the use of spreadsheet solutions.

COREQUISITE: 10606130 Strength of Materials

10606118 Kinematics

...provides the student with the skills necessary to determine the motions required to accomplish the objective of a machine, calculate velocities and accelerations, and analyze cam profiles and design gears.

PREREQUISITE: 10804114 College Tech Math 1B or 10804116 Trigonometry or 10804121 Technical Math I or 10804195 College Tech Math 1 or 10804115 College Technical Math 1

10606125 Design Problems

...prepares the learner to use knowledge of machine elements to design a mechanical system based on specifications given in class; prepare a project time line; create all documentation for manufacturing, including detail and assembly drawings; perform all design calculations.

PREREQUISITE: 10606117 Machine Elements; 10606118 Kinematics; 10606196 Drafting Mechanical V/CAD V and 10606160 Manufacturing Processes & Applications or 10606104 Developing Mfg Skills or 10606160C1 Mfg Processes Lecture C 1

10606130 Strength of Materials

...provides the learner with the skills to identify and calculate stresses induced in force-bearing elements for the purpose of sizing the material in that element, specifically studying shear, axial, bending, torsional, and combined stresses.

PREREQUISITE: 10606134 Statics

10606134 Statics

...provides the learner with the skills to calculate center of gravity, reaction forces, friction forces, and moment of inertia of bodies in static equilibrium.

PREREQUISITE: 10804121 Technical Math 1 or 10804116 Trigonometry or 10804115 College Technical Math 1 or COREQUISITE: 10804114 College Technical Math IB

10606140 Drafting Parametrics Using Solidworks

...provides the learner with the skills to utilize the SolidWorks user interface; create base features, extrusions, revolve, cuts, holes, fillets & chamfers, working planes, ribs, patterns, sweeps, shells, lofts and 2D detail drawings; edit features.

COREQUISITE: 10606107 Drafting Mechanical IV/CAD IV

10606160 Manufacturing Processes and Applications

...Introduces the learner to machining processes including, milling, turning, drilling and grinding. The learner will also learn how to properly use and read dial and digital micrometers; dial, digital and vernier calipers; as well as height gages and angle measurement devices. In addition, the student will also explore metallurgy, computer-age machining and methods in advanced manufacturing technology.

10606196 Drafting Mechanical 5/CAD 5

...provides the learner with the skills to apply classes of fits, create bottom-up and top-down assemblies using SolidWorks, specify geometric tolerancing, insert annotation symbols, use standard fasteners and apply reverse engineering.

PREREQUISITE: 10606140 Drafting Parametric Using Solidworks

10606199 Introduction to Current Manufacturing Trends

...introduces the learner to the theories and concepts of Statistical Process Control, Six Sigma and Lean Manufacturing.

PREREQUISITE: 10804115 College Technical Math 1 or 10804114 College Technical Math 1B or 10804116 Trigonometry Basic or 10804121 Technical Math I

10801195 Written Communication

...teaches the writing process, which includes prewriting, drafting, revising, and editing. Through a variety of writing assignments, the student will analyze audience and purpose, research and organize ideas, and format and design documents based on subject matter and content. Keyboarding skills are required for this course. It also develops critical reading and thinking skills

through the analysis of a variety of written documents.
PREREQUISITE: 10831103 Intro to College Wrtg or CONDITION: Written Comm Prepared Learner (Accuplacer Wrtg min score of 86 or Equivalent) and COREQUISITE: 10838105 Intro Rdg & Study Skills or CONDITION: Reading Accuplacer min score of 74 or equivalent

10801196 Oral/Interpersonal Comm

...provides students with the skills to develop speaking, verbal and nonverbal communication, and listening skills through individual speeches, group activities, and other projects.

COREQUISITE: 10838105 Intro Reading and Study Skills or CONDITION: Reading accuplcer minimum score of 74 or equivalent

10804114 College Technical Math 1B

...is a continuation of College Technical Math 1A. Topics include: measurement systems; computational geometry; right and oblique triangle trigonometry; and trigonometric functions on the unit circle. Emphasis will be on the application of skills to technical problems. Successful completion of College Technical Mathematics 1A and College Technical Mathematics 1B is the equivalent of College Technical Mathematics 1.

PREREQUISITE: 10804196 College Tech Math 1A, or COREQUISITE: 10804113 College Tech Math 1A or 10804118 Intermediate Algebra with Applications

10804118 Intermediate Algebra with Applications

...offers the learner algebra content with applications. Topics include properties of real numbers, order of operations, algebraic solution for linear equations and inequalities, operations with polynomial and rational expressions, operations with rational exponents and radicals, algebra of inverse, logarithmic and exponential functions.

PREREQUISITES: Accuplacer Math score of 100 and Accuplacer Algebra score of 55 or equivalent or 10834110 Elementary Algebra w Apps and COREQUISITE: 10838105 Intro Reading and Study Skills or CONDITION: Reading accuplacer minimum score of 74 or equivalent

10806154 General Physics 1

...presents the applications and theory of basic physics principles. This course emphasizes problem-solving, laboratory investigation, and applications. Topics include unit conversions and analysis, vectors, translational and rotational kinematics, translational and rotational dynamics, heat and temperature, and harmonic motion and waves.

COREQUISITE: 10804197 College Tech Math 1B or 10804114 College Tech Math 1B or 10804115 College Tech Math 1

10809196 Introduction to Sociology

...introduces students to the basic concepts of sociology: culture, socialization, social stratification, multiculturalism, and the five institutions, including family, government, economics, religion, and education. Other topics include demography, deviance, technology, environment, social issues, social change, social organization, and workplace issues.

COREQUISITE: 10838105 Intro Reading and Study Skills or Accuplacer Reading score of 74 or equivalent

10809198 Intro to Psychology

...introduces students to a survey of the multiple aspects of human behavior. It involves a survey of the theoretical foundations of human functioning in such areas as learning, motivation, emotions, personality, deviance and pathology, physiological factors, and social influences. It directs the student to an insightful understanding of the complexities of human relationships in personal, social, and vocational settings.

COREQUISITE: 10838105 Intro Reading and Study Skills or Accuplacer Reading score of 74 or equivalent