

## ABOUT THE PROGRAM

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.

## PROGRAM OUTCOMES

- 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.

## ADMISSIONS STEPS

- Work with Admissions Specialist to:
  - Submit application and \$30 fee.
  - Complete an assessment for placement (Accuplacer or ACT).
  - Submit official transcripts (high school and other colleges).
- Meet with program advisor/counselor to discuss program details.

## APPROXIMATE COSTS

- \$132 per credit (resident)
- \$198 per credit (out-of-state resident)
- Other fees vary by program (books, supplies, materials, tools, uniforms, health-related exams, etc.) Visit [gotoltc.edu/financial-aid/tuition-and-fees](http://gotoltc.edu/financial-aid/tuition-and-fees) for details.

## PLACEMENT SCORES

Accuplacer/ACT scores will be used to develop your educational plan. Contact your program advisor/counselor for details.

## SPECIAL NOTE

This program can also be completed by attending evenings.

## CAREER & EDUCATION ADVANCEMENT OPPORTUNITIES

LTC credits transfer to over 30 universities. For more information visit [gotoltc.edu/future-students/transfer](http://gotoltc.edu/future-students/transfer).

## CONTACT

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Catalog No.	Class Title	Credit(s)
<b>Term 1</b>		
10606101	Basic Mechanical Drafting	2
10606103	Intermediate Mechanical Drafting (AutoCAD)	2
10606105	Basic Modeling Using AutoCAD	2
10606160	Manufacturing Processes & Applications OR 10606104 Developing Manufacturing Skills AND 10606160C1 Mfg Processes Lecture C1	3
10804115	College Technical Mathematics 1	5
10809198	Introduction to Psychology	3
		<b>17</b>
<b>Term 2</b>		
10606106	Geometric Dimensioning and Tolerancing	3
10606134	Statics	4
10606140	Drafting Parametric Using Solidworks	3
10606196	Working Drawings Using SolidWorks	3
10806154	General Physics 1	4
		<b>17</b>
<b>Term 3</b>		
10606117	Machine Elements	3
10606118	Kinematics	3
10606130	Strength of Materials	4
10606195	Parametric Drafting Using Creo	3
10606197	Working Drawings Using Creo	3
10809196	Introduction to Sociology OR 10809195 Economics	3
		<b>19</b>
<b>Term 4</b>		
10606112	Tool Design Basic	3
10606125	Design Problems	3
10606199	Intro to Current Manufacturing Trends	3
10801195	Written Communication OR 10801197 Technical Reporting OR 10801136 English Composition 1	3
10801196	Oral/Interpersonal Communication	3
		<b>15</b>

**TOTAL 68**

*Curriculum and Program Acceptance requirements are subject to change.  
Program start dates vary; check with your advisor/counselor for details.*



**BASIC MECHANICAL DRAFTING USING AUTOCAD**...provides the learner with the skills to utilize 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 view projection.

**BASIC MODELING USING AUTOCAD**...provides the learner with the skill to create solid primitives, create a solid model from a two-dimensional closed profile, use Boolean operations, use modify options to existing solid models, create a detail drawing from a solid model and create assembly drawings from solid models. COREQUISITE: 10606103 Intermediate Mechanical Drafting (AutoCAD)

**COLLEGE TECHNICAL MATHEMATICS 1**...prepares the student to solve linear, quadratic, and rational equations; graphing; formula rearrangement; solve systems of equations; percent; proportions; measurement systems; computational geometry; right and oblique triangle trigonometry; trigonometric functions on the unit circle; and operations on polynomials. Emphasis will be on the application of skills to technical problems. This course is the equivalent of successful completion of College Tech Math 1a and 1b. PREREQUISITES: 10834110 Elementary Algebra w Apps or equivalent

**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 Working Drawings Using SolidWorks and 10606160 Manufacturing Processes & Applications or 10606104 Developing Mfg Skills or 10606160C1 Mfg Processes Lecture C1

**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: 10804114 College Tech Math 1B or equivalent

**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.

**INTERMEDIATE MECHANICAL DRAFTING (AUTOCAD)**...provides the learner with the skills to create two dimensional section views, create two-dimensional auxiliary views, create prints/plots from paper space, modify and set dimension attributes, apply dimensioning symbols, and apply ASME Y14.5M standards for dimensioning and tolerancing. COREQUISITE: 10606101 Basic Mechanical Drafting

**INTRODUCTION 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 equivalent

**INTRODUCTION TO CURRENT MANUFACTURING TRENDS**...introduces the learner to the theories and concepts of Statistical Process Control, Six Sigma and Lean Manufacturing. PREREQUISITE: 10804118 Intermediate Algebra with Apps or 10804110 Elementary Algebra with Apps or 10804115 College Technical Math 1 or 10804113 College Tech Math 1A and 10804114 College Tech Math 1B

**INTRODUCTION TO SOCIOLOGY**...introduces students to the basic concepts of sociology: culture, socialization, social stratification, multi-culturalism, 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 equivalent

**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: 10804118 Intermediate Algebra with Apps or 10804115 College Technical Math 1 or 10804113 College Technical Math 1A and 10804114 College Technical Math 1B

**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

**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.

**ORAL/INTERPERSONAL COMMUNICATION**...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 equivalent

**PARAMETRIC DRAFTING USING CREO**...provides the learner with the skills to use Creo user interface, sketching tools; create the following features: extrusions, revolves, holes, fillets and chamfers, ribs, sweeps, shells, blends; setup datum references, edit sketches and features and create detail drawings from Creo models. PREREQUISITES: 10606140 Drafting Parametrics-SolidWorks or 10606196 Working Drawings Using SolidWorks

**PARAMETRIC DRAFTING USING SOLIDWORKS**...provides the learner with the skills to use SolidWorks user interface, sketching tools; create the following features: extrusions, revolves, cuts, holes, fillets and chamfers, ribs, sweeps, shells, lofts; setup reference geometry, edit sketches and features and create detail drawings from SolidWorks models. COREQUISITE: 10606107 Drafting Mechanical IV/CAD IV or 10606105 Basic Modeling Using AutoCAD

**STATICS**...provides the learner with the skills to perform numerical computations and conversions using U.S. customary units and International System of Units (SI) as applied in the engineering field, use algebra methods to solve linear equations, use trigonometric formulas to analyze right and oblique triangles in the application of vectors, solve groups of two simultaneous linear equations, calculate center of gravity, reaction and friction forces, and moment of inertia of bodies in static equilibrium. PREREQUISITE: 10804115 College Technical Math 1 or 10804113 College Technical Math 1A and 10804114 College Technical Math 1B

**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

**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; 10606196 Working Drawings Using SolidWorks; 10606160 Manufacturing Processes & Applications or 10606104 Developing Manufacturing Skills and 10606160C1 Manufacturing Processes Lecture C1

**WORKING DRAWINGS USING CREO**...provides the learner with the skills to create different types of assemblies using Creo, insert standard components from vendor websites, apply classes of fits to mating parts, determine interference and clearance between parts, specify annotation notes to drawings, insert a Bill-of-Material into an assembly drawing, and apply reverse engineering. COREQUISITE: 10606195 Parametric Drafting Using Creo

**WORKING DRAWINGS USING SOLIDWORKS**...will provide the learner with the skills to create different types of assemblies using SolidWorks, insert standard components from toolbox and vendor websites, apply classes of fits to mating parts, determine interference and clearance between parts, specify annotation notes to drawings, insert a Bill-of-Material into an assembly drawing, and apply reverse engineering. COREQUISITE: 10606140 Drafting Parametric Using Solidworks

**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 equivalent and COREQUISITE: 10838105 Intro Rdg & Study Skills or equivalent