



**BUFFALO STATE**  
The State University of New York

# **Mechanical Engineering Technology Program**

*Intellectual Foundations' 2014 requirements for new students to college/university starting Fall 2014 and after*

The Electrical and Mechanical Engineering Technology programs are accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

as of 6/23/14

**Engineering Technology Department**

[www.buffalostate.edu/engineeringtechnology](http://www.buffalostate.edu/engineeringtechnology)



## **MECHANICAL ENGINEERING TECHNOLOGY**

Offered by the Engineering Technology Department, TECH 126, (716) 878-6017

Bachelor of Science degree granted. The Mechanical Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

James Mayrose, Ph.D., Chair, Engineering Technology Department, TECH 126

David J. Kukulka, Ph.D., Coordinator, Mechanical Engineering Technology Program, TECH 112

kukulkdj@buffalostate.edu

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Mechanical Engineering Technology has a series of videos that maybe of interest that describes the program, opportunities and discussion with graduates. The site is: <http://engineeringtechnology.buffalostate.edu/met-videos>

- The bachelor's degree in the Mechanical Engineering Technology program is designed to give the student a broad education in the areas of mechanical design, mechanics, stress analysis, thermosciences, and manufacturing.
- Graduates are employed by manufacturing industries, testing laboratories, marketing firms, consulting firms, government agencies, and other technology businesses.
- Graduates work as designers developing new products, as manufacturing technicians solving problems of producing these products for performance or quality, as plant engineers improving or maintaining factories, and as technical sales people selling these products.
- The duties of technologists may involve calculations, selection of materials, performance testing and evaluation, and cost estimating for the development of a mechanism or a process.

Students are admitted directly into the program as freshmen or as juniors, if they have already completed an A.A.S. or A.S. degree at an accredited college in a relevant field.



## **MECHANICAL ENGINEERING TECHNOLOGY PROGRAM**

### **ENT 101/TEC 101**

#### **Technical Drawing**

**3, 0/0**

Survey of projection theory, multi-view projection, spatial relationships, and visualization of point, lines, planes and solids; size and shape description through sketching, and computer-aided drawing; standards and conventions, auxiliary views, revolutions, tolerance, dimensions, and geometric tolerances, and pictorials.

### **ENT 102**

#### **Introduction to Equation Solving Software**

**1, 1/0**

Use of current industry-standard computer software programs that allow users to enter and manipulate mathematical equations; perform calculations; and analyze, plot, and document data. These engineering software programs are invaluable tools to technology majors, who combine engineering principles with mathematics to describe physical phenomena.

### **ENT 202**

#### **Introduction to Engineering Economics and Project Management**

**1, 1/0**

*Co-Requisite ENT 102.* Prepares students to estimate, plan, and manage projects. Provides exposure to techniques to better prepare students for problems seen in industry.

### **ENT 300**

#### **Analytical Methods for Technologists**

**3, 3/0**

*Prerequisite: MAT 126 or MAT 161, MAT 127 or MAT 162.* Application of calculus and analytic geometry to problems in technology. Introduction to ordinary differential equations used to analyzed mechanical and electrical quantities in technology.

### **ENT 301**

#### **Mechanics I**

*Prerequisite: ENT 102, PHY 107 or PHY 111, MAT 126 or 162. Co-requisite ENT 300 or MAT 315.* A study of the basic principles and applications of statics and strength of materials. Topics include equilibrium of rigid bodies, friction, centroids, properties of areas, trusses, frames, tension/compression stresses in bars, and beam bending stress.

### **ENT 302**

#### **Mechanics II**

*Prerequisite: ENT 301, ENT 300 or MAT 315.* A study of the principles and applications of dynamics. Topics include principles of dynamics, translation, rotation, dynamic equilibrium, work-energy methods and impulse-momentum methods.

### **ENT 303**

#### **Kinematics**

*Prerequisite: ENT 302.* A study of the relative motions of machine parts. Both graphical and analytical techniques are presented for position, velocity, and acceleration analysis of linkages, chains, rolling bodies, gears, and miscellaneous mechanisms.

### **ENT 311**

#### **Thermodynamics**

*Prerequisite: CHE 102 or 112, Co-requisite ENT 301.* An introduction to the principles of classical thermodynamics. Technical applications of heat-power systems, refrigeration systems, and fluid machinery.

### **ENT 312**

#### **Fluid Mechanics**

*Prerequisite: ENT 311. Co-requisite ENT 302.* Application of fluid mechanics to analysis of fluid circuits, channel flows, and fluid machines. Analysis, design and operation of instrumentation for measuring pressure and flow. Theory of dimensionless groups for models and prototypes. Hydraulic flow controllers and pressure controllers.

### **ENT 314**

#### **Solid Modeling**

**3, 2/3**

*Prerequisites: TEC 101, ENT 301.*

Three dimensional (3-D) parts and assembly creation; defining high-level features, like cuts and holes, in addition to low-level geometry; using parametric modeling; 3-D solid modeling; introduction to finite element concepts for stress and heat testing.

### **Mechanical Engineering Technology Degree Requirements**

This applies to:

- MET Students admitted to BSC after the Summer of 2014
- Transfer Students initially matriculated into a SUNY institution during the Fall 2014 semester or later.



**Mechanical Engineering Technology**

**ENT 331**

**Electrical Circuits and Devices I**

*Prerequisite: PHY 108 or PHY 112.* Study of the basic concepts of electrical circuits and systems both DC and AC. Includes loop and node analysis, superposition, maximum power transfer, alternating current analysis, phasors, inductors, capacitors, resonance, and transformers.

**ENT 335**

**Industrial Electronics**

**3, 2/3**

*Prerequisite: ENT 331, CIS 151.*

Essential industrial machines and automation topics, such as discrete and analog process control, switches and sensors, control systems, industrial controls, LabView, programmable logic controllers, and data acquisition. Laboratory exercises provide practical applications of the industrial electronics that engineering technology graduates are likely to encounter.

**ENT 401**

**Stress Analysis**

*Prerequisite: ENT 300, ENT 301, TEC 311.* An advanced course in strength of materials which focuses on the analytical, numerical, and experimental methods of stress analysis as applied to structures and machine elements. Topics covered include axial stresses and deformation, bending and torsion of beams and shafts, plane stress, plane strain, elastic stability, yield criteria, combined stresses, and energy methods.

**ENT 402**

**Shock and Vibration Analysis**

*Prerequisite: ENT 302, ENT 401. Recommend : MAT 202.* A study of the theoretical, analytical, and experimental methods used in the analysis of shock and vibration in machine elements and structures. Topics covered include free and forced vibration of one and multi-degree of freedom systems with an introduction to lumped parameter systems and continuous systems. The laboratory will stress familiarization with the instrumentation and experimental techniques used in vibration analysis.

**ENT 420**

**Professional Experience in Mechanical Engineering Technology**

**1, 1/0**

*Corequisites/Prerequisites: ENT 202, ENT 411, ENT 421, ENT 335. Prerequisites: ENT 401, ENT 331, ENT 311, ENT 312, ENT 301, ENT 302, TEC 311, TEC 201.*

Exposure to professional engineering design concepts/methodologies; MET portfolio development and evaluation of MET subject matter necessary for the senior design project; senior design project proposal development. Required for mechanical engineering technology program.

**ENT 411**

**Heat Transfer**

*Prerequisite: ENT 312.* A study of the process of heat transfer and its application to the fields of processing technology, energy conversion, and machine design. Topics covered include conduction, convection, radiation, heat exchanger design, combined modes of heat transfer, and applications to machine design.

**ENT 421**

**Machine Design I**

*Prerequisite: ENT 303, ENT 401.* A study of the techniques used to design and specify machine elements, i.e., shafts, springs, fasteners, belts, clutches, brakes, chains, bearings, gears, cams, etc.

**ENT 422**

**Machine Design II**

*Prerequisite: ENT 421, ENT 401, ENT 411.*

*Co-requisite: ENT 402,*

*Suggested Co-requisite: MAT 311.* Advanced topics in machine design including numerical control. Each student will be required to complete a major design project which includes preliminary analysis, working drawings, fabrication, and testing of a prototype.

**TEC 201**

**Materials Processing**

*Prerequisite: TEC 101.* A study of the processes and problems associated with the conversion of materials into useful forms and goods. Practical experience is acquired through laboratory activities exemplifying the major processes studied.

**TEC 311**

**Materials Science and Testing**

*Prerequisite: CHE 101 or 111.* A study of the origin and composition of industrial materials including metals and their alloys, woods, fuels, lubricants, cutting fluids, solvents, protective compounds or coating, inks, adhesives, plastics, and ceramics. Applications of testing procedures for identification and determination of physical and chemical properties suitable for specific industrial uses.

**BS in MECHANICAL ENGINEERING TECHNOLOGY AUDIT SHEET (IF)**

<i>Intellectual Foundations Requirements</i>	Credits	Grade
<b>Basic Communication</b>	<b>0-6 credits</b>	
1. CWP 101	3	
2. CWP 102	3	
<b>Arts and Humanities</b>	<b>3 credits</b>	
<b>Humanities</b>	<b>3 credits</b>	
<b>Math/Science (Accreditation Requirements)</b>	<b>15 credits</b>	
PHY 107* or PHY 111*	3	
CHE 101* or CHE 111*	3	
PHY 108* or PHY 112*	3	
CHE 102* or CHE 112*	3	
MAT 127* or MAT 162*	3	
<b>Social Science</b>	<b>3 credits</b>	
<b>Global Engagement or Foreign Language Requirement or 2 years High School</b>	<b>0-6 credits</b>	
<b>Civilizations – American History</b>	<b>9 credits</b>	
1. American History	3	
2. Western Civilizations	3	
3. Non-Western Civilizations	3	
<b>Diversity</b>	<b>3 credits</b>	
Double-dipping allowed		
<b>Accreditation Requirements</b>	<b>15 credits</b>	
CIS 151*	3	
MAT 126* or MAT 161	3	
MAT 311*	3	
MAT 315* or ENT 300	3	
SPC205*	3	
<b>Total Required Credits</b>	<b>48-63 credits</b>	

\*These courses are required to meet the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org> distribution requirements.

<b>All College Electives</b>	<b>10-21 credits</b>	

<b>TECHNICAL SCIENCES 12 credits</b>		
ENT301, MECHANICS I	3	
ENT302, MECHANICS II	3	
ENT 331, ELEC. CIRCUITS & DEVICES I	3	
ENT335, INDUSTRIAL ELECTRONICS	3	
<b>TECHNICAL SPECIALTY 42 credits</b>		
ENT 101 or TEC 101, TECHNICAL DRAWING	3	
TEC 201, MATERIALS PROCESSING	3	
TEC 311, MATERIALS SCIENCE AND TESTING	3	
ENT 102, INTRO. EQUATION-SOLVING SOFTWARE	1	
ENT 202, INTRO. ENGINEERING ECONOMICS AND PROJECT MGMT.	1	
ENT 303, KINEMATICS	3	
ENT 311, THERMODYNAMICS	3	
ENT 312, FLUID MECHANICS	3	
ENT 314, SOLID MODELING	3	
ENT401, STRESS ANALYSIS	3	
ENT402, SHOCK AND VIBRATION ANALYSIS	3	
ENT 411, HEAT TRANSFER	3	
ENT 420, PROF. EXPERIENCE IN MECHANICAL ENGINEERING TECH.	1	
ENT 421, MACHINE DESIGN I	3	
ENT 422W, MACHINE DESIGN II	3	
<b>Total</b>	<b>120 Credits</b>	

**Recommended Course Sequence for Freshmen in  
Mechanical Engineering Technology  
Mechanical Systems Option 0832 IF\*\***

Year 1		Year 1	
Fall	Credit Hrs.	Spring	Credit Hrs.
CWP 101	3	CWP 102	3
MAT 126 or MAT 161	3	MAT 127 or MAT 162	3
CHE 101 or CHE 111	3	CHE 102 or CHE 112	3
IF Course* or Elective	3	ENT 101 or TEC 101	3
ENT 102	1	IF Course* or Elective	3
IF Course* or Elective	3	<b>Total semester hours</b>	<b>15</b>
<b>Total semester hours</b>	<b>16</b>		
Year 2		Year 2	
Fall	Credit Hrs.	Spring	Credit Hrs.
MAT 311 or MAT 202	3	ENT 300 or MAT 315	3
SPC 205	3	ENT 301	3
TEC 201	3	TEC 311	3
CIS 151	3	PHY 108 OR PHY 112	3
PHY 107 or PHY 111	3	IF Course* or Elective	3
ENT 202	1	IF Course* or Elective	3
<b>Total semester hours</b>	<b>16</b>	<b>Total semester hours</b>	<b>18</b>
<b>TOTAL HOURS</b>	<b>47</b>	<b>TOTAL HOURS</b>	<b>65</b>
Year 3		Year 3	
Fall	Credit Hrs.	Spring	Credit Hrs.
ENT 302	3	ENT 303	3
ENT 311	3	ENT 312	3
ENT 314	3	ENT 331	3
ENT 401	3	IF Course* or Elective	3
IF Course* or Elective	3	Foreign Language or Elective (if needed)	3
<b>Total semester hours</b>	<b>15</b>	<b>Total semester hours</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>80</b>	<b>TOTAL HOURS</b>	<b>95</b>
Year 4		Year 4	
Fall	Credit Hrs.	Spring	Credit Hrs.
ENT 335	3	ENT 402	3
ENT 411	3	ENT 422W	3
ENT 420	1	IF Course* or Elective	3
ENT 421	3	IF Course* or Elective	3
Foreign Language or Elective (if needed)	3	<b>Total semester hours</b>	<b>12</b>
<b>Total semester hours</b>	<b>13</b>	<b>TOTAL HOURS</b>	<b>120</b>
<b>TOTAL HOURS</b>	<b>108</b>		

\*Take elective courses to meet any Buffalo State College's requirements in writing, global engagement, diversity, general education or upper division requirements.

\*\*Actual sequence and fulfilling the IF requirements are the responsibility of the student. Please check the Buffalo State's website for up-to-date requirements. This is a suggested guide.