Engineering Technicians-Manufacturing, Mechanical, Industrial

Cluster Overview: Planning, managing, and providing scientific research and professional and technical services including laboratory and testing services, and research and development services.

Career Goal (O*NET Code): (17-3029) - Industrial engineering technicians plan ways to effectively use personnel, materials, and machines in factories, stores, health care organizations, repair shops, and offices. As assistants to industrial engineers, they help prepare machinery and equipment layouts, plan workflows, conduct statistical production studies, and analyze production costs.

Student Name:_____
Grade: _____
School: _____

SUGGESTED COURSEWORK

Middle School	8th	***HS Courses:***	(Local districts may list high school credit courses here)		
High School	9th	***Courses*:**	English I Algebra I or Geometry Biology	World Geography Foreign Language I Physical Education or Athletics	Fine Arts
		Career-Related Electives:	Concepts of Engineering & Technology		
	10th	***Courses:***	English II Geometry or Algebra II Chemistry	World History Foreign Language II Elective	Elective
		Career-Related Electives:	Engineering Design & Presentation		
	11th	***Core Courses:***	English III Algebra II or Pre-Calculus Physics	United States History Foreign Language III ** Professional Communications or Speech	Elective
		Career-Related Electives:	Advanced Engineering Design & Presentation		
	12th	***Core Courses:***	English IV Pre-Calculus or Calculus 4th Science	Government/Economics Elective Elective	
		Career-Related Electives:	Practicum in STEM		

How to Become an Industrial Engineering Technician
Industrial engineering technicians typically need an associate's degree or postsecondary certificate. Associate's degree programs are typically offered by community colleges and technical institutes, and certificate programs are offered at vocational and technical schools.

EXTENDED LEARNING EXPERIENCES

Curricular Experiences*:***
BEST Robotics, Inc.
FIRST Robotics Competition
Project Lead the Way
Skills USA
Technology Student Association
The Infinity Project

Extracurricular Experiences:
Destination ImagiNation
International Bridge Building Contest
Marine Advanced Technology Education Center
National Engineering Design Competition
UIL Academic Competitions
VEX Robotics Competition

Career Learning Experiences:
Career Preparation
Job Shadowing
Internship

Service Learning Experiences:
Campus Service Organizations
Community Service Volunteer
Peer Mentoring/Peer Tutoring

COLLEGE CREDIT OPPORTUNITIES -- High School

Students should take Advanced Placement (AP), International Baccalaureate (IB), dual credit, Advanced Technical Credit (ATC), or locally articulated courses (Tech Prep), if possible. List those courses that count for college credit on your campus.

Postsecondary

Texas Southmost College	South Texas College	Texas State Technical College
		Engineering (AS)

The University of Texas at Brownsville	The University of Texas - Pan American
Engineering Technology (BS)	Manufacturing Engineering (BS) Mechanical Engineering (BS)

Carrer Options
(Sample of reported job titles)

- Project Engineer
- Engineering Technician
- Industrial Engineering Technician
- Methods Engineer
- Manufacturing Technician
- Production Staff Worker
- Industrial Engineering Analyst
- Process Documentation and Methods Analyst
- Process Engineering
- Plant Engineering
- Mechanical Designer
- Research and Development Technician
- Engineering Lab Technician
- Equipment Engineer
- Process Technician
- Design Engineer
- Designer
- Engineering Technical Analyst
- Lab Technician

Professional Associations:
- ABET
- Institute of Industrial Engineers
- American Society for Engineering Education
- Technology Student Association

*** Students must meet local & state high school graduation requirements. ** Required course for the Distinguished Graduation Plan (in addition to other measures). *** Based on campus availability. Students may select other elective courses for personal enrichment purposes.**

This plan of study serves as a guide, along with other career planning materials, for pursuing a career path and is based on the most recent information as of 2009. All plans meet high school graduation requirements as well as college entrance requirements.

Engineering Technicians—Manufacturing, Mechanical, Industrial

TEA Industry Cluster	STEM
SOC Code	17-3029
Identified by	TIP Strategies; TWC LMCI;
Projected Growth (2018)	0 %
BISD Magnet School Available	Yes

Source: Demand Occupations by Cluster, updated *June 27, 2012*

Description

What Industrial Engineering Technicians Do

Industrial engineering technicians plan ways to effectively use personnel, materials, and machines in factories, stores, health care organizations, repair shops, and offices. As assistants to industrial engineers, they help prepare machinery and equipment layouts, plan workflows, conduct statistical production studies, and analyze production costs.

Duties

Industrial engineering technicians typically do the following:

- Suggest revisions for methods of operation, material handling, or equipment layout
- Interpret engineering drawings, schematic diagrams, and formulas
- Confer with management or engineering staff to determine quality and reliability standards
- Suggest changes to production standards for achieving the best quality within the limits of equipment capacity
- Help plan work assignments, taking into account worker performance, machine capacity, and production schedules
- Prepare charts, graphs, and diagrams to illustrate workflow, routing, floor layouts, how materials are handled and how machines are used

Industrial engineering technicians study the time and steps workers take to do a task (called "time and motion" studies). To set reasonable production rates, they consider how workers are doing operations such as maintenance, production, and service.

They also observe workers to make sure that the equipment is being used and maintained according to quality assurance standards. They then evaluate the resulting data to point out or justify changes to the operations or the standards to improve quality and efficiency.

Industrial engineering technicians generally work in teams under the supervision of industrial engineers.

What Mechanical Engineering Technicians Do

Mechanical engineering technicians help mechanical engineers design, develop, test, and manufacture industrial machinery, consumer products, and other equipment. They may make sketches and rough layouts, record and analyze data, make calculations and estimates, and report their findings.

Duties
Mechanical engineering technicians typically do the following:

- Evaluate drawing designs for new or changed tools by measuring dimensions on the drawing and comparing them with the original specifications
- Prepare layouts and drawings of parts to be made and the process for putting them together
- Discuss changes with coworkers—for example, in the design of the part, in the way it will be made and put together, and in the techniques and process they will use
- Review instructions and blueprints for the project to ensure the test specifications, procedures, and objectives
- Plan, make, and put together new or changed mechanical parts for products, such as industrial machinery or equipment
- Set up and conduct tests of complete units and of parts as they would really be used, as a way to investigate proposals for improving equipment performance
- Record test procedures and results, numerical and graphical data, and recommendations for changes in product or test methods
- Analyze test results in regarding design specifications and test objectives

Mechanical engineering technicians also estimate labor costs, equipment life, and plant space. Some test and inspect machines and equipment or work with engineers to eliminate production problems. They may assist in testing products by, for example, setting up instrumentation for vehicle crash tests.

Training Opportunities Linked to Those Jobs
(Degree Types and Colleges/Universities)

How to Become an Industrial Engineering Technician
Industrial engineering technicians typically need an associate's degree or postsecondary certificate. Associate's degree programs are typically offered by community colleges and technical institutes, and certificate programs are offered at vocational and technical schools.

Education
High school students interested in becoming industrial engineering technicians should take courses in math, science, and drafting, where available. Courses that help students develop computer skills are helpful when they later need to learn computer-aided design/computer-aided manufacturing software, known as CAD/CAM.

After high school, students interested in becoming industrial engineering technicians can continue at a vocational-technical school or at a community college or technical institute.

Vocational-technical schools include postsecondary public institutions that serve local students and emphasize training needed by local employers. These programs generally award a certificate.

Community colleges offer programs similar to those in technical institutes, but there are more theory-based liberal arts courses in community colleges. Students who complete the program earn an associate's degree.

ABET (formerly the Accreditation Board for Engineering and Technology) accredits engineering programs.
Generally, prospective industrial engineering technicians should major in applied science, industrial technology, or industrial engineering technology.

Important Qualities

Analytical skills. Industrial engineering technicians must be able to help industrial engineers figure out how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Detail oriented. Industrial engineering technicians must gather and record measurements and observations needed by industrial engineers.

Communication skills. Industrial engineering technicians follow instructions from industrial engineers. They must be able to clearly understand and follow instructions, and communicate problems to their supervisors.

Critical-thinking skills. Industrial engineering technicians must be able to help industrial engineers figure out why a certain process or operation is not working as well as it might. They must ask the right questions to identify and correct weaknesses.

Math skills. Industrial engineering technicians use the principals of mathematics for analysis, design, and troubleshooting in their work.

Observation skills. These technicians spend much of their time evaluating the performance of other people or organizations to make suggestions for improvements or corrective action. They must gather and record information without interfering with workers in their environments.

How to Become a Mechanical Engineering Technician

Most employers prefer to hire someone with an associate's degree or other postsecondary training in mechanical engineering technology. Prospective engineering technicians should take as many science and math courses as possible while in high school.

Education

Prospective mechanical engineering technicians usually take courses in fluid mechanics, thermodynamics, and mechanical design in a program leading to an associate's degree. The Technology Accreditation Commission of ABET (formerly the Accreditation Board for Engineering and Technology) accredits programs that include at least college algebra, trigonometry, and basic science courses. Associate's degree programs are in the following types of institutions:

- Vocational-technical schools, which include postsecondary public institutions that serve local students and emphasize training needed by local employers.
- Community colleges, which offer programs similar to those in technical institutes but include more theory-based and liberal arts coursework.

There are also programs in mechanical engineering technology that lead to a bachelor's degree, although most technicians graduate from associate's degree programs. Those who complete a bachelor's degree work as mechanical engineering technologists, rather than as technicians. In some cases, they are considered applied mechanical engineers because they put current mechanical engineering concepts to immediate use. Completing an associate's degree in mechanical engineering technology opens the way to studying for a bachelor's degree.

Important Qualities

Communication skills. Mechanical engineering technicians follow instructions from mechanical engineers or mechanical engineering technologists. They must be able to clearly understand and follow instructions or, if they do not understand, to ask their supervisors to explain.

Creativity. Mechanical engineering technicians help to bring plans and designs to life.

Detail oriented. Mechanical engineering technicians must make precise measurements and keep accurate records for mechanical engineers.

Interpersonal skills. Mechanical engineering technicians must be able to take instructions and offer advice when it is needed.

Math skills. Mechanical engineering technicians use mathematics for analysis, design, and troubleshooting in their work.
Mechanical skills. Mechanical engineering technicians must apply theory and instructions from engineers by making new components for industrial machinery or equipment. They need to be able to operate machinery such as drill presses, grinders, and engine lathes.
Technical skills. Mechanical engineering technicians must be able to help engineers keep production machinery running and use equipment to record important data.

Texas Southmost College	South Texas College	Texas State Technical College	The University of Texas at Brownsville	The University of Texas - Pan American
		Engineering (AS)	Engineering Technology (BS)	Manufacturing Engineering (BS)
				Mechanical Engineering (BS)

Local Employers

A Specialist Transit	Brownsville		J&H Surveying CO	Harlingen
Amaya Surveying CO	Brownsville		L A Lubricants Llc	LA Feria
Chavez Automated Design	Brownsville		Mgm Engineering Group Llc	Harlingen
Gulf Systems Inc	Brownsville		Pronto Carriers	Brownsville
Innovative Medical Svc	Brownsville		Twin Diesel Svc	Port Isabel

Career Options
(Specific Job Types)

- Project Engineer
- Engineering Technician
- Industrial Engineering Technician
- Methods Engineer
- Manufacturing Technician
- Production Staff Worker
- Industrial Engineering Analyst
- Process Documentation and Methods Analyst
- Lab Technician
- Process Engineering
- Plant Engineering
- Mechanical Designer
- Research and Development Technician
- Engineering Lab Technician
- Equipment Engineer
- Process Technician
- Design Engineer
- Designer
- Engineering Technical Analyst

Salary Ranges

Wages for **Engineering Technicians, Except Drafters, All Other**

Location	Pay Period	2011				
		10%	25%	Median	75%	90%
United States	Hourly	$15.08	$20.90	$28.21	$35.62	$43.19
	Yearly	$31,400	$43,500	$58,700	$74,100	$89,800
Texas	Hourly	$12.89	$20.18	$27.51	$34.41	$43.01
	Yearly	$26,800	$42,000	$57,200	$71,600	$89,500
McAllen-Edinburg-Mission, TX MSA	Hourly	$8.64	$11.60	$24.12	$34.55	$47.70
	Yearly	$18,000	$24,100	$50,200	$71,900	$99,200

Wages for **Industrial Engineering Technicians**

Location	Pay Period	2011				
		10%	25%	Median	75%	90%
United States	Hourly	$15.56	$18.86	$23.60	$29.87	$36.20
	Yearly	$32,400	$39,200	$49,100	$62,100	$75,300
Texas	Hourly	$17.02	$20.85	$26.29	$32.75	$38.75
	Yearly	$35,400	$43,400	$54,700	$68,100	$80,600
McAllen-Edinburg-Mission, TX MSA	Hourly	—	—	—	—	—
	Yearly	—	—	—	—	—

Wages for **Mechanical Engineering Technicians**

Location	Pay Period	2011				
		10%	25%	Median	75%	90%
United States	Hourly	$15.83	$19.53	$24.69	$30.42	$36.11
	Yearly	$32,900	$40,600	$51,400	$63,300	$75,100
Texas	Hourly	$15.08	$18.93	$24.64	$33.26	$42.59
	Yearly	$31,400	$39,400	$51,300	$69,200	$88,600
McAllen-Edinburg-Mission, TX MSA	Hourly	—	—	—	—	—
	Yearly	—	—	—	—	—

Professional Associations linked to the Careers

For more information about accredited programs, visit
ABET

For more information about industrial engineering, visit
Institute of Industrial Engineers

For information on general engineering education and career resources, visit
American Society for Engineering Education
Technology Student Association

Sources

The information provided in this document was collected from the following sources:

- Occupational Outlook Handbook (http://www.bls.gov/ooh/)
- O*NET OnLine (http://www.onetonline.org/)
- Texas CARES (http://www.texascaresonline.com/)
- CareerOneStop (http://www.careeronestop.org/)