DH 0290  (F)  4 hrs. cr.  Clinical Dental Hygiene II  (Writing Intensive)
Continuation of DH 190 with added responsibilities as skills develop. Multicultural experience is gained through rotations in extended campus facilities. Sixteen hours clinical lab per week (one hour per week MAY be used for content and organizational review). Prerequisites: DH 190.

DH 0295  (F)  1 hr. cr.  Seminar in Dental Hygiene I
This seminar course is offered in conjunction with DH 290, Dental Hygiene Clinic II and is part of the clinical education continuum. Emphasis will be placed on developing advanced clinical techniques, adjunctive hygiene treatment and increased case based learning and problem solving in the clinical setting. One hour lecture per week with three-four lab sessions per semester.

DH 0300  (F)  3 hrs. cr.  Community Dental Health Education
Fundamentals of teaching and learning theories. Development of teaching units and lesson plans for various public groups and/or organizations, practical experience in public schools and community groups with experience in providing dental health education to the public. This course is designed to increase student knowledge of concepts of community dentistry and dental epidemiology that is used in population based health care. Students are allowed to critically evaluate biostatistics, scientific literature, dental care delivery and mechanisms for financing dental care. Three hrs. lecture per week.

DH 0310  (F,S)  2 hrs. cr.  Nutrition
Nutrition and diet as related to dental health, biochemistry of digestion and the utilization of nutrients. Special emphasis on dietary analysis as part of total health care and the role of the dental hygienist in providing nutritional counseling. Two hours lecture per week. Requirement: dental hygiene students must take course during second semester of program. Two hour lecture per week.

DH 0320  (F)  2 hrs. cr.  Pharmacology
Principles of drug actions and characteristics of major drug groups including sources of drugs, methods of their administration, classification, dosage, therapeutic action and drug interactions. Emphasis on drugs affecting oral health and drugs used in dentistry. Two hours lecture per week.

DH 0340  (Su)  3 hrs. cr.  Oral Pathology
Oral Pathology includes both general and oral pathology. General pathology includes an overview of basic disease processes, inflammation, immunology and wound healing. Oral pathology emphasizes recognition of oral diseases based on clinical signs and symptoms and radiographic manifestations. Treatment planning principles, based on collection of information using a variety of assessment procedures is included. Three hours of lecture per week. Prerequisite: student must have successfully completed the first three semesters of dental hygiene curriculum.

DH 0350  (F)  2 hrs. cr.  Periodontics II
Periodontics II is a continuation of Periodontics I focusing further on the prevention, diagnosis and treatment of diseases affecting the gums and supporting structures of the teeth. Clinical application will be implemented in DH 290 and DH 390. Two hours lecture per week. Prerequisites: DH 280, DH 190 and DH 210.

DH 0390  (S)  4 hrs. cr.  Clinical Dental Hygiene III
Continuation of DH 290: Clinical experience in advanced clinical procedures and discussion of the recognized dental specialties including their relationship to preventive dentistry. Sixteen hours lab week. Prerequisite: DH 290.

DH 0395  (S)  1 hr. cr.  Senior Seminar in Dental Hygiene
This seminar course serves as a means of combining information from all courses in the dental hygiene curriculum and applying content to patient cases and practice management issues. This course is also designed to assist in preparing senior dental hygiene students for the written and clinical examinations required for licensure and entry into the profession. One hour lecture per week.

**ENGINEERING TECHNOLOGY**

**Ummel Technology 153 • 417.625.9849**

**Faculty** Howe – Head, Barolet, Koch, Marsh

**Mission**
The Department of Engineering Technology (ET) provides programs designed to develop leaders in industry and society as a whole by providing a quality education to students that is application-oriented and connected to the needs of regional and global businesses.

**Department Objectives**
The Engineering Technology department at Missouri Southern will produce graduates who

1. have an appropriate mastery of the knowledge, techniques, skills and modern tools of engineering technology.
2. have the ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology.
3. are able to identify and analyze problems and design effective engineering technology based solutions.
4. contribute professionally by functioning effectively on teams.
5. communicate effectively with professionals and lay audiences.
6. have an understanding for the discipline of engineering technology and its role in a societal and global context.

**Curricular Options**
The department offers a variety of instructional programs. These programs are:

- Industrial Engineering Technology (IET), BS
- Industrial Technology Education (ITE), BS
- Drafting and Design Engineering Technology (DDET)*, AS
- Manufacturing Engineering Technology (MET), AS
Students graduating with the Associate of Science in Manufacturing Engineering Technology may continue their education by pursuing a baccalaureate degree in one of three areas:

- Industrial Engineering Technology (IET)
- Management Technology
- Industrial Technology Education

**Drafting and Design Engineering Technology (DDET), AS**

The Associate of Science in Drafting and Design Engineering Technology program prepares students to work in the Engineering Technology disciplines related to the field of drafting and design. The student will be introduced to the areas of Architecture, Technical Illustration, Surveying as well as 3D Design within the curriculum.

This program is accredited by TAC (Technology Accreditation Commission) of ABET (Accreditation Board for Engineering and Technology). The ABET accreditation is used to assure quality in educational institutions and programs. Accreditation is a voluntary, non-governmental process of peer review. It requires an educational institution or program to meet defined standards or criteria.

The curriculum prepares graduates to pursue a baccalaureate degree in Industrial Engineering Technology, Computer Information Science, Management Technology, Industrial Technology Education or enter employment as drafters/designers in the fields of manufacturing, civil, architecture or construction.

**Process Improvement Minor**

This minor was developed for non-Engineering Technology majors and focuses on skills and techniques used to improve processes and systems in a variety of industries. Any student majoring in business, health, criminal justice, CIS, biology, chemistry, technical writing or other fields will increase their competitiveness with this minor because any organization benefits from reducing cost and increasing productivity and quality. Some examples of industries who are looking for improvement analysts include Biotechnology, Pharmaceuticals, Food, Chemical Industry, Healthcare Services, Telecommunications Services, Medical Devices and Supplies, Financial Services, Insurance, Law enforcement, Business Services, Computer Software, Computer Hardware, Management Consulting Services, Government and Military Engineering Services, Mortgage Industry, Aerospace and Defense, as well as Energy and Utilities.

**Six Sigma Green Belt and Black Belt Certification**

This program is designed to provide participants with the knowledge, techniques and tools necessary to successfully fulfill the Green Belt or Black Belt role in many sectors of industry.

Six Sigma is a data-driven methodology used to improve a product or process. Six Sigma has become the world standard for manufacturing as well as service companies. Six Sigma is about understanding customer requirements, tying improvements to strategic goals of the company, quantifying the financial benefits of improvement projects and following a disciplined process in applying statistical tools to achieve a “near-perfect” process.

**Land Surveyor in Training**

Completion of the 15 credit hours of surveying classes will allow a person who has the necessary field experience and work related hours to sit for the Land Surveyor in Training licensing test in the State of Missouri. The Missouri Board of Architecture, Professional Engineering and Land Surveyors has approved this sequence of courses to meet statute Section 327.312.1(3) RSMo.
CAD Operator Certificate of Competency
This certificate was developed for non-degree seeking students.

The program is structured to prepare individuals to perform Drafting and Design work. The trained individual will have the skills to prepare drawings for manufacture and make design amendments to existing drawings using CAD programs. The certificate program prepares individuals to work as a CAD operator, as well as a drafting technician and a detailer.

CNC Operator Certificate of Competency
This certificate was developed for non-degree seeking students.

The program is designed to provide skills in the operation of Computer Numerical Controlled (CNC) lathes and milling machines. The student will be equipped to be a CNC Technician upon completion of the program.

Quality Technician Certificate of Competency
This certificate was developed for non-degree seeking students.

The program is structured to prepare individuals to assure quality in manufacturing and service industries. The trained individual will have the skills to assist a Quality, Manufacturing or Industrial Engineer in gathering and analyzing data pertinent to products and services to maintain and improve quality. The program prepares the individual to work as a Quality Technician, Quality Inspector, Quality Analyst or Process Improvement Technician.

Industrial Training
The department offers professional development opportunities for engineers, technicians and managers in areas of engineering technology. Examples of seminar or workshop topics include Root Cause Analysis, Basic Quality Tools with Minitab, Process Mapping, Failure Mode Effect Analysis, Understanding Heat-Treatment, AutoCad, Six Sigma Green Belt and Six Sigma Black Belt.

Facilities
The department provides an excellent environment for instruction and has several laboratories with sophisticated design, production and testing equipment. The manufacturing laboratory at Missouri Southern State University is a modern facility for learning about manufacturing processes. The lab contains full-size industrial machining equipment including manual lathes and milling machines as well as CNC machining centers. The material testing lab is a hands-on laboratory where students gain experience on the following equipment: metallurgical prep equipment and microscope, impact tester, universal testing machine, Rockwell hardness tester, micro-hardness tester and precision measuring equipment. Our computer facilities are equipped with personal computers and software including Minitab, Design Expert, AutoCAD, Inventor, Solidworks, Mastercam, Cosmos and 3D Studio, as well as a 3-D printer.

Bachelor of Science in Industrial Engineering Technology
Major Code IE00

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>General Education Requirements (p. 45) 46-47*</th>
<th>Required Industrial Engineering Technology Curriculum</th>
<th>47</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET 100</td>
<td>Introduction to Machine Tool Processes ........</td>
<td>3</td>
<td>3</td>
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<tr>
<td>IET 105</td>
<td>Introduction to Industrial Engineering Technology ..........</td>
<td>3</td>
<td>3</td>
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<tr>
<td>DDET 110</td>
<td>Engineering Graphics I ..................................</td>
<td>3</td>
<td>3</td>
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<tr>
<td>DDET 115</td>
<td>Introduction to 3D Computer Aided Drafting ........</td>
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<tr>
<td>MET 200</td>
<td>Computer Numerical Control ...........................</td>
<td>3</td>
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<td>DDET 204</td>
<td>Industrial Statics and Strength of Materials ..........</td>
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<tr>
<td>IET 205</td>
<td>Computer Applications &amp; Cost Analysis ...............</td>
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<td>3</td>
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<tr>
<td>MET 240</td>
<td>Engineering Materials ..................................</td>
<td>3</td>
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<tr>
<td>IET 300</td>
<td>Engineering Economics ..................................</td>
<td>3</td>
<td>3</td>
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<tr>
<td>MET 304</td>
<td>CNC Project &amp; Cost Analysis ...........................</td>
<td>3</td>
<td>3</td>
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<tr>
<td>IET 305</td>
<td>Basic Electricity &amp; Electronics .....................</td>
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<td>IET 310</td>
<td>Computer Production/ Planning Control ...............</td>
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<td>3</td>
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<tr>
<td>IET 320</td>
<td>Applied Statistical Quality Control ..................</td>
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<td>3</td>
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<tr>
<td>IET 350</td>
<td>Industrial Supervision (WI) ..........................</td>
<td>3</td>
<td>3</td>
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<td>IET 355</td>
<td>Work Measurement/Ergonomics ..........................</td>
<td>3</td>
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<td>IET 383</td>
<td>Power Generation Including Hydraulics &amp; Pneumatics ...</td>
<td>3</td>
<td>3</td>
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<tr>
<td>IET 425</td>
<td>Design of Experiments (WI) ...........................</td>
<td>3</td>
<td>3</td>
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<tr>
<td>IET 440</td>
<td>Six Sigma Methodology ..................................</td>
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<tr>
<td>IET 450</td>
<td>Plant Layout/Material Handling .......................</td>
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<td>IET 460</td>
<td>Competitive Industrial Practices .....................</td>
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<td>IET 494</td>
<td>Senior Seminar ...........................................</td>
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<tr>
<td>Technical</td>
<td>Elective** ..................................................</td>
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<tr>
<td>MATH 135</td>
<td>Trigonometry ...............................................</td>
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<tr>
<td>MATH 302</td>
<td>Applied Calculus ...........................................</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 152</td>
<td>Elementary College Physics II .................</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one from: .............................................. | 3                                                  | 3  |
| IET 315        | Probability & Statistics for Engineers ............... | 3                                                  | 3  |
| MATH 310       | Elementary Statistics ................................... | 3                                                  | 3  |
| GB 321         | Business Statistics ........................................ | 3                                                  | 3  |

Total .............................................................. | 124                                                 | 124 |

*PHYS 151 required to satisfy GER D2 and MATH 130 with a grade of C or better or MATH 140 with a grade of C or better or Math 150 with a grade of C or better or required to satisfy GER C.

**Any course with a DDET or MET prefix that is not a degree requirement for the BS in Industrial Engineering Technology satisfies the Technical Elective requirement for major code IE00.

Bachelor of Science in Education Middle School Education Grades 5-9 Certification in Industrial Technology
(This degree is 1/2 of a dual degree for Middle School Certification.)

Bachelor of Science in Education with a major in Industrial Technology Grades 5-9 Certification
One of Two Teaching Fields

Semester Hours

General Education Requirements (p. 45) 46-47* .................. | 40-41 |
Education Certification Requirements .................................. | 53-55 |
EDUC 330  Industrial Technology Methods ......................... | 3  |
Industrial Technology Requirements ................................ | 21 |
Communications ......................................................... | 6  |
DDET 110  Engineering Graphics I (3) .......................... | 3  |
IET 420  Computer Applications and Cost Analysis (3) .......... | 3  |
Energy & Power ......................................................... | 3  |
IET 381  Basic Energy & Power (3) .................................. | 3  |
Materials & Process ................................................... | 9  |
MET 100  Introduction to Machine Tool Processes (3) ........... | 3  |
MET 240  Engineering Materials (3) ................................ | 3  |
IET 391  Wood Working & Plastic (3) .............................. | 3  |
Organization and Administration .................................... | 3  |
IET 350  Industrial Supervision (WI) (3) ......................... | 3  |
Second Teaching Field ................................................. | 25-28 |
Total ............................................................... | 142-148 |

*EDUC 280 satisfies three hours of GER area I and MATH 130 or 140 or MATH 150 with a grade of “C” or better required to satisfy GER area C.
Bachelor of Science in Education  
**Middle School Education**  
Candidates who elect middle school (grades 5-9) as their major must complete two areas of concentration consisting of 22-32 hours in each area. The curriculum for these areas is a joint effort by the departments of teacher education and the teaching specialty. Students who desire to teach in a middle school may choose to become qualified in any two of the following seven areas: Language Arts (English), Math, Science, Social Studies, Business, Industrial Technology or Speech/Theatre.

**Middle School Professional Education sequence Grades 5-9**

<table>
<thead>
<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>MATH 130</td>
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<tr>
<td>PSY 205</td>
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<tr>
<td>PSY 310</td>
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<tr>
<td>PSY 412</td>
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<td>EDUC 100</td>
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<tr>
<td>EDUC 280</td>
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<tr>
<td>EDUC 301</td>
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<tr>
<td>EDUC 302</td>
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<tr>
<td>Two content area Methods Courses</td>
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<tr>
<td>(EDUC 322, 330, 333, 336, 339, 340, 344)</td>
</tr>
<tr>
<td>EDUC 321</td>
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<tr>
<td>EDUC 329</td>
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<tr>
<td>EDUC 342</td>
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<tr>
<td>EDUC 343</td>
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<td>EDUC 412</td>
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<td>EDUC 413</td>
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<td>EDUC 423</td>
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<tr>
<td>EDUC 432</td>
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<tr>
<td>EDUC 452</td>
</tr>
</tbody>
</table>

*EDUC 280 satisfies three hours of GER I.

The General Education and Department of Education requirements for the middle school program total 100 hours. The number of hours added to this core depends on the two content areas chosen. The possible choices and hours are listed below:

- IT/SS = 35
- IT/LA = 41
- Sci/IT = 43
- Math/IT = 43

**Bachelor of Science in Education  
Industrial Technology Emphasis  
Grades 9-12 Certification**  
Major Code ES23

<table>
<thead>
<tr>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>General Education Requirements (p. 46)</td>
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<tr>
<td>Education Certification Requirements (p. 179)</td>
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<tr>
<td>Industrial Technology Requirements</td>
</tr>
<tr>
<td>Communications: (minimum 7)</td>
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<tr>
<td>DDET 110</td>
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<tr>
<td>DDET 220</td>
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<tr>
<td>IET 205</td>
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<tr>
<td>Energy &amp; Power: (minimum 7)</td>
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<tr>
<td>IET 305</td>
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<tr>
<td>IET 381</td>
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<tr>
<td>IET 383</td>
</tr>
</tbody>
</table>

**Materials & Process: (minimum 7)**

- MET 100 | Introduction to Machine Tool Processes (3) |
- MET 240 | Engineering Materials (3) |
- IET 391 | Woodwork & Plastics (3) |

**Organization/Administration: (minimum 5)**

- IET 310 | Production Planning & Control (3) |
- IET 350 | Industrial Supervision (WI) (3) |

**Additional related: (for a total of 36)**

Choose one of the following two courses:

- MET 145 | Industrial Automation (3) |
- MET 200 | Computer Numerical Control (3) |

**Total**

124-125

*EDUC 280 satisfies three hours of GER I and MATH 130 or MATH 140 with a grade of ’C’ or better or MATH 150 with a grade of ’C’ or better required to satisfy GER C.

**Associate of Science Degree  
Drafting and Design Engineering Technology**  
Major Code IE01

<table>
<thead>
<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>General Education Requirements (p. 46)</td>
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<tr>
<td>Drafting and Design Engineering Technology Requirements</td>
</tr>
<tr>
<td>DDET 110</td>
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<tr>
<td>DDET 115</td>
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<tr>
<td>DDET 120</td>
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<td>DDET 130</td>
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<td>DDET 204</td>
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<td>DDET 210</td>
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<td>DDET 220</td>
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<td>DDET 230</td>
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<td>DDET 260</td>
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<td>MET 100</td>
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<tr>
<td>MET 240</td>
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<tr>
<td>PHYS 151</td>
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<tr>
<td>MATH 135</td>
</tr>
<tr>
<td>Technical Elective**</td>
</tr>
</tbody>
</table>

**Total**

64

*Required Physics course (PHYS 151) satisfies major requirement and GER D2, required MATH course (MATH 135) satisfies major requirement and GER C.  
**Any course with an IET or MET prefix that is not a degree requirement for the AS in DDET qualifies as a Technical Elective.

**Associate of Science Degree  
Manufacturing Engineering Technology**  
Major Code IE02

<table>
<thead>
<tr>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>General Education Requirements (p. 46)</td>
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<tr>
<td>Manufacturing Engineering Technology Requirements</td>
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<tr>
<td>MET 100</td>
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<tr>
<td>DDET 110</td>
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<tr>
<td>DDET 115</td>
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<tr>
<td>DDET 204</td>
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<td>MET 200</td>
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<td>IET 205</td>
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<td>MET 240</td>
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<tr>
<td>IET 300</td>
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<tr>
<td>MET 304</td>
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<tr>
<td>MATH 135</td>
</tr>
</tbody>
</table>

Select one of the following two courses:

- IET 350 | Industrial Supervision (WI) | 3
The student has three options to choose from:
• CAD Operator
• CNC Operator
• Quality Technician

CAD Operator
The program is structured to prepare individuals to perform Computer Aided Drafting and Design work in various industries. The trained individual will have the skills to prepare drawings for manufacture and make design amendments to existing drawings using CAD programs. The program will prepare the individual to work as a CAD operator, as well as a drafting technician and a detailer.

Required Engineering Technology Curriculum ........ 12
MET 100 Introduction to Machine Tool Processes ........ 3
DDET 110 Engineering Graphics I ...................... 3
DDET 115 Introduction to 3D Computer Aided Drafting .... 3
Select ONE from:
MET 120 Introduction to Machine Tool Processes ........ 3
DDET 130 Engineering Graphics II .................... 3
DDET 220 Architectural Drafting ..................... 3
DDET 230 Elementary Surveying .................... 3

CNC Operator
The program is designed to provide skills in the operation of Computer Numerical Controlled (CNC) lathe and milling machines. The student will be equipped to be a CNC Technician upon completion of the program.

Required Engineering Technology Curriculum ........ 12
MET 100 Introduction to Machine Tool Processes ........ 3
DDET 110 Engineering Graphics I ...................... 3
DDET 200 Computer Numerical Control* ................ 3
Select ONE from:
MET 200 Computer Numerical Control ................ 3
MET 240 Manufacturing with Metals ................... 3

Quality Technician
The program is designed to provide skills in Quality Tools, Statistical Process Control, Measurement Systems Analysis and Lean Manufacturing techni ques. The student will be prepared to work as a Quality Technician, Quality Inspector, Quality Analyst or Process Improvement Technician.

Required Engineering Technology Curriculum ........ 12
MET 130 College Algebra ............................ 3
IET 305 Basic Electricity & Electronics ................ 3
IET 310 Computer Production Planning Control .......... 3
IET 320 Applied Statistical Quality Control ............. 3
IET 355 Work Measurement/Ergonomics ................ 3

Missouri Southern Six Sigma Certification
Six Sigma is a data-driven methodology used to improve products or processes. Six Sigma has become the world standard for manufacturing as well as service companies. Six Sigma is about understanding customer requirements, tying improvements to strategic goals of the company, quantifying the financial benefits of improvement projects and following a disciplined process in applying statistical tools to achieve a "near-perfect" process.

Six Sigma certifications are offered through Engineering Technology and Life Long Learning. The student has two options to choose from.
• Six Sigma Green Belt
• Six Sigma Black Belt
Each belt certification can be achieved either through academic credit (option A) or as professional industry training (option B).

Industry professionals wishing to pursue option B, contact Dr. Elke Howe at 417.625.9849. The requirements for option A are outlined below.

**Six Sigma Green Belt**
Students can earn Green Belt certification by successfully completing the following courses with an average grade of B or higher. There is a special fee associated with Green Belt certification.

**Required Engineering Technology Curriculum**

- DDET 110 (F,S) 3 hrs. cr. *Engineering Graphics I*
- DDET 115 (F) 3 hrs. cr. *Introduction to 3D Computer Aided Drafting*
- DDET 116 (F) 3 hrs. cr. *Drafting and Design Engineering Technology (DDET)*

**Six Sigma Black Belt**
Students can earn Black Belt certification by successfully completing the following courses with an average grade of B or higher. There is a special fee and an industry sponsored project associated with Black Belt certification.

**Required Engineering Technology Curriculum**

- DDET 220 (S) 3 hrs. cr. *Architectural Drafting*
- DDET 230 (S) 3 hrs. cr. *Advanced Surveying*
- DDET 231 (Demand) 3 hrs. cr. *Surveying Computations*

For additional information contact:
Elke Howe, Department Head
Engineering Technology
Office: Ummel Technology 153
Phone: 417.625.9849
Email: howe-e@mssu.edu

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**Course Descriptions**

## Drafting and Design Engineering Technology (DDET)

**DDET 0110 (F,S) 3 hrs. cr.** *Engineering Graphics I*
Preparation of drawings by using state-of-the-art CADD. Spreadsheet, word-processing are incorporated along with geometric construction, lettering orthographic projection, dimensioning, sections, pictorial drawing, graphs and diagrams. One hour lecture, four hours lab per week. Co-requisite: MATH 30.

**DDET 0115 (S) 3 hrs. cr.** *Introduction to 3D Computer Aided Drafting*
Computer aided drafting and the design of basic 3D wireframe and 3D models. Individuals who have a background in CAD should take the course for personal or professional improvement. One hour lecture, four hours lab per week. Prerequisite: DDET 110 & MATH 30.

**DDET 0120 (F) 3 hrs. cr.** *Descriptive Geometry*
Practical applications of advanced projection techniques to problems in civil, structural, mechanical and architectural engineering. Manual and computer assisted projects on methods are introduced. One hour lecture, four hours lab per week. Prerequisite: DDET 110, MATH 135 or instructor’s permission.

**DDET 0130 (F) 3 hrs. cr.** *Engineering Graphics II*
Detail and assembly drawings of machines and machine elements. Survey of the use of machine tools, processes and materials in the design and fabrication of machine parts. The use of 3D and parametric design software enhance the industrial applications within this course. One hour lecture, four hours lab per week. Prerequisite: DDET 110, MATH 135.

**DDET 0204 (F) 3 hrs. cr.** *Industrial Statics and Strength of Material*
Introductory survey of selected topics of statics and strength of materials, with emphasis on equilibrium friction, summation of forces and moments. The strength of materials will concentrate on simple stress and strain, basic beam relationships and torsional load carrying members. Two hours lecture, two hours lab per week. Prerequisites: DDET 110, MATH 135, Co-requisite: PHYS 151 or instructor’s permission.

**DDET 0210 (S) 3 hrs. cr.** *Technical Illustration*
Pictorial drawing with an emphasis on mechanical and architectural applications. Major topics include mechanical illustrations, exploded views and perspectives drawn with a computer aided drafting system. Drawings will involve 2D and 3D illustration, lettering styles and computer generated rendering and animation. One hour lecture, four hours lab per week. Prerequisite: DDET 115, MATH 135.

**DDET 0220 (S) 3 hrs. cr.** *Architectural Drafting*
Principles of architectural design, preparing sets of working drawings, building details and use of modern construction materials for residential building. Manual and computer aided design techniques used throughout the course. One hour lecture, four hours lab per week. Prerequisite: DDET 110, MATH 135.

**DDET 0230 (S) 3 hrs. cr.** *Elementary Surveying*
Use and care of surveying instruments, fundamental surveying methods, traverse measurements, area computations, precise equipment, and topographic mapping. One hour lecture and four hours lab per week. Prerequisites: DDET 110 or permission of instructor and MATH 135.

**DDET 0231 (Demand) 3 hrs. cr.** *Advanced Surveying*

**DDET 0232 (Demand) 3 hrs. cr.** *Surveying Computations*
Introduction to the theory of measurements in surveying. Error propagation in horizontal and vertical position. The analysis of surveying measurement error. Error propagation in rectangular coordinate systems. Introduction to the techniques of compass rule adjustment and least squares for the adjustment of surveying data. Least squares adjustment of triangulation, trilateration and traverse network. Least squares adjustment of level networks. The use of
surveying software will be utilized. Three one-hour lectures. Required background or experience: Prerequisite: MATH 135.

DDET 0233  (Demand)  3 hrs. cr.  
Boundary Control and Legal Principles  
Boundary retracement principles based on common laws. Emphasis on simultaneous conveyances, rancho lands, resurvey problems and legal descriptions. Three one-hour lectures. Required background or experience: DDET 230.

DDET 0234  (Demand)  3 hrs. cr.  
Land and Survey Descriptions  
History of land ownership and transfer of title; types of document of land conveyance; forms of legal descriptions of public and private lands; the bureau of land management; interpretation of maps and documents for the physical survey location of land boundaries; principles of writing precise land boundary descriptions; study of easements; value of monuments rectangular surveys; monumentation, restoration of lost corners, subdivision of sections, special surveys, plats and patents, meander lines and riparian rights. Three one hour lecture-problem sessions per week. Required background or experience. Prerequisite: DDET 230.

DDET 0260  (S)  3 hrs. cr.  
Engineering Graphics III  
Topics not covered in lower DDET courses, including Vector Graphics and DDET Applications pertaining to Descriptive Geometry. Geometric Dimensioning and Tolerancing and working drawings and CAM Design will be reemphasized. Engineering design and problem solving will be an essential aspect of this course. Special topics in DDET. Finite elements will be introduced. Drafting facility management concepts will also be covered. Three hours lecture per week, open labs as required. Prerequisites: DDET 110, 120, 130, 204, MATH 135, PHYS 151. Co-requisite: MATH 302, PHYS 152 or instructor’s permission.

DDET 0271  (Demand)  3 hrs. cr.  
Graphic Communication Tech I  
Basic applications of data transfer and manipulations within industrial environments. Topics could include: basic Internet applications, Web page design, introduction to data formatting for the Internet and other topics as the technology changes. One hour lecture, four hours of lab.

DDET 0298  (Demand)  1-8 hrs. cr.  
Special Topics Drafting & Design Engineering Technology  
A special topic or topics not normally included in another drafting/design course. Prerequisites determined by the department and stipulated in a course syllabus.

DDET 0490  (Demand)  1-8 hrs. cr.  
Internship in Drafting and Design Engineering Technology  
A structured work experience in drafting/design at an institution, facility or industry not directly related to Missouri Southern. The work experience will be a practical application of the students major field of study under the direct supervision of an on-site professional who is not a Southern faculty or staff member. The on-site professionals will supervise the students activity in the field. A faculty member will be responsible for approving the placement site and supervising the overall activities of the internship. Prerequisite: 15 hours of DDET.

DDET 0498  (Demand)  1-3 hrs. cr.  
Advanced Topics in Drafting and Design Engineering Technology  
Specialized knowledge and skills related to new developments in drafting and design. Topics will vary by the semester and situation. Prerequisite: An associate degree in drafting & design or senior standing in management-technology or industrial technology.

DDET 0499  (Demand)  1-3 hrs. cr.  
Independent Study in Drafting & Design Engineering Technology  
Individually directed reading, research and discussions in selected areas of drafting and design for advanced majors. Scope, depth, area of concentration and credit hours will be arranged when registering for the course. Offered by arrangement. Prerequisite: 15 hours of DDET with a 3.0 GPA and permission of instructor, department head and school dean.

Industrial Engineering Technology (IET)

IET 0105  (F,S)  3 hrs. cr.  
Introduction to Industrial Engineering Technology  
This course introduces students to skills and resources that will help them be successful in their academic and professional career. Emphasis is provided in the areas of goal setting and personal development, using research facilities and tools available on campus, problem solving and using data, teamwork, effective communication, professional ethics, as well as introductory concepts in engineering technology. Three one-hour lectures per week. Prerequisites: MATH 30 or above.

IET 0205  (S)  3 hrs. cr.  
Computer Applications and Cost Analysis  
Provides experiences in software applications in manufacturing settings and fundamentals of cost and analysis. Software applications include spreadsheets, databases, project planning, and charting. Three hours lecture per week. Prerequisite: Math 30 or above.

IET 300  (S)  3 hrs. cr.  
Engineering Economics  
Basics of engineering economics. Assessment of economic viability of a project. Evaluation of decision alternatives using different economic criteria. Three one-hour lectures per week. Prerequisites: MATH 130 with a grade of “C” or better and IET 205.

IET 0305  (S)  3 hrs. cr.  
Basic Electricity and Electronics  
This course provides an introduction into the principals of electricity/electronics with an emphasis on applications, problem solving and laboratory experiments. Topics covered will include AC and DC circuits, Series and Parallel circuits, Electrical components, Magnetism, Power and Instruments and Measurements. Two hours lecture and two hours lab per week. Prerequisite: MATH 130 with a grade of ‘C’ or better.

IET 0310  (F)  3 hrs. cr.  
Computer Production/Planning Control  
The course is designed to provide the theory and application of production and inventory management philosophies and techniques. The topics covered in this course will be discussed in light of the framework suggested in the APICS curriculum guides so that this can serve as a foundation for students preparing for certification exams. Applications will be illustrated through the use of computers. Three one-hour lectures per week. Prerequisite: MATH 130 with a grade of ‘C’ or better.
IET 0315  (Demand)  3 hrs. cr.  
Probability & Statistics for Engineers
This course is designed for students majoring in Industrial Engineering. Topics include: data analysis, probability, random variables, correlation, linear regression and confidence intervals. Prerequisite: MATH 130 with a grade of 'C' or better.

IET 0320  (F)  3 hrs. cr.  
Applied Statistical Quality Control
This course provides participants with the basic skills and research methods to analyze organizational systems. Topics include analytical approaches to problem solving, control charts, capability analysis, flow charts, histograms and measurement systems analysis. Students are expected to take a set of data that represent an organizational process and apply the appropriate statistical procedure, analyze the results of the procedure, and develop a recommendation based on the analysis. Computer based solution techniques are used where appropriate. This course is also part of the requirements for the Six Sigma Green Belt or Black Belt certification. Prerequisites: IET 315 or MATH 310 or GB 321 and MATH 130 with a grade of 'C' or higher or permission of instructor.

IET 0350  (S)  3 hrs. cr.  
Industrial Supervision  (Writing Intensive)
The course is a study of the role of the supervisor. The focus is on key skills needed for effective supervision—e.g., goal-setting, delegating, budgeting, interviewing, negotiating, counseling, coaching, conducting groups meetings and handling grievances. Prerequisites: Junior standing, six hours English Comp or permission of instructor.

IET 0355  (F)  3 hrs. cr.  
Work Measurement/Ergonomics
This course covers work measurements and methods. The course will focus on the use of standards, value engineering, methods design, workstations, time studies and ergonomics. Prerequisite: MATH 130 with a grade of 'C' or better.

IET 0381  (Demand)  3 hrs. cr.  
Introduction to Power & Energy
This is a required technology education course which is an introduction to the methods used in industry for the use of creating force/power and the generation of this energy/powers. Emphasis is placed on the investigation and conceptual understanding of the methods of power generation as well as the distribution and use of the energy developed. Two hours lecture and two hours lab per week. Prerequisite: MATH 130 with a grade of 'C' or better.

IET 0383  (F)  3 hrs. cr.  
Power Generation including Pneumatic and Hydraulics
A required technology course which is an advanced study in the methods used in industry for the use of creating force/power and the generation of power. Emphasis is placed on the advanced investigation and conceptual understanding of the methods of power generation as well as the distribution as it relates to pneumatics & hydraulics. Two hours lecture and two hours lab per week. Prerequisite: MATH 130 with a grade of 'C' or better.

IET 0391  (Demand)  3 hrs. cr.  
Wood Working and Plastics for Shop
This is a required industrial technology education course which is an introduction to the methods used in industry in the processing and production of wood and plastic products. The student will develop an appreciation for and knowledge of materials, products, tools and process. Emphasis is placed on the proper and safe use of wood and plastic machines, tools and chemicals as well as pride in workmanship. Students will be given an opportunity to design and build wood and plastic products throughout the course. Two hours lecture and two hours lab per week.

IET 0393  (Demand)  3 hrs. cr.  
Wood and Plastic Science
This is a required industrial technology education course, which is an introduction to the science of wood and plastic and the processing and production of wood or plastic components as well as basic cabinet construction. The student will develop an appreciation for and knowledge of materials, products, tools and process as required in shop and industrial applications. Emphasis is placed on the proper and safe use of wood and plastic machines, tools and chemicals in the processing or production of wood and plastic components. Students will be given an opportunity to investigate their knowledge of design and building of wood and plastic products throughout the course. Prerequisites of technical math or equivalent and IET 391. Two hours lecture and two hours lab per week.

IET 0425  (S)  3 hrs. cr.  
Design Experiments  (Writing Intensive)
Learn basic statistical concepts of designing and analyzing experiments. Applications from various manufacturing as well as non-manufacturing fields will be illustrated throughout the course. Computer software packages to implement the methods presented will be illustrated extensively and used for homework assignments and a term project. This course is also part of the requirements for the Six Sigma Black Belt certification. Three one hour lectures per week. Prerequisites: MATH 130 with a grade of 'C' or higher and IET 320.

IET 0440  (S)  3 hrs. cr.  
Six Sigma Methodology
This course is about building on skills and knowledge gained in prior coursework and demonstrating the successful use of Six Sigma tools and concepts toward reducing costs, increasing quality, or improving lead-time. Any knowledge and tools gained throughout the curriculum may be used through the application of the DMAIC model to do the project work. This course also completes the training basis for achieving the skill level of a Six Sigma Green Belt and is part of the requirements for a Six Sigma Black Belt. Three one hour lectures per week. Prerequisites: MET 250, IET 320, IET 355, and IET 310 or IET 450 or IET 460 or permission of instructor. Co-requisite: IET 425 or permission of instructor.

IET 0450  (F)  3 hrs. cr.  
Plant Layout / Material Handling
This course is designed to give the students a comprehensive understanding of the issues involved in the design of an industrial production system. It will cover the problems in plant location, product analysis, process design, equipment selection, material handling and plant layout. Three one-hour lectures per week. Prerequisites: DDET 110, DDET 115, MATH 130 with a grade of 'C' or better.

IET 0460  (F)  3 hrs. cr.  
Competitive Industrial Practices
Explores concepts and principles guiding today's businesses. Provides students with powerful approaches for eliminating waste and improving operations in organizations. Three one-hour lectures per week. Prerequisite: Senior Standing.
IET 0490  (F,S)  1-3 hrs. cr.
Professional Internship
This course is intended to provide the student with “real-world professional” experience in the area of Industrial Engineering Technology by working with an external organization. The Engineering Technology department has several placement opportunities available to students. Students interested in pursuing an internship must start the application process the semester before they intend to work. Prerequisites: 2.5 Overall GPA minimum, 3.0 IET GPA minimum, Junior or Senior status, ET department approval.

IET 0494  (F,S)  1 hr. cr.
Senior Seminar
This class is designed to prepare the Industrial Engineering Technology senior for the transition from the university environment to the real world of work. It will cover topics such as: career development, employer expectations, job research, resume development, interviewing skills and transition issues. One hour lecture per week. Prerequisites: Senior Standing.

IET 0498  (Demand)  1-3 hrs. cr.
Advanced Topics in IET
Special topics in Industrial Engineering Technology.

Manufacturing Engineering Technology (MET)

MET 0100  (F,S)  3 hrs. cr.
Introduction to Machine Tool Processes
The theory and safe operation of basic machine tools. Fundamental practices include: safety, basic mathematics, blueprint reading, bench-work, precision measurement, metal sawing, drills and drilling, pedestal bench grinding, engine lathes, mills. One hour lecture, four hours lab. Prerequisites: MATH 30 or higher.

MET 0105  (Demand)  3 hrs. cr.
Precision Machining
An introduction to the operation of surface, cylindrical, tool and cutter grinders. Principles of inspection and gaging, applied trigonometry, tooling geometry and advanced lathe and milling practices will be covered. One hour lecture, four hours of lab. Prerequisites: MET 100, DDET 110, MATH 130 or consent of instructor.

MET 0110  (Demand)  1 hr. cr.
Fundamentals of Cutting Tools
Introduction to tool geometry, chip formation and effects of coolants and tool design on tool life. Instruction on the sharpening of standard cutting tools for drilling, formed relieved end mills and mill cutters and the applications of various factors on machinability. The use of carbides and ceramics as cutting tools. One hour lecture, four hours of lab.

MET 0145  (S)  3 hrs. cr.
Industrial Automation
This course will provide the student with the ability to program equipment used in industrial automation to perform multiple processes. This course will also focus on operation, maintenance, and safety requirements of automation equipment in a manufacturing environment. Two hours lecture, two hours lab. Prerequisite: MATH 30 or higher or ACT score of 20 or higher.

MET 0160  (Demand)  3 hrs. cr.
Inspection and Gaging
Inspection, gaging and precision measurement procedures utilizing mechanical, electronic and optical measuring equipment and related math. Geometric dimensioning and tolerancing emphasized. Computer assisted process control methods are introduced and applied to specific inspection procedures. One hour lecture, four hours of lab.

MET 0200  (F)  3 hrs. cr.
Computer Numerical Control
Basic numerical control concepts and applications, the operation and setup of numerical control machines, including Vertical machining centers and turning centers, numerical control programming as applied to machining applications using MDI. One hour lecture, four hours of lab. Prerequisites: MET 100, DDET 110, MATH 30 or 130 and MATH 135 or MATH 140 or consent of instructor.

MET 0202  (Demand)  3 hrs. cr.
Tool Design
Tool design and manufacturing is an advanced course on the designing, machining and manufacturing of production tools, dies, jigs and fixtures. Prerequisites: MET 105 and DDET 110. One hour lecture and four hours lab.

MET 0240  (S)  3 hrs. cr.
Engineering Materials
Introduction to materials currently used in today’s manufacturing settings with emphasis on metals, plastics, ceramics and composites. Laboratory activities involve both manual and computer assisted testing. Two hours lecture and two hours of lab. Prerequisite: MATH 130 with a grade of ‘C’ or better.

MET 0245  (F)  3 hrs. cr.
Manufacturing with Metals
Practical introduction to metals and alloys with emphasis on optimal use of materials in a variety of manufacturing applications. This course focuses on providing an understanding of how and when materials are used, examining specific applications and their requirements and relating those requirements to the properties of various materials. Criteria for appropriate materials selection as well as techniques for maintaining control over material properties during processing will be illustrated. Two hours lecture and two hours lab per week. Prerequisite: MATH 130 with a grade of ’C’ or better.

MET 0298  (Demand)  1-8 hrs. cr.
Topics in Manufacturing Technology
Special topics in new or emerging manufacturing technology not normally included in another course. Prerequisites specified by the department in a course syllabus.

MET 0304  (S)  3 hrs. cr.
CNC Project & Cost Analysis
This course will focus on the development of a CNC project applying the principles of design, material selection, cost analysis, planning, and numerical control concepts, including vertical machining centers and turning centers, numerical control programming, and proofing. Students will gain an understanding of basic project management skills as well as project realization. Two hours lecture, two hours lab. Prerequisites: MET 200, MET 240 or MET 245, IET 205, IET 300.

MET 0490  (Demand)  1-8 hrs. cr.
Internship in Manufacturing Technology
A structured work experience in manufacturing technology at an institution, facility or industry not directly related to Missouri Southern. Practical application of the students’ majors under the direct supervision of an on-site professional who is not an MSSU faculty or staff member. A faculty member will be responsible for approving the placement site and supervising the overall activities of the internship. Prerequisites: 15 hours of MET courses and permission of a committee.
Objectives

To prepare undergraduate students with the knowledge skills and ethics needed to advance the health and quality of life of a diverse public.

Goal 1

To prepare undergraduate students with the knowledge skills and ethics needed to advance the health and quality of life of a diverse public.

Objectives

- Collect, store, retrieve, analyze and interpret health data; in order to be prepared to design health needs assessments and establish basic health programs and services. (HS 350, HS 380, HS 390, PSY 320, GB 321, MATH 310, SOC 305)
- Describe the U.S. health profile, including key indicators, determinates, disparities, access to health services, historical and contemporary trends and implications. (HS 390, HS 370, HS 380)
- Identify and describe the evolution of the U.S. health services system and the major settings, providers and funding for the delivery of public and private preventive and treatment services. (HS 390 & Finance course)
- Recognize the importance of honoring diversity, acting with civility, practicing ethically and promoting mutual respect when working with diverse individuals, groups and communities. (HS 390, HS 312, HS 305)
- Describe the business and financial implications in the cost of health care. (HS 390)
- Identify physical, chemical or biological hazards that adversely impact human health. (HS 380, HS 370)

Goal 2

To prepare students with the fundamental academic skills to be effective communicators, critical thinkers and leaders.

Objectives

- Write grammatically and stylistically correct papers that reflect a review of relevant literature and/or integrate health related perspectives and experiences. (HS 305, HS 350, WI Allied Health course)
- Develop the ability to utilize qualitative and quantitative health care information to arrive at appropriate decisions. (PSY 320, HS 350, HS 337, HS 354, HS 380, HS 380)
- Integrate clinical practice with health of the community and develop a strong foundation in communication in order to effectively disseminate diverse health issues to community leaders, (HS 390, HS 305), health practitioners, politicians and the public at large. (Allied Health Science courses, HS 390, HS 380, HS 370)
- Understand the role of research in the dissemination of information in health promotion, disease prevention and health sciences. (HS 390, HS 380, HS 370, PSY 320 or MATH 310, Allied Health Courses).
- To understand and communicate principles of sound leadership (HS 350, MM 354, MM 352, MM 321).

Goal 3

Develop lifelong learning skills necessary to be creative and effective citizens, professionals, and leaders in an every changing world.

Objectives

- Write grammatically and stylistically correct papers that reflect a review of relevant literature and/or integrate health related perspectives and experiences. (HS 305, HS 350WI, Allied Health Courses).
- Organize and participate in community events to improve the overall health of the community. (Allied Health courses, HS 499).

Health is widely acknowledged as a major growth industry, with employment opportunities forecast to continue their strong upward trends of recent years. Opportunities for advancement will be greatest for people with a baccalaureate degree.

Associate degree prepared health profession majors and clinicians in the field who desire a baccalaureate degree have limited options to fulfill their educational goals. Graduates and clinicians from the health professions continually inquire about baccalaureate degree options to meet their busy professional lives. The Health Science degree is a specified course of study that would enhance a clinician’s expertise and opportunities for advancement. The design of the Health Science curriculum is to prepare students for career paths in the health sector, including administration, management and health promoters in educational or clinical settings in a school, medical sales, pharmaceutical marketing and distribution, community or public health environments. Graduates from the Bachelor of Health Science program may qualify to enter graduate programs or professional health science areas such as physician assistant, physical therapy and public health.

Courses in the curriculum are offered on campus as well as web based. The demand for this degree will be great among current students, past graduates and clinicians working in their field.

The Bachelor of Science degree in Health Sciences is granted to students who complete the required program of study. These requirements include the basic general education requirements for all Bachelor of Science degree programs, required science and other supportive courses in the health science area. The degree is designed with two options.

- **Emphasis One:** Allows students who complete an Associate in an allied health field to select a degree that will strengthen and utilize the associate curriculum within the Health Science degree. There are four specific