ENGINEERING MANAGEMENT, SYSTEMS AND TECHNOLOGY

Majors:

- Bachelor of Science in Engineering Technology, Electronic and Computer Engineering Technology (p. 1)
- Bachelor of Science (p. 3) in Engineering Technology (p. 1), Industrial Engineering Technology (p. 3)
- Bachelor of Science (p. 5) in Engineering Technology, (p. 1) Mechanical Engineering Technology (p. 5)

Minors:

- Automotive Systems (p. 6) Design (p. 6)
- Electronic and Computer Engineering Technology (p. 2)
- Engineering Management (p. 6)
- Human Factors (p. 4)
- Industrial Automation and Applied Robotic Systems (p. 6)
- Quality and Lean Six Sigma (p. 4)

The School of Engineering also offers a Bachelor of Science in Engineering Technology. The programs in which the degree is offered are electronic and computer engineering technology, industrial engineering technology, and mechanical engineering technology. Graduates from engineering technology are usually involved in the design, performance evaluation, service and sales of products, equipment, and manufacturing systems, or the management of these activities. The management of process operations and plant facilities are also important career paths.

The engineering technology programs provide: (1) specialized technical courses that emphasize rational thinking and the application of engineering and scientific principles to the practical solution of technological problems; (2) courses in applied mathematics and science sufficient to support the technical courses and to prepare the student for future growth; and (3) education to prepare students to effectively communicate and to take places in society as responsible, humane, competent professionals.

The University of Dayton engineering technology programs prepare graduates who:

- are experienced and competent in applying engineering knowledge and problem solving skills to the needs of industry
- are effective communicators for varied audiences
- demonstrate a commitment to ethical and professional standards of conduct
- are engaged in continuing professional development and increasing professional responsibility within their field
- exhibit leadership qualities as appropriate for the practice of their profession
- are prepared to work within and lead diverse technical teams with a sensitivity towards other cultures and a respect for the individual
- are involved in service activities that benefit their profession and their community

Electronic and Computer Engineering Technology

The Electronic and Computer Engineering Technology Program (ECT) prepares students for careers in the electronics and computer fields. The ECT curriculum, while including a strong emphasis on computers, centers on applied engineering topics in circuit analysis, analog and digital electronic design, digital communications, digital circuits, microprocessors, software, and data acquisition and instrumentation. The graduate is prepared to work in industry at a variety of tasks including analog and digital design, microprocessor hardware and software applications, electronic controls, automation, engineering sales and support, product design and development, and data communications. The curricula provide the strong foundation in the basic principles necessary to support any future career studies or development as dictated by changing technology or career roles.

Faculty
Susan Scachitti, Department Chairperson
Professor Emeriti: Globig, Hanneman, Hazen
Professor: Segalewitz
Associate Professor: S. Schneider
Assistant Professor: Watson
Assistant Faculty of Practice: Motz

Bachelor of Science in Engineering Technology, Electronic and Computer Engineering Technology (ECT) minimum 127 hours

The Common Academic Program (CAP) is an innovative curriculum that is the foundation of a University of Dayton education. It is a learning experience that is shared in common among all undergraduate students, regardless of their major. Some CAP requirements must be fulfilled by courses taken at UD (e.g., Capstone and Diversity and Social Justice). Some major requirements must also be fulfilled by courses taken at UD. Students should consult with their advisor regarding applicability of transfer credit to fulfill CAP and major program requirements.

Common Academic Program (CAP) [1]		
First-Year Humanities Commons [2]		12 cr. hrs.
HST 103	Introduction to Global Historical Studies	
REL 103	Introduction to Religious and Theological Studies	
PHL 103	Introduction to Philosophy	
ENG 100	Writing Seminar I [3]	
Second-Year Writing Seminar [4]		0-3 cr. hrs.
ENG 200	Writing Seminar II	
Oral Communication		3 cr. hrs.
CMM 100	Principles of Oral Communication	
Mathematics		3 cr. hrs.

Social Science	3 cr. hrs.
Arts	3 cr. hrs.
Natural Sciences [5]	7 cr. hrs.
Crossing Boundaries	up to 12 cr. hrs.
Faith Traditions	
Practical Ethical Action	
Inquiry	
Integrative	
Advanced Study	
Philosophy and/or Religious Studies (6 cr. hrs.)	
Historical Studies (3 cr. hrs.) [6]	
Diversity and Social Justice [7]	3 cr. hrs.
Major Capstone [8]	0-6 cr. hrs.

1. The credit hours listed reflect what is needed to complete each CAP component. However, they should not be viewed as a cumulative addition to a student's degree requirements because many CAP courses are designed to satisfy more than one CAP component (e.g., Crossing Boundaries and Advanced Studies) and may also satisfy requirements in the student's major.
2. May be completed with ASI 110 and ASI 120 through the Core Program.
3. May be completed with ENG 100A and ENG 100B, by placement.
4. May be completed with ENG 114 or ENG 198 or ASI 120.
5. Must include two different disciplines and at least one accompanying lab.
6. May be completed with ASI 110 and ASI 120 through the Core Program.
7. May not double count with First-Year Humanities Commons, Second-Year Writing, Oral Communication, Social Science, Arts, or Natural Sciences CAP components, but may double count with courses taken to satisfy other CAP components and/or courses taken in the student's major.
8. The course or experience is designed by faculty in each major; it may, or may not, be assigned credit hours.

Major in Electronic and Computer Eng Tech

MATHEMATICS AND SCIENCE REQUIREMENTS		
MTH 168	Analytic Geometry & Calculus I	4
MTH 169	Analytic Geometry & Calculus II	4
MTH 207	Introduction to Statistics	3
CHM 123 & 123L	General Chemistry and General Chemistry Laboratory	4
PHY 201 & 201L	College Physics I and College Physics Laboratory I	4
CORE ECT COURSES		
EGR 102	Introduction to the University Experience for Engineers	0
EGR 103	Engineering Innovation	2
EGR 150	Enrichment Workshop I	0
EGR 200 or COP 200	Career Launchpad: Preparing for Success Introduction to Engineering Cooperative Education	0
EGR 400	Professional Development for Seniors	1
SET 101	Introduction to Engineering Technology II	0
SET 150	Engineering Analysis I w/ Lab	3
SET 153L	Introduction to Data Analytics and Programming	1
SET 250	Engineering Analysis II	2
SET 300	Professional Development for Juniors	0
IET 317	Industrial Economic & Financial Analysis	3
IET 323	Project Management	3
MCT 110L	Mechanical Design & CAD I	2
MCT 215	Statics	3
MFG 431	Controls for Industrial Automation	3
REQUIRED TECHNICAL COURSES		
ECT 108L	Introduction to Electronic Design	1
ECT 110	Electrical Circuits I	3
ECT 120	Electrical Circuits II w/ Lab	3
ECT 206	Electron Devices I w/ Lab	3
ECT 305	Introduction to Semiconductor Manufacturing	3
ECT 224	Digital Systems Fundamentals	3
ECT 306	Electronic Devices II w/ Lab	3
ECT 357	Advanced Digital Systems Design	3
ECT 358	Microprocessor Systems Design	3
ECT 361	Programming Structures	3
ECT 408	Data Acquisition & Measurements	2
ECT 452	Feedback Controls	3
ECT 465	Digital Data Communications	3
ECT 467	Real-Time Embedded System Design w/ Lab	3
ECT 490	Senior Project	3
ELECTIVES		
Engineering Technology & Science Electives [1]		9
Total Hours		**93**

1. Select from list approved by the Department.

Minor in Electronic and Computer Engineering Technology (ECT)

This minor provides a concentration in the electronic and computer field that will complement the student's major program of study. It is open to all majors except electronic and computer engineering technology, electrical engineering and computer engineering. All prerequisites and co-requisites must be followed. Only one course may double count for both the student's major and minor.

ECT 120	Electrical Circuits II w/ Lab	3
ECT 224	Digital Systems Fundamentals	3
Select one emphasis from: [1,2]		6
Analog Devices Emphasis		
ECT 206	Electron Devices I w/ Lab	

ECT 306	Electronic Devices II w/ Lab	
Digital Systems Emphasis		
ECT 357	Advanced Digital Systems Design	
ECT 358	Microprocessor Systems Design	
Software Emphasis		
ECT 361	Programming Structures	
ECT 362	Concepts & Applications of Computer Operating Systems	
Total Hours		**12**

Industrial Engineering Technology

The Industrial Engineering Technology Program has as its objective providing specialized education to prepare students for management and technical staff positions in manufacturing and service organizations such as health care, banking, transportation, food service, and government. Graduates may be involved in the economic selection and location of equipment, the planning of work methods and expected output, quality assurance, facilities layout, and scheduling and controlling the flow of materials. The curriculum emphasizes courses in work measurement, planning and control of lean processes, human factors, safety, facilities layout design and simulation, economic and financial analysis, statistical process control, management of projects and global technical organizations, cost estimating and cost control, supply chain management and mathematical decision-making.

Faculty
Susan Scachitti, Department Chairperson
Professor Emeritus: Edmonson, Mykytka
Professor: Scachitti
Associate Professors: Appiah-Kubi, Blust, Bommer
Assistant Professors: Mowrey, Lee
Lecturer: Kulkarni

Bachelor of Science in Engineering Technology, Industrial Engineering Technology (IET) minimum 130 hours

The Common Academic Program (CAP) is an innovative curriculum that is the foundation of a University of Dayton education. It is a learning experience that is shared in common among all undergraduate students, regardless of their major. Some CAP requirements must be fulfilled by courses taken at UD (e.g., Capstone and Diversity and Social Justice). Some major requirements must also be fulfilled by courses taken at UD. Students should consult with their advisor regarding applicability of transfer credit to fulfill CAP and major program requirements.

Common Academic Program (CAP) [1]

First-Year Humanities Commons [2]		12 cr. hrs.
HST 103	Introduction to Global Historical Studies	
REL 103	Introduction to Religious and Theological Studies	
PHL 103	Introduction to Philosophy	
ENG 100	Writing Seminar I [3]	
Second-Year Writing Seminar [4]		0-3 cr. hrs.
ENG 200	Writing Seminar II	
Oral Communication		3 cr. hrs.
CMM 100	Principles of Oral Communication	
Mathematics		3 cr. hrs.
Social Science		3 cr. hrs.
Arts		3 cr. hrs.
Natural Sciences [5]		7 cr. hrs.
Crossing Boundaries		up to 12 cr. hrs.
Faith Traditions		
Practical Ethical Action		
Inquiry		
Integrative		
Advanced Study		
Philosophy and/or Religious Studies (6 cr. hrs.)		
Historical Studies (3 cr. hrs.) [6]		
Diversity and Social Justice [7]		3 cr. hrs.
Major Capstone [8]		0-6 cr. hrs.

1. The credit hours listed reflect what is needed to complete each CAP component. However, they should not be viewed as a cumulative addition to a student's degree requirements because many CAP courses are designed to satisfy more than one CAP component (e.g., Crossing Boundaries and Advanced Studies) and may also satisfy requirements in the student's major.
2. May be completed with ASI 110 and ASI 120 through the Core Program.
3. May be completed with ENG 100A and ENG 100B, by placement.
4. May be completed with ENG 114 or ENG 198 or ASI 120.
5. Must include two different disciplines and at least one accompanying lab.
6. May be completed with ASI 110 and ASI 120 through the Core Program.
7. May not double count with First-Year Humanities Commons, Second-Year Writing, Oral Communication, Social Science, Arts, or Natural Sciences CAP components, but may double count with courses taken to satisfy other CAP components and/or courses taken in the student's major.

[8] The course or experience is designed by faculty in each major; it may, or may not, be assigned credit hours.

Major in Industrial Engineering Technology, BST		
MATHEMATICS AND SCIENCE REQUIREMENTS		
MTH 168	Analytic Geometry & Calculus I	4
MTH 169	Analytic Geometry & Calculus II	4
MTH 207	Introduction to Statistics	3
CHM 123	General Chemistry	3
CHM 123L	General Chemistry Laboratory	1
PHY 201	College Physics I	3
PHY 201L	College Physics Laboratory I	1
CORE IET COURSES		
EGR 102	Introduction to the University Experience for Engineers	0
EGR 103	Engineering Innovation	2
EGR 150	Enrichment Workshop I	0
EGR 200	Career Launchpad: Preparing for Success	0
or COP 200	Introduction to Engineering Cooperative Education	
EGR 400	Professional Development for Seniors	1
SET 101	Introduction to Engineering Technology II	0
SET 150	Engineering Analysis I w/ Lab	3
SET 153L	Introduction to Data Analytics and Programming	1
SET 300	Professional Development for Juniors	0
ECT 108L	Introduction to Electronic Design	1
ECT 110	Electrical Circuits I	3
MCT 110L	Mechanical Design & CAD I	2
MCT 111L	Mechanical Design & CAD II	2
MCT 215	Statics	3
MFG 108L	Manufacturing Processes Laboratory	1
MFG 204	Materials & Processes	3
MFG 204L	Materials & Processes Laboratory	1
MFG 206L	Dimensional Metrology Laboratory	1
MFG 240	Manufacturing & Product Design	3
REQUIRED TECHNICAL COURSES		
IET 230	Work Measurement	3
IET 316	Quantitative Analysis	3
IET 317	Industrial Economic & Financial Analysis	3
IET 318	Statistical Process Control	3
IET 323	Project Management	3
IET 330	Cost Estimating and Control	3
IET 332	Facilities Layout Design	3
IET 335	Process Simulation and Analysis	3
IET 408	Lean Management and Six Sigma	3
IET 415	Global Supply Chain Management	3
IET 420	Industrial & Environmental Safety	3
IET 435	Human Factors	3
IET 490	Senior Project	3
ELECTIVES		
Engineering Technology & Science Electives [1]		12
Total Hours		**97**

[1] Select from list approved by the Department.

Minor in Human Factors

This minor is open to all majors except industrial engineering technology. The program provides a concentration in the field of human factors and performance measurement as applied to work in industrial settings, banking, healthcare, government, and service organizations that will complement the student's major field of study. All prerequisites and corequisites must be followed. Only one course may double count for both the student's major and minor.

IET 230	Work Measurement	3
IET 320	Design and Analysis of Experiments	3
IET 420	Industrial & Environmental Safety	3
IET 435	Human Factors	3

Minor in Quality and Lean Six Sigma (QSS)

This minor is open to all majors. The program provides a concentration in the fields of quality control and Lean and Six Sigma methodologies. Upon successful completion of this minor, the student will have command of statistical quality tools as well as the breadth of quality management concepts and will gain experience in the practical application of tools that are used to increase productivity, enhance quality, and improve operational excellence. All prerequisites and corequisites must be followed. Only one course may double count for both the student's major and minor.

IET 408	Lean Management and Six Sigma	3
IET 409	Lean Management	3
IET 320	Design and Analysis of Experiments	3
IET 318	Statistical Process Control	3
or IET 322	Data Analytics	
Total Hours		**12**

Mechanical Engineering Technology

The Mechanical Engineering Technology Program emphasizes the practical application of the principles of the mechanical engineering field. Career opportunities are in mechanical design, computer-aided design, product evaluation and development, manufacturing engineering, computer-aided manufacturing, plant engineering, technical sales, technical service, fluid power, automation, and supervision. A significant portion of the graduates are in technical management. The curriculum includes a core of technical sciences; applied courses in design, thermodynamics, fluid mechanics, and manufacturing; extensive laboratory experiences; and mathematics from college algebra through probability, statistics, calculus, and differential equations. Courses are required in oral and written communication, with components in the humanities and social sciences to provide insight into the impact of technology on society. Concepts from basic education are stressed in technical courses. The curriculum is broad to prepare graduates for employment and provide a foundation on which to base continued study of changing technology.

Faculty
Susan Scachitti, Department Chairperson
Professors Emeriti: Mott, Untener, Wolff
Associate Professors: Blust, Zouhri
Faculty of Practice: Cahill, Obermeyer
Lecturer: Kulkarni

Bachelor of Science in Engineering Technology, Mechanical Engineering Technology (MCT) minimum 129 hours

The Common Academic Program (CAP) is an innovative curriculum that is the foundation of a University of Dayton education. It is a learning experience that is shared in common among all undergraduate students, regardless of their major. Some CAP requirements must be fulfilled by courses taken at UD (e.g., Capstone and Diversity and Social Justice). Some major requirements must also be fulfilled by courses taken at UD. Students should consult with their advisor regarding applicability of transfer credit to fulfill CAP and major program requirements.

Common Academic Program (CAP) [1]

First-Year Humanities Commons [2]		12 cr. hrs.
HST 103	Introduction to Global Historical Studies	
REL 103	Introduction to Religious and Theological Studies	
PHL 103	Introduction to Philosophy	
ENG 100	Writing Seminar I [3]	
Second-Year Writing Seminar [4]		0-3 cr. hrs.
ENG 200	Writing Seminar II	
Oral Communication		3 cr. hrs.
CMM 100	Principles of Oral Communication	
Mathematics		3 cr. hrs.
Social Science		3 cr. hrs.
Arts		3 cr. hrs.
Natural Sciences [5]		7 cr. hrs.
Crossing Boundaries		up to 12 cr. hrs.
Faith Traditions		
Practical Ethical Action		
Inquiry		
Integrative		
Advanced Study		
Philosophy and/or Religious Studies (6 cr. hrs.)		
Historical Studies (3 cr. hrs.) [6]		
Diversity and Social Justice [7]		3 cr. hrs.
Major Capstone [8]		0-6 cr. hrs.

1. The credit hours listed reflect what is needed to complete each CAP component. However, they should not be viewed as a cumulative addition to a student's degree requirements because many CAP courses are designed to satisfy more than one CAP component (e.g., Crossing Boundaries and Advanced Studies) and may also satisfy requirements in the student's major.
2. May be completed with ASI 110 and ASI 120 through the Core Program.
3. May be completed with ENG 100A and ENG 100B, by placement.
4. May be completed with ENG 114 or ENG 198 or ASI 120.
5. Must include two different disciplines and at least one accompanying lab.
6. May be completed with ASI 110 and ASI 120 through the Core Program.
7. May not double count with First-Year Humanities Commons, Second-Year Writing, Oral Communication, Social Science, Arts, or Natural Sciences CAP components, but may double count with courses taken to satisfy other CAP components and/or courses taken in the student's major.
8. The course or experience is designed by faculty in each major; it may, or may not, be assigned credit hours.

Major in Mechanical Engineering Technology, BST

MATHEMATICS AND SCIENCE REQUIREMENTS		
MTH 168	Analytic Geometry & Calculus I (MATHEMATICS AND SCIENCE REQUIREMENTS)	4
MTH 169	Analytic Geometry & Calculus II	4
MTH 207	Introduction to Statistics	3
CHM 123 & 123L	General Chemistry and General Chemistry Laboratory	4
PHY 201 & 201L	College Physics I and College Physics Laboratory I	4
CORE MCT COURSES		
EGR 102	Introduction to the University Experience for Engineers	0
EGR 103	Engineering Innovation	2
EGR 150	Enrichment Workshop I	0
EGR 200 or COP 200	Career Launchpad: Preparing for Success Introduction to Engineering Cooperative Education	0
SET 101	Introduction to Engineering Technology II	0
EGR 400	Professional Development for Seniors	1
SET 150	Engineering Analysis I w/ Lab	3
SET 153L	Introduction to Data Analytics and Programming	1
SET 250	Engineering Analysis II	3
SET 300	Professional Development for Juniors	0
ECT 108L	Introduction to Electronic Design	1
ECT 110	Electrical Circuits I	3
ECT 408	Data Acquisition & Measurements	2

IET 317	Industrial Economic & Financial Analysis	3
IET 323	Project Management	3
MFG 108L	Manufacturing Processes Laboratory	1
MFG 204 & 204L	Materials & Processes and Materials & Processes Laboratory	4
MFG 206L	Dimensional Metrology Laboratory	1
MFG 240	Manufacturing & Product Design	3
REQUIRED TECHNICAL COURSES		
MCT 110L	Mechanical Design & CAD I	2
MCT 215	Statics	3
MCT 111L	Mechanical Design & CAD II	2
MCT 221	Strength of Materials	3
MCT 231	Fluid Mechanics	3
MCT 315	Dynamics	3
MCT 320	Design of Machine Elements I	3
MCT 342	Thermodynamics	3
MCT 337	Fluid Power w/ Lab	3
MCT 420	Design of Machine Elements II	3
MCT 490	Senior Project	3
ELECTIVES		
Electrical Elective		3
Technical Electives [1]		12
Total Hours		**96**

[1] Select from list approved by the Department.

Minor in Automotive Systems Design (AST)

This minor is open to all majors. The program provides a concentration in the automotive field that will complement the student's major program of study. All prerequisites and corequisites must be followed. Only one course may double count for both the student's major and minor.

ECT 456	Automotive Electrical & Safety Systems	3
MCT 456	Automotive Powertrain & Chassis Systems	3
Select two courses from:		6
ECT 224	Digital Systems Fundamentals	
ECT 452	Feedback Controls	
ECT 465	Digital Data Communications	
MCT 420	Design of Machine Elements II	
or MEE 427	Mechanical Design I	
MCT 438	Heat Transfer	
or MEE 410	Heat Transfer	
MCT 440	Applied Vibrations	
MCT 446	Applied Finite Element Modeling	
MFG 432	Plastics, Composites & Nano Materials & Processes	
Total Hours		**12**

Only one course may double count for both the student's major and minor.

Minor in Industrial Automation and Applied Robotic Systems (ARS)

This minor is open to all majors in the School of Engineering. The program provides a concentration in the industrial automation and applied robotic systems field that will complement the student's major field of study. All prerequisites and corequisites must be followed. Only one course may double count for both the student's major and minor.

Industrial Automation and Applied Robotic Systems [1]		
Choose 4 courses for 12 credit hours		12
ECT 452	Feedback Controls	
MFG 424	Robotics	
MFG 431	Controls for Industrial Automation	
MFG 434	Robotics & Computer Numerical Control	
MFG 427	Computer Integrated Manufacturing & Global Manufacturing	
MFG 435	Advanced Numerical Control	
Total Hours		**12**

Only one course may double count for both the student's major and minor.

[1] If the minor's required courses are already required by the student's major, the student may select ECT 224 or MCT 313 to complete a total of at least twelve semester hours. Students in Engineering programs may not select courses with content similar to courses offered in their major.

Minor in Engineering Management (ENM)

This twelve credit hour minor is open to all engineering and engineering technology majors. Completion of this minor will provide the student with understanding of basic concepts relevant to the management of engineering operations. Students who anticipate moving from technical to managerial positions during their careers may wish to consider this minor. Only one course may double count for both the student's major and minor.

ENM 505	Systems Engineering Fundamentals	3
ENM 530	Engineering Economy	3
or ISE 430	Engineering Economy	
Select two courses from:		6
ENM 500	Probability & Statistics for Engineers	
ENM 515	Human Factors Engineering	
ENM 534	Decision Analysis	
ENM 539	Project Management	
ENM 560	Quality Assurance	
ENM 565	Reliability Engineering I	
ENM 582	Engineering Organizational Development	
ISE 300	Probability & Statistics for Engineers	
ISE 421	Introduction to Operations Research [1]	
ISE 455	System Dynamics	
ISE 460	Quality Assurance	
ISE 465	Reliability & Maintainability	
SYE 521	Introduction to Operations Research	

SYE 572	System Simulation	
Total Hours		**12**

Only one course may double count for both the student's major and minor.

[1] ENM 500 (or ISE 300 or MTH 367) is a prerequisite.

Electronic and Computer Engineering Technology

First Year

Fall	Hours	Spring	Hours
ENG 100 (Satisfies CAP Writing Seminar)	3	REL 103 (Satisfies CAP First-Year Humanities Common)	3
HST 103 (Satisfies CAP First-Year Humanities Common)	3	PHL 103 (Satisfies CAP First-Year Humanities Common)	3
MTH 168	4	CHM 123	3
SET 150	3	CHM 123L	1
SET 153L	1	MTH 169	4
ECT 108L	1	ECT 110	3
EGR 103	2	SET 101	0
EGR 150	0		
EGR 102	0		
	17		**17**

Second Year

Fall	Hours	Spring	Hours
ECT 120	3	ENG 200 (satisfies CAP Second Year Writing Seminar)	3
ECT 224	3	ECT 206	3
ECT 361	3	ECT 357 or 358	3
PHY 201	3	SET 250	3
PHY 201L	1	MCT 110L	2
MTH 207	3	MCT 215	3
EGR 200	0		
	16		**17**

Third Year

Fall	Hours	Spring	Hours
SSC 200 (Satisfies CAP Social Science)	3	CAP Advanced PHL/REL (may also satisfy additional CAP components)	3
CMM 100 (satisfies CAP Communication)	3	CAP ADVANCED PHL/REL (MAY ALSO SATISFY ADDITIONAL CAP COMPONENTS)	3
ECT 305	3	ECT 408	2
ECT 306	3	ECT 465	3
MFG 431	3	ECT 357 or 358	3
SET 300	0	TECH Elective	3
	15		**17**

Fourth Year

Fall	Hours	Spring	Hours
CAP Advanced HST (may also satisfy additional CAP components)	3	CAP ARTS (may also satisfy additional CAP components)	3
ECT 467	3	ECT 452	3
TECH Elective	3	TECH Elective	3
IET 317	3	ECT 490 (Satisfies CAP Capstone Requirement)	3
IET 323	3		
EGR 400	1		
	16		**12**

Total credit hours: 127

Industrial Engineering Technology

First Year

Fall	Hours	Spring	Hours
ENG 100 (Satisfies CAP Writing Seminar)	3	PHL 103 (Satisfies CAP First-Year Humanities Common)	3
REL 103 (Satisfies CAP First-Year Humanities Common)	3	CMM 100	3
HST 103	3	CHM 123	3
SET 150	3	CHM 123L	1
MTH 168	4	MTH 169	4
EGR 103	2	SET 153L	1
EGR 150	0	MCT 110L	2
EGR 102	0	SET 101	0
	18		**17**

Second Year

Fall	Hours	Spring	Hours
ENG 200 (Satisfies CAP Second Year Writing Seminar)	3	SSC 200	3
PHY 201	3	MFG 108L	1
PHY 201L	1	IET 318	3
IET 230	3	IET 316	3
MTH 207	3	IET 317	3
ECT 108L	1	ECT 110	3
MCT 215	3		
EGR 200	0		
	17		**16**

Third Year

Fall	Hours	Spring	Hours
CAP Advanced PHL/REL (Ethics) (may also satisfy additional CAP components)	3	CAP Advanced PHL/REL (may also satisfy additional CAP components)	3
IET 332	3	MFG 240	3
IET 408	3	IET 330	3
MCT 111L	2	IET 335	3

MFG 204	3	IET 435	3
MFG 204L	1		
MFG 206L	1		
SET 300	0		
	16		**15**

Fourth Year

Fall	Hours	Spring	Hours
CAP Advanced HST (may also satisfy additional CAP components)	3	CAP ARTS (may also satisfy additional CAP components)	3
IET 420	3	IET 415	3
IET 323	3	TECH Elect	3
TECH Elect	3	TECH Elect	3
TECH Elect	3	IET 490 (Satisfies CAP Capstone Requirement)	3
EGR 400	1		
	16		**15**

Total credit hours: 130

Mechanical Engineering Technology

First Year

Fall	Hours	Spring	Hours
ENG 100 (Satisfies CAP Writing Seminar)	3	HST 103 (Satisfies CAP First-Year Humanities Common)	3
REL 103 (Satisfies CAP First-Year Humanities Common)	3	PHL 103	3
MFG 108L	1	MCT 111L	2
SET 150	3	CHM 123	3
MTH 168	4	CHM 123L	1
MCT 110L	2	MTH 169	4
EGR 150	0	EGR 103	2
EGR 102	0	SET 101	0
	16		**18**

Second Year

Fall	Hours	Spring	Hours
ENG 200 (Satisfies CAP Second Year Writing Seminar)	3	CMM 100 (Satisfies CAP Communication)	3
MFG 204	3	MCT 221	3
MFG 204L	1	MCT 231	3
PHY 201	3	MFG 206L	1
PHY 201L	1	MFG 240	3
MTH 207	3	SET 250	3
SET 153L	1	ECT 108L	1
MCT 215	3		
EGR 200	0		
	18		**17**

Third Year

Fall	Hours	Spring	Hours
SSC 200 (Satisfies CAP Social Science)	3	CAP Advanced PHL/REL (Ethics) (may also satisfy additional CAP components)	3
MCT 315	3	MCT 320	3
MCT 337	3	IET 323	3
MCT 342	3	IET 317	3
ECT 110	3	TECH EL	3
SET 300	0		
	15		**15**

Fourth Year

Fall	Hours	Spring	Hours
CAP Advanced PHL/REL (may also satisfy additional CAP components)	3	CAP ARTS (may also satisfy additional CAP components)	3
MCT 420	3	CAP Advanced HST (may also satisfy additional CAP components)	3
ECT 408	2	TECH Elective	3
TECH Elective	3	TECH Elective	3
Electrical Elective	3	MCT 490 (Satisifies CAP Capstone Requirement)	3
EGR 400	1		
	15		**15**

Total credit hours: 129

Electronic Computer Tech Courses

ECT 108L. Introduction to Electronic Design. 1 Hour
Modern design techniques to develop electronic devices are explored. This is achieved through the application of electronic test and measurement equipment, design software, and electronic prototyping tools. Experience with such systems is gained through the completion of individual and team design projects. Three laboratory hours per week.

ECT 110. Electrical Circuits I. 3 Hours
Practical concepts of single voltage source DC and AC circuits: current, voltage, resistance, power, series and parallel circuits, capacitance, magnetic circuits, and inductance. Corequisites: SET 150 or MTH 168; ECT 110L or ECT 108L.

ECT 110L. Electrical Circuits I Laboratory. 1 Hour
Experiments in single voltage source DC and AC circuits to accompany ECT 110. Three laboratory hours per week. Corequisite(s): ECT 110.

ECT 120. Electrical Circuits II w/ Lab. 3 Hours
Practical concepts of multiple voltage and current source DC and AC circuits: reactance, impedance, phase, circuit analysis, power factor, resonance, filters, and transformers. Circuit calculations using vectors, complex algebra, and simultaneous equations. This course includes significant practical experiences through laboratory exercises; 2 contact hours of lecture and 3 contact hours of lab. Prerequisites: ECT 110; MTH 168.

ECT 206. Electron Devices I w/ Lab. 3 Hours
Fundamentals of semiconductor diodes, transistors (bipolar and field effect), amplifiers, biasing and small signal analysis. This course includes significant practical experiences through laboratory exercises and design projects; 2 contact hours of lecture and 3 contact hours of lab. Prerequisites: ECT 110; ECT 108L.

ECT 206L. Electron Devices I Laboratory. 1 Hour
To accompany ECT 206. Three hours of laboratory a week. Corequisite(s): ECT 206.

ECT 224. Digital Systems Fundamentals. 3 Hours
Fundamental theory and techniques of digital systems to include binary arithmetic, logic gates and simplification methods, combinational and sequential circuit design, and programmable logic devices. Digital system design and implementation using current principles, practices, and tools is introduced. This course includes significant practical experiences through laboratory exercises and design projects. Prerequisites: ECT 110.

ECT 224L. Digital Computer Fundamentals Laboratory. 1 Hour
To accompany ECT 224. Three hours of laboratory a week. Corequisite(s): ECT 224.

ECT 305. Introduction to Semiconductor Manufacturing. 3 Hours
An introduction to the fundamental processes required to fabricate semiconductor chips and microelectronic circuits. The study of manufacturing silicon from sand to semiconductor wafers includes topics in material science, process engineering, microelectronics fabrication, and packaging. Both classic and modern manufacturing techniques are explored for small-scale and large-scale chip production. The entire microelectronics fabrication cycle is covered, and cleanroom lab experiences are used to provide students experiential learning on key fabrication processing steps. Prerequisite(s): ECT 110 or ECE 201 or EGR 203 or MEE 205 or PHY 207.

ECT 306. Electronic Devices II w/ Lab. 3 Hours
Fundamentals of integrated circuits, operational amplifiers, transistors, photoelectric devices, silicon-controlled rectifiers, and their associated circuits. This course includes significant practical experiences through laboratory exercises and design projects; 2 contact hours of lecture and 3 contact hours of lab. Prerequisites: ECT 206; MTH 169.

ECT 306L. Electronic Devices II Laboratory. 1 Hour
To accompany ECT 306. Three hours of laboratory a week. Corequisite(s): ECT 306.

ECT 357. Advanced Digital Systems Design. 3 Hours
A study of modern digital system design using programmable logic devices (PLDs), hardware description languages (HDLs), and low-level software languages. The course covers the design, analysis, and implementation of simple to complex digital systems including finite state machines, ALUs, and systems-on-chip. Current industrial methods including good HDL coding practices of readability, re-configurability, and efficient execution are emphasized. Additionally, students will work with modern computer aided tools for design, simulation, and implementation activities. This course includes significant practical experiences through laboratory exercises and design projects. Prerequisites: ECT 224, ECT 361.

ECT 358. Microprocessor Systems Design. 3 Hours
A study of microprocessor architecture, interfaces, and applications. Processor organization and instruction set architecture is investigated. Processor I/O interfaces and applications are implemented using low and high level software languages and electronic circuit design. Current industrial practices and modern tools are used for hardware and software design. This course includes significant practical experiences through laboratory exercises and design projects. Prerequisites: ECT 224, ECT 361.

ECT 358L. Microprocessors II Laboratory. 1 Hour
To accompany ECT 358. Emphasis on microcomputer programming. Three hours of laboratory a week. Corequisite(s): ECT 358.

ECT 361. Programming Structures. 3 Hours
The study of programming language concepts. Emphasis on the C language and its application to microcomputer hardware and software development. Prerequisites: SET 153L.

ECT 362. Concepts & Applications of Computer Operating Systems. 3 Hours
Introduction to the fundamentals and applications of computer operating systems and the interaction of hardware and software. Operating systems for large-scale, mini-, and microcomputers introduced through case studies. Prerequisite(s): ECT 361.

ECT 400. Selected Topics. 1-4 Hours
Investigation and discussion of current technical topics in electronic and computer engineering technology. May be taken more than once. Prerequisite(s): Permission of department chairperson.

ECT 408. Data Acquisition & Measurements. 2 Hours
Measurement and evaluation of the characteristics of engineering materials, structural mechanics, electromechanical systems, and physical systems. Emphasis on data acquisition, signal conditioning and manipulation, and virtual instrumentation. Prerequisites: (ECT 110L or ECT 108L); SET 250.

ECT 452. Feedback Controls. 3 Hours
Study of principles of control including Nyquist criteria, Bode plots, PID loops, motor control virtual instrumentation, and advanced concepts. Laplace transform analysis is utilized. Prerequisite: ECT 408.

ECT 456. Automotive Electrical & Safety Systems. 3 Hours
Theory and design of automotive electrical and safety systems. Electrical system topics include electrical charging systems and batteries, starters, powertrain and vehicle control systems, and sensors. Trends in hybrid gasoline-electric and all electric vehicles will be surveyed. Safety system topics included crash avoidance systems, crashworthiness systems, and post-crash survivability. Overview of manufacturing, commercial, and regulatory aspects of the automotive industry. Prerequisite(s): ECT 110 or EGR 203 or ECE 201 or MEE 205.

ECT 461. Power Distribution & Control. 3 Hours
Study of power distribution systems including components, basic operation, polyphase circuits, characteristics, and application. Emphasis on the generation of electric power, its transmission, and its application to high power systems. Prerequisite(s): ECT 110.

ECT 465. Digital Data Communications. 3 Hours
Study of communication methods and protocols. Applications to networks, satellite communication, phone systems, fiber optics, modems, and other data transmission. A special emphasis is placed on digital networks. Prerequisite(s): ECT 224.

ECT 466. Microcomputer Architecture. 3 Hours
To develop an understanding of the basic hardware architecture of industry standard microcomputers including CPUs, standard busses, memory, mass storage devices, Systems-on-a-Chip and their implementation, I/O devices, and network interfaces. Study of architecture of recent microprocessors. Prerequisite(s): ECT 224, ECT 361.

ECT 467. Real-Time Embedded System Design w/ Lab. 3 Hours
An introduction to the fundamentals and applications of real-time embedded systems. Fundamental concepts of embedded hardware and real-time operating systems (RTOS) are introduced. Real-time internet-of-things and instrumentation and controls applications are implemented on various platforms using high-level software languages and electronic circuit design. Current industrial practices and modern tools are used for hardware and software design. This course includes significant practical experiences through laboratory exercises and design projects; 2 contact hours of lecture and 3 contact hours of lab. Corequisites: ECT 358, ECT 408.

ECT 490. Senior Project. 3 Hours
Advanced study and research of the product realization process focusing on conceptual design, embodiment design, final design, and prototyping or other design verification. Students work on externally sponsored engineering projects in multidisciplinary teams that perform engineering analysis that includes safety, ergonomics, environmental, cost and sociological impact of their designs. Prerequisite(s): ECT 306 and (ECT 358 or ECT 357) and ECT 408 and IET 323.

ECT 493. Honors Thesis. 3 Hours
HONORS THESIS Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program.

ECT 494. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program. Prerequisite(s): ECT 493.

Engineering Technology Courses

SET 100. Introduction to Engineering Technology I. 0 Hours
First semester of introduction to Engineering Technology seminar for all engineering technology majors. Introduction to the University of Dayton, the School of Engineering, the Department of Engineering Technology, engineering technology programs and careers. Emphasizes professional ethics, critical thinking and communications, and team dynamics. Academic policies, academic planning, registration procedures, counseling and career placement services.

SET 101. Introduction to Engineering Technology II. 0 Hours
Second semester of introduction to Engineering Technology seminar for all engineering technology majors. Introduction to the University of Dayton, the School of Engineering, the Department of Engineering Technology, engineering technology programs and careers. Emphasizes professional ethics, critical thinking and communications, and team dynamics. Academic policies, academic planning, registration procedures, counseling and career placement services.

SET 102. Engineering Technology Transfer Seminar. 0 Hours
A seminar for Engineering Technology majors who transferred from another academic institution. Introduction to the University of Dayton, the School of Engineering, the Department of Engineering Technology, Engineering Technology programs, and careers. Emphasizes professional ethics, critical thinking and communication, and team dynamics. Academic policies, academic planning, registration procedures, counseling, and career placement services.

SET 150. Engineering Analysis I w/ Lab. 3 Hours
Overview of the mathematics topics heavily used in sophomore-level engineering technology courses. Topics include algebraic analysis, trigonometry, vectors and complex number, sinusoids and harmonic signals, systems of equations and matrices, differentiation, and integration. All topics are motivated by engineering applications. This course is a lecture with integrated lab; 3 hours of lecture with 2 hours of lab.

SET 153L. Introduction to Data Analytics and Programming. 1 Hour
Introduction to algorithmic thinking and data analytics utilizing modern spreadsheet and software programming tools for engineering.

SET 198. Research & Innovation Laboratory. 1-6 Hours
Students participate in 1) selection and design, 2) investigation and data collection, 3) analysis and 4) presentation of a research project. Research can include, but is not limited to, developing an experiment, collecting and analyzing data, surveying and evaluating literature, developing new tools and techniques including software, and surveying, brainstorming and evaluating engineering solutions and engineering designs. Proposals from teams of students will be considered. Prerequisite(s): Permission of department chairperson.

SET 200. Professional Development for Sophomores. 0 Hours
Presentations on contemporary and professional engineering subjects by students, faculty, and engineers in active practice. The seminar addresses topics in key areas that complement traditional courses and prepare distinctive graduates, ready for life and work. Registration required for all Engineering Technology sophomore students.

SET 250. Engineering Analysis II. 3 Hours
Integration of mathematical skills learned in calculus and statistics with engineering applications and analyses. Advanced engineering analysis methods will be introduced. Topics to be covered include: engineering applications and solution methods in the areas of linear algebra, numerical methods, Fourier transforms, Laplace transforms, differential equations, and statistics. Engineering math tools will be utilized. Prerequisites: MTH 169; MTH 207; SET 153L.

SET 298. Research & Innovation Laboratory. 1-6 Hours
Students participate in 1) selection and design, 2) investigation and data collection, 3) analysis and 4) presentation of a research project. Research can include, but is not limited to, developing an experiment, collecting and analyzing data, surveying and evaluating literature, developing new tools and techniques including software, and surveying, brainstorming and evaluating engineering solutions and engineering designs. Proposals from teams of students will be considered. Prerequisite(s): Permission of department chairperson.

SET 300. Professional Development for Juniors. 0 Hours
Presentations on contemporary and professional engineering subjects by students, faculty, and engineers in active practice. The seminar addresses topics in key areas that complement traditional courses and prepare distinctive graduates, ready for life and work. Registration required for all Engineering Technology sophomore students. Prerequisites: EGR 200 or COP 200 or SET 200.

SET 398. Research & Innovation Laboratory. 1-6 Hours
Students participate in 1) selection and design, 2) investigation and data collection, 3) analysis and 4) presentation of a research project. Research can include, but is not limited to, developing an experiment, collecting and analyzing data, surveying and evaluating literature, developing new tools and techniques including software, and surveying, brainstorming and evaluating engineering solutions and engineering designs. Proposals from teams of students will be considered. Prerequisite(s): Permission of department chairperson.

SET 400. Professional Development for Seniors. 1 Hour
Career planning for engineering technology majors. The job search process, resume preparation, the job interview, professional development. Required of all engineering technology majors in the junior or senior year. Prerequisites: SET 300 or COP 101 or COP 102.

SET 498. Research & Innovation Laboratory. 1-6 Hours
Students participate in 1) selection and design, 2) investigation and data collection, 3) analysis and 4) presentation of a research project. Research can include, but is not limited to, developing an experiment, collecting and analyzing data, surveying and evaluating literature, developing new tools and techniques including software, and surveying, brainstorming and evaluating engineering solutions and engineering designs. Proposals from teams of students will be considered. Prerequisite(s): Permission of department chairperson.

Industrial Engineering Tech Courses

IET 230. Work Measurement. 3 Hours
Fundamentals of work simplification, motion economy, and productivity improvement using the techniques of time-and-motion study. Setting of labor standards using the techniques of stop watch, pre-determined time, standard data, and work sampling. .

IET 230L. Work Measurement Laboratory. 1 Hour
The application of real-world time-and-motion-study techniques such as operation process, worker-machine, and assembly charts. Calculations for time standards, production efficiency, line balance, cost reduction, labor, and equipment. A written and oral report on a team project. Three hours of laboratory each week. Prerequisites: MTH 137. Corequisites: IET 230.

IET 316. Quantitative Analysis. 3 Hours
Introduction of the mathematical techniques used to support decision making and managerial analysis. Probability theory, decision theory, linear programming, queuing theory, matrix algebra, differential and integral calculus, and differential equations. Prerequisites: MTH 169; SET 153L. Corequisites: MTH 207 or MTH 367 (may be taken concurrently).

IET 317. Industrial Economic & Financial Analysis. 3 Hours
Comparison of manufacturing or service industry projects and investments based on their economic value. Quantification of costs and benefits; analysis using present worth, annual worth, and rate of return methods. Basic monetary concepts, including balance sheets, income statements, amortization charts, etc. The course will culminate in the development of a Business Plan for a new product designed by the student team. Prerequisites: SET 150 or MTH 168 or MTH 148.

IET 318. Statistical Process Control. 3 Hours
Statistics and probability theory applied to produce control charts (x-bar, R, s, p, u, and c) to monitor processes. Interpretation and application of these charts. Problem solving techniques, Pareto analysis, and modern quality management techniques. Prerequisites: MTH 168, MTH 207 or MTH 367.

IET 319. Quality Improvement Methods. 3 Hours
Study of problem-solving methodologies and techniques. Team development. Students will learn to use Pareto diagrams, force field analysis, cause and effect diagrams, process mapping, and other problem-solving tools. Quality costs, product liability, and ethics are also covered. Prerequisite(s): IET 318.

IET 320. Design and Analysis of Experiments. 3 Hours
This class introduces students to analytic methods for experimental design. It concerns the design, collection, and analysis of experiments both in manufacturing and service systems. Students will examine the proper analysis for a given experimental design and set of assumptions. Topics will include one-way and factorial designs, fractional factorial designs. Students will learn both computational and software-based analytic methods. Prerequisites: MTH 207 or MTH 367.

IET 321. Quality Management. 3 Hours
This course provides students with an understanding of managing a total quality environment to improve quality, increase productivity and reduce costs. The course covers Total Quality Management implementation strategies, requirements of ISO 9000, QS 9000, and the Malcolm Baldrige award. Prerequisites: IET 318; MTH 207 or MTH 367.

IET 322. Data Analytics. 3 Hours
Data analytics help to enhance productivity through the application of quantitative and qualitative techniques to extract and categorize data to identify and analyze data patterns. Data analytics demand an integrated set of skills such as statistics, machine learning, and mathematics. This course will introduce students to some of the tools and basic principles of data analytics. Among the techniques, tools, and concepts that students will be introduced to are data collection, analysis of exploratory data, descriptive modeling, predictive modeling, evaluation and effective communication of analytical outcomes. Prerequisite(s): IET 316.

IET 323. Project Management. 3 Hours
This course is intended to prepare students to understand and be able to apply the principles of project management to processes they encounter in their jobs. Topics include the role of project manager, planning the project, work breakdown structure, scheduling project, project control and evaluation, earned value analysis, study of the structure, techniques, and application of project management including mathematical models, decision-making, styles of management, ethics, and communications. Students will also work on a team project with written and oral presentations. Prerequisites: CMM 100, Junior or Senior status.

IET 330. Cost Estimating and Control. 3 Hours
Study of the fundamentals of cost estimating of labor, material, and overhead for products, projects, operations, and systems. Semester team projects, written and oral. Study of job order and process cost accounting, activity based costing, and cost-volume-profit relationships. Prerequisites: IET 317 and IET 332.

IET 332. Facilities Layout Design. 3 Hours
Design of manufacturing and service facilities for the most efficient flow of raw materials, work-in-process, and completed stock through a work place. Facilities layout, material handling, and warehousing in relation to trends toward reduced inventory, smaller lot sizes, and just-in-time. Prerequisite(s): MCT 110L.

IET 335. Process Simulation and Analysis. 3 Hours
Introduction to analysis of business, service and industry systems using a simulation software package. Topics covered include creation of simulation models in two and three dimensions that model processes and how to gather the appropriate input data and analyze the output data from the simulation software. Prerequisites: MTH 367 or MTH 207.

IET 335L. Process Simulation and Analysis Lab. 1 Hour
Introduction to analysis of business, service and industry systems using a simulation software package. Topics covered include creation of simulation models in two and three dimensions that model processes and how to gather the appropriate input data and analyze the output data from the simulation software. Prerequisite(s): SET153L and Junior or Senior status.

IET 400. Selected Topics. 1-4 Hours
Self-paced research course. Preparation of a documented written research project on an engineering technology subject. May not be taken more than once. Prerequisite(s): Permission of department chairperson.

IET 401. Global Regulatory and Legal Framework of Quality in Industry and Business. 3 Hours
This course is geared to students interested in broadening their understanding of the legal and regulatory framework established to ensure quality in the development of products in science and technology. This course will provide an overview of regulations for the pharmaceutical, medical device, biotech, animal health, and consumer goods industries. Students will be introduced to fundamental concepts in the regulations related to clinical trial development, management, ethics, data integrity, data security, privacy, change control and validation.

IET 402. Product Development and Validation in Life Sciences. 3 Hours
This course will give students an understanding of the processes used in the pharmaceutical, medical device, and pharmaceutical industries for the development of new products. Students will learn the scientific principles used in such developments that ensure that products meet quality standards. This course, the second in a series of courses which will better prepare students for employment in the quality health science areas. Instructors will explore how rigorous human factor engineering studies and clinical trials provide essential inputs into the product development process. The students will be introduced to concepts such as gap analysis, risk assessment, master plan, process characterization, installation qualification, operational qualification, measurement system analysis, repeatability and reproducibility (data collection / analysis), performance qualification/validation. In a world of innovative technology, it is critical that the students gain an understanding of computer system and software validation to ensure the quality of data generation, data storage, and digital processes used in manufacturing and products with digital components using technical and practical aspects expected in the regulated life science industries. Prerequisites: MED 401 or IET 401 or ISE 401.

IET 403. Risk and Failure Analysis in Quality Science. 3 Hours
This course will dive into the nuances of the life science industries related to the specific regulations that apply to consumer health products. Importantly, it is desired that students take this course while on internship at a life science company such that they can experience a failure while learning all that is required for acceptable resolution. Through the use of historical risk analysis techniques, such as FMEA, Fault Tree, and 5 Why's, students will be able to analyze a holistic set of data (in-production, across product lines, across equipment, human variability, on-market, on-stability, validation studies, change control, etc.) that will lead to scientifically justified investigations supported by evidence, and the identification of effective corrective and preventative actions (CAPA). Prerequisites: MED 401 or IET 401 or ISE 401.

IET 408. Lean Management and Six Sigma. 3 Hours
This course reviews the tools used to improve business performance, such as increasing process efficiency and reducing variation and waste. The course is designed around the rigorous approach known as DMAIC and covers a wide variety of problem-solving strategies based on statistics, optimization, and project management. The course elegantly integrates Six Sigma methodologies with lean enterprise principles, such as Kaizen, poka-yoke, and pull-push systems. The topics covered in this course are used both in manufacturing and service industry including hospitals, banks, and retailers. At the end of this course, students will be equipped to help organizations achieve their operational excellence. Prerequisite(s): Junior or senior status.

IET 409. Lean Management. 3 Hours
Study of the principles and current practices of optimizing production using Lean Manufacturing concepts. Just-In-Time, Takt Time, Kaizen, set-up reduction, pull systems, focused factories, standard operations, total productive maintenance, and defect-free manufacturing. Prerequisite(s): Junior or senior status.

IET 410. Design for Six Sigma for Engineers. 3 Hours
Product development methodology for the development of robust products, processes and services; methods for collecting and statistically analyzing the voice of the customer; development of product concepts; experimentation for designing in quality; product modeling to reduce risk through robust design; data driven decision-making for continuous improvement in products, service design, and process design. Prerequisites: MTH 207 or MTH 367, IET 408.

IET 415. Global Supply Chain Management. 3 Hours
This course is intended to educate students on the fundamental roles played by supply chain management in the Global economy. Students will gain knowledge on the management of local and global supply chain functions and their impact on industries, customers, and suppliers. Students will learn to optimize supply chain resources to reduce cost and improve revenue. Students will learn to utilize data and contemporary tools to make informed decisions in a global supply chain environment. Prerequisite(s): Junior or Senior status.

IET 420. Industrial & Environmental Safety. 3 Hours
Application of safety techniques and principles to identify and correct unsafe situations and practices. Study of system safety, failure modes and effects analysis, fault tree analysis, preliminary hazard analysis, hazardous materials and practices, OSHA, health and personal protection.

IET 423. The IET in Service Organizations. 3 Hours
Case studies, articles, guest speakers, and projects to provide insight into how industrial engineering technology skills and training can be applied to service industries including hospitals, banks, and eating and retailing establishments. IET major; junior status. Prerequisite(s): Junior or Senior status.

IET 426. Systems Engineering Foundation. 3 Hours
There is a need for engineering professionals to understand the benefits of following a sound systems engineering approach when designing and improving systems. This course addresses systems engineering concepts and processes, explaining activities and tools for developing system solutions to meet customer needs. Using the online Systems Engineering Body of Knowledge as the guiding topics such as systems thinking, concept of operations, requirements analysis, design, testing, and life-cycle sustainment are discussed. The design lifecycle models including the Vee model along with the different system types of product, service, enterprise, and system of system will be discussed. The interdisciplinary and cross-functional nature of systems engineering is also emphasized along with the systems engineering management planning. Prerequisites: Junior or Senior standing.

IET 435. Human Factors. 3 Hours
Methods to improve the interface between humans and their environment. Human characteristics are studied to determine the best way to design the task, product, work station, or other environmental features to accommodate the human. Written and oral projects. Prerequisite(s): IET 230 and (Junior or Senior status).

IET 446. Six Sigma Green Belt. 3 Hours
Learn, practice, and use six-sigma tools in preparation of a final certification project in a commercial business situation. Use, analyze and solve an identified business variation problem to achieve industry recognized certification.

IET 490. Senior Project. 3 Hours
Advanced study and research of the product realization process focusing on conceptual design, embodiment design, final design, and prototyping or other design verification. Students work on externally sponsored engineering projects in multidisciplinary teams that perform engineering analysis that includes safety, ergonomics, environmental, cost and sociological impact of their designs. Prerequisites: IET 323; IET 408; IET 435. Corequisites: IET 335; IET 330.

IET 493. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program.

IET 494. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program. Prerequisites: IET 493.

Mechanical Engineering Tech Courses

MCT 110L. Mechanical Design & CAD I. 2 Hours
An introduction to Mechanical Design using commercial computer-aided design (CAD) software. Using appropriate CAD modeling techniques to create 3-dimensional component and assembly models. Creating technical drawings that show a basic knowledge of industry standards and practices. The course includes an introduction to Geometric Dimensioning & Tolerancing principals and 2-dimensional CAD layouts.

MCT 111L. Mechanical Design & CAD II. 2 Hours
Intermediate and advanced design techniques and application of standards to develop mechanical devices are explored through the application of 3D parametric solid-modeling computer-aided design (CAD) software. The student will gain experience through the completion of individual and team design projects. Students will analyze customer requirements using Quality Function Deployment, Design for Manufacturability and Design Failure Mode & Effects analysis as they develop more advanced models and assemblies to meet these requirements. Prerequisites: MCT 110L or MEE 104L.

MCT 112L. Introduction to Mechanical Design. 3 Hours
Modern design techniques to develop a mechanical device are explored. This is achieved through the application of commercial parametric solid modeling software. Experience with such a system is gained through the completion of individual and team design projects. The application of Geometric Dimensioning & Tolerancing standards per ASME Y14.5 2009 is integrated into the design process. Prerequisite(s): MCT 110L.

MCT 215. Statics. 3 Hours
Study of forces on bodies at rest. Vectors, force systems, components, reactions, resultants, free body diagrams, equilibrium, centroids, and moments of inertia. Prerequisites: SET 150 or MTH 168. Corequisites: MTH 168.

MCT 220. Statics & Dynamics. 3 Hours
Study of forces on bodies at rest and in motion using Newton¿¿s three laws of motion. Vectors, force systems, components, reactions, resultants, free body diagrams, equilibrium, centroids, moment of inertia, kinetics, and kinematics. Corequisite(s): MTH 137 or MTH 168.

MCT 221. Strength of Materials. 3 Hours
Analysis and design of load-carrying members, considering stress, strain, and deflection. Study of direct tension, compression, and shear; torsion; shear and moment diagrams; bending; combined stress; analysis of columns; pressure vessels. Prerequisites: MCT 215; MTH 168.

MCT 231. Fluid Mechanics. 3 Hours
Fluid properties, fluid statics including manometry, submerged surfaces, buoyancy and stability of floating bodies. The principles of fluid flow including Bernoulli's and energy equations, energy losses, and pump power. Analysis and design of pipe line systems and open channels; pump selection. Prerequisite(s): MTH 168.

MCT 313. Industrial Mechanisms. 3 Hours
Design and analysis of linkages and cams. Graphical solutions to kinematics problems including the concepts of instantaneous motion and relative motion. Development and analysis of motion diagrams. Study of geometric features of gears and gear transmission systems. Prerequisite(s): MCT 110L, MCT 220; MTH 137 or MTH168.

MCT 315. Dynamics. 3 Hours
Study of bodies in motion with a focus on machinery applications. Kinematics of particles and rigid bodies including translation, rotation, plane motion, and relative motion. Kinetics by the methods of force-mass-acceleration, work-energy, and impulse-momentum. Introduction to mechanical vibrations. Prerequisite(s): MCT 215; MTH 169; PHY 201.

MCT 317. Machine Dynamics. 3 Hours
Principles of applied engineering mechanics as they relate to machines; static force analysis in both 2 and 3 dimensional systems, kinetics of machine components by the methods of force-mass-acceleration, work-energy, and impulse-momentum; machine balancing; introduction to mechanical vibrations. Prerequisite(s): MCT 111L, MCT 313; MTH 138 or MTH 168; SET 153L.

MCT 320. Design of Machine Elements I. 3 Hours
Analytical design techniques used to evaluate machine elements & structures; stress analysis, working stress, failure theories, fatigue failure, buckling failure. Design methods for gears. Original design project using commercial 3D solid modeling software. Introduction to Finite Element Analysis using commercial software. Prerequisites: MCT 112L, MCT 221.

MCT 330. Design of Machine Elements. 3 Hours
Analytical design techniques used to evaluate machine elements; stress analysis, working stress, failure theories, fatigue failure; design methods for spur gears, shafts, keys and couplings, roller and journal bearings, and springs. Original design project. Prerequisite(s): MCT 111L, MCT 221, MFG 208L.

MCT 336. Fluid Power. 3 Hours
Study of hydraulic and pneumatic fluid power components and systems used in industrial, mobile, and aerospace applications; standard symbols in circuit design; circuit analysis; specification for pumps, valves, cylinders, and circuits; hydraulic fluids; filtration; electric motors; system efficiencies; proportional control and electrohydraulic servo control systems; seals; fluid conductors; pneumatic components and systems. Library research project. Corequisite(s): MCT 336L.

MCT 336L. Fluid Power Laboratory. 1 Hour
To accompany MCT 336. Evaluation of fluid power components: pressure, flow, RPM, sound level, current, voltage, power, torque, and time. Graphical design, computational analysis, assembly, and testing of typical circuits and systems. Testing of hydraulic fluids for viscosity, pour point, flash and fire point, specific gravity. Three hours of laboratory a week. Corequisite(s): MCT 336.

MCT 337. Fluid Power w/ Lab. 3 Hours
Study of hydraulic and pneumatic fluid power components and systems used in industrial, mobile, and aerospace applications; standard symbols in circuit design; circuit analysis; specification for pumps, valves, cylinders, and circuits; hydraulic fluids; filtration; electric motors; system efficiencies; proportional control and electro-hydraulic servo control systems; seals; fluid conductors; pneumatic components and systems. Evaluation of fluid power components; pressure, flow, RPM, sound level, current, voltage, power, torque, and time. Graphical design, computational analysis, assembly, and testing of typical circuits and systems. Testing of hydraulic fluids for viscosity, pour point, flash and fire point, specific gravity. This course is a lecture with an integrated lab; 2 hours of lecture with 3 hours of lab.

MCT 342. Thermodynamics. 3 Hours
Energy analysis of engineering systems using the concepts and laws of thermodynamics. The principle of the mechanical equivalent of heat, behavior of pure substances, use of thermodynamic property tables, and study of gas mixtures. Application of the Carnot cycle to both heat engines and reversed heat engines. Prerequisites: MCT 231.

MCT 400. Selected Mechanical Topics. 1-4 Hours
Investigations and discussion of cur-rent technical topics in mechanical engineering technology. Research report. May be taken more than once. Prerequisite(s): Permission of department chairperson.

MCT 420. Design of Machine Elements II. 3 Hours
Design, analysis, and selection of basic machine components including: belt & chain drives, gears, rolling contact & plain surface bearings, linear motion elements, electric motors, and clutches/brakes. Design project(s) using commercial 3D solid modeling software. Prerequisite(s): MCT 320; MCT 315.

MCT 423. Product Development. 3 Hours
Synthesis of mechanical devices and systems. Emphasis on the integration of various machine elements into a single unit. Activities include design, scheduling, budgeting, purchasing, fabrication, assembly and performance testing of an original team project. Prerequisite(s): MCT 330.

MCT 430. Design of Fluid Power Systems. 3 Hours
Energy efficiency; pressure drop determinations, variable volume pressure-compensated pumps, accumulators, proportional and electrohydraulic valves, cylinder design, hydraulic motor selection; circuit design, open and closed loop systems, power unit design; sizing of electric motors; use of industrial data and National Fluid Power Assn.-JIC design standards. Individual design project. Prerequisite(s): MCT 336.

MCT 438. Heat Transfer. 3 Hours
The principles of conduction, convection, and thermal radiation energy transfer. Conduction through series and parallel walls, pipes, and containers. Forced and free convection through films, thermal radiation of energy between surfaces, and the overall transfer of heat. Prerequisites: MCT 231; SET 250.

MCT 440. Applied Vibrations. 3 Hours
Free and forced vibration of single degree of freedom systems with and without damping. Industrial applications including reciprocating and rotating machinery, balancing, isolation, and noise reduction. Demonstrations of vibration sensors and instrumentation. Prerequisite(s): MCT 317; SET 153L.

MCT 445. Experimental Mechanics. 3 Hours
The selection, application, and use of strain gages and strain gage rosettes. Transformation of stress and strain. Advanced mechanics of materials topics with empirical verification of theoretical predictions. Prerequisite(s): MCT 221. Corequisite(s): MCT 445L.

MCT 445L. Experimental Mechanics Laboratory. 1 Hour
Installation of strain gauge rosettes. Experiments to determine the state of strain and stress in structures using strain gauges, photoelasticity, and brittle coatings. Vibration measurement using strain gauges, accelerometers, and motion transducers. Written and oral reports. Corequisite(s): MCT 445.

MCT 446. Applied Finite Element Modeling. 3 Hours
Introduction to the fundamentals of structural finite element modeling. Geometry creation, element types, material specification, problem solution and results postprocessing. A focus is placed on modeling techniques using commercially available software. Prerequisites: MCT 221; SET 250.

MCT 456. Automotive Powertrain & Chassis Systems. 3 Hours
Theory and design of engines, transmissions, suspension, and chassis systems. Overview of manufacturing and commercial aspects of the automotive industry. Prerequisites: EGR 201 or MCT 215.

MCT 490. Senior Project. 3 Hours
Advanced study and research of the product realization process focusing on conceptual design, embodiment design, final design, and prototyping or other design verification. Students work on externally sponsored engineering projects in multidisciplinary teams that perform engineering analysis that includes safety, ergonomics, environmental, cost and sociological impact of their designs. Prerequisite(s): IET 323 and MCT 320. Corequisite(s): MCT 420.

MCT 493. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program.

MCT 494. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program. Prerequisites: MCT 493.