

DEPARTMENT OF TECHNOLOGY

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MISSION

The central mission of the Department of Technology at the University of Maryland Eastern Shore is to serve the Eastern Shore region, the State of Maryland, and the nation by improving technical education and the professional technical practice of construction and engineering technology.

The mission is achieved through high quality instruction, research, and community service. Through the teaching and learning process the department aims to provide knowledge, skills, and values to students preparing for professional technical careers and persons currently employed in industry. New technical and professional knowledge is developed and disseminated through research and community service.

Academic programs include Construction Management Technology, Engineering Technology, and Technology Education. Each program emphasizes basic knowledge and up-to-date technical skills that will enable graduates to solve problems in a logical manner and to draw conclusions from principles and facts.

Through the humanistic studies in each program, students are taught to recognize their responsibilities as citizens to prepare themselves for active participation in society.

GOALS

The goal of the **Construction Management Technology** program is the preparation of well educated professionals for challenging careers in the construction industry. Learning experiences are combined from the fields of construction technology, architecture, and business administration to prepare professionals with the ability to manage and supervise the total construction process. Graduates qualify for employment with general contracting and subcontracting firms and in government.

The goal of the **Engineering Technology** program is to prepare students for challenging careers in Electrical/Electronic Engineering Technology and Mechanical Engineering Technology. After receiving the Bachelor of Science degree, graduates are employed as Engineering Technologists. The emphasis in engineering technology courses is on the practical design and utilization of devices and systems, with a strong laboratory program supporting the lecture courses. Engineering Technology provides an engineering education with emphasis on systems operations and applications.

The goal of the **Technology Education** program is to prepare professionals who will qualify for certification to teach technology education at the middle school and high school levels. Emphasis is placed on improving the teaching- learning process and promoting and developing technological literacy, which is the ability to use, manage, understand, and assess technology. Study is focused on technical applications to support classroom and laboratory activities.

OBJECTIVES

The educational experiences offered by the Department of Technology will provide students with opportunities to

- demonstrate an operational knowledge of the techniques associated with the design, construction and maintenance of residential and commercial structures;
- exercise independent judgment and sound ethical values in expediting work without jeopardizing its effectiveness, safety or cost;
- organize and manage personnel, materials and equipment for carrying out construction, maintenance and operation of complex engineering systems;
- demonstrate effective communication of ideas by means of spoken and written language as well as graphic techniques;
- solve technical problems that translate ideas into functioning, machines, structures and systems;
- plan and implement instructional programs to meet the needs of students in a technological age;

- plan and instruct technology education programs that promote technical literacy through the application of mathematics and science and other subjects in classroom and laboratory activities;
- improve the professional technical practice of Construction Management, Engineering Technology, and Technology Education through continuing education and community service; and
- demonstrate humanistic values and responsibilities that promote active participation as productive citizens.

DESCRIPTION OF PROGRAMS

The **Construction Management Technology (CMTE)** curriculum is a four year program of study leading to a Bachelor of Science Degree. This interdisciplinary curriculum accredited by the American Council for Construction Education (ACCE) provides a background in the several physical and applied sciences and construction technology. Technical content is balanced by courses in business management, communications, humanities, and social sciences. This broad diversification provides the technical base needed for immediate employment as well as the managerial concepts for career development. Students must complete 126 semester hours of designated coursework including supervised internship in the construction industry.

The curriculum in **Engineering Technology (ETEE/ETME)** follows TAC/ABET recommendations and offers upper division courses leading to a Bachelor of Science Degree in **Electrical/Electronic Engineering Technology** and **Mechanical Engineering Technology**. The program is designed to provide a flexible course of study for students holding an Associate Degree in Engineering Technology from the Maryland Community College system and for students transferring out of the regular engineering program. The first two years may be completed through any of the engineering technology programs offered by an accredited community college. The Electrical/Electronics option is designed to prepare graduates for a career in the Electrical Engineering field. The curriculum provides in-depth exposure to the areas of communications, digital systems (including microprocessors), power machinery, and electronic systems design. The Mechanical option is designed to prepare graduates for a career in the Mechanical Engineering field. The curriculum provides in-depth exposure to the areas of manufacturing, thermal power, and mechanical systems design. It is anticipated that most students from community colleges will transfer about 60 credit hours. Total semester credits required for graduation is 126.

Technology Education (EDTE) is a four-year program of study leading to a Bachelor of Science degree, which will certify students to teach technology education in the secondary school. Students acquire technical knowledge and skills through creative and problem solving learning experiences related to the designed world. A sequence of professional education and liberal studies courses are also required to develop leadership and citizenship skills needed for successful teaching. A total of 126 credits is required for graduation.

Graduation requirements for each major program are divided among general education courses, major core courses, supportive courses, elective courses and professional education courses. Students must receive a grade of "C" or better in prerequisite courses, major core courses, supportive courses, technical elective courses, and selected general education courses. Included in the total semester hours for graduation, technology majors are required to complete a minimum of forty (40) semester hours of general education courses.

ALTERNATIVE CREDITS

Beginning Fall 2005, all students who enroll in degree programs will be required to complete 12 alternative credits before graduating. Alternative credits can be earned by completing internships, summer and winter session courses, on-line courses, and courses completed while studying abroad.

**CONSTRUCTION MANAGEMENT TECHNOLOGY
Required and Recommended Course Sequence**

I. General Education Requirements

TOTAL REQUIRED FOR GENERAL EDUCATION – 41 Credits

Students should consult with their freshman or departmental advisor when making course selections.

A. Curriculum Area I – (Arts and Humanities)* 9 Credits

Course	No.	Title	Credits
ARTS	101	Exploration of Visual Arts	3
ENGL	203	Fundamentals of Contemporary Speech	3
ENGL	328	World Literature I	3

B. Curriculum Area II – (Social and Behavioral Sciences)* 6 Credits

Course	No.	Title	Credits
ECON	201	Principles of Economics I	3
SOCI	201	Social Problems	3

C. Curriculum Area III – (Biological and Physical Sciences) 8 Credits**

Course	No.	Title	Credits
PHYS	121	General College Physics I	3
PHYS	123	General College Physics I Lab	1
PHYS	122	General College Physics II	3
PHYS	124	General College Physics II Lab	1

D. Curriculum Area IV – (Mathematics) 8 Credits**

Course	No.	Title	Credits
MATH	111	Elementary Mathematical Analysis	4
MATH	112	Calculus I	4

E. Curriculum Area V – (English Composition) 9 Credits**

Course	No.	Title	Credits
ENGL	101	Basic Composition I	3
ENGL	102	Basic Composition II	3
ENGL	305	Technical Writing	3
ENGL	001	English Proficiency Exam	

F. Curriculum Area VI – (Emerging Issues) 1 Credit

Course	No.	Title	Credit
GNST	101	First Year Experience Seminar	1

*Course Requirements other than those listed above should be selected in consultation with the advisor or Department Chairman.

**Students are required to receive a grade of C or better in these courses.

II. Program Core Courses 67 Credits

Course	No.	Title	Credits
CMTE	201	Architectural Drawing	3
CMTE	205	Computer Applications in Construction	3
CMTE	214	Construction Surveying	3
CMTE	230	Construction Materials	3
CMTE	286	Construction Planning & Scheduling	3
CMTE	295	Construction Management Internship I	2

Course	No.	Title	Credits
CMTE	311	Construction Methods I	3
CMTE	312	Construction Methods II	3
CMTE	313	Statics	3
CMTE	314	Strength of Materials	4
CMTE	315	Environmental Technology I	3
CMTE	316	Environmental Technology II	3
CMTE	317	Soils In Construction	3
CMTE	342	Construction Estimating I	3
CMTE	395	Construction Management Internship II	2
CMTE	413	Structural Design I	3
CMTE	414	Structural Design II	3
CMTE	425	Construction Management I	3
CMTE	426	Construction Management II	3
CMTE	445	Construction Estimating II	3
CMTE	454	Site Development	3
CMTE	458	Senior Seminar	2
EDTE	131	Computer-Assisted Drawing and Design I (CAD-I)	3
III. Supportive Courses			12 Credits
Course	No.	Title	Credits
ACCT	201	Introduction to Financial Accounting	3
BUAD	304	Small Business Management and Entrepreneurship	3
ECON	202	Principles of Economics II	3
ENVS	101	Introduction to Environmental Science	3
IV. Elective Business Courses			6 Credits
Course	No.	Title	Credits
BUAD	132	Introduction to Business	3
BUAD	300	Business Ethics	3
BUAD	302	Management and Organizational Behavior	3
BUAD	412	Business Law	3
FINA	340	Financial Management	3
FINA	442	Principles of Real Estate	3
FINA	441	Insurance and Business Risk	3
TOTAL PROGRAM REQUIREMENTS			126

**CONSTRUCTION MANAGEMENT
TECHNOLOGY
Recommended Course Sequence**

FRESHMAN YEAR

FALL SEMESTER	HOURS
ARTS 101 Exp. of Visual Arts	3
EDTE 131 Computer-Assisted Drawing and Design I (CAD)	3
ENGL 101 Basic Composition I	3
GNST 100 First Yr. Experience Seminar	1
MATH 111 Elem. Math Analysis	<u>4</u>
Semester Total	14

SPRING SEMESTER	HOURS
CMTE 230 Construction Materials	3
ECON 201 Prin. of Economics I	3
ENGL 102 Basic Composition II	3
ENGL 001 English Proficiency Exam	0
ENVS 101 Intro. to Environmental Science	<u>3</u>
Semester Total	12

SOPHOMORE YEAR

FALL SEMESTER	HOURS
CMTE 201 Architect. Drawing	3
CMTE 205 Comp. Applic. in Construction	3
ECON 202 Prin. of Economics II	3
ENGL 203 Fund. of Cont. Speech	3
PHYS 121 Gen. College Physics I	3
PHYS 123 Gen. College Physics I Lab	<u>1</u>
Semester Total	16

SPRING SEMESTER	HOURS
CMTE 214 Const. Surveying	3
ENGL 305/W Technical Writing	3
PHYS 122 Gen. College Physics II	3
PHYS 124 Gen. College Physics II Lab	1
MATH 112 Calculus I	4
SOCI 201 Social Problems	<u>3</u>
Semester Total	17

SUMMER	HOURS
CMTE 295 Constr. Manag. Internship I	2

JUNIOR YEAR

FALL SEMESTER	HOURS
ACCT 201 Intro to Financial Accounting	3
CMTE 286 Construct. Plan. & Scheduling	3
CMTE 311 Construction Methods I	3
CMTE 313 Statics	3
CMTE 315 Environ. Technology I	3
ENGL 328 World Literature I	<u>3</u>
Semester Total	18

SPRING SEMESTER	HOURS
BUAD Elective	3
CMTE 312 Const. Methods II	3
CMTE 314 Strength of Materials	4
CMTE 316 Environ. Tech II	3
CMTE 342 Construction Estimating I	<u>3</u>
Semester Total	16

SUMMER	HOURS
CMTE 395 Constr. Manag. Internship II	2

SENIOR YEAR

FALL SEMESTER	HOURS
BUAD Elective	3
CMTE 317 Soils in Construction	3
CMTE 413 Structural Design I	3
CMTE 425 Const. Mgt. I	3
CMTE 445 Const. Estimating II	<u>3</u>
Semester Total	15

SPRING SEMESTER	HOURS
BUAD Elective	3
CMTE 414 Structural Design II	3
CMTE 426 Const. Mgt. II	3
CMTE 454 Site Development	3
CMTE 458 Senior Seminar	<u>2</u>
Semester Total	14

Total Credits Required 126

ELECTRICAL/ELECTRONICS ENGINEERING TECHNOLOGY
Required and Recommended Course Sequence

I. General Education Requirements

TOTAL REQUIRED FOR GENERAL EDUCATION – 40 Credits

Students should consult with their freshman or departmental advisor when making course selections.

A. Curriculum Area I – (Arts and Humanities)* 9 Credits

Course	No	Title	Credits
ARTS	101	Exploration of the Visual Arts	3
ENGL	203	Fundamentals of Contemporary Speech	3
ENGL	328	World Literature I	3

B. Curriculum Area II – (Social and Behavioral Sciences)* 6 Credits

Course	No.	Title	Credits
ECON	202	Principles of Economics II	3
SOCI	201	Social Problems	3

C. Curriculum Area III – (Biological and Physical Sciences) 8 Credits**

Course	No.	Title	Credits
PHYS	121	General College Physics I	3
PHYS	123	General College Physics I Lab	1
PHYS	122	General College Physics II	3
PHYS	124	General College Physics II Lab	1

D. Curriculum Area IV – (Mathematics) 7 Credits**

Course	No.	Title	Credits
MATH	110	Trigonometry and Analytic Geometry	3
MATH	112	Calculus I	4

E. Curriculum Area V – (English Composition) 9 Credits**

Course	No.	Title	Credits
ENGL	101	Basic Composition I	3
ENGL	102	Basic Composition II	3
ENGL	001	English Proficiency Exam	0
ENGL	305/W	Technical Writing	3

F. Curriculum Area VI - Emerging Issues 1 Credit

Course	No.	Title	Credit
GNST	100	First Year Experience Seminar	1

II. Program Core Courses 44 Credits

Course	No.	Title	Credits
ETEE	114	Electronics I*	3
ETEE	201	Circuit Technology I*	3
ETEE	202	Circuit Technology II*	3
ETEE	215	Electronics II*	3
ETEE	216	Electronics III*	3
ETEE	218	Electronics Laboratory*	4
ETEE	303	Circuit Technology III	3
ETEE	314	Electric Power and Machinery	3

Course	No.	Title	Credits
ETEE	335	Logic & Switching Circuits	3
ETEE	346	Control Circuits	3
ETEE	355	Advanced Electronic & Computer Networks	3
ETEE	421	Instrumentation & Measurements	4
ETEE	485	Design Technology I	3
ETEE	486	Design Technology II	3

*Course Requirements other than those listed above should be selected in consultation with the advisor or Department Chairman.

**Students are required to receive a grade of C or better in these courses.

III. Supportive Courses **12 Credits**

Course	No.	Title	Credits
CHEM	111	Principles of Chemistry I	3
CHEM	113	Principles of Chemistry I Lab	1
CSDP	220	Introduction to Computer Programming	4
MATH	211	Calculus II	4

IV. Technical Elective Courses **24 Credits**

Group I (Minimum of 18 hours)

Course	No.	Title	Credits
CMTE	313	Statics	3
CSDP	222	Advanced Computer Programming	4
EDTE	131	Computer-Assisted Drawing and Design I (CAD-I)	3
EDTE	132	Computer-Assisted Drawing and Design II (CAD-II)	3
ETEE	222	Advanced Electrical Networks*	3
ETEE	425	Communication and Microwave Technology	3
ETEE	474	Nuclear Fundamentals	3
ETME	318	Applied Dynamics	3
ETME	395	Industrial Practice	3

Group II (Minimum of 6 hours)

Course	No.	Title	Credits
BUAD	302	Management and Organizational Behavior	3
BUAD	410	Production Management	3
BUAD	411	Operations Research and Decision Theory	3
BUAD	412	Business Law I	3
ECON	303	Labor Economics	3

V. Elective Courses **6 Credits**

Group III (Minimum 6 hours)

Course	No.	Title	Credits
		FREE Elective	3
		FREE Elective	3

TOTAL PROGRAM REQUIREMENTS **126**

*These are community college level courses; they, or appropriate substitutions, should be completed before enrolling at UMES.

ELECTRICAL/ELECTRONICS ENGINEERING TECHNOLOGY
Recommended Course Sequence

The following is a prototype of the associate degree program or equivalent experience that should be completed before enrolling for the junior and senior year.

The following is a recommended course sequence for those graduates of associate-degree technology programs or equivalent experiences to complete requirements for the Bachelor of Science degree in Engineering Technology at UMES.

FRESHMAN YEAR

FALL SEMESTER	HOURS
Algebra/Trigonometry/Geometry	3
Basic Composition I	3
Computer-Assisted Drawing and Design I (CAD-I)	3
Freshman Orientation	1
Gen. College Physics I	3
Gen. College Physics I Lab	1
Semester Total	14

SPRING SEMESTER	HOURS
Electronics I	3
English Composition II	3
English Proficiency Exam	0
Gen. College Physics II	3
Gen. College Physics II Lab	1
Calculus I	<u>4</u>
Semester Total	14

SOPHOMORE YEAR

FALL SEMESTER	HOURS
Circuit Technology I	3
Electronics II	3
Principles of Chemistry I	3
Principles of Chemistry I Lab	1
Calculus II	4
Fund. Contemporary Speech	<u>3</u>
Semester Total	17

SPRING SEMESTER	HOURS
Circuit Technology II	3
Electronics III	3
Electronics Laboratory	4
Introduction to Computers	4
Literature, Foreign Lang.	<u>3</u>
Semester Total	16

JUNIOR YEAR

FALL SEMESTER	HOURS
ENGL 305/W Technical Writing	3
ETEE 303 Circuit Tech. III	3
ETEE 335 Logic & Switching Circuit	3
ETEE 421 Instru. & Measurements	4
One course in: Literature, Foreign Lang. or Fine Arts	<u>3</u>
Semester Total	16

SPRING SEMESTER	HOURS
CSDP 220 Intro. to Computer Program.	4
ETEE 314 Elec. Power & Mech.	3
ETEE 346 Control Circuits	3
ETEE 355 Adv. Elect. & Comp. Net.	3
FREE Elective	<u>3</u>
Semester Total	16

SENIOR YEAR

FALL SEMESTER	HOURS
ETEE 485 Design Technology I	3
One course in: Literature or Foreign Language	3
Technical Elective	3
Technical Elective	3
Technical Elective	<u>3</u>
Semester Total	15

SPRING SEMESTER	HOURS
ETEE 486 Design. Tech. II	3
FREE Elective	3
FREE Elective	3
Technical Elective	3
Technical Elective	3
Technical Elective	<u>3</u>
Semester Total	18

Total Credits Required 126

**MECHANICAL ENGINEERING TECHNOLOGY
Required and Recommended Course Sequence**

I. General Education Requirements

TOTAL REQUIRED IN GENERAL EDUCATION – 40 Credits

Students should consult with their freshman or departmental advisor when making course selections.

A. Curriculum Area I – (Arts and Humanities)* 9 Credits

Course	No.	Title	Credits
ARTS	101	Exploration of the Visual Arts	3
ENGL	328	World Literature I	3
ENGL	203	Fundamentals of Contemporary Speech	3

B. Curriculum Area II –(Social and Behavioral Sciences)* 6 Credits

Course	No.	Title	Credits
ECON	202	Principles of Economics II	3
SOCI	201	Social Problems	3

C. Curriculum Area III – (Biological and Physical Sciences) 8 Credits**

Course	No.	Title	Credits
PHYS1	121	General College Physics I	3
PHYS1	123	General College Physics I Lab	1
PHYS1	122	General College Physics II	3
PHYS1	124	General College Physics II Lab	1

D. Curriculum Area IV – (Mathematics) 7 Credits**

Course	No.	Title	Credits
MATH	110	Trigonometry and Analytic Geometry	3
MATH	112	Calculus I	4

E. Curriculum Area V – (English Composition) 9 Credits**

Course	No.	Title	Credits
ENGL	101	Basic Composition I	3
ENGL	102	Basic Composition II	3
ENGL	305/W	Technical Writing	3

F. Curriculum Area VI – (Emerging Issues) 1 Credit

Course	No.	Title	Credit
GNST	101	First Year Experience Seminar	1

*Course Requirements other than those listed above should be selected in consultation with the advisor or Department Chairman.

**Students are required to receive a grade of C or better in these courses.

II. Program Core Courses 50 Credits

Course	No.	Title	Credits
CMTE	313	Statics	3
CMTE	314	Strength of Materials	4
EDTE	131	Computer-Assisted Drawing and Design I (CAD-I)	3
EDTE	132	Computer-Assisted Drawing and Design II (CAD-II)	3
ETEE	201	Circuit Technology I	3
ETEE	202	Circuit Technology II	3
ETME	301	Thermodynamics and Heat Power	3

Course	No.	Title	Credits
ETME	303	Machine Design I	3
ETME	318	Applied Dynamics	3
ETME	325	Engineering Materials	3
ETME	342	Fluid Mechanics	3
ETME	356	Manufacturing Processes	3
ETME	381	Instrumentation and Measurements	4
ETME	423	Heating, Ventilating, & Air Conditioning	3
ETME	445	Computer Integrated Manufacturing	3
ETME	475	Mechanical Systems Design I	3

III. Supportive Courses

18 Credits

Course	No.	Title	Credits
BUAD	411	Operations Research & Decision Theory	3
BUAD	410	Production Management	3
CHEM	111	Principles of Chemistry I	3
CHEM	113	Principles of Chemistry I Lab	1
CSDP	220	Introduction to Computer Programming	4
MATH	211	Calculus II	4

IV. Technical Elective Courses – (Minimum 15 hours)

15 Credits

Course	No.	Title	Credits
CMTE	214	Construction Surveying	3
CMTE	316	Environmental Technology II	4
CMTE	413	Structural Design I	3
CSDP	222	Advanced Programming	4
CSDP	341	Numerical Analysis	3
EDTE	341	Transportation Technologies	3
EDTE	342	Energy and Power Technologies	3
ENEE	241	Numerical Techniques in Engineering	3
ETEE	303	Circuit Technology III	3
ETEE	314	Electrical Power and Machinery	3
ETEE	474	Nuclear Fundamentals	3
ETME	304	Machine Design II	3
ETME	360	CNC Machines and Programming	3
ETME	395	Industrial Practice	3
ETME	476	Mechanical Systems Design II	3
MATH	212	Calculus III	4
MATH	321	Differential Equations	4

V. Free Elective

3 Credits

TOTAL PROGRAM REQUIRED CREDITS

126

**MECHANICAL ENGINEERING
TECHNOLOGY
Recommended Course Sequence**

The following is a prototype of the associate degree program or equivalent experience that should be completed before enrolling for the junior and senior year.

The following is a recommended course sequence for those graduates of associate-degree technology programs or equivalent experiences to complete requirements for the Bachelor of Science degree in Engineering Technology at UMES.

FRESHMAN YEAR

FALL SEMESTER	HOURS
Computer-Assisted Drawing and Design I (CAD-I)	3
English Composition I	3
Freshman Orientation	1
General College Physics I	3
General College Physics I Lab	1
Trig. and Analytic Geometry	<u>3</u>
Semester Total	14

SPRING SEMESTER	HOURS
Behavioral Sciences	3
Calculus I	4
Computer-Assisted Drawing and Design II (CAD-II)	3
English Composition II	3
General College Physics II	3
General College Physics II Lab	<u>1</u>
Semester Total	17

SOPHOMORE YEAR

FALL SEMESTER	HOURS
Fund. of Contemporary Speech	3
Circuit Technology I	3
Literature, Foreign Lang.	3
<u>or</u> Fine Arts	3
Principles of Chemistry I	3
Principles of Chemistry I Lab	1
Statics	<u>3</u>
Semester Total	16

SPRING SEMESTER	HOURS
Calculus II	4
Circuit Technology II	3
Literature, Foreign Lang.	3
<u>or</u> Fine Arts	3
Principles of Economics II	3
Strength of Materials	<u>4</u>
Semester Total	17

JUNIOR YEAR

FALL SEMESTER	HOURS
ENGL 305 Technical Writing	3
ETEE 325 Engineering Materials	3
ETME 301 Thermo. & Heat Power	3
ETME 303 Machine Design I	3
ETME 381 Instru.& Measurements	<u>4</u>
Semester Total	16

SPRING SEMESTER	HOURS
CSDP 220 Intro to Computer Program.	4
ETME 318 Applied Dynamics	3
ETME 342 Fluid Mechanics	3
ETME 356 Manufacturing Processes	3
FREE Elective	<u>3</u>
Semester Total	16

SENIOR YEAR

FALL SEMESTER	HOURS
BUAD 411 Oper. Research and Deci. Theory	3
ETME 423 Heating, Ventilating, & Air Conditioning	3
ETME 445 Computer Integrated Manufacturing	3
Technical Elective	3
Technical Elective	<u>3</u>
Semester Total	15

SPRING SEMESTER	HOURS
BUAD 410 Production Management	3
ETME 475 Mech. Systems Design I	3
Technical Elective	3
Technical Elective	3
Technical Elective	<u>3</u>
Semester Total	15

Total Credits Required 126

**TECHNOLOGY EDUCATION
Required and Recommended Course Sequence**

I. General Education Requirements

TOTAL REQUIRED IN GENERAL EDUCATION – 42 Credits

Students should consult with their freshman or departmental advisor when making course selections.

A. Curriculum Area I – (Arts and Humanities)* 9 Credits

Course	No.	Title	Credits
ARTS	101	Exploration of the Visual Arts	3
ENGL	203	Fundamentals of Contemporary Speech	3
ENGL	328	World Literature I	3

B. Curriculum Area II – (Social and Behavioral Sciences)* 6 Credits

Course	No.	Title	Credits
ECON	201	Principles of Economics I	3
PSYC	200	Introduction to Psychology	3

C. Curriculum Area III – (Biological and Physical Sciences) 11 Credits**

Course	No.	Title	Credits
BIOL	101/W	Theories and Applications of Biological Science	3
PHYS	121	General College Physics I	3
PHYS	123	General College Physics I Lab	1
PHYS	122	General College Physics II	3
PHYS	124	General College Physics II Lab	1

D. Curriculum Area IV – (Mathematics) 6 Credits**

Course	No.	Title	Credits
MATH	109	College Algebra	3
MATH	110	Trigonometry and Analytic Geometry	3

E. Curriculum Area V – (English Composition) 9 Credits**

Course	No.	Title	Credits
ENGL	101	Basic Composition I	3
ENGL	102	Basic Composition II	3
ENGL	001	English Proficiency	0
ENGL	305/W	Technical Writing	3

F. Curriculum Area VI - Emerging Issues 1 Credit

Course	No.	Title	Credit
GNST	101	First Year Experience Seminar	1

*Course Requirements other than those listed above should be selected in consultation with the advisor or Department Chairman.

**Students are required to receive a grade of C or better in these courses.

II. Program Core Courses 42 Credits

Course	No.	Title	Credits
EDTE	111	Technology and Society	3
EDTE	131	Computer-Assisted Drawing and Design I (CAD-I)	3
EDTE	132	Computer-Assisted Drawing and Design II (CAD-II)	3
EDTE	211	Electrical and Electronics Technologies I	3
CMTE	230	Construction Materials	3

Course	No.	Title	Credits
EDTE	232	Information and Communication Technologies	3
EDTE	341	Transportation Technologies	3
EDTE	342	Energy and Power Technologies	3
EDTE	351	Construction Technologies	3
ETME	356	Manufacturing Processes	3
EDTE	361	Manufacturing Technologies	3
EDTE	467	Instructional Analysis and Curriculum Development	3
EDTE	481	Facilities Organization and Management	3
EDTE	483	Core Technologies II	3

III. Professional Education Courses

42 Credits

Course	No.	Title	Credits
EDCI	200	Introduction to Contemporary Education	3
EDCI	288	PRAXIS Preparation	1+
PSYC	305	Developmental Psychology	3
PSYC	307	Educational Psychology	3
EDCI	311	Comprehensive Assessment in Education	3
EDCI	400	Senior Seminar	3
EDCI	406	Classroom Management	3
EDCI	409	Teaching Reading in the Content Areas: Part I	3
EDCI	410	Teaching Reading in the Content Areas: Part II	3
EDCI	425D	Curriculum and Instructional Methods in Technology Education	3
EDCI	460D	Teaching Internship	6
EDCI	470D	Teaching Internship	6
EDSP	428	Communication and Collaboration in Special Education	3

TOTAL PROGRAM REQUIRED CREDITS

126

+Credit does not count toward graduation.

TECHNOLOGY EDUCATION
Recommended Course Sequence

FRESHMAN YEAR

FALL SEMESTER			HOURS
ARTS 101	Exploration of the Visual Arts		3
EDTE 111	Technology and Society		3
EDTE 131	Computer-Assisted Drawing and Design I (CAD-I)		3
ENGL 101	Basic Composition I		3
GNST 100	First Yr. Experience Seminar		1
MATH 109	College Algebra		<u>3</u>
Semester Total			16

SPRING SEMESTER			HOURS
BIOL 101	Theories & Aps in Bio. Sci.		3
EDTE 132	Computer-Assisted Drawing and Design II (CAD-II)		3
MATH 110	Trig. and Analytic Geometry		3
ENGL 102	Basic Composition II		3
ENGL	English Proficiency Exam		0
SOCI 201	Social Problems		<u>3</u>
Semester Total			15

SOPHOMORE YEAR

FALL SEMESTER			HOURS
ECON 201	Principles of Economics I		3
EDCI 200	Introduction to Education		3
EDCI 288	PRAXIS Preparation		1+
ENGL 203	Fund. of Contemporary Speech		3
PHYS 121	Gen. College Physics I		3
PHYS 123	Gen. College Physics I Lab		<u>1</u>
Semester Total			13

SPRING SEMESTER			HOURS
CMTE 230	Construction Materials		3
EDTE 211	Electrical and Electronics Tech I		3
EDTE 232	Info & Communications Tech		3
PHYS 122	Gen. College Physics II		3
PHYS 124	Gen. College Physics II Lab		1
PSYC 305	Developmental Psychology		<u>3</u>
Semester Total			16

JUNIOR YEAR

FALL SEMESTER			HOURS
ENGL 305	Technical Writing		3
ENGL 328	World Literature I		3
EDTE 341	Transportation Technologies		3
EDTE 351	Construction Technologies		3
ETME 356	Manufacturing Processes		3
PSYC 307	Educational Psychology		<u>3</u>
Semester Total			18

SPRING SEMESTER			HOURS
EDCI 406	Classroom Management	<u>3</u>	3
EDCI 409	Teaching Reading: Part I		3
EDTE 342	Energy and Power Tech.		3
EDTE 361	Manufacturing Technologies		3
EDTE 467	Instru. Analysis Curr. Devel.		<u>3</u>
Semester Total			15

SENIOR YEAR

FALL SEMESTER			HOURS
EDCI 311	Comprehensive Assessment		3
EDCI 410	Teaching Reading: Part II		3
EDCI 425D	Curric. & Instruct Tech Ed		3
EDTE 481	Facilities Org. & Management		3
EDTE 483	Core Technologies II		3
EDSP 428	Comm. & Collab in Special Ed		<u>3</u>
Semester Total			18

SPRING SEMESTER			HOURS
EDCI 400	Senior Seminar		3
EDCI 460	Teaching Internship		6
EDCI 470	Teaching Internship		<u>6</u>
Semester Total			15
Semester Total			15
Total Credits Required			126

+Credit does not count toward graduation.

MINOR PROGRAMS

In order to minor in Construction Management Technology, it is recommended that the Department Chairman be contacted as early as possible. A minor advisor will be assigned by the chairman. All prerequisites for departmental courses must be met before enrolling in the courses to satisfy the minor sequence.

Two suggested minors in Construction Management Technology are outlined below, one for those interested in technical applications and one for those interested in management applications. Upon justification by the student, limited substitution of courses can be made upon approval by the Department Chairman.

TECHNICAL

Students interested in a minor in Construction Management Technology and in technical applications should complete the following courses, totaling **25 credits**:

Course	No.	Title	Credits
CMTE	201	Architectural Drawing	3
CMTE	214	Construction Surveying	3
CMTE	230	Construction Materials	3
CMTE	300-400	Level Course	3
CMTE	313	Statics	3
CMTE	314	Strength of Materials	4
EDTE	131	Computer-Assisted Design and Drawing I (CAD-I)	3
EDTE	132	Computer-Assisted Design and Drawing II (CAD-II)	3

MANAGEMENT

Students interested in a minor in Construction Management Technology and in management applications should complete the following courses, totaling **24 credits**:

Course	No.	Title	Credits
CMTE	201	Architectural Drawing	3
CMTE	230	Construction Materials	3
CMTE	311	Construction Methods I	3
CMTE	342	Construction Estimating I	3
CMTE	425	Construction Management I	3
CMTE	445	Construction Estimating II	3
EDTE	131	Computer-Assisted Drawing and Design I (CAD)	3
EDTE	132	Computer-Assisted Drawing and Design II (CAD)	3

MECHANICAL ENGINEERING TECHNOLOGY

Students interested in a minor in Mechanical Engineering Technology should complete the following courses, totaling **25 credits**:

Course	No.	Title	Credits
CMTE	313	Statics	3
CMTE	314	Strength of Materials	4
EDTE	131	Computer-Assisted Drawing and Design I (CAD)	3
EDTE	132	Computer-Assisted Drawing and Design II (CAD)	3
ETME	301	Thermodynamics & Heat Power	3
ETME	303	Machine Design I	3
ETME	356	Manufacturing Processes	3
ETME	423	Heating, Ventilating & Air Conditioning	3

**TECHNOLOGY EDUCATION
TEACHER CERTIFICATION**

Students interested in a minor in Technology Education may pursue one of two tracks depending on their career objective. A sequence of courses has been designed for both Technology Education Teacher Certification and Technical Applications in industry. The Technology Education Teacher Certification sequence (based on established state requirements) may be pursued by education majors who also desire certification in Technology Education. Students must meet all departmental prerequisites and receive a grade of C or better in required courses.

Manufacturing and Construction Technology 39 Credits

Course	No.	Title	Credits
CMTE	230	Construction Materials	3
EDTE	351	Construction Technologies	3
EDTE	361	Manufacturing Technologies	3
EDTE		Technical Elective	3
ETME	356	Manufacturing Processes	3

Design and Communication Technology

Course	No.	Title	Credits
CMTE	201	Architectural Drawing	3
EDTE	131	Computer-Assisted Drawing and Design I (CAD-I)	3
EDTE	132	Computer-Assisted Drawing and Design II (CAD-II)	3
EDTE	232	Information and Communication Technologies	3

Energy and Transportation Technology

Course	No.	Title	Credits
EDTE	211	Electrical and Electronics Technologies I	3
EDTE	212	Electrical and Electronics Technologies II	3
EDTE	341	Transportation Technologies	3
EDTE	342	Energy and Power Technologies	3

Six additional semester hours to include:

Course	No.	Title	Credits
EDTE	481	Facilities Organization & Mgt.	3
EDTE	499	Research and Experimentation in Technology Education I	3

Additional professional education courses, as listed below for Career and Technology Education, and student teaching may also be required by the State for certification.

Technical Applications For Industry 27 Credits

Course	No.	Title	Credits
CMTE	230	Construction Materials	3
EDTE	131	Computer-Assisted Drawing and Design I (CAD-I)	3
EDTE	132	Computer-Assisted Drawing and Design II (CAD-II)	3
EDTE	211	Electrical and Electronics Technologies I	3
EDTE	212	Electrical and Electronics Technologies II	3
EDTE	351	Construction Technologies	3
EDTE	361	Manufacturing Technologies	3
ETME	356	Manufacturing Processes	3
		Technical Elective	3

CAREER AND TECHNOLOGY EDUCATION CERTIFICATION

The University of Maryland is designated as one of the institutions which shall offer the "Trade and Industrial" certification courses. The courses which are offered are those required for certification in Maryland. To become certified as a trade-industrial and service occupations teacher in the State of Maryland, a person must successfully complete 18-21 credit hours of instruction.

The following courses will satisfy the Standard (SPC) Certification Requirements:

Course	No.	Title
EDCI	409	Teaching Reading in the Content Areas: Part I
EDCI	410	Teaching Reading in the Content Areas: Part II
EDSP	200	Introduction to Special Education
EDTE	368	Curriculum Development and Methods of Teaching I
EDTE	370	Curriculum Development and Methods of Teaching II
EDTE	437	Student Performance Assessment
EDTE	440	Integrating Math and Science in Occupational and Technical Education

COURSE DESCRIPTIONS

CONSTRUCTION MANAGEMENT TECHNOLOGY

CMTE 201 Architectural Drawing 3 crs.
This is an introductory course in architectural planning and blue print reading utilized by architects and builders of residential, commercial, and light industrial properties throughout the construction industry. Students utilize CAD drafting skills and sketches to produce plans, details, and sections used in field and office operations. Lecture one hour, laboratory four hours. Prerequisite: EDTE 131.

CMTE 205 Computer Applications in Construction 3 crs.
This course develops a solid understanding of micro-computers, the Windows operating system, and Internet usage. Students develop proficiency in the use of various commercially available software packages, such as word processing, presentation, spreadsheet, and database management. A variety of construction specific software programs in estimating, scheduling, and construction project management are introduced. Lecture two hours; laboratory two hours. Prerequisite: Sophomore standing.

CMTE 214 Construction Surveying 3 crs.
This course covers coordinates, directions, distances and elevations. The course includes traverses, boundary surveys leveling, national rectangular coordinate systems, property description, public land subdivision, metes and bounds, and topographic surveys. Lecture one hour; laboratory four hours. Prerequisite: MATH 110 or MATH 111.

CMTE 230 Construction Materials 3 crs.
The properties of various materials used in construction, such as wood, steel, clay products, concrete, plastic, glass, concrete products, soils, and other materials are covered in this course. Lecture two hours; laboratory two hours.

CMTE 286 Construction Planning & Scheduling 3 crs.
The focus of this course is on the application of planning and scheduling techniques to a construction project. The use of bar charts and critical path method (CPM) are emphasized, as well as cost allocation, resource leveling, schedule updating, and microcomputer application. Lecture two hours; laboratory two hours. Prerequisite: CMTE 201, CMTE 205.

CMTE 295 Construction Management Internship I 2 crs.
This course is designed to provide students with work experience as interns under supervision of construction professionals. Students become familiar with many phases of construction under actual job conditions, which may include estimating, field engineering, inspecting, scheduling, and supervision. Students must register for the course during summer school and work a minimum of 40 hours per week for six (6) weeks to receive credit for the course. Students enrolled in the Military Reserve Officer Training Corps may receive credit for (1) summer camp experience under this

course listing (while enrolled at UMES). Prerequisites: Completion of Sophomore year and permission of instructor.

CMTE 311 Construction Methods I 3 crs.
The study and analysis of job planning, work methods, materials, equipment, and power tool and equipment safety methods employed on residential construction projects are covered in this course. Lecture one hour; laboratory four hours. Prerequisites: CMTE 201, CMTE 230, and MATH 110 or MATH 111.

CMTE 312 Construction Methods II 3 crs.
This course is a continuation of Construction Methods I as applied to commercial, institutional, and industrial construction projects. Integration of OSHA and MOSHA safety standards for personal safety are covered in this course. Lecture one hour; laboratory four hours. Prerequisite: CMTE 311.

CMTE 313 Statics 3 crs.
This course covers the composition and resolution of forces; equilibrium of force systems; application of the principles of statics to problems, including force analysis of simple structures; centroids; and moments of inertia. Lecture three hours. Prerequisites: MATH 110 and PHYS 121.

CMTE 314 Strength of Materials 4 crs.
This course covers the behavior of materials subjected to tension, compression, shear, and bending; design of beams and columns; tests to determine the physical properties of various structural materials, including steel, wood, and aluminum; and analysis and interpretation of test data. Lecture three hours; laboratory two hours. Prerequisites: CMTE 313 and MATH 112.

CMTE 315 Environmental Technology I 3 crs.
This course covers heat loss, heat gain, and humidity control; the control of temperature and humidity in buildings; basics of designing heating, ventilation, and air conditioning systems; sizing of pipes and ducts, and selection of HVAC equipment. Principles of water services, drainage, waste and vent, and fire protection systems will also be covered. Lecture two hours; laboratory two hours. Prerequisites: Junior standing, CMTE 201, ENGL 305, MATH 112, and PHYS 121.

CMTE 316 Environmental Technology II 3 crs.
This course covers the principles and practices of electrical systems, lighting systems, vertical transportation for buildings, sound control, and year-round climate control in buildings. The course also includes code provisions and cost estimation. Lecture one hour; laboratory four hours. Prerequisites: CMTE 201, ENGL 305, PHYS 121, PHYS 122, and MATH 112.

CMTE 317 Soils In Construction 3 crs.
This course covers the identification and properties of soils with emphasis on laboratory and field testing. The influence of soil material in certain construction operations and in the construction contract are emphasized. Lecture one hour. Laboratory four hours. Prerequisites: CMTE 312 and CMTE 230.

CMTE 342 Construction Estimating I 3 crs.
The classification of work, quantity survey techniques, as well as cost estimating of labor, material, and equipment used in the completion of construction projects are covered in this course. Lecture two hours; laboratory two hours. Prerequisites: CMTE 311, MATH 110 or MATH 111.

CMTE 395 Construction Management Internship II 2 crs.
This course is designed to provide students with work experience as interns under supervision of construction professionals. Students become familiar with many phases of construction under actual job conditions, which may include estimating, field engineering, inspecting, scheduling, and supervision. Students must register for the course during summer school and work a minimum of 40 hours per week for six (6) weeks to receive credit for the course. Students with verifiable construction experience of three (3) years or more may receive credit under this course listing. Verification will be through letters of recommendation from employer(s) on company letterhead and documented payroll receipts. Junior college transfer students who have completed an Associate Degree Program are required to complete one internship course.

CMTE 413 Structural Design I 3 crs.
This course covers theory and principles of the design of steel and timber structural elements and connections and their applications in construction. Lecture three hours. Prerequisite: CMTE 314.

CMTE 414 Structural Design II 3 crs.
This course covers the theory and principles of the design of reinforced concrete and masonry structural elements and their applications in construction. Lecture three hours. Prerequisite: CMTE 314.

CMTE 425 Construction Management I 3 crs.
This course covers construction industry organization and ethics; contract documents, their relationships, meanings and significance in construction; human relations and communications. Safety, health, and risk control are topics that are also included in this course. Lecture three hours. Prerequisite: CMTE 312, CMTE 205 CMTE 286.

CMTE 426 Construction Management II 3 crs.
This course covers the effective management and control to complete a construction project in accordance with the contract documents, within budget, on time, and safely. Topics discussed include professional ethics, project management principles, effective communications, cost engineering, management accounting, procurement, change orders, claims, value engineering, safety management, and

computer applications. Lecture three hours. Prerequisites: CMTE 286, CMTE 425, and CMTE 445.

CMTE 445 Construction Estimating II 3 crs.
This course covers the analysis and determination of costs of construction operations, including all the normal bid-preparation activities that take place in a constructor's estimating section. This course also includes construction cost accounting and control, microcomputer applications, and professional ethics. Lecture three hours. Prerequisites: CMTE 205 and CMTE 342.

CMTE 454 Site Development 3 crs.
This course covers market analysis and search, site selection criteria, zoning, deed restrictions, physical influences on land, use of information coming from personal interviews and printed information from city and county offices, and preliminary layout and design of selected projects. Lecture two hours; laboratory two hours. Prerequisites: CMTE 201, CMTE 214, and CMTE 312.

CMTE 458 Senior Seminar 2 crs.
This course covers selected construction problems by individuals or project teams. The course includes presentation of selected topics by students and construction industry representatives. Laboratory four hours. Prerequisite: Senior standing in Construction.

CMTE 499 Undergraduate Research in Construction Management Technology 1-3 crs.
This course is designed for the junior-senior undergraduate student who has an interest in pursuing a special problem as an independent research project. Credits and hours may be arranged for either or both semesters and require the consent of the instructor and approval of the Department Chairman.

TECHNOLOGY EDUCATION

EDTE 111 Technology and Society 3 crs.
This course examines the nature of technology, its meaning, application, significance, historical role, and importance in today's technological society. Course content focuses on the characteristics and scope of technology; core concepts of technology; relationships and connections between technology and other fields; the cultural, social, economic, and political effects of technology; the effects of technology on the environment; and the role of society in the development and use of technology. Lecture three hours.

EDTE 131 Computer-Assisted Drawing and Design I (CAD-I) 3 crs.

This course covers the attributes of design. Engineering design and the basics of technical drawing are covered in this course. The design process is utilized to solve problems. Basic technical drawing skills are developed, such as sketching, coordinate systems, the principles and theory of visualization, shape description, orthographic projection, isometric views, dimensioning, sectional views, and auxiliary views. Students use and apply Computer-Assisted Drawing and Design (CAD) software to produce basic technical drawings. Lecture two hours; and laboratory two hours.

EDTE 132 Computer-Assisted Drawing and Design II (CAD) 3 crs.

In this course advanced computer-assisted drawing and design software is used to produce three-dimensional drawings. Engineering design and problem solving are used to research and develop renderings and animated wire-frame, surface, and solid three-dimensional models. The use of libraries of pre-drawn materials is also covered. Lecture two hours; and laboratory two hours. Prerequisite: EDTE 131 or permission of instructor.

EDTE 211 Electrical and Electronics Technologies I 3 crs.

This course covers the fundamental principles of DC and AC circuits. Ohm's Law, series and parallel circuits, semi-conductors, circuit symbols, magnetism, SI units, and test equipment are also studied. Lecture two hours; and two laboratory hours. Prerequisites: MATH 110 and PHYS 121.

EDTE 212 Electrical and Electronics Technologies II 3 crs.

This course provides an advanced study of AC circuits, inductance, capacitance, and resonance applied to communication devices such as computers. Emphasis is placed on power supplies, amplifiers, oscillators, receivers, and test equipment. Lecture two hour;. laboratory two hours. Prerequisite: EDTE 211.

EDTE 232 Information and Communication Technologies 3 crs.

This course covers various information and communication systems. It examines how information can be encoded, transmitted, and received. Graphic communications, television, radio, computer networks, computer graphics, the Internet, telephone, and other systems and subsystems are also examined. The symbols, design, and language of information and communication are discussed. Lecture two hours; laboratory two hours. Prerequisite: EDTE 132.

EDTE 314 Biotechnology 3 crs.

This course covers techniques that use living organisms or parts of an organism to make or modify products to improve plants or animals, including humans. Developing micro-organisms for specific uses is emphasized. Lecture two hours; laboratory two hours. Prerequisite: BIOL 101.

EDTE 341 Transportation Technologies 3 crs.

This course covers transportation systems used to transport people and goods. The design and operation of transportation systems and subsystems, governmental regulations, care of products and systems, design and operation of transportation systems, and the impact of transportation systems on society are studied. Lecture two hours, laboratory two hours. Prerequisite: Junior standing.

EDTE 342 Energy and Power Technologies 3 crs.

The use and impact of energy and power systems in society are examined in this course. Such areas as power efficiency and conservation, energy sources, thermodynamics, renewable and non-renewable forms of energy, and alternate energy are studied. Technical aspects of systems design and development for solar energy, nuclear energy, wind energy, geothermal energy, hydro-energy and other sources are also examined. Lecture two hours; laboratory two hours. Prerequisite: EDTE 341.

EDTE 351 Construction Technologies 3 crs.

The structures, systems, processes, and procedures of construction technologies are examined in this course. Principles of construction, personnel management and organization, the design process, methods, materials, tools, and equipment used in building structures are studied. Prefabricated materials, infrastructures and renovation are additional topics covered. Lecture two hours; laboratory two hours. Prerequisite: Junior Standing.

EDTE 361 Manufacturing Technologies 3 crs.

This course is a study of the principles of manufacturing goods, processes, and systems. Personnel management, organizational structures, durable and non-durable goods, product design, interchangeability, and product marketing are covered. Students research and select products suitable for mass-production using an enterprise system. Emphasis is placed on the manufacturing design process. The social, cultural and economic problems and benefits are examined. Lecture two hours; laboratory two hours. Prerequisite: ETME 356.

***EDTE 368 Curriculum Development and Methods of Teaching I 3 crs.**

This course focuses on identifying course content, developing instructional plans, writing objectives, designing instructional strategies, and developing instructional materials for career and technology education courses. State and national content standards are used as a basis for curriculum design. This is the first of a two-course sequence which utilizes competency-based materials and authentic teaching experiences. Lecture three hours. Prerequisite: Permission of instructor.

***EDTE 370 Curriculum Development and Methods of Teaching II** 3 crs.

A field-based internship in a public school under the supervision of an experienced mentor teacher and a university teacher educator is the basis for this course. Beginning teachers plan, develop, deliver, and assess competency-based instruction in their assigned area of teaching. Laboratory six hours. Prerequisite: EDTE 368.

EDTE 415 History and Principles of Career and Technology Education 3 crs.

The history, purpose, goals, principles, and concepts of career and technology education are discussed in this course. Other topics include federal legislative acts, definition of terms, instructional programs, career clusters, administration of programs, and current trends. Lecture three hours. Prerequisite: Permission of instructor.

***EDTE 437 Student Performance Assessment** 3 crs.

This course teaches how to identify and utilize appropriate performance criteria to measure student achievement in the cognitive, psychomotor, and affective domains. A variety of assessment instruments is developed to document student mastery of instructional objectives. Topics covered include performance tests, rating scales, checklists, rubrics, student portfolio assessment, and grading systems. Lecture three hours. Prerequisite: Permission of instructor.

***EDTE 440 Integrating Math and Science in Occupational and Technical Education** 3 crs.

The purpose of this course is to provide teachers with techniques and methods to assist students in improving their math and science skills. Techniques and problem application will be covered for specific occupational/technical areas. Lecture three hours. Prerequisite: Permission of instructor.

EDTE 445 American Industry and Global Competition 3 crs.

This course is an examination of American business and industry in relation to current and future global economy trends. All aspects of the industry are covered, including planning, management, finance, technical and production skills, principles of technology, labor issues, community issues, and health, safety, and environmental issues. Lecture three hours. Prerequisite: Permission of instructor.

***EDTE 450 Mentoring: Expectations and Responsibilities** 3 crs.

Introduction to mentoring, selecting mentors, mentor/teacher responsibilities, teacher observation, problems of beginning teachers, mentoring techniques, assessment, and portfolio development are covered in this course. This course is designed to prepare experienced teachers that are interested in becoming mentors in their school system. Lecture three hours. Prerequisite: Permission of instructor.

EDTE 467 Instructional Analysis and Curriculum Development 3 crs.

This advanced curriculum design course covers methods of conducting an instructional analysis in a content area in order to develop curriculum materials. Emphasis is placed on the integration and utilization of national and state content standards. Based on these standards, goals, objectives, indicators, expectancies, student learning activities, instructional materials, and assessment limits and instruments are designed. Lecture three hours. Prerequisite: Permission of instructor.

EDTE 480 Coordination of Work-Based Learning 3 crs.

Study of a variety of work-based learning programs will be covered including cooperative work-experience internships, mentorships, job shadowing, and apprenticeship. Mission, trends and current practices in these programs will be discussed. Methods and techniques of coordination in comprehensive and part-time programs at the secondary and adult levels are covered. Prerequisite: Senior standing or consent of instructor.

EDTE 481 Facilities Organization and Management 3 crs,

Basic elements of organizing and managing career and technology education facilities comprise the core of this course. Selection of instructional tools, equipment, and supplies; safety; state and federal laws; facility layout arrangements; and classroom management are studied. Lecture three hours. Prerequisite: Senior standing.

EDTE 482 Core Technologies I 3 crs.

This course covers the core technologies that are the building blocks of all technology systems. Mechanical and structural technologies are examined with regard to common components, simple controls, basic system design, safety, and applications. An overview of materials technology includes an examination of ferrous and non-ferrous materials, common industrial forms, and the primary and secondary processing of industrial materials. Topical investigations and modular activity packages are utilized to enhance understanding of the core technologies. Lecture two hours. Laboratory two hours. Prerequisite: Senior standing or permission of instructor.

EDTE 483 Core Technologies II 3 crs.

The core technologies that are the building blocks of all technology systems are covered in this course. Electrical, electronic, optical, fluid, and thermal technologies are examined with regard to common components, simple controls, basic system design, safety, and applications. The context for the study of these core technologies is the design and development of technology systems to solve practical problems. Communication skills are developed through the documentation of the design and development process. Topical investigations and modular activity packages are utilized to enhance understanding of the core technologies. Lecture two hours; laboratory two hours. Prerequisite: Senior standing or permission of instructor.

EDTE 484 Information Systems 3 crs.
This course provides students with knowledge and skills related to communication systems, application of computers, computer controlled robots and machines, imaging, publishing, audio systems, video systems, and telecommunications. The focus of the course is on integrating instruction through information systems into the technology/learning strategies used in technology education. These strategies include: (1) Ingenuity Challenges, (2) Topical Investigations, (3) Product Generation, (4) Modular Activity Packages, (5) Research and Experimentation, and (6) Engineering Design and Development. Lecture two hours; laboratory two hours. Prerequisite: Senior standing or permission of instructor.

EDTE 485 Safety Programs in Education and Occupational Settings 3 crs.
This course is a study of exemplary safety practices through conference discussions, group demonstrations, and development of written safety programs for occupational education facilities. Organized plant visits and industrial safety programs are studied. Lecture three hours. Prerequisite: Senior standing or permission of instructor.

EDTE 486 Instructional Technology and Media Development 3 crs.
The study of various instructional technology commonly used as learning tools to assist with instructional delivery is the focus of this course. Computers, software, hardware, the Internet, web-page design, e-portfolios, video and audio resources, and other multimedia devices are covered. Lecture two hours; laboratory two hours. Prerequisite: Senior standing or permission of instructor.

EDTE 499 Research and Experimentation Technology Education 1-3 crs.
This advanced course focuses on solving technological issues through the problem solving method. Students identify a technological problem, determine possible solutions, design or utilize test apparatus, collect data, write a research report, and present their findings. Emphasis is placed on inquiry, utilizing resources, analyzing and synthesizing data, and developing solutions. Credit hours arranged. Prerequisite: Permission of instructor.

***Career and Technology Education Certification courses**

**ELECTRICAL/ELECTRONICS
ENGINEERING TECHNOLOGY**

ETEE 303 Circuit Technology III 3 crs.
This course covers advanced network analysis and provides an introduction to the use and applications of Laplace and Fourier transforms, filter theory, and computer applications. Lecture two hours. Laboratory two hours. Prerequisites: Junior Standing, CSDP 220 and MATH 211.

ETEE 314 Electric Power and Machinery 3 crs.
This course focus on the generation, transmission and distribution of electrical energy, theory and operation of transformers, DC machines, and AC machines including three phase synchronous, asynchronous, single phase and their equivalent circuits and performance analysis. Lecture two hours; laboratory two hours. Prerequisites: Junior standing and *ETEE 202.

ETEE 335 Logic and Switching Circuits 3 crs.
This course will focus on the principles and application of asynchronous logic, encoder and decoder, control and programmable logic, multiplexer, demultiplexer, PLA, memory latches, systems and codes, counters, shift registers, computer arithmetic circuits, memory systems, static and dynamic RAM and ROMS, and interfacing. Lecture two hours; laboratory two hours. Prerequisites: Junior standing and *ETEE 216.

ETEE 346 Control Circuits 3 crs.
This course will focus on the study of open and closed loop control systems, principles of feedback control, analysis of system response and criteria of system stabilities and compensation. Lecture two hours. Laboratory two hours. Prerequisite: ETEE 303.

ETEE 355 Advanced Electronic and Computer Networks 3 crs.
This is an introductory course in electronic circuits for computers that covers number systems, computer organization, assembly language programming, micro-processors, system components and interfacing concepts. Lecture two hours; laboratory two hours. Prerequisite: ETEE 335.

ETEE 421 Instrumentation and Measurements 4 crs.
This course will focus on the fundamental concepts of mechanical and electronic measurement of distance, velocity, acceleration, time, pressure, force and strain. Introduction to development of measuring systems and calibration of these systems and the application of measuring systems to industrial technology. Lecture two hours; laboratory four hours. Prerequisites: Senior standing, CSDP 220, ETEE 202 and MATH 112.

ETEE 425 Communication and Microwave Technology 3 crs.
The course will cover the basics of electronic communication technology, digital communication, codes, serial interfaces, error detection, data link control, protocol, networking and network topology. Lecture two hours. Laboratory two hours. Prerequisites: Permission of instructor and MATH 211.

ETEE 474 Nuclear Fundamentals 3 crs.
This course will focus on the basic theory related to the nuclear energy complex, nuclear reactor design, isotopic and chemical separations and computer applications in problem solving. Lecture three hours. Prerequisites: Permission of the instructor and Senior standing.

ETEE 485 Design Technology I 3 crs.
This course will focus on the design process, including creativity, analysis, synthesis, and decision-making. It will also cover applications of analytical techniques, experimental results and individual or group design projects, emphasizing the synthesis of a design solution to meet performance specifications. Lecture three hours. Prerequisites: ETEE 335, ETEE 421 and Senior standing.

***These are community college level courses; they, or appropriate substitutions, should be completed before enrolling at UMES.**

ETEE 486 Design Technology II 3 crs.
This course will focus on individual or group design projects requiring the synthesis of analytical, experimental and manufacturer's data for the development of an electronic system. The course will require execution of the design in sufficient detail to permit construction and testing or evaluation of a prototype, model, or mock-up and consideration of reliability, safety, human factors, and economics of production. Computer applications will be required. Lecture one hour; laboratory four hours. Prerequisites: CSDP 220 and ETEE 485.

ETEE 499 Undergraduate Research in Electrical Engineering Technology 1-3 crs.
This course is designed for the junior-senior undergraduate student who has an interest in pursuing a special problem as an independent research project. Credits and hours may be arranged for either or both semesters and require the consent of the instructor and approval of the Department Chairman.

MECHANICAL ENGINEERING TECHNOLOGY

ETME 301 Thermodynamics and Heat Power 3 crs.
This course covers the basic laws of thermodynamics, properties of fluids. Applications of the first and second laws of thermodynamics in the analysis of basic heat engines and their cycles used in power generation will also be covered. Lecture three hours. Prerequisites: CHEM 111, MATH 211 and PHYS 122.

ETME 303 Machine Design I 3 crs.
This course covers design and selection of machine elements, power transmissions, shafts, couplings, keys, threaded fasteners, belts, rivets, welding, lubrication, sleeve bearings with roller bearings. Lecture three hours. Prerequisites: CMTE 212 and MATH 112.

ETME 304 Machine Design II 3 crs.
This course covers the design and selection of machine elements, including chain drives, hoists and conveyors, brakes, clutches, power screws, gears, cams, springs, and fly wheels. Lecture three hours. Prerequisite: ETME 303.

ETME 318 Applied Dynamics 3 crs.
This course covers systems of heavy particles and rigid bodies at rest and in motion, rectilinear motion, curvilinear motion, rotation, plane motion, work, energy, power, impulse, and momentum. Lecture three hours. Prerequisites: CMTE 313 and MATH 211.

ETME 325 Engineering Materials 3 crs.
This course covers the nature, properties, and behavior of materials used in engineering applications. Materials studied include metals, plastics, polymers, and composites. The production of metals, heat treatment, and powder metallurgy will also be covered. Lecture three hours. Prerequisites: CHEM 111, MATH 112, and PHYS 122.

ETME 342 Fluid Mechanics 3 crs.
This course covers fluid flow concepts and basic equations, laminar and turbulent flow, flow in pipes and open channels, energy and momentum equations, Bernoulli's equation, principles of flow measurements and instrumentation, fluid power, and machinery. Lecture two hours; laboratory two hours. Prerequisites: CMTE 313 and MATH 211.

ETME 356 Manufacturing Processes 3 crs.
This course covers modern industrial metal working and fabrication processes. Machines and tools used in these processes are also covered. Additionally, study includes casting, welding, cold and hot working, metal cutting processes, and quality control. Lecture two hours; laboratory two hours. Prerequisites: MATH 110 and PHYS 122.

ETME 360 CNC Machines and Programming 3 crs.
This course covers principles of numerical control, Computer Numerically Controlled (CNC) machines used in production, CNC machine capabilities, and point to point programming using G-codes and auxiliary machine control functions. Computer assisted design and computer assisted CNC machine programming are also studied. Lecture two hours; laboratory two hours. Prerequisites: CSDP 220, ETME 356 and MATH 110.

ETME 381 Instrumentation and Measurements 4 crs.
This course covers the fundamental concepts of mechanical and electronic measurements of distance, velocity, acceleration, time, pressure, temperature, force, strain, and flow. Measurement systems, and application of selected instruments, with emphasis on interpretation of results are also studied. Lecture three hours; laboratory two hours. Prerequisites: CSDP 220, ETEE 202 and MATH 112.

ETME 395 Industrial Practice 3 crs.

This course requires work experience practice in a Mechanical Engineering Technology related field. A minimum of 10 weeks of employment is required. The supervisor of the student must submit a confidential performance evaluation letter for the work done by the student to the faculty advisor. Students must register for the course before commencement of industrial practice for proper credit. Prerequisite: Prior approval of the faculty advisor.

ETME 423 Heating, Ventilating, and Air Conditioning 3 crs.

This course covers heat loss, heat gain, the control of temperature and humidity in buildings, and the basics of designing heating, ventilating and air conditioning systems, including sizing of pipes and ducts. Selection of HVAC equipment is also covered. Lecture two hours; laboratory two hours. Prerequisites: EDTE 132, ENGL 305, MATH 112 and PHYS 122.

ETME 445 Computer Integrated Manufacturing 3 crs.

This course covers principles of computer integrated manufacturing, system integration and architecture, data base development, interfaces, hardware and software requirements, communication protocols and programming. Lecture three hours. Prerequisites: CSDP 220 and ETME 356.

ETME 475 Mechanical Systems Design I 3 crs.

This course covers the design process; creativity, analysis, synthesis, and decision making, applications of analytical techniques and experimental results, individual or group projects emphasizing the synthesis of a design solution to meet performance specifications. Use of computers in design and drafting will be required. Lecture two hours. Laboratory two hours. Prerequisites: Senior standing, CSDP 220, ETME 303 and MATH 211.

ETME 476 Mechanical Systems Design II 3 crs.

This course covers advanced individual or group design projects requiring the synthesis of analytical, experimental, and manufacturer's data for development of the design in sufficient detail to permit construction and testing or evaluation of prototype, model, or mock-up. Consideration of reliability, safety, human factors, and economics of construction. Use of computers in design and drafting will be required. Lecture two hours. Laboratory two hours. Prerequisite: ETME 475.

ETME 499 Undergraduate Research in Mechanical Engineering Technology 1-3 crs.

This course is designed for the junior-senior undergraduate student who has an interest in pursuing a special problem as an independent research project. Credits and hours may be arranged for either or both semesters and requires the consent of the instructor and approval of the Department Chairman. A written contract must be signed within the first week of the semester.

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