

Engineering, Construction and Industrial Degrees and Certificates

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Information contained in this publication is current as of January 22, 2010.

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Associate of Applied Science Degree in General Engineering Technology: Mechanical Engineering Technology

AREA: General Engineering Technology:
Mechanical Engineering Technology

DEGREE: Associate of Applied Science Degree

LENGTH: Four semesters (two-year) program

PURPOSE: This curriculum provides educational opportunities for those who seek employment in industry, for those who desire to upgrade their knowledge or acquire practical skills in the field, and for those who wish to transfer and complete a bachelor of science degree in mechanical engineering technology.

OCCUPATIONAL OBJECTIVES: draftsman/designer, engineer's aide, engineering technician, industrial test technician, maintenance technician or other related positions

TRANSFER GUIDELINES: Graduates with appropriate course selection may qualify to enter mechanical engineering technology programs at selected universities. Students preparing for transfer must consult with the program advisor. Course selection is very important to assure junior status upon transfer. Potential transfer institutions include East Tennessee State University, North Carolina State University, Old Dominion University, Rochester Institute of Technology, West Virginia Institute of Technology and West Virginia University. Students interested in transferring to other institutions, including Virginia Tech, must determine transfer requirements of their intended destination school.

PROGRAM REQUIREMENTS: The curriculum is designed to integrate courses in mechanical engineering technology, mechanics, physics, general education, drafting, computer information systems and technical electives. Students entering the program must have algebra I and geometry skills or be willing to improve those skills through developmental studies. The program may be completed on a part-time basis since courses are alternated between day and evening hours. Technical electives must be selected from an approved list available from the program advisor. Upon satisfactory completion of the four-semester program, the graduate will be awarded the associate of applied science degree in general engineering technology with a mechanical engineering technology specialization. Transfer opportunities for associate of applied science degrees, if existing, are very specific in nature. Students enrolling in an applied science degree with plans to transfer should explore opportunities with their faculty advisor.

Course#	Title	Credits
First Semester		
EGR 110	Engineering Graphics	3
ENG 111	College Composition I	3
MEC 113	Materials and Processes of Industry	3
MTH	Approved math elective ¹	3
PED/HLT	Physical education (or health)	2
SDV 100	College Success Skills	1
	Approved social science elective ²	3
	Total	18
Second Semester		
CAD 241	Parametric Solid Modeling I	3
ENG 115	Technical Writing	3
ETR 113	D.C. and A.C. Fundamentals I	3
MTH	Approved math elective ¹	3
	Approved programming/computer elective ³	3
	Approved social science elective ²	3
	Total	18
Third Semester		
CAD 242	Parametric Solid Modeling II	3
EGR 135	Statics for Engineering Technology	3
EGR 206	Engineering Economics	3
PHY 201	General College Physics I	4
	Approved technical elective ³	3
	Total	16
Fourth Semester		
EGR 136	Strength of Materials	3
EGR 216	Computer Methods in Engineering and Technology	3
EGR 247	Materials Lab	1
PHY 202	General College Physics II	4
	Approved technical elective ³	3
	Approved humanities elective ⁴	3
	Total	17
	Program Total	69

¹ Approved math electives: MTH 115 and MTH 116, or MTH 163 and MTH 164, or MTH 213 and MTH 214 will fulfill the math requirements for the program. Developmental math courses may be required for students to build their math skills before taking any of the approved math electives. Students must take a math placement test to determine their math skill level.

² Students may select social science electives from the approved list on page 51.

³ Requires approval of program advisor.

⁴ Students may select humanities electives from the approved list on page 50.

*Associate of Applied Science Degree in General Engineering Technology: Civil Engineering
Technology Specialization*

AREA: General Engineering Technology:
Civil Engineering Technology Specialization

DEGREE: Associate of Applied Science Degree

LENGTH: Four semesters (two-year) program

PURPOSE: This curriculum provides educational opportunities for those who seek employment in the construction industry, for those who desire to upgrade their knowledge or acquire practical skills in the field, and for those who wish to transfer and complete a bachelor of science degree in civil engineering technology.

OCCUPATIONAL OBJECTIVES: construction/building inspector, construction estimator, draftsman/designer, engineer's aide, engineering technician or other related positions

TRANSFER GUIDELINES: Graduates with appropriate course selection may qualify to enter civil engineering technology programs at selected universities. Students preparing for transfer must consult with their program advisors. Course selection is very important to assure junior status upon transfer. Potential transfer institutions include East Tennessee State University, North Carolina State University, Old Dominion University, Rochester Institute of Technology, West Virginia Institute of Technology and West Virginia University. Students interested in transferring to other institutions, including Virginia Tech, must determine transfer requirements of their intended destination school.

PROGRAM REQUIREMENTS: The curriculum is designed to integrate courses in civil engineering technology, mechanics, physics, general education, drafting, computers and technical electives. Students entering the program must have algebra I and geometry skills or be willing to improve those skills through developmental studies. The program may be completed on a part-time basis since courses are alternated between day and evening hours. Technical electives must be selected from an approved list available from the program advisor. Upon satisfactory completion of the four-semester curriculum, the graduate will be awarded the associate of applied science degree in general engineering technology with a civil engineering technology specialization. Transfer opportunities for associate of applied science degrees, if existing, are very specific in nature. Students enrolling in an applied science degree with plans to transfer should explore opportunities with their faculty advisor.

Course#	Title	Credits
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First Semester

ARC	130	Materials and Methods of Construction	3
EGR	110	Engineering Graphics	3
ENG	111	College Composition I	3
MTH		Approved math elective ¹	3
PED/HLT		Physical education (or health)	2
SDV	100	College Success Skills	1
		Approved social science elective ²	3
		Total	18

Second Semester

ARC	221	Architectural CAD Appl. Software I	3
CIV	225	Soil Mechanics	2
CIV	226	Soil Mechanics Lab	1
ENG	115	Technical Writing	3
MTH		Approved math elective ¹	3
		Approved programming/computer elective ³	3
		Approved social science elective ²	3
		Total	18

Third Semester

CIV	171	Surveying I	3
EGR	135	Statics for Engineering Technology	3
EGR	206	Engineering Economics	3
PHY	201	General College Physics I	4
		Approved technical elective ³	3
		Total	16

Fourth Semester

CIV	172	Surveying II	3
EGR	136	Strength of Materials	3
EGR	247	Materials Lab	1
PHY	202	General College Physics II	4
		Approved humanities elective ⁴	3
		Approved technical elective ³	3
		Total	17

Program Total **69**

¹ Approved math electives: MTH 115 and 116, or MTH 163 and MTH 164, or MTH 213 and MTH 214 will fulfill the math requirements for the program. Developmental math courses may be required for students to build their math skills before taking any of the approved math electives. Students must take a math placement test to determine their math skill level.

² Students may select social science electives from the approved list on page 51.

³ Requires approval of program advisor.

⁴ Students may select humanities electives from the approved list on page 50.

Associate of Applied Science Degree in General Engineering Technology: Computer-Aided Drafting Specialization

AREA: General Engineering Technology:
Computer-Aided Drafting Specialization

DEGREE: Associate of Applied Science Degree

LENGTH: Four semesters (two-year) program

PURPOSE: Skills in computer-aided drafting (CAD) are increasingly valuable and sought in the workplace. This curriculum is designed to provide a thorough preparation in drafting, emphasizing the use of computers and, in particular, computer-aided design and drafting. Communication skills and problem-solving skills are also emphasized, both of which are critical to success in the workplace. This program is particularly valuable for those who wish to gain employment in technical support careers or for those who need to upgrade skills within their current fields.

OCCUPATIONAL OBJECTIVES: CAD operator, CAD technician, drafting technician, engineer's aid or other related positions

TRANSFER GUIDELINES: Although this program is not designed as a transfer program, it does include many courses which will transfer into engineering technology programs at select four-year institutions. This allows students who eventually develop a desire to transfer the opportunity to transfer about two-thirds or more of the credit earned. How much credit is actually transferable depends on the transfer institution selected. Students should work closely with their advisors if and when they develop an interest in transferring.

PROGRAM REQUIREMENTS: This curriculum integrates courses in civil engineering technology, mechanical engineering technology, drafting, architecture, computer programming and general education. Students entering the program must have algebra I and geometry skills, or be willing to improve those skills through developmental studies. Technical electives should be selected in consultation with an assigned advisor. Upon satisfactory completion of the curriculum, graduates will be awarded the associate of applied science degree in general engineering technology with a computer-aided drafting specialization. Transfer opportunities for associate of applied science degrees, if existing, are very specific in nature. Students enrolling in an applied science degree with plans to transfer should explore opportunities with their faculty advisor.

Course#	Title	Credits
First Semester		
ARC 130	Materials and Methods of Construction	3
EGR 110	Engineering Graphics	3
ENG 111	College Composition I	3
MEC 113	Materials and Processes of Industry	3
MTH	Approved math elective ¹	3
SDV 100	College Success Skills	1
	Total	16
Second Semester		
ARC 221	Architectural CAD Applications Software I	3
CAD 241	Parametric Solid Modeling I	3
ENG 115	Technical Writing	3
ETR 113	D.C. and A.C. Fundamentals I	3
MTH	Approved math elective ¹	3
	Approved programming/computer Elective ²	3
	Total	18
Third Semester		
ARC 222	Architectural CAD Applications Software II	3
CAD 242	Parametric Solid Modeling II	3
EGR 206	Engineering Economics	3
	Approved humanities elective ⁴	3
	Approved social science elective ³	3
	Approved technical elective ²	3
	Total	18
Fourth Semester		
CAD 238	Computer Aided Modeling and Rendering II	2
CAD 280	Design Capstone Project	3
EGR 216	Computer Methods in Engineering and Technology	3
EGR 247	Materials Lab	1
PED/HLT	Physical education (or health)	2
	Approved social science elective ³	3
	Approved technical elective ²	3
	Total	17
	Program Total	69

¹ Approved math electives: MTH 115 and MTH 116, or MTH 163 and MTH 164, or MTH 213 and MTH 214 will fulfill the math requirements for the program. Developmental math courses may be required for students to build their math skills before taking any of the approved math electives. Students must take a math placement test to determine their math skill level.

² Requires approval of program advisor.

³ Students may select social science electives from the approved list on page 51.

⁴ Students may select humanities electives from the approved list on page 50.

Associate of Applied Science Degree in General Engineering Technology: Industrial Electricity and Controls Technology Specialization

AREA: General Engineering Technology:
Industrial Electricity and Controls Technology
Specialization

DEGREE: Associate of Applied Science Degree

LENGTH: Four semesters (two-year) program

PURPOSE: This curriculum provides educational opportunities for those seeking employment in the many manufacturing industries and businesses, which need individuals trained in basic electrical applications, including the control of machinery and processes. It is also appropriate for those attempting to upgrade their knowledge or acquire practical skills. This program can also provide critical education components to apprenticeship programs of various types. This program is not intended for transfer.

OCCUPATIONAL OBJECTIVES: electrical apprentice, electrician, electrician's helper, industrial electrician, journeyman or other related positions

PROGRAM REQUIREMENTS: This program is designed to integrate basic industrial electricity courses, basic machinery control courses, basic engineering technology courses and general education courses. Students entering the program should have basic arithmetic skills and must be willing to advance their math skills through required math courses. Most students should start with MTH 120 (Introduction to Math), but may select a higher-level math if they are prepared for it. All entering students must take a math placement test to determine their math skill level. Many of the electrical and control courses require the use of mathematics, and it is important for students to start with their math courses as early as possible in the program. The basic intent of this program is to produce technically skilled graduates, with a broad technical background and a well-rounded general education foundation. All electives, including technical electives, must come from an approved list or be approved by one of the full-time faculty members teaching technical courses in the program.

Course#	Title	Credits
First Semester		
EGR 110	Engineering Graphics	3
ELE 133	Practical Electricity I	3
ENG 111	English Composition I	3
MEC 113	Materials and Processes of Industry	3
MTH	Approved math elective ¹	3
SDV 100	College Success Skills	1
Total		16
Second Semester		
CAD 241	Parametric Solid Modeling I	3
ELE 134	Practical Electricity II	3
ELE 159	Electrical Motors	3
ENG 115	Technical Writing	3
MTH	Approved math elective ¹	3
Total		15
Third Semester		
EGR 206	Engineering Economics	3
ELE 156	Electrical Control Systems	3
	Approved programming/computer elective ²	3
	Approved social science elective ³	3
	Approved technical electives ²	6
Total		18
Fourth Semester		
ELE 137	National Electric Code	3
ETR 113	D.C. and A.C. Fundamentals I	3
PED/HLT	Physical education (or health)	2
	Approved humanities elective ⁴	3
	Approved social science elective ³	3
	Approved technical elective ²	3
Total		17
Program Total		66

¹ Approved math electives: MTH 120, or MTH 115 and 116, or MTH 163 and 164, or MTH 213 and 214 will fulfill the math requirements for the program. Developmental math courses may be required for students who need to build their math skills before taking any of the approved math electives. Students must take a math placement test to determine their math skill level. Most students will probably want to start with MTH 103.

² Requires approval of program advisor.

³ Students should select social science electives from the list on page 51.

⁴ Students should select humanities electives from the list on page 50.

Associate of Applied Science Degree in General Engineering Technology: Technical Operations

AREA: General Engineering Technology:
Technical Operations

DEGREE: Associate of Applied Science Degree

LENGTH: Four semesters (two-year) program

PURPOSE: This curriculum provides educational opportunities for those who are or those who seek to be employed in a field that requires a substantial technical knowledge base. The curriculum also provides an opportunity to transfer and complete a bachelor of science degree in Technical Operations from Old Dominion University, which can be completed on the Middletown or Warrenton campus of Lord Fairfax Community College. This curriculum has extended technical and science electives to allow some customization for both employers and students.

OCCUPATIONAL OBJECTIVES: Engineering aid, production line lead, technical support technician, testing technician, technical sales, production support technician, or other related positions.

TRANSFER GUIDELINES: Graduates with appropriate course selection may qualify to enter the General Engineering Technology, Technical Operations Specialization at Old Dominion University. This Bachelor of Science program can be completed at the ODU site on either the Middletown campus or the Warrenton campus of Lord Fairfax Community College. Course selection is very important to insure a smooth transfer process, and students must work closely with their program advisor. Transfer to other universities must be explored by the student on a case by case basis.

PROGRAM REQUIREMENTS: This curriculum is designed to integrate a variety of required technical courses, substantial technical electives, science electives, and required general education courses. Students entering the program must have algebra 1 and geometry skills or be willing to improve those skills through developmental studies. Additionally, students must take courses in the proper order so that prerequisite courses are completed as appropriate. The program may be completed on a part-time basis since courses are alternated between day and evening hours. Technical electives must be approved by the program advisor. Student can work with their employers to identify the type of technical and science electives to best suit their employment advancement goals. Employers are also encouraged to work with Lord Fairfax Community College for consideration of special courses or possible work experience (typically by internship) as technical electives. Students who intend to transfer will have specific course requirements for technical electives and should consult with their program advisor about those requirements.

Course#	Title	Credits
First Semester		
MEC 113	Materials and Processes of Industry	3
EGR 110	Engineering Graphics	3
ENG 111	English Composition I	3
PED/HLT	Physical Education or Health	2
MTH	Approved math elective	3
	Approved social science elective	3
SDV 100	College Success Skills	1
	Total	18
Second Semester		
CAD 241	Parametric Solid Modeling I	3
ETR 113	DC and AC Fundamentals	3
ENG 115	Technical Writing	3
MTH	Approved math elective	3
	Approved computer elective	3
	Approved social science elective	3
	Total	18
Third Semester		
CAD 242	Parametric Solid Modeling II	3
EGR 206	Engineering Economics	3
	Science elective ¹	4
	Approved technical elective ²	6
	Total	16
Fourth Semester		
EGR 216	Computer Methods in Engineering and Technology	3
EGR 247	Materials Lab	1
	Science Elective ¹	4
	Approved humanities elective	3
	Approved technical elective ²	6
	Total	17
	Program Total	69

¹A one-year sequence of biology, chemistry, geology or physics is recommended; however, depending on the requirements of the four-year institutions, two one-semester courses in different sciences may be substituted with advisor approval.

²Requires approval of program advisor.

Career Studies Certificates

AREA: Construction Technology

PURPOSE: To introduce students to major practical aspects of construction technology

PROGRAM REQUIREMENTS:

Course#	Title	Credits
ARC 130	Introduction to Materials and Methods of Construction	3
BLD 231	Construction Estimating I ¹	3
CAD 165	Architectural Blueprint Reading	3
	Approved elective	3
	Total	12

¹ Prerequisites for BLD 231 are CAD 165 and ARC 130.

AREA: Drafting

PURPOSE: To enable students to develop drafting graphics skills related to architecture, machine design, and using specialized computer software in the drafting field

PROGRAM REQUIREMENTS:

Course#	Title	Credits
ARC 130	Materials and Methods of Construction	3
ARC 221	Architectural CAD Applications Software I	3
ARC 222	Architectural CAD Applications Software II	3
CAD 241	Parametric Solid Modeling I	3
CAD 242	Parametric Solid Modeling II	3
EGR 110	Engineering Graphics ¹	3
MEC 113	Materials and Processing of Industry	3
	Total	21

¹ Prerequisite for ARC 221, CAD 241

AREA: Electrical Technician

PURPOSE: To expose students to theory and applications related to related electrical systems

OCCUPATIONAL OBJECTIVES: To prepare students for entry-level positions in the electrical field

PROGRAM REQUIREMENTS:

Course#	Title	Credits
CAD 175	Schematics and Mechanical Diagrams	2
ELE 133	Practical Electricity I	3
ELE 134	Practical Electricity II	3
ELE 135	National Electrical Code Industrial	3
	or	
ELE 137	National Electrical Code Residential	
ELE 156	Electrical Control Systems	3
ELE 159	Electrical Motors	3
ELE 239	Programmable Logic Controllers	3
MTH 120	Introduction to Math	3
	Total	23

AREA: HVAC

PURPOSE: To expose students to theory and application related to HVAC

OCCUPATIONAL OBJECTIVES: To prepare students for entry-level positions in heating, ventilation and air conditioning

PROGRAM REQUIREMENTS:

Course#	Title	Credits
AIR 121	Air Conditioning and Refrigeration I	3
AIR 122	Air Conditioning and Refrigeration II	3
AIR 134	Circuits and Controls	3
AIR 154	Heating Systems I	3
AIR 155	Heating Systems II	3
ELE 133	Practical Electricity I	3
	Total	18

Career Studies Certificates

AREA: Industrial Design

PURPOSE: To introduce students to the principles of sound industrial design, including related mathematics and concepts

PROGRAM REQUIREMENTS:

Course#	Title	Credits
EGR 135	Statics for Engineering Technology ¹	3
EGR 136	Strength of Materials for Engineering Technology ²	3
EGR 247	Mechanics Laboratory ³	1
MEC 113	Materials and Processes of Industry or	3
ARC 130	Materials and Methods of Construction	
MTH 115	Technical Mathematics I	3
MTH 116	Technical Mathematics II	3
Total		16

¹ Prerequisite for EGR 135 is MTH 115.

² Prerequisites for EGR 136 are EGR 135 and MTH 116.

³ Prerequisite for EGR 247 is EGR 136.

AREA: Industrial Maintenance Technician

PURPOSE: To expose students to theory and application related to the maintenance of heating, air conditioning, electrical systems and motors and welding

OCCUPATIONAL OBJECTIVES: To prepare students for entry-level positions in industrial maintenance

PROGRAM REQUIREMENTS:

Course#	Title	Credits
AIR 121	Air Conditioning and Refrigeration I	3
CAD 175	Schematics and Mechanical Diagrams	2
ELE 126	Electricity and Shop Power Distribution	2
ELE 133	Practical Electricity I	3
ELE 134	Practical Electricity II	3
ELE 156	Electrical Controls Systems	3
ELE 159	Electrical Motors	3
WEL 120	Introduction to Welding	3
	Approved electives	3
Total		25