



**HVACR ENGINEERING TECH & ENERGY MANAGEMENT (HVEM) – 124 CREDITS**      **2020-2021**  
 Bachelor of Science (BS)      College of Engineering Technology

**SELF AND SOCIETY COMPETENCY – 9 CREDITS REQUIRED**

Three courses are required with a minimum of 9 credits: must be from two different disciplines, have at least one 200 level or higher course, and at least one Self and Society Foundation course.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
ECON	201	Principles of Microeconomics (MATH 109 or 110 either with C- or higher or (MATH 114, 115, 116, 117, 118, 119, 120, 122, 126, 130, 132 or 220 or Math ACT 19 or (Pre-2016) Math SAT 460 or (Post-2016) Math SAT 500))	3	

**U.S. DIVERSITY COMPETENCY – 1 COURSE REQUIRED**

If not met by courses taken for Culture Competency, Self and Society Competency, or Michigan Transfer Agreement (MTA), a student must have one course with the U.S. Diversity attribute. Some courses include both Global and U.S. Diversity attributes.

Prefix	Code	Course Title and Prerequisites	Credits	Grade

**GLOBAL DIVERSITY COMPETENCY – 1 COURSE REQUIRED**

If not met by courses taken for Culture Competency, Self and Society Competency, or Michigan Transfer Agreement (MTA), a student must have one course with the Global Diversity attribute. Some courses include both Global and U.S. Diversity attributes.

Prefix	Code	Course Title and Prerequisites	Credits	Grade

**COLLABORATION COMPETENCY – COURSES REQUIRED MET IN MAJOR**

If not met by courses taken in the bachelor's degree program, a student must have two courses with the Collaboration attribute. Some courses include both Collaboration and Problem Solving attributes.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
HVAC	451	Energy Audit and Analysis (HVAC 393 and MATH 126 both with C- or higher) ( <i>Met in Major</i> )	0	
HVAC	499	Commercial HVAC System Design (HVAC 415, 451, and 462 all with C- or higher) ( <i>Met in Major</i> )	0	

**PROBLEM SOLVING COMPETENCY – COURSES REQUIRED MET IN MAJOR**

If not met by courses taken in the bachelor's degree program, a student must have two courses with the Problem Solving attribute. Some courses include both Collaboration and Problem Solving attributes.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
HVAC	451	Energy Audit and Analysis (HVAC 393 and MATH 126 both with C- or higher) ( <i>Met in Major</i> )	0	
HVAC	499	Commercial HVAC System Design (HVAC 415, 451, and 462 all with C- or higher) ( <i>Met in Major</i> )	0	

**COLLEGE REQUIREMENTS – 84 CREDITS REQUIRED**

(Course prerequisites are shown in parentheses)

**MAJOR COURSES – 84 CREDITS REQUIRED**

In addition to the required courses, student must have an approved associate degree totaling 42 credits.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
HVAC	285	HVAC System Design Using Business Information Modeling (Department Approval)	2	
HVAC	312	Control Theory and Application (HVAC 285, 321, and 342 all with C- or higher)	4	
HVAC	321	HVAC Air System Select and Design (HVEM Major; Co-Requisite HVAC 285)	4	
HVAC	325	HVAC Hydronic System Select Design (HVAC 285, 321, and 342 all with C- or higher)	4	
HVAC	342	Load Analysis and Energy Modeling (HVEM Major; Co-Requisite HVAC 285)	4	

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Prefix	Code	Course Title and Prerequisites	Credits	Grade
HVAC	350	Contracting Issues in HVACR (HVAC 285, 342, and (HVAC 321 or 322) all with C- or higher)	4	
HVAC	393	Summer Internship ((HVAC 312 or 313), (HVAC 325 or 326), and HVAC 350 all with C- or higher)	4	
HVAC	415	Direct Digital Control (HVAC 393 and MATH 126 both with C- or higher)	4	
HVAC	451	Energy Audit and Analysis (HVAC 393 and MATH 126 both with C- or higher)	4	
HVAC	462	HVAC Primary Equipment Selection (HVAC 393 and MATH 126 both with C- or higher)	4	
HVAC	499	Commercial HVAC System Design (HVAC 415, 451, and 462 all with C- or higher)	4	

**NOTES**

- Students who return to the university after an interrupted enrollment, not including summer semester, must normally meet the requirements of the curriculum which are in effect at the time of their return, not the requirements which were in effect when they were originally admitted.

**ADMISSION REQUIREMENTS**

**NEW STUDENT ADMISSION REQUIREMENTS**

- Students must have completed the Associate of Applied Science (AAS) in HVACR Technology (HVAR) program at Ferris State University or an equivalent associate program at another institution with a minimum 2.50 GPA (on a 4.00 scale).
- Students should possess computer literacy skills and have completed College Intermediate Algebra and Trigonometry courses and at least one Natural Sciences Competency course.

**TRANSFER STUDENT ADMISSION REQUIREMENTS**

- Students must have completed the Associate of Applied Science (AAS) in HVACR Technology (HVAR) program at Ferris State University or an equivalent associate program at another institution with a minimum 2.50 GPA (on a 4.00 scale).
- Students should possess computer literacy skills and have completed College Intermediate Algebra and Trigonometry courses and at least one Natural Sciences Competency course.

**PROGRAM OUTCOMES**

- Students will analyze and select commercial and industrial Heating, Ventilation, and Air Conditioning (HVAC) systems for specific applications.
- Students will design commercial and industrial Heating, Ventilation, and Air Conditioning (HVAC) systems, given design parameters, building type and geographic location.
- Students will select secondary equipment for specific commercial and industrial ducting and piping systems.
- Students will select primary equipment for specific commercial and industrial ducting and piping systems.
- Students will program control sequences for specific commercial and industrial Heating, Ventilation, and Air Conditioning (HVAC) systems and equipment.
- Students will perform an energy audit of an actual facility and analyze utilities for proper application; Operation and Maintenance (O and M) and Energy Conservation Measures (ECMs) for potential energy savings; and implementation feasibility using payback calculations.
- Students will utilize and develop estimates, specs, economic cost analysis and codes and standards. Students will also describe the key duties of Project Management.

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## GRADUATION REQUIREMENTS

In order to graduate from Ferris State University, students must meet both University and Programmatic Graduation Requirements.

### UNIVERSITY GRADUATION REQUIREMENTS

These are the minimum graduation requirements for a bachelor's degree at Ferris State University:

- All requirements as specified in the [University Requirements](#) section must be met.
- A minimum of 120 credits must be earned.
- A 2.00 or higher cumulative Ferris State University GPA is required.
- A minimum of 30 credits must be earned from Ferris State University to meet the Residency requirement.
- A minimum of 40 credits of 300 level or higher courses must be earned.

### PROGRAMMATIC GRADUATION REQUIREMENTS

These are the additional graduation requirements mandated by the program:

- All requirements as specified in the [College Requirements](#) section must be met.
- A minimum grade of C- must be earned in all HVAC courses.

## CONTACT INFORMATION

COLLEGE: College of Engineering Technology

PHONE: 231-591-3062

DEPARTMENT/SCHOOL: Built Environment

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## SUGGESTED SEMESTER LAYOUT

Consult Advisor to Approve Your Customized Plan in MyDegree

### THIRD YEAR

Fall Courses	Credits
HVAC 285	2
HVAC 321	4
MATH 126	4
HVAC 342	4
ENGL 311	3
<b>Total Credits</b>	<b>17</b>

Spring Courses	Credits
HVAC 312	4
HVAC 350	4
HVAC 325	4
Natural Sciences Competency	3-4
<b>Total Credits</b>	<b>15-16</b>

Summer Courses	Credits
HVAC 393	4
<b>Total Credits</b>	<b>4</b>

### FOURTH YEAR

Fall Courses	Credits
HVAC 415	4
HVAC 451	4
HVAC 462	4
Culture Competency	3
<b>Total Credits</b>	<b>15</b>

Spring Courses	Credits
HVAC 499	4
ECON 201	3
Culture Competency	3
Self and Society Competency	3
<b>Total Credits</b>	<b>13</b>

Summer Courses	Credits
<b>Total Credits</b>	