

Automotive Engine Theory (AUMT 2305)



Credit: 3 semester credit hours (3 hours lecture, 0 hours lab)

Prerequisite/Co-requisite: AUMT 1301

Course Description

Fundamentals of engine operation and diagnosis including lubrication and cooling systems. Emphasis on identification of components, measurements, inspections, and repair methods. This is a Tech Prep course.

Required Textbook and Materials

1. **Modern Automotive Technology**
Author: James E. Duffy
Publisher The Goodheart – Willcox Company
ISBN 1-5970-956-6
2. **Modern Automotive Technology- Work Book**
Author: James E. Duffy
Publisher The Goodheart – Willcox Company
ISBN 1-5970-958-0
3. Notebook and 8.5" x 11" notebook paper
4. Blue and Black ink pens

Course Objectives

Upon completion of this course, the student will be able to:

1. Explain appropriate safety procedures. F1.4, F2.3, F3.3, F4.1, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3, C1.2, C5.2, C9.1, C10.3, C15.4, C16.4, C20.4
2. Demonstrate familiarity with historical development and information on the automotive industry. F1.4, F2.3, F3.3, F4.1, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3, C1.2, C5.2, C9.1, C10.3, C15.4, C16.4, C20.4
3. Demonstrate safe, professional, and responsible work practices. F1.4, F2.3, F3.3, F4.1, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3, C1.2, C5.2, C9.1, C10.3, C15.4, C16.4, C20.4
4. Identify and demonstrate the proper use of shop equipment and tools. F1.4, F2.3, F3.3, F4.1, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3, C1.2, C5.2, C9.1, C10.3, C15.4, C16.4, C20.4
5. Identify and describe functions of vehicle subsystems. F1.4, F2.3, F3.3, F4.1, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3, C1.2, C5.2, C9.1, C10.3, C15.4, C16.4, C20.4
6. Demonstrate the use of service publications. F1.4, F2.3, F3.3, F4.1, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3, C1.2, C5.2, C9.1, C10.3, C15.4, C16.4, C20.4
7. Identify various automotive fasteners used in industry. F1.4, F2.3, F3.3, F4.1, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3, C1.2, C5.2, C9.1, C10.3, C15.4, C16.4, C20.4
8. Perform automotive maintenance "A" check. F1.4, F2.3, F3.3, F4.1, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3, C1.2, C5.2, C9.1, C10.3, C15.4, C16.4, C20.4

SCANS Skills and Competencies

Beginning in the late 1980's, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job. In 1991 the Commission announced its findings in *What Work Requires in Schools*. In its research, the Commission determined that "workplace know-how" consists of two elements: foundation skills and workplace competencies.

Course Outline

- A. Safety and Shop Policy
 - 1. Auto shop Layout
 - 2. Shop Safety
 - 3. General Safety Rules
 - 4. Customer Relations
- B. Engine Fundamentals
 - 1. Engine Operation
 - 2. Engine Bottom End
 - 3. Engine Top End
 - 4. Engine Front End
- C. Engine Design Classification
 - 1. Cylinder arrangement
 - 2. Alternative fuels
 - 3. Typical automotive engines
- D. Engine Top, Bottom, and Front End Construction
 - 1. Top end construction
 - 2. Bottom end construction
 - 3. Front end construction
- E. Engine Size and Performance Measurement
 - 1. Determine engine size
 - 2. Engine terms
 - 3. Torque and horse power
- F. Cooling System Fundamentals
 - 1. Cooling System Functions
 - 2. Cooling System Operation
 - 3. Cooling System Types
 - 4. Basic cooling system
- 5. Closed & Open Cooling Systems
- 6. Cooling System Instrumentation
- 7. Antifreeze and Conditioners
- 8. Engine Heaters
- G. Coolant Testing and Maintenance
 - 1. Cooling diagnosis
 - 2. Cooling problems
 - 3. Coolant service
 - 4. Components service
- H. Lubrication System Fundamentals
 - 1. Lubrication System Functions
 - 2. Lubrication System Operation
 - 3. Positive Crankcase Ventilation System
 - 4. Oil Pressure Indicator
 - 5. Industry Trend
- I. Lubrication system testing and service
 - 1. Lubrication System Function
 - 2. Lubrication System Problems
 - 3. Lubrication service
 - 4. Components service
- J. On-Board Diagnostics and Scan Tools
 - 1. On-Board Diagnostic Systems
 - 2. Scanning Computer Problems
 - 3. Energizing OBD I Systems without a Scan Tool
 - 4. Erasing Trouble Code

Grade Scale

90 – 100	=	A
80 – 89.9	=	B
70 – 79.9	=	C
60 – 69.9	=	D
0 – 59.9	=	F

Course Evaluation

Final grades will be calculated according to the following criteria:

Daily work, quizzes, and homework assignment.	40%
Test over Lecture and Chapters	30%
Outside assignment or class presentation.	10%
<u>Final Exam</u>	<u>20%</u>
Total	100%

Course Requirements

1. Complete specific reading assignments in a timely manner specified by the instructor.
2. Seek out available material on the subject being taught, utilizing the library, periodicals and / or the Internet.
3. Wear sleeved shirts, full length jeans or work pants and preferably leather shoes to class and on campus. No shorts or tank tops are allowed.
4. Participate in project interview when offered.
5. Complete all work book and class assignments.
6. Be present at class sessions and examinations as scheduled.

Attendance Policy

1. Missing more than 20% of classes will result in an automatic “F” for the course.
2. Absences are counted for unexcused, excused and coming to class late.
3. Missing more than 20% of a class period will count as an absence.
4. Being tardy 3 times equals 1 absence.

If you wish to drop, you are responsible for the drop process. I will not initiate the drop, no matter how many absences or zeroes you have; that is, if you stop coming to class and do not drop, you will earn an F in the course. ***Students are allowed only 6 drops, from any public Institute of higher education, in their lifetime.***

Course Policies

1. **No Cell Phone or Electronic Devices** allowed in class, except in special circumstances and it is approved by the instructor.

All cell phones must be turned off and put away. Text messaging during class time will not be tolerated. Text messaging during an exam will be considered academic dishonesty. The exam will be considered over and the student will receive a zero for the exam.

2. **No** smoking or use of any **tobacco** products allowed
3. Do not bring any **food** or **drinks** in class
4. No visitor allowed in class including children

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5. Do not disturb lecture for any reason. If you must leave class or come in late, do so without disturbing class.
6. **DRESS CODE: Proper work attire only, NO Open shoes, Short pants, low riding, or sleeveless shirts, will be allowed in any program classrooms.**
7. **No** grades will be **dropped**, No homework or assignments can be made up or accepted after instructor has taken up for grading.
8. **Homework** must be done **in proper outline form, neat and legible**, prepared on **loose leaf (8.5" X 11") note book paper**, written only on **one** side.
9. Assignment must be turn in at the beginning of class
10. Any student caught cheating will be dropped from class and given an F for the semester grade.

NOTE:

Students who violate any of these policies will be asked to leave class and will be recorded as absent for the class period. Students who continue to disturb classes will be suspended from class for the remainder of the semester and receive a grade of F.

Students may vary in their competency levels on these abilities. You can expect to acquire these abilities only if you honor all course policies, attend classes regularly, complete all assigned work in good faith and on time, and meet all other course expectations of you as a student.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

Course Schedule

Week	Topic	Reference
1	Course introduction and policies <ul style="list-style-type: none">• Lecture• Class discussion	Syllabus / Handouts
2/3	<ul style="list-style-type: none">• Auto Shop Safety• Lecture• Chapter assignments• Test chapter 5	Chapter 5 Power point

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Week	Topic	Reference
4/5	Engine Fundamentals and Design Classification <ul style="list-style-type: none">• Lecture• Chapter Assignment• Test chapter 11	Chapter 11
6/ 7	Engine Top, Bottom, and Front End Construction <ul style="list-style-type: none">• Lecture• Chapter Assignment• Test Chapter 13, 14, and 15	Chapter 13, 14 & 15 Power point
8/9	Engine Size and Performance Measurements <ul style="list-style-type: none">• Lecture• Chapter Assignment• Test Chapter 16	Chapter 16
10/11	Cooling System Fundamentals, Testing, and Maintenance <ul style="list-style-type: none">• Lecture• Chapter Exercises• Test chapter 39 & 40	Chapter 39 & 40
12/13	Lubrication system Fundamentals <ul style="list-style-type: none">• Lecture• Chapter assignment• Test chapter 41 & 42	Chapters 41 & 42
14/15	On Board Diagnostics and Scan Tools <ul style="list-style-type: none">• Lecture• Chapter assignment• Test chapter 18	Chapter 18
16	Final Project and final exam <ul style="list-style-type: none">• Lecture	Lecture/Review

The course schedule is a proposed schedule. Changes in the schedule may be made based upon the instructor's professional judgment. If you are absent on a day in which changes to the schedule have been announced, it is your responsibility to find out those changes.

Contact Information:
Varies by Instructors