

Course Syllabus AUT 150-101 Fall 2013

Internal Combustion Engine Principles

Automotive Technology Department
College of Applied Sciences and Arts
Southern Illinois Carbondale

Instructor: Blaine Heisner
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Class Calendar

Meeting Time: 8:00 – 11:50am
August 19 – October 30
Mon, Tues, Thurs, Fri.
(Wed. by arrangement)

University Calendar

September 2 Labor Day
October 12-15 Fall Break

Excused Absence for religious holidays –
Students absent from classes because of required observances of major religious holidays will be excused. It is the student's responsibility to notify in advance the instructor of each class that will be missed. Students must also take the responsibility for making up work missed.

Final Exam

October 30

Class Location

Laboratory: TEC Engine Lab
Classroom: TEC 0171

Prerequisites

None

Office Hours

By appointment

COURSE DESCRIPTION:

Course combines the study of engine operational theory with practical technical skills. Content emphasizes the 720 degree power cycle and the dynamics of engine operation, design and efficiency (thermal, mechanical & volumetric). Laboratory experience consists of engine disassembly, component design study, inspection and measurement of components and engine assembly techniques.

COURSE OBJECTIVES:

At the conclusion of the course, given the necessary materials, students will:

1. Explain and identify each element of the four-stroke (Otto) cycle with 100% accuracy.
2. Identify internal combustion engine (ICE) systems and components with 100% accuracy.

3. State the purpose and function of ICE systems and components with 100% accuracy.
4. Define and apply common ICE terminology.
5. Explain *cause and effect* relationships of ICE systems and components to form 100% correct conclusions.
6. Maintain a safe and orderly workspace to a level which satisfies the instructor.
7. Locate and apply service information resources with 100% accuracy.
8. Perform ICE diagnostic procedures using required tools, as directed by service literature with 100% accuracy.
9. Determine root causes of ICE system and component failures with 100% accuracy.
10. Determine ICE component reusability with 100% accuracy.
11. Perform ICE service procedures, as directed by service literature with 100% accuracy.

TOPIC TRAINING SCHEDULE

Week 1-Four Stroke Cycle Handout

Four Stroke Engine Cycle, Intake/Compression/Power/Exhaust

Week 2- Textbook Chapters 2, 7, & 20

Engine Service Tools, Shop Safety, and Engine Disassembly

Week 3- Textbook Chapters 5, 6, & 18

Engine Size/Performance, Service Information, Engine Mechanical Problems

Week 4-5 Textbook Chapters 9, 21, & 24

Short Block Construction, Rebuilding, and Machining

Midterm Exams

Week 6- Textbook Chapters 12, 13

Cooling and Lubrication System Operation and Service

Week 7- Textbook Chapters 10, 22

Cylinder Heads & Valves, Rebuilding, and Machining

Week 8- Textbook Chapters 11, 23, 16

Timing Components/Front End/Manifolds/Forced Induction

Week 9- Textbook Chapters 8, 14, 15

Engine Combustion, Fuels, Emission, Ignition Systems

Week 10- Textbook Chapter 17 & 19
Engine Performance Problems, Diagnosis, Tune-Up

Final Exams

TEXTBOOKS:

Required: Duffy, J. E. (2010). *Auto engine repair* (5th ed.). Tinley Park, IL: The Goodheart-Wilcox Company, Inc.

TOOLS AND EQUIPMENT:

Program required tool set

NOTE:

- **Additional handouts or other references will be provided at the appropriate time.**
- **Safety glasses will be used at all times in the lab.**

ASSIGNMENTS:

- **Weekly ASE questions will be assigned. These will be required to be handwritten, question and answer. Additional assignments may be given throughout the semester. Students will be given adequate notice for completion of assignments.**

LAB/LIVE WORK:

The laboratory component of this class is significant and all students are expected to participate fully during these times. Laboratory work will consist of specific assignments (lab sheets), instructor assigned work, which may include vehicles from the general public. Students will gain useful experience reinforcing the theory taught in the classroom. Lab work must be performed in a timely manor to maximize the benefit to the student. Students will be expected to observe all program and shop regulations and participate in maintaining a clean and safe work environment.

GRADING AND TESTING

Quizzes will be given at the end of each week of the course. These quizzes will focus on the subject material for each week. ASE questions will be assigned each week and must be turned in on time to receive full credit. Lab sheets will be provided throughout the semester and usually at least one lab sheet will be graded each week. Lab sheets are **NOT** to be printed out at the TEC, but may be used in lab from your Tablet as an e-copy. Midterm and final lab practical performance assessments will be administered at the end of the 5th and 10th weeks of the course. A comprehensive exam in the style of the ASE A-1 certification exam will be administered at the end of the 10th week of the course. The instructor reserves the right to assign additional assignments throughout the course.

The total points a student acquires at the end of the class will determine the final class grade. Points accumulated by the student will be the product of:

- Quizzes
- Assignments
- Exams- Midterm and Final
- Classroom Participation
- Lab Sheets

GRADING SCALE:

A = 93 -100%
B = 85 - 92%
C = 77 - 84%
D = 70 - 76%
F = 69 and below

ATTENDANCE POLICY

Since each class meeting builds upon the next, it is important that you are present for each class. **Attendance is required as part of the class grade.** Attendance will be taken at the beginning of each class. The Automotive Department's attendance policy will be implemented as follows:

- Each absence will result in a **2.5%** reduction in the student's final grade.
- Being late for class three (**3**) times will equal one (**1**) absence.
- Excessive absences may lead the student to a conference with the Chairperson of the Department of Automotive Technology before rejoining his/her class.
- Students will be provided the opportunity to make up **only one (1)** absence.

AUT 150 Safety Notice

As with any service operation, safety is of up most importance, please observe the following items at all times while working in the classroom and lab.

- State approved safety glasses must be worn at all times while working in the Lab.
- Keep the shop and workspace organized. Dispose of all waste in the proper manner. Clean up all spills immediately. Return all tools to their correct locations.
- Dress in a safe manner. No sandals in the lab. Secure long hair and loose clothing. Remove any dangling jewelry while in the lab.
- Use the correct tool for the job.
- Sharp tools such as punches and screwdrivers are not to be carried in pockets.
- Use all equipment guards and shields. Never disable safety equipment.
- Lift with the knees, not the back.
- Use adequate lighting whenever possible.
- Ventilate the shop area when fumes are present. Open doors or use exhaust hose.
- Never work under a vehicle unless it is supported by jack stands. Block the wheels of a lifted vehicle when using jack stands.
- Follow all instructions and safety notices when available for equipment or tools.
- Never direct compressed air at yourself or another person.
- Wear gloves as needed when working with chemicals
- Report all unsafe practices, accidents, or injuries to the instructor immediately.
- Be aware of locations of First Aid Kits, Eye Wash Stations, and Fire Extinguishers.

I have read and understand the above information concerning shop safety.

Print Name: _____

Signature: _____

Date: _____

Southern Illinois University
Automotive Technology
Student Information Sheet

PRINT CLEARLY
(Please fill out and return to instructor as soon as possible)

Name _____ ID# _____

1. Local Address _____

City _____

Phone #: _____ **E-mail** _____

2. Home Address _____

City _____ State _____ Zip _____

Phone # _____

Past automotive work experience and for how long:

Indicate which of the following applies to you:

Attended auto classes in high school _____

Attended auto classes at a community college _____

In what ASE areas are you certified? _____

What is your immediate occupational goal upon graduation from SIU?

If you have any medical conditions, of which your instructor should be aware, please indicate below:

Any other comments, concerns, or anything else I should know at this time?

