 Course Syllabus  AUT 150  Spring 2016

Internal Combustion Engine Principles

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

Instructor: Blaine Heisner  Phone: (618) 453-9138
Office: TEC 0160B  Email: bheisner@siu.edu

Class Calendar
Meeting Time: 1:00 – 4:50am
January 19 – April 1
Mon, Tues, Thurs, Fri.
(Wed. by arrangement)

Final Exam
April 1

Drop Dates
Full Refund-January 31
Last Drop Date-March 20

Class Location
Laboratory: TEC 0175
Classroom: TEC 0171

Prerequisites
None

University Calendar
Spring Break March 12-20

Office Hours
Tuesdays & Thursdays 9am-noon

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.

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**

Module 1- Four Stroke Cycle Handout  
Four Stroke Engine Cycle, Intake/Compression/Power/Exhaust

Module 2- Textbook Chapters 2, 7, & 20  
Engine Service Tools, Shop Safety, and Engine Disassembly

Module 3- Textbook Chapters 5, 6, & 18  
Engine Size/Performance, Service Information, Engine Mechanical Problems

Module 4- Textbook Chapters 9, 21, & 24  
Short Block Construction, Rebuilding, and Machining

Midterm Lab Practical

Module 6- Textbook Chapters 12, 13  
Cooling and Lubrication System Operation and Service

Module 7- Textbook Chapters 10, 22  
Cylinder Heads & Valves, Rebuilding, and Machining

Module 8- Textbook Chapters 11, 23, 16  
Timing Components/Front End/Manifolds/Forced Induction

Final Exams
TEXTBOOKS:


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:

- Various assignments will 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, 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. 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 = 87 - 92%
C = 76 - 86%
D = 70 - 75%
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 attendance policy will be implemented as follows:

- Absences will contribute to 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.
- Students with perfect attendance will have an attendance bonus applied to final grade.

**CLASS DISRUPTIONS**

- Disruptions can induce random errors which affect students’ ability to learn.
- Disruptive activities include sleeping in class, unnecessary talking, unauthorized use of electronic devices, swatting flies, etc…
- Disruptive activities will not be tolerated under any circumstances.
### Individual Performance Tracking Sheet

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<th>Activity</th>
<th>Points earned</th>
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### 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?
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

What is your occupational goal five years after you have completed your education at 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?
_________________________________________________________________
_________________________________________________________________