Modesto Junior College
Course Outline of Record

AUTEC 311

I. OVERVIEW
The following information will appear in the 2009 - 2010 catalog

AUTEC-311 Basic Automotive Systems 4 Units

Materials Fee Required
Introduction to the construction and operating principles of automotive systems to include; engine, cooling, lubrication, fuel, exhaust, and electrical. Proper selection and use of automotive shop manuals, service publications, tools, measuring devices, etc. Field trips might be required. Course is applicable to the associate degree.

II. LEARNING CONTEXT
Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goals specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

   a. Shop safety
      i. Environmental issues

   b. Tool identification, selection and use
      i. Hand
      ii. Power
      iii. Measuring
      iv. Metal working

   c. Fasteners
      i. Threaded fasteners
      ii. Non-threaded fasteners
      iii. Locking devices
      iv. Thread repair tools

   d. Service publications
      i. Service manuals/specification charts
      ii. Mitchell On-Demand, Alldata, and Prosis
e. Bearings and sealants

f. Introduction to cooling systems
   i. Air cooling
   ii. Liquid cooling

g. Introduction to lubrication systems

h. Introduction to fuel systems
   i. Mechanical fuel delivery
   ii. Electronic fuel injection (EFI)

i. Introduction to ignition systems
   i. Distributor
   ii. Distributorless

j. Introduction to exhaust and emissions systems

k. Introduction to electrical systems
   i. Electrical theory
   ii. Circuit construction
   iii. Electrical measurement

l. Automobile theories of operation
   i. Thermodynamics
   ii. Pressure and vacuum
   iii. Newton's Laws of Motion
   iv. Hydraulic theory

m. Vehicle design
   i. Aerodynamics
   ii. Passenger protection

n. Introduction to power systems
   i. Engine design and operation
2. **Required Lab Content:**

   a. Demonstrate safe working practices

   b. Metalworking project
      
         i. Use of metalworking tools
         
         ii. Use of charts to identify drill and tap combinations
         
         iii. Use of thread cutting tools

   c. Engine project
      
         i. Consult appropriate information sources to obtain engine specifications
         
         ii. Follow instruction correctly and use appropriate tools to dismantle and reassemble an internal combustion engine
         
         iii. Identify major engine components
         
         iv. Select and use appropriate measuring tools to determine servicability of engine components
         
         v. Produce report of findings

3. **Recommended Content:**

   a. The automotive business
      
         i. Global automotive business
         
         ii. Local automotive business
         
         iii. Technician training

B. **HOURS AND UNITS**

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<th>INST METHOD</th>
<th>TERM HOURS</th>
<th>UNITS</th>
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<tr>
<td>Lect</td>
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4 Units

C. **METHODS OF INSTRUCTION (TYPICAL)**

   Instructors of the course might conduct the course using the following method:
   
   1. Related material will be presented through combined lecture, discussion, and lab demonstration.
   
   2. Additional studies will be required from manuals, references, and service publications.

D. **ASSIGNMENTS (TYPICAL)**
1. **EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS**
   *Time spent on coursework in addition to hours of instruction (lecture hours)*
   
   a. Weekly reading and study of assigned textbook chapter in order to actively engage in classroom discussion.
   
   b. Completing chapter review questions each week and submitting for grading.
   
   c. Researching additional sources of information relating to the weekly topic of instruction.

2. **EVIDENCE OF CRITICAL THINKING**
   *Assignments require the appropriate level of critical thinking*
   
   a. Various manuals and service publications will be consulted to determine proper procedures for service or repair.
   
   b. Serviceability of engine components will be evaluated by comparing measurements taken with manufacturer's specifications.
   
   c. Upon completion of research, planning and performing a defined task, a verbal and written report is required.

   **Typical Examples of Exam or Homework Questions:**
   
   a. The rim on a head gasket around the cylinder hole;
      i. protects the gasket material from being damaged.
      ii. seals the combustion chamber better.
      iii. prevents combustion gases from entering the cooling system.
      iv. all of the above.
   
   b. Technician A says pressure is measured in inches of mercury. Technician B says vacuum is the absence of pressure. Who is correct?

E. **TEXTS AND OTHER READINGS (TYPICAL)**


III. **DESIRED LEARNING**

A. **COURSE GOAL**
   *As a result of satisfactory completion of this course, the student should be prepared to:*

   Demonstrate understanding of basic automotive shop safety. Identify the various types of hand and power tools used in the automotive industry. Describe the basic automotive systems and their respective functions.

B. **STUDENT LEARNING GOALS**
   *Mastery of the following learning goals will enable the student to achieve the overall course goal.*

   1. **Required Learning Goals**
Upon satisfactory completion of this course, the student will be able to:

a. Identify the various types of hand and power tools as well as their uses.
b. Research various repair manuals and service publications to acquire information on repairs and maintenance of vehicles.
c. Apply safe practices during lab exercises.
d. Describe the basic automotive systems and their respective functions.
e. Understand the construction and operation of basic automotive system.
f. Demonstrate understanding of basic automotive shop safety.

2. **Lab Learning Goals**

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

a. Demonstrate safe working practices in the laboratory.
b. Demonstrate competence in the selection and use of various measuring tools.
c. Identify the main components of an internal combustion engine.
d. Demonstrate competence in the selection and use of basic hand tools.

IV. **METHODS OF ASSESSMENT (TYPICAL)**

A. **FORMATIVE ASSESSMENT**

1. Evaluation of demonstrated skill performed during labs.
2. Textbook chapter review questions.
3. Unit exams and quizzes.

B. **SUMMATIVE ASSESSMENT**

1. Final examination.
2. Notebook.