Syllabus

Course Information

Organization	Gateway Technical College
Course Number	602-113
Credits	2
Contact Hours	54
Instructor	William Fell
E-mail Address	fellw@gtc.edu
Office	T120
Campus	Kenosha
Address	3520 30th Ave.
City/State/Zip	Kenosha WI 53
Office Hours	To Be Determined
Office Phone	262. 498. 8593
Beginning Date	02/28/2007
Number of Weeks	3
Meeting Times/Location	Wed. -Friday 8:00am - 2:00 pm

Description

This course covers the operating principles of the modern automobile engine along with its mechanical, and cooling systems. Preparedness for the ASE (Automotive Service Excellence) exam is emphasized.

Prerequisites

Valid Drivers License

602-148 Auto Mechanical Fundamenrtals and Service Reference

Textbooks

Barry Hollembeak and Don Knowles. *Automotive Engine Repair and Rebuilding " Classroom Edition"* . Delmar Thomson Learning. 2002. **Edition:** 2nd. **Pages:** 270. **ISBN:** 0-7668-1626-5.

Barry Hollembeak and Don Knowles. *Automotive Engine Repair and Rebuildin " Shop Edition".* Delmar Thomson Learning . 2002. **Edition:** 2nd. **Pages:** 536. **ISBN:** 0-7668-1626-5.

Jack Erjavec. *Automotive Technology - A Systems Approach* . Delmar Thomson Learning. **Edition:** 4th.

Core Abilities

A. Act responsibly
B. Communicate clearly and effectively
C. Demonstrate essential computer skills
D. Demonstrate essential mathematical skills
E. Develop job-seeking skills
F. Respect self and others as members of a diverse society
G. Think critically and creatively
H. Work cooperatively
I. Value learning

Competencies

1. Perform General Engine Diagnosis

2. Remove, inspect and replace timing belts and/or timing chains, tensioners and related hardware
3. Perform Lubrication and Cooling Systems Repair

Grading Information

Grading Rationale

The learner must complete all performance tasks with a minimum of a level 3 skill rating, observed by the instructor or mentor and answer the related technicial questions.

Grading Scale

A The learner must complete all performance assessments, 70% at a level 4 rating and a level 3 on the remaining, average a 70 % on written exams.

B The learner must complete all performance assessments, 50% at a level 4 rating and a level 3 .on the remaining, average a 70 % on written exams.

C The learner must complete all performance assessments at a level 3 rating and average a 70 % on written exams.

D The learner has not completed all performance assessments at a level 3 rating or has an average of less than 70 % on written exams.

F The learner has not completed all performance assessments or written exams within the allotted 54 hours.

Guidelines for Success

Attendance 1

You are responsible to be in class as scheduled and complete the course work in the allotted time. You must notify your-faculty advisor if you will be absent.

ADA Statement 1

I wish to fully include persons with disabilities in this course. Please let me know if you need any special accommodations in the curriculum, instruction, or assessments of this course to enable you to fully participate. I will maintain the confidentiality of the information you share with me.

ADA Statement 2

If you have any special needs or concerns, please contact your faculty advisor or the special needs instructor on your campus.
(Racine: Linda Mahony or Peggy Jude)

Safety, Housekeeping, and Property Guidelines

Safety and Operational Policy: Students must follow all posted and .written course procedures regarding safety and course operations. Failure to follow safety procedures or course procedures after a verbal and a written citation will result in DISMISSAL from the program.

Learning and Assessment Activities

Course Requirements: You are required to complete all Learning Plans (Learning Plans identify the Learning Activities, Performance tasks, Performance Assessment Activities and tests that must be completed). Learning Plans are provided by instructors and each Learning Activity is initialed by an instructor on the Learning Plan as you complete it. Some Learning Activities and Performance Activities may be completed with a partner and rated by an instructor. You must complete all Performance Assessment Activities without assistance.

Performance-Based - It's about Learning!

You, as a learner, are the most important part of instruction. In performance based instruction; we carefully

identify what you need to be able to do as a result of an instructional experience. Next we determine how you can show that you have learned these skills. Finally, we plan learning activities that will help you develop the skills.

Performance-based instruction has many advantages for you:

I) What you will learn is based on the skills you will need, rather than on outlines of information.

2) You can plan how to invest your time and energy. To help you do that, we tell you right up: front WHAT you will learn, how we expect you to show WHEN you have learned, and HOW you may go about learning.

3) You know the standards for evaluation before the performance test. You earn a grade according to how well you perform the skills rather than according to how well others in the class perform. You are not graded on a curve.

4) You are actively involved in the learning. We design learning activities and assignments that teach you to solve problems and to learn on your own.

5) When you complete a learning experience, you have documentation showing the skills you have learned. You can use this information when you seek employment, admission to further education, advanced standing or transfer of credit.

You may find it helpful to learn the basic. Terminology we use to describe WHAT, WHEN, and HOW you will learn.

WHAT

Core Ability--A broad capability that you will develop throughout a course or program rather than in one specific lesson. Core abilities include skills that everyone needs to succeed, such as problem-solving, communication, employability, and lifelong learning.

Competency--A major skill, knowledge, or attitude that you will learn as a result of a given learning experience. A competency is specific to a discipline (such as history, math, and language) or to: an occupational area (such as nursing, accounting, and engineering).

Learning Objective--A supporting skill, knowledge, or attitude that you will learn as a step toward mastery of a specific competency. Each competency has two or more learning objectives.

WHEN

Performance Standards. Observable and measurable specifications by which your performance will be evaluated, and a description of the situation under which your performance will be assessed.

Performance Assessment Activity--A statement that tells you what you must do to show mastery of one or more competencies (instructions for completing assignments, performance assessment tasks, or tests).

HOW

Learning Activity--A statement that describes what you can do to help you master specific learning objectives and competencies. (You may think of them as assignments.)

Core Abilities

Your teachers have worked with representatives from business and industry to identify seven skills that are essential to your success in obtaining and keeping a job. You will work towards obtaining and improving these skills in all your courses. By helping you develop the core abilities and holding you responsible for their application, your teachers will help you increase the likelihood of career success.

Core abilities give you an added value in the labor market, because employers prefer to hire and promote individuals who:

Work productively, which means that you possess and apply effective work habits and attitudes within an organizational setting.

Learn effectively, which means that you possess necessary basic skills in reading, writing, and computers; apply skills in acquiring information; and use learning tools and strategies.

Communicate clearly, which means that you apply appropriate writing, speaking, and listening skills in order to precisely convey information, ideas, and opinions.

Work cooperatively, which means that you are capable of working with others to complete tasks, solve problems, resolve conflicts, provide information, and offer support.

Act responsibly, which means that you recognize an obligation to yourself and others for your decisions and actions.

Value-self positively, which means that you apply the principles of physical and psychological wellness to your life.

Think critically and creatively, which means that you apply the principles and strategies of purposeful, active, organized thinking.

Adapted from Core Ability. Statement
Moraine Park Technical College Catalog 1994-95

Auto Engine Minor 602-113
Learning Design

Auto Engine Minor 602-113
Learning/Teaching Plans

Learning Plan 1
Safety, Inspection and Maintenance

Learning Plan Information

Title:	Safety, Inspection and Maintenance
Developer(s):	Ken Dotzler
Date:	01/05/2006

Performance Expectations

Target Competency (ies)

1. **Perform General Engine Diagnosis**

Linked Core Abilities
Act responsibly
Communicate clearly and effectively
Develop job-seeking skills
Respect self and others as members of a diverse society
Think critically and creatively
Work cooperatively
Value learning

Performance Standards

Criteria
- o By Utilizing service manual or electronic service information
- o By utililzing the apporpriate hand and/or power tools appropriate for task being performed
- o When all tasks being performed adhere to manufacturers specifications and demonstrate shop safety procedures
- o Evaluate engine condition by performing necessary diagnostic test
- o Evaluate engine performance concern using appropiate testing equipment
- o Prepare a professional estimate for repair
- o Communicate to customer engine repair/replacement options

Conditions for Assessments
- o In Class and/or Lab, or by providing documented on the job work experience

Learning Objectives

a. A1Identify and interpret engine concern. Determine necessary action
b. A2Research applicable vehicle and service information
c. A3Locate & interpret vehicle and major component identification numbers
d. A4Inspect engine assembly for fuel, oil, coolant, and other leaks, Determine necessary action.
e. A5Diagnose engine noises & vibrations. Determine necessary action.
f. A6Diagnose the cause of excessive oil consumption, unusual engine exhaust color, odor, and sound. Determine necessary action.
g. A7Perform engine vacuum tests; Determine necessary action.
h. A8Perform cylinder power balance tests; Determine necessary action.
i. A9Perform cylinder compression tests; Determine necessary action.
j. A10Perform cylinder leakage tests; Determine necessary action.

Learning Activities

_____1. Read " Classroom Edition " Chapter 1 Safety
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. Read " Classroom Edition" Chapter 2 Theory of Engine Operation
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. Read " Classroom Edition" Chapter 9 Engine Seals, Sealent and Gaskets
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

4. Read " Shop Edition" Chapter 1 Safety and Shop Practice

Properties
Cycle: *Group Size:* *Focus:* *Environment:* *Content Type:* *Intelligence:* *Learning Style:* *Brain:* *VAK:* *Notes:*
_____5. LISTEN to a lecture. : Safety
Properties
Cycle: *Group Size:* *Focus:* *Environment:* *Content Type:* *Intelligence:* *Learning Style:* *Brain:* *VAK:* *Notes:*
_____6. LISTEN to a lecture.: Theroy of Engine Operation
Properties
Cycle: Comprehension *Group Size:* Large Group *Focus:* Teacher Centered *Environment:* *Content Type:* *
Intelligence: Verbal/Linguistic *Learning Style:* Conceptualizing *Brain:* Left Brain *VAK:* Auditory *Notes:*
_____7. LISTEN to a lecture. : Engine Component Identification
Properties
Cycle: *Group Size:* *Focus:* *Environment:* *Content Type:* *Intelligence:* *Learning Style:* *Brain:* *VAK:* *Notes:*
_____8. LISTEN to a lecture. : Engine Sizes and Types
Properties
Cycle: *Group Size:* *Focus:* *Environment:* *Content Type:* *Intelligence:* *Learning Style:* *Brain:* *VAK:* *Notes:*
_____9. LISTEN to a lecture. : Gaskets and Sealants
Properties
Cycle: *Group Size:* *Focus:* *Environment:* *Content Type:* *Intelligence:* *Learning Style:* *Brain:* *VAK:* *Notes:*
_____10. LISTEN to a lecture. : Performing under hood inspections (Fluid Leaks)
Properties
Cycle: *Group Size:* *Focus:* *Environment:* *Content Type:* *Intelligence:* *Learning Style:* *Brain:* *VAK:* *Notes:*
_____11. LISTEN to a lecture. : Estimating and Repair Orders
Properties
Cycle: *Group Size:* *Focus:* *Environment:* *Content Type:* *Intelligence:* *Learning Style:* *Brain:* *VAK:* *Notes:*
_____12. LISTEN to a lecture. : Performing Lube, Oil and Filter
Properties
Cycle: *Group Size:* *Focus:* *Environment:* *Content Type:* *Intelligence:* *Learning Style:* *Brain:* *VAK:* *Notes:*

Assessment Activities
_____1. Classroom Edition: Chapter 1 Multiple Choice Review Questions
Page 16 1-10
_____2. Classroom Edition: Chapter 2 Multiple Choice Review Questions
Page 53 1-10
_____3. Classroom Edition :Chapter 9 Multiple Choice Review Questions
Page 222 1-10
_____4. Shop Edition:Chapter 1 ASE Style Review Questions
Page 20 1-10
_____5. Job Sheet 1 - Leak Inspection and LOF

Teaching Plans

1A
Total Time In: 0
Date: 01/05/2006

Teaching Plan Activities
1. *Teaching Activity:*
Learning Activity: Read " Classroom Edition " Chapter 1 Safety
Time In: 0
Time Outside: 0
Supplies: Classroom Edition Textbook

2. *Teaching Activity:*
Learning Activity: Read " Classroom Edition" Chapter 2 Theory of Engine Operation
Time In: 0
Time Outside: 0
Supplies: Classroom Edition Textbook

3. *Teaching Activity:*
Learning Activity: Read " Classroom Edition" Chapter 9 Engine Seals, Sealent and Gaskets
Time In: 0
Time Outside: 0
Supplies: Classroom Edition Textbook

4. *Teaching Activity:*
Learning Activity: Read " Shop Edition" Chapter 1 Safety and Shop Practice
Time In: 0
Time Outside: 0

Supplies: Shop Edition Textbook

5. *Teaching Activity:*
Learning Activity: LISTEN to a lecture. : Safety
Time In: 0
Time Outside: 0

6. *Teaching Activity:*
Learning Activity: LISTEN to a lecture.: Theroy of Engine Operation
Time In: 0
Time Outside: 0

7. *Teaching Activity:*
Learning Activity: LISTEN to a lecture. : Engine Component Identification
Time In: 0
Time Outside: 0

8. *Teaching Activity:*
Assessment Activity: Classroom Edition: Chapter 1 Multiple Choice Review Questions Page 16 1-10
Time In: 0
Time Outside: 0
Supplies: Classroom Edition Textbook

9. *Teaching Activity:*
Assessment Activity: Classroom Edition: Chapter 2 Multiple Choice Review Questions Page 53 1-10
Time In: 0
Time Outside: 0
Supplies: Classroom Edition Textbook

10. *Teaching Activity:*
Assessment Activity: Classroom Edition :Chapter 9 Multiple Choice Review Questions Page 222 1-10
Time In: 0
Time Outside: 0
Supplies: Classroom Edition Textbook

11. *Teaching Activity:*
Assessment Activity: Shop Edition:Chapter 1 ASE Style Review Questions Page 20 1-10
Time In: 0
Time Outside: 0
Supplies: Shop Edition Textbook

12. *Teaching Activity:*
Assessment Activity: Job Sheet 1 - Leak Inspection and LOF
Time In: 0
Time Outside: 0
Supplies: Handout

Learning Plan 2
Oil System and Cooling System

Learning Plan Information

Title:	Oil System and Cooling System
Developer(s):	Ken Dotzler
Date:	01/05/2006

Performance Expectations

Target Competency (ies)
3. **Perform Lubrication and Cooling Systems Repair**

Linked Core Abilities
Act responsibly

Communicate clearly and effectively
Develop job-seeking skills
Respect self and others as members of a diverse society
Think critically and creatively
Work cooperatively
Value learning

Performance Standards

Criteria
- o By Utilizing service manual or electronic service information
- o By utililzing the apporpriate hand and/or power tools appropriate for task being performed
- o When all tasks being performed adhere to manufacturers specifications and demonstrate shop safety procedures
- o Diagnose and repair engine lubrication system concer
- o Diagnose and repair Cooling system concern
- o Evaluate cooling system performance
- o Evaluate engine lubrication system performance
- o Prepare a professional estimate for repair

Conditions for Assessments
- o In Class and/or Lab, or by providing documented on the job work experience

Learning Objectives

a. D1Perform oil pressure tests; Determine necessary action.
b. D2Inspect oil pump gears or rotors, housing, pressure relief devices and pump drive. Perform necessary action.
c. D3Perform cooling system, cap, and recovery system tests.
d. D4Inspect, replace, & adjust drive belts, tensioners, and pulleys; check pulley & belt alignment
e. D5Inspect & replace cooling & heater system hoses
f. D6Inspect, test, and replace thermostat & housing
g. D7Test coolant; drain & recover coolant; flush & refill cooling system with recommended coolant; bleed air as required
h. D8Perform oil & filter change
i. D9Remove & replace radiator
j. D10Inspect & test fan(s) (electrical or mechanical), fan clutch, fan shroud, and air dam
k. D11Inspect auxiliary oil coolers. Determine necessary action.
l. D12Inspect, test, and replace oil temperature and pressure switches and sensors.
m. D13 Inspect, test, remove, and replace water pump

Learning Activities

_____1. Read " Classroom Edition " Chapter 3 Engine Operating System
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. Read " Shop Edition" Chapter 3 Diagnosing and Servicing Engine
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. LISTEN to a lecture. : Lubrication System
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. LISTEN to a lecture. : Oil Pumps
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. LISTEN to a lecture. : Cooling System
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
Cap, Thermostat and Water pumps

Assessment Activities

_____1. Classroom Edition ; Chapter 3 Review Questions
Page 88 1-10
_____2. Shop Edition: Chapter 3 ASE Style Review Questions
Page 168
_____3. Job Sheet 2 - Oil Pressure Test
_____4. Job Sheet 3- Cooling System Inspection and Service
_____5. Job Sheet 4- R & R Cooling System Components

Teaching Plans

2A Teaching Plan 1
Total Time In: 0

Date: 01/05/2006

Teaching Plan Activities

1. *Teaching Activity:*
Learning Activity: Read " Classroom Edition " Chapter 3 Engine Operating System
Time In: 0
Time Outside: 0
Supplies: Classroom Edition Textbook

2. *Teaching Activity:*
Learning Activity: Read " Shop Edition" Chapter 3 Diagnosing and Servicing Engine
Time In: 0
Time Outside: 0
Supplies: Shop Edition Textbook

3. *Teaching Activity:*
Learning Activity: LISTEN to a lecture. : Lubrication System
Time In: 0
Time Outside: 0

4. *Teaching Activity:*
Learning Activity: LISTEN to a lecture. : Oil Pumps
Time In: 0
Time Outside: 0

5. *Teaching Activity:*
Learning Activity: LISTEN to a lecture. : Cooling System
Time In: 0
Time Outside: 0

6. *Teaching Activity:*
Assessment Activity: Classroom Edition ; Chapter 3 Review Questions
Page 88 1-10
Time In: 0
Time Outside: 0
Supplies: Classroom Edition Textbook

7. *Teaching Activity:*
Assessment Activity: Shop Edition: Chapter 3 ASE Style Review Questions
Page 168
Time In: 0
Time Outside: 0
Supplies: Shop Edition Textbook

8. *Teaching Activity:*
Assessment Activity: Job Sheet 2 - Oil Pressure Test
Time In: 0
Time Outside: 0
Supplies: Handout

9. *Teaching Activity:*
Assessment Activity: Job Sheet 3- Cooling System Inspection and Service
Time In: 0
Time Outside: 0
Supplies: Handout

10. *Teaching Activity:*
Assessment Activity: Job Sheet 4- R & R Cooling System Components
Time In: 0
Time Outside: 0
Supplies: Handout

Learning Plan 3
Engine Test

Learning Plan Information

Title: Engine Test
Developer(s): Ken Dotzler
Date: 01/05/2006

Performance Expectations

Learning Activities

_____1. LISTEN to a lecture. : Engine Vacuum Testing
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. LISTEN to a lecture. : Engine Power Balance Testing and Techniques
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. LISTEN to a lecture. : Compression Testing
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____4. LISTEN to a lecture. : Cylinder Leakage
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. Job Sheet 5- Engine Testing

Teaching Plans

3A Teaching Plan 1
Total Time In: 0
Date: 01/05/2006

Teaching Plan Activities

1. *Teaching Activity:*
Learning Activity: LISTEN to a lecture. : Engine Vacuum Testing
Time In: 0
Time Outside: 0

2. *Teaching Activity:*
Learning Activity: LISTEN to a lecture. : Engine Power Balance Testing and Techniques
Time In: 0
Time Outside: 0

3. *Teaching Activity:*
Learning Activity: LISTEN to a lecture. : Compression Testing
Time In: 0
Time Outside: 0

4. *Teaching Activity:*
Learning Activity: LISTEN to a lecture. : Cylinder Leakage
Time In: 0
Time Outside: 0

5. *Teaching Activity:*
Assessment Activity: Job Sheet 5- Engine Testing
Time In: 0
Time Outside: 0
Supplies: Handout

Learning Plan 4
Timing Belts and Timing Chains

Learning Plan Information
Title: Timing Belts and Timing Chains
Developer(s): Ken Dotzler
Date: 01/05/2006

Performance Expectations

Target Competency (ies)

2. **Remove, inspect and replace timing belts and/or timing chains, tensioners and related hardware**

Linked Core Abilities

Act responsibly
Communicate clearly and effectively
Develop job-seeking skills
Respect self and others as members of a diverse society
Think critically and creatively
Work cooperatively
Value learning

Performance Standards

Criteria

- o By Utilizing service manual or electronic service information
- o By utililzing the apporpriate hand and/or power tools appropriate for task being performed
- o When all tasks being performed adhere to manufacturers specifications and demonstrate shop safety procedures
- o Diagnose timing belt/chain determine appropriate action
- o Remove, inspect, and clean timing belts/chain and related hardware
- o Restore engine to operating condition
- o Prepare a professional estimate for repair
- o Communicate to customer engine repair/replacement options

Conditions for Assessments

- o In Class and/or Lab, or by providing documented on the job work experience

Learning Objectives

a. B12Inspect camshaft drives (including gear wear & backlash, chain & sprocket wear) Determine necessary action.
b. B13Inspect & Replace timing belt(s), overhead camdrive sprockets and tensioners; check belt/chain tension; adjust as necessary
c. B16Establish camshaft(s) timing and cam sensor indexing according to manufacturer's specifications & procedures

Learning Activities

_____1. Read " Classroom Edition " Chapter 7 pages 153-158 Camshafts and Valve Trains
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. Read " Shop Edition" Chapter 7 pages 307-320 Valve Train inspection and Service
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. LISTEN to a lecture. : Timing Belts, Timing Chains and Service
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. Job Sheet 6 - Timing Belt/Chain Replacement

Teaching Plans

4A Teaching Plan 1

Total Time In: 0
Date: 01/05/2006

Teaching Plan Activities

1. *Teaching Activity:*
Learning Activity: Read " Classroom Edition " Chapter 7 pages 153-158 Camshafts and Valve Trains
Time In: 0
Time Outside: 0
Supplies: Classroom Edition Textbook

2. *Teaching Activity:*
Learning Activity: Read " Shop Edition" Chapter 7 pages 307-320 Valve Train inspection and Service
Time In: 0
Time Outside: 0
Supplies: Shop Edition Textbook

3. *Teaching Activity:*

Learning Activity: LISTEN to a lecture. : Timing Belts, Timing Chains and Service
Time In: 0
Time Outside: 0

4. *Teaching Activity:*
Assessment Activity: Job Sheet 6 - Timing Belt/Chain Replacement
Time In: 0
Time Outside: 0
Supplies: Handout

Auto Simulation II
Syllabus

Course Information

Title Auto Simulation II

Course Number 602-161

Credits 3

Organization Gateway Technical College

Developer(s) Steve Semon, Bill Fell

Time(s) Thursday 12:00pm – 5:00pm; 5:00pm – 10:00pm
Friday 7:00am – 12:00pm
8/23/07 – 12/13/07

Prerequisites
1. Student must have a valid drivers license.
2. Engine Performance I, HVAC, and Engine Minor

Goals
1. The student will perform all P-1, 80% of P-2, and 50% of P-3 tasks required for this course and prepare for the ASE Chassis Electrical, HVAC Certification exams.

Description This course will allow the student to perform NATEF tasks in areas Electrical, HVAC and Minor Engine systems. The tasks are to be performed in conjunction with the repair of a school owned vehicle in a simulated shop environment. A strong emphasis is placed on customer relations and communications. Students will perform both Service Writer and Parts Person Positions on a rotating basis as well as performing NATEF Tasks. Student preparedness for the ASE (Automotive Service Excellence) certification exam is emphasized.

Standards Demonstrate personal and environmental safety practices.
Diagnose general engine concerns.
Diagnose vehicle electrical systems concerns.
Diagnose HVAC concerns.

Service Simulation II Syllabus

Core Abilities Act responsibly
Communicate clearly and effectively.
Demonstrate essential computer skills.
Develop the skills required to successfully seek and obtain Employment.
Respect self and others as members of a diverse society.
Think critically and creatively.
Work cooperatively.
Value learning.

Competencies

1. Demonstrate personal and environmental safety practices.
2. Diagnose and repair general engine concerns.
3. Engine related services.
4. Diagnose and service batteries.
5. Diagnose and repair starting systems.
6. Diagnose and repair charging systems.
7. Diagnose and repair lighting systems.
8. Diagnose and repair horn, wiper/washer systems.
9. A/C system diagnosis and repair.
10. Evaporator, Condenser and related components.
11. HVAC systems diagnosis and repair.
12. Operating systems and related components.
13. Refrigerant recovery, recycling, and handling.
14. Read and interpret technical information.
15. Use electronic service information.
16. Write repair orders.

Grading Policy

Grading Rationale

The learner must complete all required NATEF tasks and demonstrate a level 3 skill rating while performing repairs on customer vehicles under the supervision of instructor(s) and or ASE certified mentor. Performance Evaluation Forms (Self and Instructor) must be completed for each service or repair performed.

Student must describe one repair they have performed each week in class. These repairs will be delivered orally each week and count as 30% of you grade.

Service Simulation II Sylllabus

Student must on a rotating basis perform the duties of a Service Writer. Duties include making appointments, writing repair orders, writing estimates, keeping track of vehicles being repaired, and notifying customers of vehicle repair status and finish times.

Student must on a rotating basis perform the duties of a Parts Person. Duties include ordering parts needed for repairs in service, ordering shop supplies, providing prices to the Service Writer to aide in writing estimates Working as tool room handler to dispatch and check in special tools.

SKILL LEVEL 4 – Scored 45pts out of 50pts possible on the Service Simulation Evaluation form.

SKILL LEVEL 3 – Scored 40pts out of 50pts possible on the Service Simulation Evaluation form.

SKILL LEVEL 2 – Scored 35pts out of 50pts possible on the Service Simulation Evaluation form.

SKILL LEVEL 1 – Scored 30pts out of 50pts possible on the Service Simulation Evaluation form.

SKILL LEVEL 0 – Scored 25pts out of 50pts possible on the Service Simulation Evaluation form.

Service Simulation II Syllabus

Grading Scale

Grade	Requirement
A	MUST COMPLETE ALL P-1 TASKS, 80% OF P-2 TASKS AND 50% OF P-3 TASKS, ACHIEVED A 4 SKILL RATING ON 90% OF SERVICE SIMULATION EVALUATIONS. Score a 4 skill rating on 90% of the verbal presentations. Score 70% or better on the related ASE EXAM.
B	MUST COMPLETE ALL P-1 TASKS, 80% OF P-2 TASKS AND 50% OF P-3 TASKS, ACHIEVED A 4 SKILL RATING ON 75% OF SERVICE SIMULATION EVALUATIONS. Score a 4 skill rating on 80% of the verbal presentations. Score 70% or better on the related ASE EXAM.
C	MUST COMPLETE ALL P-1 TASKS, 80% OF P-2 TASKS AND 50% OF P-3 TASKS. ACHIEVE A 3 SKILL LEVEL FOR SERVICE SIMULATION EVALUATIONS. Score a 3 skill rating on 80% of the verbal presentations. Score a 70% or better on the related ASE EXAM.
D	NOT COMPLETED ALL P-1 TASKS, 80% OF P-2 TASKS AND 50% OF P-3 TASKS, OR ACHIEVED A 3 SKILL LEVEL RATING FOR SERVICE SIMULATION EVALUATIONS. Did not perform the required 6 verbal Presentations and or scoring less then 70% on the related ASE EXAM.
F	NOT COMPLETED ALL P-1 TASKS, 80% P-2 TASKS AND 50% OF P-3 TASKS, IN THE ALLOTTED TIME

Policies and Information

Class procedures and Requirements

ATTENDENCE: You are responsible to be in class according to the schedule you were provided. You must complete the VEHICLE REPAIRS or SERVICE in 2X OR twice the published FLAT RATE TIME. You must call the lab and let an instructor know you be ABSENT or LATE. CALL ? and leave a voice mail message. A doctors excuse may be required.

SAFETY and OPERATIONAL POLICY: Students must follow all posted and written course procedures regarding safety and course operations. Failure to follow safety procedures or course procedures after a verbal and written citation will result in a DISMISSAL from the course.

COURSE REQUIREMENTS: Student must have a valid drivers license. Service Simulation Activities are taken from the NATEF tasks list, they should be completed independently without assistance but may be completed with a partner, MAXIMUM skill level given with a partner will be a 3 rating by an instructor.

VERBAL PRESENTATIONS: Students must participate in all verbal presentations both in presentation and discussion.

SERVICE WRITER: Write service orders, work with Parts Person to compile estimates, and students to keep track of vehicles being repaired. Perform any other duties the Instructor feels need to be done.

PARTS PERSON: Work with students to get parts prices and parts need for repairs. Work with Service Writer to compile estimates. Check out and check in specialty tools.

Order shop supplies and perform any other duties Instructor feels need to be done.

SIMULATION II
NATEF TASKS

ELECTRICAL/ELECTRONIC SYSTEMS

For every task in Electrical/Electronic Systems, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

VI. ELECTRICAL/ELECTRONIC SYSTEMS

A. General Electrical System Diagnosis

1.	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1
2.	Identify and interpret electrical/electronic system concern; determine necessary action.	P-1
3.	Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.	P-1
4.	Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals).	P-1
5.	Diagnose electrical/electronic integrity of series, parallel and series-parallel circuits using principles of electricity (Ohm's Law).	P-1
6.	Use wiring diagrams during diagnosis of electrical circuit problems.	P-1
7.	Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems.	P-1
8.	Check electrical circuits with a test light; determine necessary action.	P-2
9.	Measure source voltage and perform voltage drop tests in electrical/electronic circuits using a voltmeter; determine necessary action.	P-1

10.	Measure current flow in electrical/electronic circuits and components using an ammeter; determine necessary action.	P-1
11.	Check continuity and measure resistance in electrical/electronic circuits and components using an ohmmeter; determine necessary action.	P-1
12.	Check electrical circuits using fused jumper wires; determine necessary action.	P-2
13.	Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.	P-1
14.	Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.	P-1
15.	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	P-1
16.	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action.	P-1
17.	Remove and replace terminal end from connector	
18.	Repair connectors and terminal ends.	P-1
19.	Repair wiring harness (including CAN/BUS systems).	
20.	Perform solder repair of electrical wiring.	P-1
21.	Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures	P-3

VI. ELECTRICAL/ELECTRONIC SYSTEMS

B. Battery Diagnosis and Service

1.	Perform battery state-of-charge test; determine necessary action.	P-1
2.	Perform battery capacity test (or conductance test); confirm proper battery capacity for vehicle application; determine necessary action.	P-1
3.	Maintain or restore electronic memory functions.	P-1
4.	Inspect, clean, fill, and replace battery.	P- P-1

5.	Perform slow/fast battery charge.	P-2
6.	Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.	P-1
7.	Start a vehicle using jumper cables and a battery or auxiliary power supply.	P-1

VI. ELECTRICAL/ELECTRONIC SYSTEMS

C. Starting System Diagnosis and Repair

1.	Perform starter current draw tests; determine necessary action.	P-1
2.	Perform starter circuit voltage drop tests; determine necessary action.	P-1
3.	Inspect and test starter relays and solenoids; determine necessary action.	P-2
4.	Remove and install starter in a vehicle.	P-1
5.	Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	P-2
6.	Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	P-2

VI. ELECTRICAL/ELECTRONIC SYSTEMS

D. Charging System Diagnosis and Repair

1.	Perform charging system output test; determine necessary action.	P-1
2.	Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions.	P-1
3.	Inspect, adjust, or replace generator (alternator) drive belts, pulleys, and tensioners; check pulley and belt alignment.	P- P-1
4.	Remove, inspect, and install generator (alternator).	P-1

5. Perform charging circuit voltage drop tests; determine necessary action. P-1

VI. ELECTRICAL/ELECTRONIC SYSTEMS

E. Lighting Systems Diagnosis and Repair

1. Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action. P-1

2. Inspect, replace, and aim headlights and bulbs. P-2

3. Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action. P-2

VI. ELECTRICAL/ELECTRONIC SYSTEMS

F. Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair

1. Inspect and test gauges and gauge sending units for cause of intermittent, high, low, or no gauge readings; determine necessary action. P-1

2. Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action. P-3

3. Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action. P-1

4. Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action. P- P-3

VI. ELECTRICAL/ELECTRONIC SYSTEMS

G. Horn and Wiper/Washer Diagnosis and Repair

1. Diagnose incorrect horn operation; perform necessary action. P-2

2. Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action. P-2

3.	Diagnose incorrect washer operation; perform necessary action.	P-2

VI. ELECTRICAL/ELECTRONIC SYSTEMS

H. Accessories Diagnosis and Repair

1.	Diagnose incorrect operation of motor-driven accessory circuits; determine necessary action.	P-2
2.	Diagnose incorrect heated glass, mirror, or seat operation; determine necessary action.	P- P-2
3.	Diagnose incorrect electric lock operation; determine necessary action.	P-2
4.	Diagnose incorrect operation of cruise control systems; determine necessary action.	P-3
5.	Diagnose supplemental restraint system (SRS) concerns; determine necessary action. (Note: Follow manufacturer's safety procedures to prevent accidental deployment.)	P- P-1
6.	Disarm and enable the airbag system for vehicle service.	P-1
7.	Diagnose radio static and weak, intermittent, or no radio reception; determine necessary action.	P-3
8.	Remove and reinstall door panel.	P-1
9.	Diagnose body electronic system circuits using a scan tool; determine necessary action.	P-2
10.	Check for module communication (CAN/BUS) errors using a scan tool.	P-3
11.	Diagnose the cause of false, intermittent, or no operation of anti-theft systems.	P-2

HEATING AND AIR CONDITIONING

For every task in Heating and Air Conditioning, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

VII. HEATING AND AIR CONDITIONING

A. A/C System Diagnosis and Repair

1.	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1
2.	Identify and interpret heating and air conditioning concern; determine necessary action.	P-1
3.	Research applicable vehicle and service information, such as heating and air conditioning system operation, vehicle service history, service precautions, and technical service bulletins.	P-1
4.	Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).	P-1
5.	Performance test A/C system; diagnose A/C system malfunctions using principles of refrigeration.	P-1
6.	Diagnose abnormal operating noises in the A/C system; determine necessary action.	P-2
7.	Identify refrigerant type; select and connect proper gauge set; record pressure readings.	P-1
8.	Leak test A/C system; determine necessary action.	P-1
9.	Inspect the condition of discharged oil; determine necessary action.	P-2
10.	Determine recommended oil for system application.	P-1

11. Using scan tool, observe and record related HVAC data and trouble codes. P-1

VII. HEATING AND AIR CONDITIONING

B. Refrigeration System Component Diagnosis and Repair

1. Compressor and Clutch

1. Diagnose A/C system conditions that cause the protection devices (pressure, thermal, and PCM) to interrupt system operation; determine necessary action. P-2

2. Inspect and replace A/C compressor drive belts; determine necessary action. P-1

3. Inspect, test, and/or replace A/C compressor clutch components and/or assembly. P-2

4. Remove, inspect, and reinstall A/C compressor and mountings; measuredetermine required oil quantity. P-1

P-3

2. Evaporator, Condenser, and Related Components

1. Determine need for an additional A/C system filter; perform necessary action. P-3

2. Remove and inspect A/C system mufflers, hoses, lines, fittings, O-rings, seals, and service valves; perform necessary action. P-2

3. Inspect A/C condenser for airflow restrictions; perform necessary action. P-1

4. Remove, inspect, and reinstall receiver/drier or accumulator/drier; measure determine required oil quantity. P-1

5. Remove and install expansion valve or orifice (expansion) tube. P-1

6. Inspect evaporator housing water drain; perform necessary action. P-3

7. Remove, inspect, and reinstall evaporator; measure determine required oil quantity. determine necessary action P-3

8.	Remove, inspect, and reinstall condenser; measure determine required oil quantity.	P-3

VII. HEATING AND AIR CONDITIONING

C. Heating, Ventilation, and Engine Cooling Systems Diagnosis and Repair

1.	Diagnose temperature control problems in the heater/ventilation system; determine necessary action.	P-2
2.	Perform cooling system, cap,pressure; determine necessary action Perform cooling system pressure tests; check coolant condition, inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.	P-1
3.	Inspect engine cooling and heater system hoses and belts; perform necessary action.	P-1
4.	Inspect, test, and replace thermostat and gasket.	P-1
5.	Determine coolant condition and coolant type for vehicle application; drain and recover coolant.	P-1
6.	Flush system; refill system with recommended coolant; bleed system.	P-1
7.	Inspect and test cooling fan, fan clutch, fan shroud, and air dams; perform necessary action.	P-1
8.	Inspect and test electric cooling fan, fan control system and circuits; determine necessary action.	P-1
9.	Inspect and test heater control valve(s); perform necessary action.	P-2
10.	Remove, inspect, and reinstall heater core.	P-3

11.	Perform engine running compression test; determine necessary action.	P-2
12.	Perform cylinder leakage test; determine necessary action.	P-1
13.	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns with an oscilloscope and/or engine diagnostic equipment; determine necessary action.	P-1
14.	Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.	P-1
15.	Verify engine operating temperature; determine necessary action.	P-1
16.	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.	P-1
17.	Verify correct camshaft timing.	P-2

VIII. ENGINE PERFORMANCE

F. Engine Related Service

1.	Adjust valves on engines with mechanical or hydraulic lifters.	P-1
2.	Remove and replace timing belt; verify correct camshaft timing.	P-1
3.	Remove and replace thermostat and gasket.	P-1
4.	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.	P-1
5.	Perform common fastener and thread repair to include, remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.	P-1
6.	Perform oil and filter changes.	P-1
7.	Demonstrate proficiency in using oxy-acetylene torch to heat and cut metal.	P-3
8.	Identify hybrid vehicle internal combustion engine service precautions.	P-3

Auto Simulation II Syllabus

Automotive Fuel and Emissions Control Systems

Choose a Chapter: Choose Section

Chapter Title

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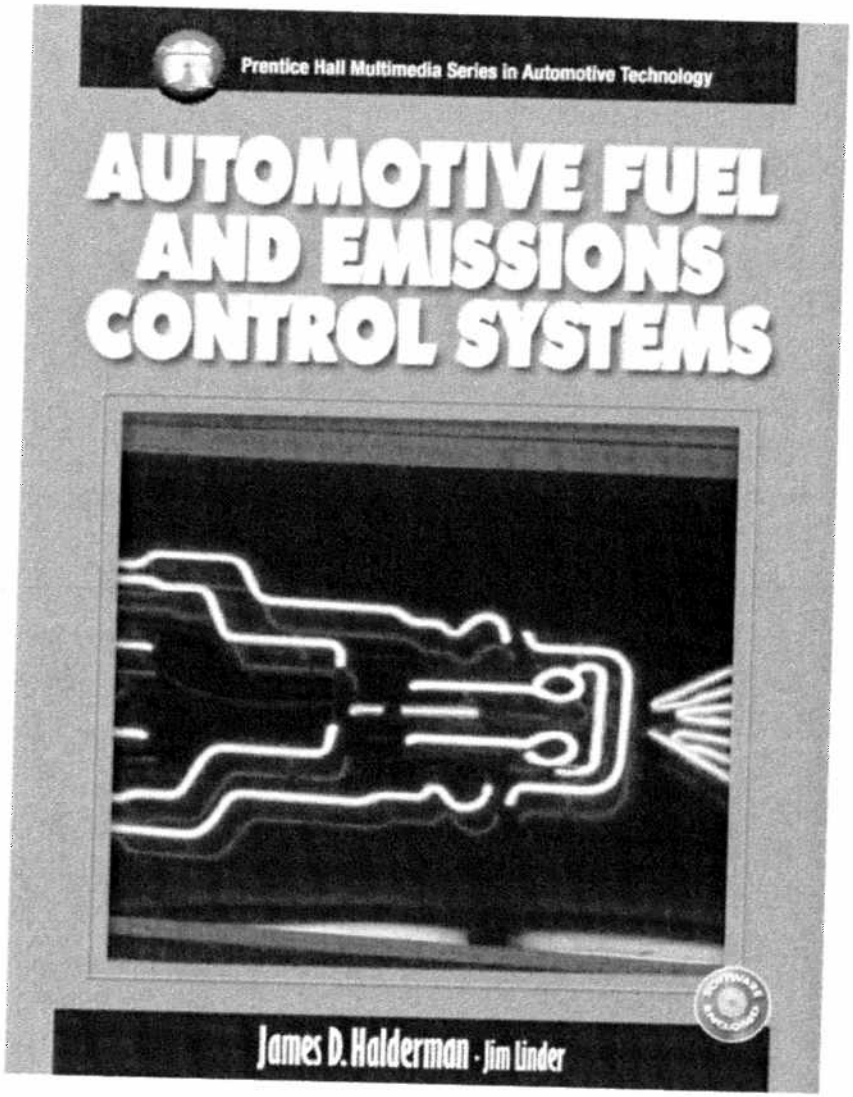

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Engine Performance II
Learning Design

Engine Performance II
Syllabi

Syllabus 1
Auto Engine Performance II

Syllabus Information

Class Information

Title:	Auto Engine Performance II
Weeks:	0

Instructor Information

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Grading Information
Grading Rationale
The learner must complete all required NATEF tasks and demonstrate a level 3 skill rating while performing repairs on customer vehicles under the supervision of instructor(s) and or ASE certified mentor. Performance Evaluation Forms (Self and Instructor) must be completed for each service or repair performed.

Grading Scale
A 93 - 100 Excellent work in all of the above
B 85 - 92 Above average work in all of the above
C 77 - 84 Average work in all of the above
D 70 - 76 Below average work in all of the above
F Below 70 Failing to meet standards

Guidelines and Information
Attendance 1
ATTENDANCE: You are responsible to be in class according to the schedule you were provided. You must complete the VEHICLE REPAIRS or SERVICE in 2X OR twice the published FLAT TIME RATE. You must call the lab and let an insturctor know you will be ABSENT or LATE. CALL _____ and leave a voice mail message. A doctors excuse may be required.

Gateway Technical College recognizes the importance of attendance in the learning process but does not believe that attendance in and of itself constitutes learning.

Instructors will document in their corese syllabi fair and reasonable attendance policies for their classes based on their subject matter, delivery methods, learning activities, student audience, external regulations, college and departmental guidelines, and employer expectations in their field of instruction.

Students are responsible for reading and understanding each class attendance policy and for learning any material covered during an absence.

Students will not be penalized for hours missed prior to late enrollment in a class if they enroll under the regular late enrollment policy. Students are expected to begin attending immediately after such late enrollment.

Students may miss class without penalty to attend college-sponsored field trips, competitions, or other educational activities if pre-arranged with their instructors.

When absences occur, students are responsible for making up any work missed and obtaining notes from lectures or other class activities so their learning may continue. Faculty can be contacted during posted office hours.

Students may be graded on attendance in accordance with college and departmental guidelines. The greatest portion of the course grade will be based on demonstration of the skills, knowledge, and behaviors that are the outcomes of the course.

Students with disputes related to the instructors' attendance policies shall follow the Student Due Process procedures outlined in the student handbook.

Special Needs

If you have any special needs or concerns, please contact your classroom instructor. If you have any Special Educational Needs, the following staff is available to help you.

Racine Campus: Helen Suda, Linda Mahoney, Peggy Jude
Kenosha Campus: Jack Sullivan, Barbara Giese
Elkhorn Campus: Pat Harkness, Kathy Peterson

Safety, Housekeeping, and Property Guidelines

ADA Statement 2
ATTENDANCE: You are responsible to be in class according to the schedule you were provided. You must complete the VEHICLE REPAIRS or SERVICE in 2X OR twice the published FLAT RATE TIME. You must call the lab and let an instructor know you will be ABSENT or LATE. Call _____ and leave a voice mail message. A doctor's excuse may be required.

Engine Performance II
Learning Design

Engine Performance II
Learning/Teaching Plans

Learning Plan 1
Learning Plan 1 - Safety Overview, Overview of Engine Performance & Basic Theories

Purpose/Overview
Review with students the Syllabus, Safety & Governmental Regulations, and class expectations. Assign students to read Chapter: 1 & 2 in the Classroom Manual.

Learning Plan Information

Title:	Learning Plan 1 - Safety Overview, Overview of Engine Performance & Basic Theories
Developer(s):	Robert D. Braun
Date:	01/15/2006

Performance Expectations

Target DACUM Tasks
A-1 Follow safety procedures while using equipment
A-2 Employ steps to be taken in case of injury
A-3 Use safety equipment such as gloves, goggles, ear plugs
A-4 Use appropriate metod of disposing of waste
A-5 Refer to MSDS
A-6 Follow safety rules involving flammable liquids
A-7 Follow lock-out and tag-out procedures
A-8 Participate in employee fight-to-know meetings
A-9 Follow instructions on warning labels
A-10 Use fire safety equipment

Learning Activities
_____1. REVIEW Chapter 1 CLASSROOM MANUAL "Overview of Engine Performance" Pages 1 - 15
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. COMPLETE Review Questions "Multiple Choice" Page 17
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. REVIEW Chapter 1 SHOP MANUAL "Tools and Safety" Pages 1 - 31
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 1 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. COMPLETE Chapter 1 MANUAL JOB SHEETS 1 & 2. (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. REVIEW Chapter 2 CLASSROOM MANUAL "Basic Theroies" Pages 19 - 35
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____7. REVIEW Chapter 2 SHOP MANUAL "Typical Shop Procedures and Equipment" Pages 37 - 78
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____8. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 2 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____9. COMPLETE Chapter 2 MANUAL JOB SHEETS 3 & 4 (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____10. Obtain Learning Plan 2
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Learning Plan 2
.Learning Plan 2 -Electricity & Electronics

Purpose/Overview
Review Basics of Electron Flow, Electricity Defined, Electrical Laws, Types of Current, Electrical Circuits, Semiconductors, Magnetism Principles, Theory of Induction and EMI Suppression from Chapter 2. Review Chapter 2 Questions. Assign students to read Chapters 3 & 5.

Learning Plan Information

Title:	Learning Plan 2 -Electricity & Electronics
Developer(s):	Robert D. Braun
Date:	01/15/2006

Performance Expectations

Target Competency (ies)

1. **Perform Battery Test using the three types of battery testing techniques.**

   Performance Standards

   Criteria
   - o By utilizing service manual or electronic service information
   - o By utilizing the appropriate hand and/or power tools appropriate for task being performed
   - o When all tasks being performed adhere to manufacturers specifications and demonstrate shop safety procedures
   - o o Diagnose and evaluate fuel injectors and fuel pumps.
   - o o Remove, clean and inspect induction system components.
   - o o Replace fuel injectors and pump.
   - o o Prepare a professional estimate for repair
   - o o Communicate to customer fuel system service needs

   Conditions for Assessments
   - o In Class and/or Lab, or by providing documented on the job work experience

2. **Perform Electrical Voltage drop accurately 75% of the time.**

   Performance Standards

   Criteria
   - o By Utilizing service manual or electronic service information
   - o By utililzing the apporpriate hand and/or power tools appropriate for task being performed
   - o When all tasks being performed adhere to manufacturers specifications and demonstrate shop safety procedures
   - o Evaluate engine condition by performing necessary diagnostic test
   - o Evaluate engine performance concern using appropriate testing equipment
   - o Prepare a professional estimate for repair
   - o Communicate to customer engine repair/replacement options

   Conditions for Assessments
   - o In Class and/or Lab, or by providing documented on the job work experience

3. **Perform alternator output test**

   Performance Standards

   Criteria
   - o By Utilizing service manual or electronic service information
   - o By utililzing the appropriate hand and/or power tools appropriate for task being performed
   - o When all tasks being performed adhere to manufacturers specifications and demonstrate shop safety procedures
   - o Diagnose timing belt/chain determine appropriate action
   - o Remove, inspect, and clean timing belts/chain and related hardware
   - o Restore engine to operating condition
   - o Prepare a professional estimate for repair
   - o Communicate to customer fuel system service needs

   Conditions for Assessments
   - o In Class and/or Lab, or by providing documented on the job work experience

4. **Perform starter draw test**

Performance Standards

Criteria
- o Demonstrate an understanding of starting and charging systems operational theory.
- o Demonstrate an understanding of ignition systems operational theory.
- o Demonstrate general electrical system diagnosis.
- o Demonstrate battery diagnosis and service.
- o Demonstrate starting system diagnosis and repair.
- o Demonstrate charging system diagnosis and repair.
- o Demonstrate ignition system diagnosis and repair.
- o Diagnose and repair gauges, warning devices, and driver information systems.

Conditions for Assessments
- o In Class and/or Lab, or by providing documented on the job work experience

5. **Diagnose ignition system using one of the lab's analyzers.**

Performance Standards

Conditions for Assessments
- o In Class and/or Lab, or by providing documented on the job work experience

6. **Accurately present to the instructor your knowledge of calculating ohms law on a vehicle application.**

Performance Standards

Conditions for Assessments
- o In Class and/or Lab, or by providing documented on the job work experience

Target DACUM Tasks
A-1 Follow safety procedures while using equipment
A-2 Employ steps to be taken in case of injury
A-3 Use safety equipment such as gloves, goggles, ear plugs
A-4 Use appropriate metod of disposing of waste
A-5 Refer to MSDS
A-6 Follow safety rules involving flammable liquids
A-7 Follow lock-out and tag-out procedures
A-8 Participate in employee fight-to-know meetings
A-9 Follow instructions on warning labels
A-10 Use fire safety equipment

Target General Education Outcomes
GENERAL EDUCATION STATEMENT OF PURPOSE: Gateway Technical College believes students need General Education skills in order to succeed in careers and life. Recognizing this fundamental importance, the College requires general education coursework in all programs in order to give students effective communication, mathematical, scientific thinking, and global social skills.
COMMUNICATIONS DIVISION STATEMENT OF PURPOSE: We deliver postsecondary course work in oral and written communications that responds to the changing needs of students, employers, and communities in Southeastern Wisconsin.
Write effectively as an individual
Write effectively as a member of a group
Speak effectively as an individual
Speak effectively as a member of a group
Establish credibility in presentations
SOCIAL SCIENCE DIVISION STATEMENT OF PURPOSE: The Social Science Division of General Education equips students to navigate through the vast array of social, political, and economic conditions in which they live and work.
Students will observe potential cause/effect relations and collect relevant data
Students will demonstrate an understanding of cause and effect relationships
Students will predict and test empirical data based upon their knowledge or cause and effect
Students will solve problems based upon their knowledge of cause and effect relationships
Students will apply their knowledge of cause and effect relationships to a new situation
MATHEMATICS AND SCIENCE DIVISION STATEMENT OF PURPOSE: We deliver postsecondary mathematics and science education that responds to the changing needs of students, employers, and communities in Southeastern Wisconsin.
Maintain a safe and healthy work environment for self and group
Accomplish tasks necessary to complete an assignment/project
Apply problem solving steps

Demonstrate knowledge and application of formulas
Demonstrate knowledge and application of measurement
Perform computations using appropriate methods
Ask questions for clarification
Speak/write with clarity so others can understand
Take good care of tools and equipment

Target Program Outcomes
Proper fuel pressure measurement
Professionally repair fuel system lines/plumbing.
Independently test the fuel pressure and volume of all vehicle types.
Test and repair the vapor recovery system
Be able to perform the gas quality using appropriate technique and equipment.
Properly diagnose and repair fuel injectors and fuel pump by using a low amps probe

Target Core Abilities
Act responsibly
Communicate clearly and effectively
Demonstrate essential computer skills
Demonstrate essential mathematical skills
Develop job-seeking skills
Respect self and others as members of a diverse society
Think critically and creatively
Work cooperatively
Value learning

Learning Activities
_____1. REVIEW Learning Plan 2 "Electricity & Electronics"
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. READ and understand Chapter 4 CLASSROOM MANUAL "Electricity & Electronics" Pages 89 - 123
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. COMPLETE Review Questions "Multiple Choice" Test Page 124
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. REVIEW Chapter 4 SHOP MANUAL "Electricity & Electronics" Pages 129 - 179
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 4 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 4 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____7. COMPLETE Chapter 4 MANUAL JOB SHEETS 8 - 11 (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____8. Obtain Learning Plan 3
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Learning Plan 3
Learning Plan 3 - Engine Design & Operation, Intake & Exhaust Systems

Learning Plan Information
Title: Learning Plan 3 - Engine Design & Operation, Intake & Exhaust Systems
Date: 01/16/2006

Performance Expectations

Learning Activities
_____1. REVIEW Chapter 3 CLASSROOM MANUAL "Engine Design and Operation, Pages 39 - 87
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. COMPLETE Review Questions, Multiple Choice, Page 88
Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. REVIEW Chapter 3 SHOP MANUAL Pages 85-120
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 3 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. COMPLETE Chapter 3 MANUAL JOB SHEETS 5-7. (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. REVIEW Chapter 5 CLASSROOM MANUAL "Intake & Exhaust Systems", Pages 125-157
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____7. COMPLETE Review Questions, Multiple Choice, Pages 158-159
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____8. REVIEW Chapter 5 SHOP MANUAL, Pages 191-224
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____9. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 5 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____10. COMPLETE Chapter 5 MANUAL JOB SHEETS 12 & 13. (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____11. Obtain Learning Plan 4.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Learning Plan 4
Learning Plan 4 - Input Sensors & Computer Outputs & Networks

Learning Plan Information
Title: Learning Plan 4 - Input Sensors & Computer Outputs & Networks
Date: 01/16/2006

Performance Expectations

Learning Activities
_____1. REVIEW Chapter 6 CLASSROOM MANUAL "Input Sensors , Pages 161 - 188
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. COMPLETE Review Questions, Multiple Choice, Pages 189-190
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. REVIEW Chapter 6 SHOP MANUAL Pages 235-302
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 6 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. COMPLETE Chapter 6 MANUAL JOB SHEETS 14-17. (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. REVIEW Chapter 7 CLASSROOM MANUAL "Computer Outputs and Networks", Pages 191-208
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____7. COMPLETE Review Questions, Multiple Choice, Page 209
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____8. REVIEW Chapter 7 SHOP MANUAL, Pages 315-325
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____9. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 7 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____10. COMPLETE Chapter 7 MANUAL JOB SHEETS 19 & 20. (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____11. Obtain Learning Plan 5.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Learning Plan 5
Learning Plan 5 - On-Board Diagnostic (OBD) and Computer Systems

Purpose/Overview
Review Motor Principles, Starter Drives, Cranking Motor Circuits, Starter Control Circuit Components, and Cranking Motor Design from Chapter 6. Assign students to read Chapter 7.

Learning Plan Information
Title: Learning Plan 5 - On-Board Diagnostic (OBD) and Computer Systems
Date: 01/16/2006

Performance Expectations

Learning Activities
_____1. REVIEW Chapter 8 CLASSROOM MANUAL "On-Board Diagnostic (OBD) and Computer Systems , Pages 211-242
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. COMPLETE Review Questions, Multiple Choice, Pages 243-244
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. REVIEW Chapter 8 SHOP MANUAL Pages 333-376
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 8 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. COMPLETE Chapter 8 MANUAL JOB SHEETS 21 & 22. (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. Obtain Learning Plan 6.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Learning Plan 6
Learning Plan 6 - Related Systems

Purpose/Overview
Review Principle of Operation, AC Generator Circuits, AC Generator Operation Overview, Regulation, Charging Indicators, and AC Generator Design Differences from Chapter 7. Assign students to read Chapter 8.

Learning Plan Information
Title: Learning Plan 6 - Related Systems
Date: 01/16/2006

Performance Expectations

Learning Activities
_____1. REVIEW Chapter 9 CLASSROOM MANUAL "Related Systems , Pages 245-283
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. COMPLETE Review Questions, Multiple Choice, Page 284
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. REVIEW Chapter 9 SHOP MANUAL Pages 383-404
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 9 Manual Job Sheets.
Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes.
_____5. COMPLETE Chapter 9 MANUAL JOB SHEETS 23 & 24. (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. Obtain Learning Plan 7.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Learning Plan 7
Learning Plan 7 - Fuel Systems & Electronic Fuel Injection

Purpose/Overview
Review Basic Circuitry, Ignition Components, Ignition Timing, Spark Timing Systems, Timing Advance, Electronic Switching Systems, Electronic DI System Operation, Common DI Systems, Computer-Controlled Ignition System Operation, and EI System Operation from Chapter 8. Assign students to read Chapters 9, 10, & 11.

Learning Plan Information
Title: Learning Plan 7 - Fuel Systems & Electronic Fuel Injection
Date: 01/16/2006

Performance Expectations

Learning Activities
_____1. REVIEW Chapter 10 CLASSROOM MANUAL "Fuel Systems" , Pages 285 - 323
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. COMPLETE Review Questions, Multiple Choice, Pages 324-325
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. REVIEW Chapter 10 SHOP MANUAL Pages 411-446
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 11 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. COMPLETE Chapter 10 MANUAL JOB SHEETS 25-26. (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. REVIEW Chapter 11 CLASSROOM MANUAL "Electronic Fuel Injection", Pages 327-375
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____7. COMPLETE Review Questions, Multiple Choice, Pages 376 - 377
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____8. REVIEW Chapter 11 SHOP MANUAL, Pages 453-493
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____9. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 11 Manual Job Sheets.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____10. COMPLETE Chapter 11 MANUAL JOB SHEETS 27 - 29. (Remove from textbook and have instructor CORRECT).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____11. Obtain Learning Plan 8.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Learning Plan 8
Learning Plan 8 - Distributor Igniton & Electronic Ignition (EI) Systems

Learning Plan Information
Title: Learning Plan 8 - Distributor Igniton & Electronic Ignition (EI) Systems
Date: 01/16/2006

Performance Expectations

Learning Activities

_____1. REVIEW Chapter 12 CLASSROOM MANUAL "Distributor Ignition" , Pages 379-408

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. COMPLETE Review Questions, Multiple Choice, Page 410

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. REVIEW Chapter 12 SHOP MANUAL Pages 503-567

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____4. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 12 Manual Job Sheets.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____5. COMPLETE Chapter 12 MANUAL JOB SHEETS 30-34. (Remove from textbook and have instructor CORRECT).

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____6. REVIEW Chapter 13 CLASSROOM MANUAL "Electronic Fuel Injection", Pages 411-445

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____7. COMPLETE Review Questions, Multiple Choice, Pages 446-447

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____8. REVIEW Chapter 13 SHOP MANUAL, Pages 583 - 620

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____9. COMPLETE ASE Review Questions using SCAN TRON answer form. Turn in with the Chapter 13 Manual Job Sheets.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____10. COMPLETE Chapter 13 MANUAL JOB SHEET 35. (Remove from textbook and have instructor CORRECT).

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Syllabus
Auto Simulation III

Course Information

Organization	Gateway Technical College
Course Number	602-169
Credits	3
Contact Hours	90
Campus	Racine
Address	1001 South Main Street
City/State/Zip	Racine WI.
Office Phone	262-619 - 7128

Description
This course will allow the student to perform acquired skills in the areas of auto electrical systems, computerized electronic systems, computerized fuel delivery and mixing systems, and emission systems. The affected repairs are to be done on customer vehicles, simulating a shop environment. A strong emphasis will be placed on customer relations and communications. Preparedness for the ASE (Automotive Service Excellence) exam is emphasized.

Competencies

1. Perform General Engine Diagnosis
2. Perform Computerized Engine Controls Diagnosis and Repair
3. Perform Fuel Delivery Diagnosis and Repair
4. Perform Emissions Control Systems Diagnosis and Repair
5. Perform Exhaust Systems Diagnosis and Repair
6. Perform Air Induction Diagnosis and Repair
7. Conduct five gas analysys
8. Perform engine analysys
9. Read and interpret technical information
10. Use electronic service information system.
11. Write repair orders

Grading Information
Grading Rationale
The learner must compltete all required NATEF tasks and demonstrate a level 3 skill rating while performing repairs on customer vehicles under the supervision of instructor(s) and or ASE certified mentor. Performance Evaluation Forms (Self/Instructor) must be completed for each service or repair performed.

SKILL LEVEL 4 - Scored 45pts out of 50pts possible on the Service Simulation Evaluation form.

SKILL LEVEL 3 - Scored 40pts out of 50pts possible on the Service Simulation Evaluation form.

SKILL LEVEL 2 - Scored 35pts out of 50pts possible on the Service Simulation Evaluation form.

SKILL LEVEL 1 - Scored 30pts out of 50pts possible on the Service Simulation Evaluation form.

SKILL LEVEL 0 - Scored 25pts out of 50pts possible on the Service Simulation Evaluation form.

Grading Scale

A. MUST COMPLETE: ALL P-1 TASKS, 80% OF P-2 TASKS, AND 50% OF P-3 TASKS. ACHIEVED A 4 SKILL RATING ON 90% OF SERVICE SIMULATION EVALUATIONS and score 70% or better on the related ASE TESTS.

B. MUST COMPLETE: ALL P-1 TASKS, 80% OF P-2 TASKS, AND 50% OF P-3 TASKS. ACHIEVED A 4 SKILL RATING FOR 75% SERVICE SIMULATION EVALUATIONS and score 70% or better on the related ASE TESTS.

C. MUST COMPLETE: ALL P-1 TASKS, 80% OF P-2 TASKS, AND 50% OF P-3 TASKS. ACHIEVE A 3 SKILL LEVEL FOR SERVICE SIMULATION EVALUATIONS and score 70% on the related ASE TESTS.

D. NOT COMPLETED: ALL P-1 TASKS, 80% OF P-2 TASKS, AND 50% OF P3 TASKS, OR ACHIEVED A 3 SKILL LEVEL RATING FOR SERVICE SIMULATION EVALUATIONS and scoring less than 70% on the related ASE TEST,

F. NOT COMPLETED: ALL P-1 TASKS, 80% OF P-2 TASKS, AND 50% OF P-3 TASKS, IN THE RELATED TIME.

Auto Simulation III 602-169
Learning Design

Auto Simulation III 602-169
Learning/Teaching Plans

Learning Plan 1
Auto Simulation III

Purpose/Overview
The student must demonstrate the NATEF skills related to Engine Performance including General Engine Performance; Computerized Engine Controls; Ignition Systems; Fuel, Air, and exhaust Sytems; Emission Control Systems and Engine related services.

Learning Plan Information

Title:	Auto Simulation III
Developer(s):	Bill Fell
Date:	10/31/2005

Prerequisites
- Student will have a valid drivers license.
- Student will have taken Engine Performance III

Performance Expectations

Target Competency (ies)
1. **Perform General Engine Diagnosis**

Performance Standards

Criteria
- you performed following all personal and enviromental safety practices.
- you meet industry standards for quality.
- you completed 100 % of the General Engine Diagnosis P-1 NATEF tasks with a score of 2 or above on a scale of 0-4.
- you completed 80% of the General Engine Diagnosis P-2 NATEF tasks with a score of 2 or above on a scale of 0-4.
- you completed 50% of the General Engine Diagnosis P-3 NATEF tasks with a score of 2 or above on a scale of 0-4.
- you chose and demonstrated the use of the proper tools.

Conditions for Assessments
- given personal and enviromental safety equipment.
- when you complete 100% of the P-1 NATEF tasks for engine performance; general engine diagnosis.
- when you complete 80% of the P-2 NATEF tasks for engine performance; general engine diagnosis.
- when you complete 50% of the P-3 NATEF tasks for engine performance; general engine diadnosis.
- given an operational vehicle.
- in the lab or course related place of work.
- given the proper tools.
- given the appropriate references
- given the appropriate test equipment.

2. **Perform Computerized Engine Controls Diagnosis and Repair**

Performance Standards

Criteria
- you performed following all personal and environmental safety practices.
- you meet industry standards for quality.
- you completed 100 % of the Computerized Engine Controls Diagnosis and Repair P-1 NATEF tasks with a score of 2 or above on a scale of 0-4.
- you completed 80% of the Computerized Engine Controls Diagnosis and Repair P-2 NATEF tasks with a score of 2 or above on a scale of 0-4.
- you completed 50% of the Computerized Engine Controls Diagnosis and Repair P-3 NATEF tasks with a score of 2 or above on a scale of 0-4.
- you chose and demonstrated the use of the proper tools.

Conditions for Assessments
- given the appropriate references

- given the proper tools.
- in the lab or course related place of work.
- when you complete 100% of the P-1 NATEF tasks for engine performance; Computerized Engine Controls Diagnosis and Repair.
- when you complete 80% of the P-2 NATEF tasks for engine performance; Computerized Engine Controls Diagnosis and Repair.
- when you complete 50% of the P-3 NATEF tasks for engine performance; Computerized Engine Controls Diagnosis and Repair.
- given an operational vehicle.
- given personal and environmental safety equipment.

3. **Perform Fuel Delivery Diagnosis and Repair**

Performance Standards

Criteria
- you performed following all personal and environmental safety practices.
- you meet industry standards for quality.
- you completed 100 % of the Fuel System Diagnosis and Repair P-1 NATEF tasks with a score of 2 or above on a scale of 0-4.
- you completed 80% of the Fuel System Diagnosis and Repair P-2 NATEF tasks with a score of 2 or above on a scale of 0-4
- you completed 50% of the Fuel System Diagnosis and Repair P-3 NATEF tasks with a score of 2 or above on a scale of 0-4
- you chose and demonstrated the use of the proper tools.

Conditions for Assessments
- when you complete 100% of the P-1 NATEF tasks for engine performance; Fuel System Diagnosis and Repair.
- when you complete 80% of the P-2 NATEF tasks for engine performance; Fuel System Diagnosis and Repair.
- when you complete 50% of the P-3 NATEF tasks for engine performance; Fuel System Diagnosis and Repair.
- given the appropriate references
- given the proper tools.
- in the lab or course related place of work.
- given an operational vehicle.
- given personal and environmental safety equipment.

4. **Perform Emissions Control Systems Diagnosis and Repair**

Performance Standards

Criteria
- you performed following all personal and environmental safety practices.
- you meet industry standards for quality.
- you completed 100 % of the Emissions Control Systems Diagnosis and Repair P-1 NATEF tasks with a score of 2 or above on a scale of 0-4.
- you completed 80% of the Emissions Control Systems Diagnosis and Repair P-2 NATEF tasks with a score of 2 or above on a scale of 0-4.
- you completed 50% of the Emissions Control Systems Diagnosis and Repair P-3 NATEF tasks with a score of 2 or above on a scale of 0-4.
- you chose and demonstrated the use of the proper tools.

Conditions for Assessments
- when you complete 100% of the P-1 NATEF tasks for engine performance; Emissions Control Systems Diagnosis and Repair.
- when you complete 80% of the P-2 NATEF tasks for engine performance; Emissions Control Systems Diagnosis and Repair.
- when you complete 50% of the P-3 NATEF tasks for engine performance; Emissions Control Systems Diagnosis and Repair.
- given the appropriate references
- given the proper tools.
- in the lab or course related place of work.
- given an operational vehicle.
- given personal and environmental safety equipment.

5. **Perform Exhaust Systems Diagnosis and Repair**

Performance Standards

Criteria
- you performed following all personal and environmental safety practices.
- you completed 100 % of the Exhaust Systems Diagnosis and Repair P-1 NATEF tasks with a score of 2 or

of 0-4.
o you completed 80% of the Exhaust Systems Diagnosis and Repair P-2 NATEF tasks with a score of 2 or above on a scale of 0-4.
o you completed 50% of the Exhaust Systems Diagnosis and Repair P-3 NATEF tasks with a score of 2 or above on a scale of 0-4.
o you meet industry standards for quality.
o you chose and demonstrated the use of the proper tools.

Conditions for Assessments
o when you complete 100% of the P-1 NATEF tasks for engine performance; Exhaust Systems Diagnosis and Repair.
o when you complete 80% of the P-2 NATEF tasks for engine performance; Exhaust Systems Diagnosis and Repair.
o when you complete 50% of the P-3 NATEF tasks for engine performance; Exhaust Systems Diagnosis and Repair.
o given the appropriate references
o given the proper tools.
o in the lab or course related place of work.
o given an operational vehicle.
o given personal and environmental safety equipment.

6. **Perform Air Induction Diagnosis and Repair**

Performance Standards

Criteria
o you performed following all personal and environmental safety practices.
o you completed 100 % of the Air Induction Systems Diagnosis and Repair P-1 NATEF tasks with a score of 2 or above on a scale of 0-4.
o you completed 80% of the Air Induction Systems Diagnosis and Repair P-2 NATEF tasks with a score of 2 or above on a scale of 0-4.
o you completed 50% of the Air Induction Systems Diagnosis and Repair P-3 NATEF tasks with a score of 2 or above on a scale of 0-4.
o you meet industry standards for quality.
o you chose and demonstrated the use of the proper tools.

Conditions for Assessments
o when you complete 100% of the P-1 NATEF tasks for engine performance; Air Induction Systems Diagnosis and Repair.
o when you complete 80% of the P-2 NATEF tasks for engine performance; Air Induction Systems Diagnosis and Repair.
o when you complete 50% of the P-3 NATEF tasks for engine performance; Air Induction Systems Diagnosis and Repair.
o given the proper tools.
o in the lab or course related place of work.
o given an operational vehicle.
o given the appropriate references
o given personal and environmental safety equipment.

7. **Conduct five gas analysys**

Performance Standards

Criteria
o you performed following all personal and environmental safety practices.
o you completed 100 % of the Exhaust Gas Analysis P-1 NATEF tasks with a score of 2 or above on a scale of 0-4.
o you completed 80% of the Exhaust Gas Analysis P-2 NATEF tasks with a score of 2 or above on a scale of 0-4.
o you completed 50% of the Exhaust Gas Analysis P-3 NATEF tasks with a score of 2 or above on a scale of 0-4.
o you meet industry standards for quality.
o you chose and demonstrated the use of the proper tools.

Conditions for Assessments
o when you complete 100% of the P-1 NATEF tasks for engine performance; Exhaust Gas Analysis.
o when you complete 80% of the P-2 NATEF tasks for engine performance; Exhaust Gas Analysis.
o when you complete 50% of the P-3 NATEF tasks for engine performance; Exhaust Gas Analysis.
o in the lab or course related place of work.
o given the proper tools.
o given an operational vehicle.
o given the appropriate references
o given personal and environmental safety equipment.

8. **Perform engine analysys**

Performance Standards

Criteria
- o you performed following all personal and environmental safety practices.
- o you completed 100 % of the Engine Analysis P-1 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you completed 80% of the Engine Analysis P-2 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you completed 50% of the Engine Analysis P-3 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you meet industry standards for quality.
- o you chose and demonstrated the use of the proper tools.

Conditions for Assessments
- o when you complete 100% of the P-1 NATEF tasks for engine performance; Engine Analysis.
- o when you complete 80% of the P-2 NATEF tasks for engine performance; Engine Analysis.
- o when you complete 50% of the P-3 NATEF tasks for engine performance; Engine Analysis.
- o in the lab or course related place of work.
- o given the proper tools.
- o given an operational vehicle.
- o given the appropriate references
- o given personal and environmental safety equipment.

9. **Read and interpret technical information**

Performance Standards

Criteria
- o you performed following all personal and environmental safety practices.
- o you completed 100 % of the Reading and Interpreting Technical Information P-1 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you completed 80% of the Reading and Interpreting Technical Information P-2 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you completed 50% of the Reading and Interpreting Technical Information P-3 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you meet industry standards for quality.
- o you chose and demonstrated the use of the proper tools.

Conditions for Assessments
- o when you complete 100% of the P-1 NATEF tasks for engine performance; Reading and Interpreting Technical Information.
- o when you complete 80% of the P-2 NATEF tasks for engine performance; Reading and Interpreting Technical Information.
- o when you complete 50% of the P-3 NATEF tasks for engine performance; Reading and Interpreting Technical Information.
- o in the lab or course related place of work.
- o given the proper tools.
- o given an operational vehicle.
- o given the appropriate references
- o given personal and environmental safety equipment.

10. **Use electronic service information system.**

Performance Standards

Criteria
- o you performed following all personal and environmental safety practices.
- o you completed 100 % of the Electronic Service Information P-1 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you completed 80% of the Electronic Service Information P-2 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you completed 50% of the Electronic Service Information P-3 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you meet industry standards for quality.
- o you chose and demonstrated the use of the proper tools.

Conditions for Assessments
- o when you complete 100% of the P-1 NATEF tasks for engine performance; Electronic Service Information.
- o when you complete 80% of the P-2 NATEF tasks for engine performance; Electronic Service Information.
- o when you complete 50% of the P-3 NATEF tasks for engine performance; Electronic Service Information.
- o in the lab or course related place of work.
- o given the proper tools.
- o given an operational vehicle.
- o given the appropriate references
- o given personal and environmental safety equipment.

11. **Write repair orders**

Performance Standards

Criteria
- o you performed following all personal and environmental safety practices.
- o you completed 100 % of the Writing Repair Orders P-1 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you completed 80% of the Writing Repair Orders P-2 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you completed 50% of the Writing Repair Orders P-3 NATEF tasks with a score of 2 or above on a scale of 0-4.
- o you meet industry standards for quality.
- o you chose and demonstrated the use of the proper tools.

Conditions for Assessments
- o when you complete 100% of the P-1 NATEF tasks for engine performance; Wriring Repair Orders.
- o when you complete 80% of the P-2 NATEF tasks for engine performance; Writing Repair Orders.
- o when you complete 50% of the P-3 NATEF tasks for engine performance; Writing Repair Orders.
- o in the lab or course related place of work.
- o given the proper tools.
- o given an operational vehicle.
- o given the appropriate references
- o given personal and environmental safety equipment.

Learning Activities

_____1. Participate in Service Simulation orientation. (Review Syllabus, Course Rquirments, NATEF Skills Performance Evaluations both Self and Instructor).

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. Locate Service requests forms and review. Identify vehicles that require services or repairs that correspond with the NATEF tasks for 602-169.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. Communicate with vehicle owner and make the necessary arrangements to service the vehicle. VEHICLE OWNER MUST BE PRESENT AND SIGN BOTH REQUEST FOR SERVICE FORM AND TWO PLACES ON THE REPAIR ORDER.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____4. Student must check for availability of repair parts.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____5. Complete a repair estimate.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____6. Perform vehicle diagnosis. Service and repairs as required.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____7. Perform a QUALITY SERVICE TASK on the vehicle.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____8. Communicate with the vehicles owner concerning service and repairs performed and make arrangements for vehicle pick up.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____9. Obtain three copies of the completed R.O.. Take two copies to the school cashier. Take one copy and document NATEF tasks performed by it's NATEF number on the R.O..

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____10. Document NATEF tasks performed on Service Simulation III NATEF lists.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____11. Complete PERFORMANCE EVALUATION FORMS (SELF & INSTRUCTOR) attach to R.O..

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____12. Repeat activities 7-10 until you have completed the required NATEF tasks. (All P-1's, 80% of P-2's and 50% of P-3's or 70 FLAT RATE HOURS IN THE CORRESPONDING ENGINE PERFORMANCE TASKS).

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____13. Paricipate in a weekly class discusion on a repair you have made in the last week.(Student will Desciribe a Concern, Cause, and Correction)

Properties

Cycle: Group Size: Focus: Environment: Content Type:

_____14. Complete Course portfolio. (Include copies of all repair orders with attached evaluation forms, and completed Servic
Simulation NATEF lists.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____15. Complete the related ASE sample tests. Engine Performance

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. Complete a portfolio that includes all repair orders that were completed to document course competancies performed. A
signed Service Simulation Evaluation Forms (Self & Instructor) for each repair order.

_____2. Include in your portfolio the NATEF task lists with instructors initials as to the tasks completed.

_____3. Obtain and include in your portfolio the ASE sample test answer sheets for Engine Performance.

Syllabus
Instrumentation & Testing

Course Information

Course Number	602-156
Credits	3
Contact Hours	72
Instructor	Robert D. Braun
E-mail Address	braunr@gtc.edu
Office	TBA
Campus	Gateway Technical College - Horizon Center Campus
Address	4940 - 88th Avenue
City/State/Zip	Kenosha, WI 53144-1690
Office Hours	By Appointment Only
Office Phone	TBA
Office Fax	TBA
Beginning Date	08/22/2007
Number of Weeks	8
Meeting Times/Location	WTH 0700-1200; Horizon Center RM: TBA

Description

This course covers the general theory, operation and applications of diagnostic systems. OBD scan tools, graphing multi-meters, Digital Storage Oscilloscopes and Exhaust Gas Analyzers will be used to collect vehicle data and diagnose common system failures in late model vehicles. Preparedness for the ASE (Automotive Service Excellence) exam is emphasized.

Prerequisites

602-159 Engine Performance II

Core Abilities

A. Act responsibly
B. Communicate clearly and effectively
C. Demonstrate essential computer skills
D. Demonstrate essential mathematical skills
E. Develop job-seeking skills
F. Respect self and others as members of a diverse society
G. Think critically and creatively
H. Work cooperatively
I. Value learning

Competencies

1. Recognize potential shop safety hazards
2. Apply safe workplace procedures
3. Explain the advantage of a Digital Storage Oscilloscope
4. Define "pulse width modulation" as it relates to digital signals
5. Describe the main features and common controls found on a scanner
6. Use a scanner to observe a data stream produced by a PCM on an OBD-equipped vehicle

7. Explain the difference between analog and digital voltage signals
8. Describe input signal aplification in a computer
9. Explain the purpose of the SYNC sensor signal in an EI system with a combined crankshaft and SYNC sensor
10. Explain the purpose of the Ignition Module
11. Locate and test the ignition system power and ground circuits, primary & secondary ignition circuits, and ignition timing
12. Inspect, diagnose and repair an electronic ignition system
13. Inspect and test an ignition system secondary circuit wiring and components using a DSO
14. Understand and explain the purpose of 5-gas exhaust analysis
15. Understand and explain CO, HC, 02, NOx, and CO2 and how they relate to automotive emissions
16. Understand and explain the dilution correction factor
17. Understand tand explain the combination readings from a 5-gas exhaust analyzer
18. Determine baseline vehicle emission levels using an exhaust gas analyzer
19. Diagnose common vehicle emission failures and engine problems using an exhaust gas analyzer

Grading Information

Grading Rationale

The learner must complete all required NATEF tasks and demonstrate a level 3 skill rating while performing repairs on customer vehicles under the supervision of instructor(s) and or ASE certified mentor. Performance Evaluation Forms (Self and Instructor) must be completed for each service or repair performed.

Grading Scale

A	93 - 100 Excellent work in all of the above
B	85 - 92 Above average work in all of the above
C	77 - 84 Average work in all of the above
D	70 - 76 Below average work in all of the above
F	Below 70 Failing to meet standards

Guidelines for Success

Attendance 1

ATTENDANCE: You are responsible to be in class according to the schedule you were provided. You must complete the VEHICLE REPAIRS or SERVICE in 2X OR twice the published FLAT TIME RATE. You must call the lab and let an instructor know you will be ABSENT or LATE. CALL _____ and leave a voice mail message. A doctors excuse may be required.

Gateway Technical College recognizes the importance of attendance in the learning process but does not believe that attendance in and of itself constitutes learning.

Instructors will document in their course syllabi fair and reasonable attendance policies for their classes based on their subject matter, delivery methods, learning activities, student audience, external regulations, college and departmental guidelines, and employer expectations in their field of instruction.

Students are responsible for reading and understanding each class attendance policy and for learning any material covered during an absence.

Students will not be penalized for hours missed prior to late enrollment in a class if they enroll under the regular late enrollment policy. Students are expected to begin attending immediately after such late enrollment.

Students may miss class without penalty to attend college-sponsored field trips, competitions, or other educational activities if pre-arranged with their instructors.

When absences occur, students are responsible for making up any work missed and obtaining notes from

lectures or other class activities so their learning may continue. Faculty can be contacted during posted office hours.

Students may be graded on attendance in accordance with college and departmental guidelines. The greatest portion of the course grade will be based on demonstration of the skills, knowledge, and behaviors that are the outcomes of the course.

Students with disputes related to the instructors' attendance policies shall follow the Student Due Process procedures outlined in the student handbook.

Special Needs

If you have any special needs or concerns, please contact your classroom instructor. If you have any Special Educational Needs, the following staff is available to help you.

Racine Campus: Helen Suda, Linda Mahoney, Peggy Jude
Kenosha Campus: Jack Sullivan, Barbara Giese
Elkhorn Campus: Pat Harkness, Kathy Peterson

Attendance A
Attendance means "being here" mentally as well as physically. 602-156 Instrumentation & Testing relies heavily on active participation of learners. The learning activities are designed to prepare you for your final performance of each competency. Being ill-prepared in the Automotive Repair Industry could jeopardize your safety and that of others, could damage expensive equipment, or could result in economic losses when products are not up to specification. During the course of the program, you will be expected to be in attendance just as you would be on a job--both physically and mentally. Should you find yourself ill or in extenuating circumstances that prevent you from being in class, you are still responsible for doing the work for that day.

Attendance B
Attendance will effect your grade based on the following:

90-100% - No grade impact
80-89% - A one point grade reduction for each point below 90%
less than 80% - One letter grade reduction

Handbook
You are required to read and follow all policies in the Gateway & Horizon Center Student Handbooks.

How To Get The Most Out Of This Learning Experience
Take charge of your own learning. Raise questions, probe, explore, go after what you need.

Be open. Use your imagination, consider new possibilities, and create something new for yourself.

Give as well as receive. Give liberally to co-learners and be prepared to receive a great deal from them.

Have fun. Plan to thoroughly enjoy this opportunity to learn and to grow in your professional competence and satisfaction.

Safety, Housekeeping, and Property Guidelines-Horizon Center
To remain in the program, students must adhere to safety guidelines. Horseplay will not be tolerated. Cheating will not be tolerated. Work performed in the lab must be executed in accordance with all safety standards and the specific safety precautions for each task. Students are required to wear the appropriate personal protective equipment when in the lab area or working on activities that may pose a hazard to themselves or others. It is the duty of all students to watch out for safety throughout the area and bring any unsafe practices they might observe to the attention of the instructor.

Students are required to know the location of all fire exits, fire extinguishers, eyewash and shower stations, emergency evacuation routes, and a procedure to obtain help in an emergency.

Tools belong to Gateway Technical College and are not to be taken from the Horizon Center. All tools are to be used safely and with respect. Tools are to be returned to their proper storage space at the end of each class. Supplies are provided by Gateway Technical College and are to be used with discretion. Wasting supplies will not be tolerated.

Students must purchase their own steel-toed safety shoes and wear them any time they are working in the lab.

Good housekeeping is important to safety in any operation, and the Automotive Repair industry is no exception. Students are expected to keep their work areas neat and orderly, minimizing potential safety hazards.

SP2 Training
You are required to complete Safety and Pollution Prevention training prior to working in the lab.

Log on to www.sp2.org to complete your required training.
The school ID number is: 91139
The password is: shirt
The PIN number is your student ID number

If you have difficulty logging on contact your instructor.

Syllabus

Course Information

Course Number	602-156
Credits	3
Contact Hours	72

Description

This course covers the general theory, operation and applications of diagnostic systems. OBD scan tools, graphing multi-meters, Digital Storage Oscilloscopes and Exhaust Gas Analyzers will be used to collect vehicle data and diagnose common system failures in late model vehicles. Preparedness for the ASE (Automotive Service Excellence) exam is emphasized.

Prerequisites

602-159 Engine Performance II

Core Abilities

A. Act responsibly
B. Communicate clearly and effectively
C. Demonstrate essential computer skills
D. Demonstrate essential mathematical skills
E. Develop job-seeking skills
F. Respect self and others as members of a diverse society
G. Think critically and creatively
H. Work cooperatively
I. Value learning

Competencies

1. Recognize potential shop safety hazards
2. Apply safe workplace procedures

3. Explain the advantage of a Digital Storage Oscilloscope
4. Define "pulse width modulation" as it relates to digital signals
5. Describe the main features and common controls found on a scanner
6. Use a scanner to observe a data stream produced by a PCM on an OBD-equipped vehicle
7. Explain the difference between analog and digital voltage signals
8. Describe input signal aplification in a computer
9. Explain the purpose of the SYNC sensor signal in an EI system with a combined crankshaft and SYNC sensor
10. Explain the purpose of the Ignition Module
11. Locate and test the ignition system power and ground circuits, primary & secondary ignition circuits, and ignition timing
12. Inspect, diagnose and repair an electronic ignition system
13. Inspect and test an ignition system secondary circuit wiring and components using a DSO
14. Understand and explain the purpose of 5-gas exhaust analysis
15. Understand and explain CO, HC, 02, NOx, and CO2 and how they relate to automotive emissions
16. Understand and explain the dilution correction factor
17. Understand tand explain the combination readings from a 5-gas exhaust analyzer
18. Determine baseline vehicle emission levels using an exhaust gas analyzer
19. Diagnose common vehicle emission failures and engine problems using an exhaust gas analyzer

Instrumentation & Testing
Learning Design

Instrumentation & Testing
Learning/Teaching Plans

Learning Plan 1
Learning Plan 1 - Safety & Ohms Law

Purpose/Overview
Review the Syllabus, Safety & Governmental Regulations, grading and class expectations with students. Present final presentation guidelines. Review ohms law.

Learning Plan Information

Title:	Learning Plan 1 - Safety & Ohms Law
Developer(s):	Robert D. Braun
Date:	08/13/2006

Performance Expectations

Target Competency (ies)

1. **Recognize potential shop safety hazards**

   Performance Standards

   Criteria
   - o When all tasks being performed adhere to manufacturers specifications and demonstrate shop safety procedures

   Conditions for Assessments
   - o In Class and/or Lab, or by providing documented on the job work experience

2. **Apply safe workplace procedures**

   Performance Standards

   Criteria
   - o When all tasks being performed adhere to manufacturers specifications and demonstrate shop safety procedures

   Conditions for Assessments
   - o In Class and/or Lab, or by providing documented on the job work experience

Learning Activities

_____1. View Ohm's Law power-point, particapate in discussion.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. complete JS-1: Ohm's Law
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Teaching Plans

1A

Total Time In:	0
Date:	08/13/2006

Teaching Plan Activities

Learning Plan 2
Learning Plan 2 - Scan Tools

Learning Plan Information

Title:	Learning Plan 2 - Scan Tools
Developer(s):	Robert D. Braun

Performance Expectations

Target Competency (ies)

3. **Explain the advantage of a Digital Storage Oscilloscope**

   Performance Standards

4. **Define "pulse width modulation" as it relates to digital signals**

   Performance Standards

5. **Describe the main features and common controls found on a scanner**

   Performance Standards

6. **Use a scanner to observe a data stream produced by a PCM on an OBD-equipped vehicle**

   Performance Standards

Learning Activities

_____1. Complete at least 2 jobs sheets from JS2 to JS5

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. Complete PAA1

Learning Plan 3

Learning Plan 3 - Graphing Scanners

Learning Plan Information

Title:	Learning Plan 3 - Graphing Scanners
Date:	08/13/2006

Performance Expectations

Target Competency (ies)

7. **Explain the difference between analog and digital voltage signals**

   Performance Standards

8. **Describe input signal aplification in a computer**

   Performance Standards

Learning Activities

_____1. Complete at least 3 job sheets between JS6 to JS10

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. Complete PAA2

_____2. Complete Quiz 3

Learning Plan 4
Learning Plan 4 - Grahing Multi-Meters

Learning Plan Information

Title:	Learning Plan 4 - Grahing Multi-Meters
Date:	08/13/2006

Performance Expectations

Target Competency (ies)

9. **Explain the purpose of the SYNC sensor signal in an EI system with a combined crankshaft and SYNC sensor**

   Performance Standards

10. **Explain the purpose of the Ignition Module**

    Performance Standards

11. **Locate and test the ignition system power and ground circuits, primary & secondary ignition circuits, and ignition timing**

    Performance Standards

12. **Inspect, diagnose and repair an electronic ignition system**

    Performance Standards

13. **Inspect and test an ignition system secondary circuit wiring and components using a DSO**

    Performance Standards

Learning Activities

_____1. Complete at least 5 job sheets between JS11 to JS21

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. complete PAA3
_____2. complete quiz 4

Learning Plan 5
Learning Plan 5 - DSOs

Learning Plan Information

Title:	Learning Plan 5 - DSOs
Date:	08/13/2006

Performance Expectations

Learning Activities

_____1. Complete assigned DSO job sheets

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities
_____1. Copmete PAA4
_____2. Complete Quiz 5
_____3. Complete PAA5
_____4. Complete Quiz 6

Learning Plan 6
Learning Plan 6 - Dynos, gas analyzers, and EVAP testers

Learning Plan Information
Title: Learning Plan 6 - Dynos, gas analyzers, and EVAP testers
Date: 01/16/2006

Performance Expectations

Learning Activities
_____1. Coplete Job Sheets JS45, JS46, and JS47
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities
_____1. Complete PAA6
_____2. Complete Quiz 7

Learning Plan 7
Learning Plan 7 - Intro to Engine tuning

Purpose/Overview
Optional Learning plan; provide time permits

Learning Plan Information
Title: Learning Plan 7 - Intro to Engine tuning
Date: 08/13/2006

Performance Expectations

Learning Plan 8
Learning Plan 8 - Final

Purpose/Overview
complete final exam and give final presenations

Learning Plan Information
Title: Learning Plan 8 - Final
Date: 08/13/2006

Performance Expectations

Target Competency (ies)
14. **Understand and explain the purpose of 5-gas exhaust analysis**

Performance Standards

15. **Understand and explain CO, HC, 02, NOx, and CO2 and how they relate to automotive emissions**

Performance Standards

16. **Understand and explain the dilution correction factor**

Performance Standards

17. **Understand tand explain the combination readings from a 5-gas exhaust analyzer**

Performance Standards

18. **Determine baseline vehicle emission levels using an exhaust gas analyzer**

Performance Standards

19. **Diagnose common vehicle emission failures and engine problems using an exhaust gas analyzer**

Performance Standards

Assessment Activities

_____1. Give fianl presentaion
_____2. Complete final exam

Learning Plan 9

Learning Plan Information

Title:
Date: 08/13/2006

Performance Expectations

Teaching Plans

9A

Total Time In: 0
Date: 08/13/2006

Teaching Plan Activities

Learning Plan 10

Learning Plan Information

Title:
Date: 08/13/2006

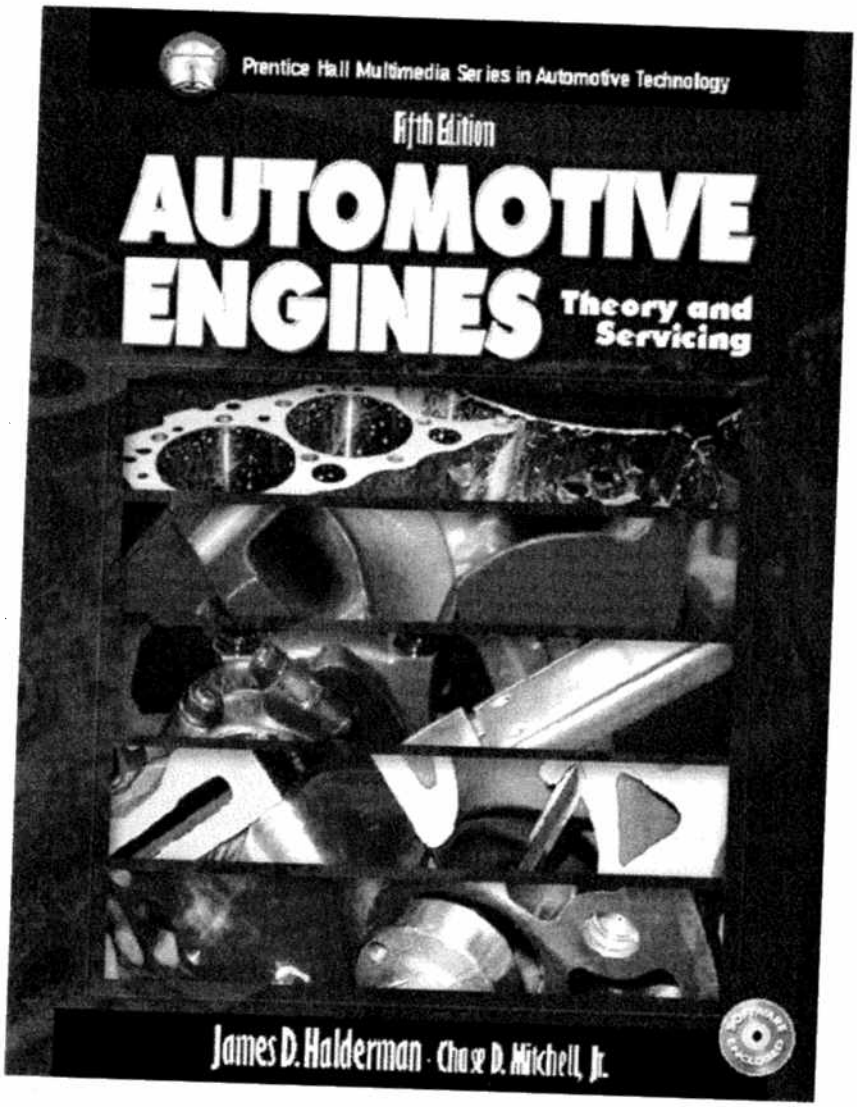
Performance Expectations

Automotive Engines: Theory and servicing, 5/e

Choose a Section: Choose a Section

Current Section:

PEARSON Custom Publishing



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ISBN: 0-13-113325-X

Syllabus

Course Information

Organization	Gateway Technical College
Course Number	602-177
Credits	3
Contact Hours	90
Instructor	TBA
E-mail Address	TBA
Office	TBA
Campus	Gateway Technical Collage - Horizon Center
Address	4840 88th ave
City/State/Zip	Kenosha,WI 53144
Office Hours	TBA
Office Phone	TBA
Number of Weeks	8
Meeting Times/Location	MTW 1200-1700

Description

This course covers the operation, construction, testing, and overhaul of automotive gasoline internal combustion engines. The areas that will be covered are engine design, diagnosis, disassembly, inspection, machining, and reassembly. Preparedness for the ASE (Automotive Service Excellence) exam is emphasized.

Prerequisites

Engine Minor -602-151

Textbooks

Halderman & Mitchell. *Automotive Engines Theory and Servicing*. Prentice Hall. 2005. **Edition:** 5th. **ISBN:** 013113325X.

Core Abilities

A. Act responsibly
B. Communicate clearly and effectively
C. Demonstrate essential computer skills
D. Demonstrate essential mathematical skills
E. Develop job-seeking skills
F. Respect self and others as members of a diverse society
G. Think critically and creatively
H. Work cooperatively
I. Value learning

Competencies

1. Perform General Engine Diagnosis; Removal and Reinstallation (R & R)

2. Perform Cylinder Head and Valve Train Diagnosis and Repair
3. Perform Engine Block Diagnosis, Disassembly, Repair, and Resassembly

Grading Information

Grading Scale

Guidelines for Success

Attendance 1

ATTENDANCE: You are responsible to be in class according to the schedule you were provided. You must complete the VEHICLE REPAIRS or SERVICE in 2X OR twice the published FLAT TIME RATE. You must call the lab and let an instructor know you will be ABSENT or LATE. CALL _____ and leave a voice mail message. A doctors excuse may be required.

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Kenosha Campus: Jack Sullivan, Barbara Giese
Elkhorn Campus: Pat Harkness, Kathy Peterson

Attendance A
Attendance means "being here" mentally as well as physically. 602-177 Engine Major relies heavily on active participation of learners. The learning activities are designed to prepare you for your final performance of each competency. Being ill-prepared in the Automotive Repair Industry could jeopardize your safety and that of others, could damage expensive equipment, or could result in economic losses when products are not up to specification. During the course of the program, you will be expected to be in attendance just as you would be on a job--both physically and mentally. Should you find yourself ill or in extenuating circumstances that prevent you from being in class, you are still responsible for doing the work for that day.

Attendance B
Attendance will effect your grade based on the following:

90-100% - No grade inpact
80-89% - A one point grade reduction for each point below 90%
less than 80% - One letter grade reduction

How To Get The Most Out Of This Learning Experience
Take charge of your own learning. Raise questions, probe, explore, go after what you need.

Be open. Use your imagination, consider new possibilities, and create something new for yourself.

Give as well as receive. Give liberally to co-learners and be prepared to receive a great deal from them.

Have fun. Plan to thoroughly enjoy this opportunity to learn and to grow in your professional competence and satisfaction.

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Students are required to know the location of all fire exits, fire extinguishers, eyewash and shower stations, emergency evacuation routes, and a procedure to obtain help in an emergency.

Tools belong to Gateway Technical College and are not to be taken from the Horizon Center. All tools are to be used safely and with respect. Tools are to be returned to their proper storage space at the end of each class. Supplies are provided by Gateway Technical College and are to be used with discretion. Wasting supplies will not be tolerated.

Students must purchase their own steel-toed safety shoes and wear them any time they are working in the lab.

Good housekeeping is important to safety in any operation, and the Automotive Repair industry is no exception. Students are expected to keep their work areas neat and orderly, minimizing potential safety hazards.

Handbook
You are required to read and follow all polices in the Gateway & Horizion Center Student Handbooks.

SP2 Training
You are required to complete Safety and Pollution Prevention training prior to working in the lab.

Log on to www.sp2.org to complete your required training.
The school ID number is: 91139
The password is: shirt
The PIN number is your student ID number

If you have difficulty logging on contact your instructor.

Advanced Emissions
Syllabus

Course Information

Title Advanced Emissions

Course Number 602-160
Credit 2

Organization

Developer {s)

Prerequisites

1. 602-156 Instrumentation and Testing

Goals

1. Teach the students competency in the use of diagnostic test equipment and techniques for troubleshooting and repairing vehicles failing Wisconsin's Vehicle Inspection Programs tests.

Description This course covers the operation of diagnostic test equipment, including lab scope, scan tool, 4/5 gas-analyzer and dynamometer

Standards

Demonstrate an understanding of engine analyzer operation.
Demonstrate an understanding of gas analyzer operation.
Demonstrate an understanding of lab scope operation.
Demonstrate an understanding of a scan tool.
Demonstrate an understanding of dynamometer operation.
Demonstrate an understanding of On-Board diagnostic systems.
Demonstrate an understanding of Sensor pattern interpretation.
Demonstrate an understanding diagnostic procedures.
Demonstrate general electrical system diagnosis.

Core Abilities

- Act responsibly
- Communicate clearly and effectively
- Demonstrate essential computer skills
- Demonstrate essential mathematical skills
- Think critically and creatively
- Work cooperatively
- Value learning

Units and Competencies

1. Demonstrate general engine analyzer operation.
2. Demonstrate general gas analyzer operation.
3. Demonstrate general lab scope operation.
4. Demonstrate general scan tool operation.
5. Demonstrate general dynamometer operation.
6. Demonstrate general On-board diagnostic systems.
7. Demonstrate general sensor pattern interpretation.
8. Demonstrate general diagnostic procedures.
9. Demonstrate general electrical system diagnosis.

Textbooks Textbook is not required.

Supplies None

Section Information

Section Title Advanced Emissions

Beginning Date

Number of Weeks 12

Meeting Times and Locations Tuesdays, 6:00 pm-9:00 pm; Thursdays 6:00 pm-9:00 pm

Instructor Name

Office N/A

Campus

Address

City

Auto Lab phone

Home phone

Fax

E-Mail

Office hours TBA

Grading Policy

Grading Rationale

The learner must complete all performance tasks with a minimum of a level 3 skill rating, observed by the instructor or mentor and answer the related technicial questions.

SKILL LEVEL 4 - SKILLED (Student has completed the Performance or Learning Activity, Independently and can answer all related technical questions) no further training is required.

SKILL LEVEL 3 - ENTRY LEVEL (Student has completed the Performance or Learning Activity with a partner, or and can not answer all related technical questions) further training may be required.

SKILL LEVEL 2 - PRACTICED (Student has completed the Performance or Learning Activity with assistance and can not answer all related technical questions) further training and practice is required.

SKILL LEVEL 1 - EXPOSURE (Student has not completed the Performance or Learning Activity, further training is required.

SKILL LEVEL 0 - NO EXPOSURE (Student has had no technical instruction or attempted this activity or task).

Grading Scale

Grade	Requirement
A	The learner must complete all performance assessments, 70% at a level 4 rating and a level 3 on the remaining, average a 70 % on written exams and pass practical evaluation assessment
B	The learner must complete all performance assessments, 50% at a level 4 rating and a level 3 on the remaining, average a 70 % on written exams and pass practical evaluation assessment
C	The learner must complete all performance assessments at a level 3 rating and average a 70 % on written exams and pass practical evaluation assessment
D	The learner has not completed all performance Assessments at a level 3 rating or has an average of less than 70% on written exams.
F	The learner has not completed all performance assessments or written exams within the allotted 72 hours or fail practical evaluation assessment.

Policies and Information

Class Procedures and Requirements

Attendance: You are responsible to be in class as scheduled and complete the course work in the allotted time. You must notify your-faculty advisor if you will be absent.

Safety and Operational Policy: Students must follow all posted and .written course procedures regarding safety and course operations. Failure to follow safety procedures or course procedures after a verbal and a written citation will result in DISMISSAL from the program.

Course Requirements: You are required to complete all Learning Plans (Learning Plans identify the Learning Activities, Performance tasks, Performance Assessment Activities and tests that must be completed). Learning Plans are provided by instructors and each Learning Activity is initialed by an instructor on the Learning Plan as you complete it. Some Learning Activities and Performance Activities may be completed with a partner and rated by an instructor. You must complete all Performance Assessment Activities without assistance.

Course Content and Timeline.....Total Hours = 72

Module 1-	Introduction to Emissions Testing
Module 2-	Emissions Theory
Module 3-	Catalytic Converter Theory & Testing
Module 4-	NOx Testing
Module 5-	Electrical Testing Tools & Techniques
Module 6 -	Non-Scan Tool Diagnosis
Module 7 -	Scan Tools & OBD
Module 8 -	Waveform Diagnosis
Module 9-	Case Studies
Module 10 -	Final Exam Written & Practical

Performance-Based Instruction

You, as a learner, are the most important part of instruction. In performance based instruction; we carefully identify what you need to be able to do as a result of an instructional experience. Next we determine how you can show that you have learned these skills. Finally, we plan learning activities that will help you develop the skills.

Performance-based instruction has many advantages for you:

I) What you will learn is based on the skills you will need, rather than on outlines of information.

2) You can plan how to invest your time and energy. To help you do that, we tell you right up: front WHAT you will learn, how we expect you to show WHEN you have learned, and HOW you may go about learning.

3) You know the standards for evaluation before the performance test. You earn a grade according to how well you perform the skills rather than according to how well others in the class perform. You are not graded on a curve.

4) You are actively involved in the learning. We design learning activities and assignments that teach you to solve problems and to learn on your own.

5) When you complete a learning experience, you have documentation showing the skills you have learned. You can use this information when you seek employment, admission to further education, advanced standing or transfer of credit.

You may find it helpful to learn the basic. Terminology we use to describe WHAT, WHEN, and HOW you will learn.

WHAT

Core Ability--A broad capability that you will develop throughout a course or program rather than in one specific lesson. Core abilities include skills that everyone needs to succeed, such as problem-solving, communication, employability, and lifelong learning.

Competency--A major skill, knowledge, or attitude that you will learn as a result of a given learning experience. A competency is specific to a discipline (such as history, math, and language) or to: an occupational area (such as nursing, accounting, and engineering).

Learning Objective--A supporting skill, knowledge, or attitude that you will learn as a step toward mastery of a specific competency. Each competency has two or more learning objectives.

WHEN

Performance Standards. Observable and measurable specifications by which your performance will be evaluated, and a description of the situation under which your performance will be assessed.

Performance Assessment Activity--A statement that tells you what you must do to show mastery of one or more competencies (instructions for completing assignments, performance assessment tasks, or tests).

HOW

Learning Activity--A statement that describes what you can do to help you master specific learning objectives and competencies. (You may think of them as assignments.)

Core Ability Statement

Your teachers have worked with representatives from business and industry to identify seven skills that are essential to your success in obtaining and keeping a job. You will work towards obtaining and improving these skills in all your courses. By helping you develop the core abilities and holding you responsible for their application, your teachers will help you increase the likelihood of career success.

Core abilities give you an added value in the labor market, because employers prefer to hire and promote individuals who:

Work productively, which means that you possess and apply effective work habits and attitudes within an organizational setting.

Learn effectively, which means that you possess necessary basic skills in reading, writing, and computers; apply skills in acquiring information; and use learning tools and strategies.

Communicate clearly, which means that you apply appropriate writing, speaking, and listening skills in order to precisely convey information, ideas, and opinions.

Work cooperatively, which means that you are capable of working with others to complete tasks, solve problems, resolve conflicts, provide information, and offer support.

Act responsibly, which means that you recognize an obligation to yourself and others for your decisions and actions.

Value-self positively, which means that you apply the principles of physical and psychological wellness to your life.

Think critically and creatively, which means that you apply the principles and strategies of purposeful, active, organized thinking.

Adapted from Core Ability. Statement
Moraine Park Technical College Catalog 1994-95

ADA Statement

If you feel you may need an accommodation or special services for this class, please see me or _____ in Special Services at _____ or TDD (xxx) xxx-xxxx.

Special Needs Statement

If you have any special needs or concerns, please contact your faculty advisor or the special needs instructor or the special needs instructor on your campus.
(Racine: Linda Mahony or Peggy Jude)

Syllabus
Manual Transmissions and Drivetrains

Course Information

Organization	Gateway Technical College
Course Number	602-171
Credits	3
Contact Hours	72
Campus	Racine Campus

Description
This course will emphasize operational theory, failure analysis, techniques and diagnosis, construction, testing, and repair of manual drive train components. Preparedness for the ASE (Automotive Service Excellence) exam is emphasized. Prerequisites: 602-146, 602-167, and STUDENT MUST HAVE A VALID DRIVERS LICENCE.

Competencies

1. Perform General Drive Train Repair
2. Perform Clutch Repair
3. Perform Transmission/Transaxle Repair
4. Perform Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Repair
5. Perform Drive Axle Repair
6. Perform Four-wheel Drive/All-wheel Drive Component Repair

Grading Information
Grading Rationale
All Performance Activites (Lab Projects) are evaluated using the LAB PROJECT EVALAUTION form.

A Repair Order must be written for all Performance Activites that include a CONCERN, CAUSE, and CORRECTION.

Perfromance Activites include: In car Transmission and Clutch servicng; Transmission/ transaxle R&R and disaasmbly, Inspection and or Overhaul and Diagnosis; Clutch Assembly replacment; Rear Differential Disassmbly , Assembly, and Set-up.

Must complete an ASE syle exam with 85% of its questions answered correctly.

LABORATORY
A) Quality of work
B) Quanity of work
C) Orderly work habits
D) Correct assembly and adjustment of parts
E) Following Laboratory guides and Instructor directions
F) Steadyness on the job
H) Cleanliness of work area and return of tools and equipment to proper area
G) Proper operation or inspection of project

TECHNICAL KNOWLEGE
A) Study guide reviews
B) Learning plan exams
C) Written assingments
D) ASE style exam

Skill Level Rating scale:

4: Skilled - Can perform job independently with no additional training.

3: Moderatley Skilled - Has peformed job independently during the traing program, limited additional training may be required.

2: Limited Practice - Has practiced job during training program, additional training is required to develope skill.

1: Exposer Only - general information provided with no practice time, close supervision needed and additional training required.

Grading Scale

A	The learner must complete all performance assesment activities and receive a level 4 rating on 90% and a level 3 on the remaining tasks. Learner must score a 93% or better on an ASE style exam.
B	The learner must complete all performance assesment activities and receive a 3.5 average skill rating. Learner must score a 84% or better on an ASE syle exam.
C	The learner must complete all performance assesment activities and receive a level 3 rating or an average of 3.4. Learner must score a 75% or better on an ASE syle exam.
D	The learner must have attempted all performance assesment activites some are not at the minum level 3 rating. Learner must score a 67% or better on an ASE style exam.

Guidelines for Success

Academic Honesty 3

Academic honesty is a core principle of learning and scholarship. When you violate this principle, you cheat yourself of the confidence that comes from knowing you have mastered the targeted skills and knowledge. You also hurt all members of the learning community by falsely presenting yourself as having command of competencies with which you are credited, thus degrading the credibility of the college, the program, and your fellow learners who hold the same credential.

All members of the learning community share an interest in protecting the value, integrity, and credibility of the outcomes of this learning experience. We also have the responsibility to censor behaviors that interfere with this effort. The following behaviors will be subject to disciplinary action:

Plagiarism - presenting someone else's words, ideas, or data as your own work.

Fabrication - using invented information or the falsifying research or other findings.

Cheating - misleading others to believe you have mastered competencies or other learning outcomes that you have not mastered. Examples include, but are not limited to:
1. Copying from another learner's work
2. Allowing another learner to copy from your work
3. Using resource materials or information to complete an assessment without permission from your instructor
4. Collaborating on an assessment (graded assignment or test) without permission from the instructor
6. Taking a test for someone else or permitting someone else to take a test for you

Academic Misconduct - other academically dishonest acts such as tampering with grades, taking part in obtaining or distributing any part of an assessment, or selling or buying products such as papers, research, projects or other artifacts that document achievement of learning outcomes.

Attendance 2

Importance of class attendance: Class attendance contributes significantly to academic success. Students who attend classes regularly tend to earn higher grades and have higher passing rates in courses. Excessive absences may jeopardize your grades or even your ability to continue in this course.

Class absences: If you are absent from class for any reason you are responsible for all missed work and for contacting the instructor promptly.

Performance-Based - It's about Learning!
Your success is the main goal of any learning experience. In performance-based learning, we carefully identify what you need to be able to do as a result of a learning experience. Next we determine how you can show that you have learned these skills. Finally, we plan learning activities that will help you develop the target skills, knowledge, and attitudes.

Benefits for you:
1) You will learn skills and knowledge that you can apply, rather than outlines of information.

2) We tell you right up front WHAT you will learn, how we expect you to show WHEN you have learned, and HOW you may go about learning. This helps you plan how to invest your time and energy.

3) You know the standards for evaluation before the assessment. You earn a grade according to how well you perform the skills rather than according to how well others in the class perform. You are not graded on a curve.

4) You are actively involved in the learning. We design learning activities and assignments that teach you to solve problems and to learn on your own.

5) When you complete a learning experience, you have documentation showing the skills and knowledge you have learned. You can use this information when you seek employment, admission to further education, advanced standing or transfer of credit.

Basic Terminology:
Core Ability - A broad capability that you will develop throughout a course, program, or major, rather than in one specific lesson. Core abilities include skills that everyone needs to succeed, such as problem solving and communication.

Competency - A major skill, knowledge, or attitude that you will learn as a result of a given learning experience.

Criteria - Specifications that describe a successful performance.

Conditions - Descriptions of how you will show that you have achieved a competency.

Learning Objectives - Supporting skills that you will learn as a step toward mastering a specific competency.

Learning Activities -Statements that describe strategies for learning skills, knowledge, and attitudes. (You might think of them as learning assignments.)

Assessment Activities - Statements that describe what you must do to get feedback on your performance or earn credit for your achievements.

Performance Assessment Task - Directions for completing a required assignment and a scoring guide telling you how your performance of a skill or the product you create will be evaluated.

Auto Manual Transaxles 602-171
Learning Design

Auto Manual Transaxles 602-171
Learning/Teaching Plans

Learning Plan 1
Fundementals

Purpose/Overview
The Learner will apply basic Manual Drive Train and Axle diagnosis, Be able to use test equipement, Be able to read service manuals to properly diagnosis the Manual Drive Train and Axles. Perform Maintenance and adjustments to Manual Drive Train systems for automotive and light duty trucks.

Learning Plan Information

Title:	Fundementals
Developer(s):	Bill Fell
Date:	01/09/2006

Prerequisites
- o Sudent MUST HAVE a valid DRIVERS LICENCE
- o Student must have taken 602- 146, 602 - 167

Performance Expectations

Target Competency (ies)
1. **Perform General Drive Train Repair**

Performance Standards

Criteria
- o you are 100% complete and accurate on all learning activites.
- o you meet industry standards for quality.
- o you performed a level 2 or above on a scale of 0-4 on all assesment activites.
- o you score a 70% or better on an ASE style exam.
- o you performed following all personal and enviromental safety practices.

Conditions for Assessments
- o in a simulated worksite enviroment or a course related place of employment.
- o given an operational vehicle or its components
- o given the proper tools.
- o given the appropriate references.
- o given the appropriate test equipment
- o given personal and enviromental safety equipment.

Learning Activities
_____1. Review Learning Objectives.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. Read Chapter 2 (Todays Technician, Manual Transmission & Tranaxles) Class room and shop manual.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. Answer Chapter 2 Review questions. (Turn in to be graded)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. Correct Chapter 2 Review questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. Participate in class lecture and discussion.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. View Thomson Learning Manual Transmission video Drive Train Theory and Clutches, Drive Train Theory only. Complete video work sheet.
Properties

_____7. Identify major components of the Manual Drive Train on a vehilce in a lab. (Lab Activity #1)

. **Properties**

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____8. Perform measurements to a differential; Backlash of differential ring, Axle end play, Rear differential preload. (Lab Activit #1)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. Complete Lab Activity #1 with a minimum score of a 3.

Learning Plan 2
Clutch Diagnosis and Repair

Purpose/Overview

The student will learn Diagnosis, Testing , and Repair of Manual Drive Train Clutch assembly. The maintenance and adjustment with needed repairs made on a Manual Clutch assembly. The service of a Manual Clutch Assembly.

Learning Plan Information

Title:	Clutch Diagnosis and Repair
Developer(s):	Bill Fell
Date:	01/09/2006

Performance Expectations

Target Competency (ies)

2. **Perform Clutch Repair**

Performance Standards

Criteria

- o in a simulated worksite enviroment or a course related place of employment.
- o you performed following all personal and enviromental safety practices.
- o you score a 70% or better on an ASE style exam.
- o you performed a level 2 or above on a scale of 0-4 on all assesment activites.
- o you meet industry standards for quality.

Conditions for Assessments

- o in a simulated worksite enviroment or a course related place of employment.
- o given an operational vehicle or its components
- o given the appropriate references.
- o given the proper tools.
- o given the appropriate test equipment
- o given personal and enviromental safety equipment.

Learning Activities

_____1. Review learning objectives.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. Read Chapter 3 (Manual Transmission & Transaxles) class room and shop manual.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. Answer chapter 3 Review questions (Turn in to be graded).

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____4. Correct review questions.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____5. Participate in class lecture and discussion.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____6. View Thomson Learning Manual Transmission Drive Train Theory and Clutches, Clutches section only. Complete video work sheet.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____7. Identify, Inspect, and complete clutch diagnosis and repairs. (Lab Activity #2)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____8. Complete ASE style quiz.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. Complete Lab Acitivty #2 with a minimum score of 3.

_____2. Complete ASE syle Quiz with a minimum score of 75%.

Learning Plan 3
Transmission Diagnosis and Repair

Purpose/Overview

The repair, testing and diagnosis of vehicle with Manual Drive Train and Axles. The maintenance and adjustment with the needed repairs made on a vehicle. The learner will develope skills to diagnosis, repair, maintain, disassmble clean and inspection of a transmission, and to perform repairs and adjustment.

Learning Plan Information

Title:	Transmission Diagnosis and Repair
Developer(s):	Bill Fell
Date:	01/09/2006

Performance Expectations

Target Competency (ies)

3. **Perform Transmission/Transaxle Repair**

Performance Standards

Criteria

- o in a simulated worksite enviroment or a course related place of employment.
- o you performed following all personal and enviromental safety practices.
- o you score a 70% or better on an ASE style exam.
- o you performed a level 2 or above on a scale of 0-4 on all assesment activites.
- o you meet industry standards for quality.

Conditions for Assessments

- o in a simulated worksite enviroment or a course related place of employment.
- o given an operational vehicle or its components
- o given the appropriate references.
- o given the proper tools.
- o given the appropriate test equipment
- o given personal and enviromental safety equipment.

Learning Activities

_____1. Review Learning Objectives.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. Read Chapter 4 (Manual Transmission & Transaxles) Class room and Shop manual.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. Answer Chapter 4 Review questions (Turn in to Instructor).

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____4. Correct review questions.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____5. Participate in class lecture and dicussion.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____6. View video Thomson Learning " Manual Transmissions and Transaxles." Complete video work sheet.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____7. Identify, inspect and complete transmission diagnosis and repair. (Lab Actitvity #3)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____8. Complete ASE style quiz.

Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities
_____1. Complete Lab Activity #3 with a minimum score of 3.
_____2. Complete ASE style Quiz with a minimum score of 75%.

Learning Plan 4
Axles and shafts

Purpose/Overview
The student will learn the different methods used by manufacturers of transmitting torque to the wheels. The different joints used in axle shafts and methods used for offseting torque steer. Diagnosing vibration concerns. The importance of the drive shaft.

Learning Plan Information

Title:	Axles and shafts
Developer(s):	Bill Fell
Date:	01/10/2006

Performance Expectations

Target Competency (ies)
4. **Perform Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Repair**

Performance Standards

Criteria
- o in a simulated worksite enviroment or a course related place of employment.
- o you performed following all personal and enviromental safety practices.
- o you score a 70% or better on an ASE style exam.
- o you performed a level 2 or above on a scale of 0-4 on all assesment activites.
- o you meet industry standards for quality.

Conditions for Assessments
- o in a simulated worksite enviroment or a course related place of employment.
- o given an operational vehicle or its components
- o given the appropriate references.
- o given the proper tools.
- o given the appropriate test equipment
- o given personal and enviromental safety equipment.

Learning Activities
_____1. Review Learning Objectives.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. Read Chapters 5 & 6 (Manual Transmission & Transaxles) Class room and shop manual.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. Answer Chapters 5 & 6 Review questions (Turn in to Instructor).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. Correct review questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. Participate in class lecture and discussion.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. View video Thomson Learning "Drive Shafts & Universal Joints, Differentials, and Drive axles." Drive shafts and Universal joints section. Complete video work sheet.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____7. Diagnose drivetrain Vibration, Constant-velocity joint repair, maintenance, disassembly, cleaning and inspection. (Lab Activity #4)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____8. Universal-joint repair, maintenance, and replacement. (Lab Activity #4)
Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____9. Complete ASE style quiz
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities
_____1. Complete Lab Activity #4 with a minimum score of a 3.
_____2. Complete ASE style Quiz with a minimum score of 75%.

Learning Plan 5
Drive Axles and Rear Differentials

Purpose/Overview
The student will develop skills needed in Manual Drive Train and Axle Diagnosis, Repair, and Adjustment. Diagnosis by appling basic troubleshooting procedures in the repair, testing and diagnosis of Rear Differentials and drive axles for automotive and light trucks.

Learning Plan Information

Title:	Drive Axles and Rear Differentials
Developer(s):	Bill Fell
Date:	01/10/2006

Performance Expectations

Target Competency (ies)
5. **Perform Drive Axle Repair**

Performance Standards

Criteria
- o in a simulated worksite enviroment or a course related place of employment.
- o you performed following all personal and enviromental safety practices.
- o you performed a level 2 or above on a scale of 0-4 on all assesment activites.
- o you score a 70% or better on an ASE style exam.
- o you meet industry standards for quality.

Conditions for Assessments
- o in a simulated worksite enviroment or a course related place of employment.
- o given personal and enviromental safety equipment.
- o given an operational vehicle or its components
- o given the appropriate references.
- o given the proper tools.
- o given the appropriate test equipment

Learning Activities
_____1. Review learning Objectives.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. Read Chapter 7 (Manual Transmssions and Transaxles).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. Answer Chapter 7 Review questions (Turn in to Instructor).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. Correct review questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. Participate in Class Lecture and Discussion.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. View Video Thomson Learning "Drive Shafts & Universal Joints, Differentials, and Drive Axles. Complete Video work sheet.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____7. Diagnose Rear Axle and Differential noise. Disassemble, Clean and inspect, Set-up a rear Differential. (Lab acitivty #5)
Properties
Cycle: Group Size: Focus: Environment:

_____8. Complete an ASE style quiz.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. Complete Lab Activity #4 with a minimum score of a 3.
_____2. Complete ASE Style Quiz with a minimum score of 75%.

Learning Plan 6
Four Wheel and All Wheel Drive systems

Purpose/Overview

The student will develope the skills ro diagnose, repair and adjust Four Wheel Drive Components. Applying basic troubleshooting procedures in repair, testing and diagnosis of Manual Drive train and Four-Wheel Drive Component Axles, and All Wheel Drive systems and maintenance and ajustment for automotive and light duty trucks.

Learning Plan Information

Title:	Four Wheel and All Wheel Drive systems
Developer(s):	Bill Fell
Date:	01/10/2006

Performance Expectations

Target Competency (ies)

6. **Perform Four-wheel Drive/All-wheel Drive Component Repair**

Performance Standards

Criteria
- o in a simulated worksite enviroment or a course related place of employment.
- o you performed following all personal and enviromental safety practices.
- o you performed a level 2 or above on a scale of 0-4 on all assesment activites.
- o you score a 70% or better on an ASE style exam.
- o you meet industry standards for quality.

Conditions for Assessments
- o in a simulated worksite enviroment or a course related place of employment.
- o given an operational vehicle or its components
- o given the appropriate references.
- o given the appropriate test equipment
- o given personal and enviromental safety equipment.

Learning Activities

_____1. Review Learning Objectives.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. Read Chapter 8 & 9 (Manual Transmission & Transaxles) . Class room and Shop Manual.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. Answer Chapter 8 & 9 Review Questions (Turn in to Instructor)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____4. Correct review questions.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____5. Participate in class room lecture and discussion.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____6. View Video Thomson Learning " Four Wheel Drive & Drive Train, Electronic and Electric Systems" Four Wheel Drive & Drive Train section only.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____7. Answer Video Worksheet.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Learning Plan 7

Electrical

Purpose/Overview
The student will learn the electrical components used on Manual Drive Trains, Transmissions and Transaxles, Four and All Whee Drive systems. Diagnose, repair and maintenance of Electrical components.

Learning Plan Information

Title:	Electrical
Developer(s):	Bill Fell
Date:	01/11/2006

Performance Expectations

Learning Activities

_____1. Review Learning Objectives.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. Read Chapter 10 (Manual Transmission & Transaxle).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. Answer Chapter 10 Review Questions (Turn into Instructor).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____4. Correct Review Questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____5. Participate in Class Lecture and Discusssion.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____6. View Video Thomson Learning " Four Wheel Drive & Drive Train, Electronic and Electric Systems. Answer Video Worksheet.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____7. Complete ASE Style Quiz.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____8. Complete ASE style Final Exam.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. Complete ASE Style Quiz with a minimum score of 75%.
_____2. Complete ASE Style Final Exam with a minimum score of 75%.

Syllabus
AUTOMATIC TRANSMISSION/TRANSAXLES

Course Information

Organization	GATEWAY TECHNICAL COLLEGE
Credits	3
Contact Hours	72
Instructor	William Fell
E-mail Address	fellw@gtc.edu
Office	T - 105
Campus	RACINE
Address	1001 S. MAIN
City/State/Zip	RACINE
Office Phone	262.916.7128
Office Fax	262-619-6201

Description

This course covers the theory of operation, maintainence, service or repair and diagnosis of modern automatic transmissions and transaxles. Students will demonstrate skill by performing service and repair on training units and live vehicles. Students will be prepared for the ASE Automatic Transmission/Transaxle certification exam.

Prerequisites

Courses 602-148, 171, and Valid Drivers License

Textbooks

Erjavec. *Automotive Technology.* DELMAR. 2000. **Edition:** 4TH. **Source:** GTC BOOKSTORE.

Erjavec. *Automatic Transmissions & Transaxles.* Thomson Delmar Learning. 2003. **Edition:** 3rd. **ISBN:** 0-7668-5999-1. **Source:** Book Store.

Learner Supplies

Cleaning pan - 9" X 15" X 2". **Manufacturer:** ---.

Core Abilities

- Act responsibly
- Communicate clearly and effectively
- Demonstrate essential computer skills
- Respect self and others as members of a diverse society
- Think critically and creatively
- Work cooperatively

Competencies

1. Relate the Fundamentals of Automatic Transmission and Transaxle Operating Principles.
2. Perform Transmission and Transaxle Maintenance and Adjustment
3. Perform In-Vehicle Transmission and Transaxle Repair
4. Perform Off-Vehicle Transmission and Transaxle Repair
5. Perform General Transmission and Transaxle Diagnosis

Grading Information

Grading Rationale

All Performance Activities (Lab Projects) are evaluated using the LAB PROJECT EVALUATION form.
A Repair Order must be written for Performance Activities that include a CONCERN, CAUSE and CORRECTION.
Performance Assesment Activities include: In-car Transmission Servicing, Transmision/Transaxle R&R, (3) Transmission/Transaxle disassembly, inspection and or overhaul and Diagnosis.
Must complete the ASE Automatic Transmission/Transaxle self test with 85% of the questions answered correctly.
The following criteria are use for evaluation. Emphasis is placedon lab work and the ASE style final exam.
LABORATORY
A. Quality of work
B. Quantity of work
C. Orderly work habits
D. Correct assembly and adjustment of all parts.
E. Following Laboratory Guides and Instructors Directions.
F. Ability to read and interpret manufactures technical procedures.
G. Steadiness on the job.
H. Cleanliness of work area and return of tools and equipment to proper area.
I. Proper operation or inspection of project.

TECHNICAL KNOWLEDGE
A. Study Guide Reviews
B. Learning Plan Exams
B. Self Study Post Test
C. Written Assignments
D. ASE Self-Study Exam

Grading Scale

A	Student must complete all Performance Activities (Projects) with a skill rating of 4.0 on lab projects and average 90% or better on written tests.
B	Student must complete all Performance Activities (Projects) with a skill rating 3.5 on lab projects and average 80% to 89% on written tests.
C	Student must complete all Performance Activities (Projects) with a skill rating of 3.0 and average 70% to 79% on written tests.
D	Student must complete 70% of Performance Activities (Projects) with a skill rating of 3.0 and average 60% to 69% on written tests.
F	Student does not complete Lab Requirements or averages less than 60% on written tests.

Guidelines for Success

Class Procedures and Requirements

Attendance: You are responsible to be in class as scheduled and complete the course work in the alloted time. You must notify your faculty advisior if you will be absent.

Course Requirements: You are required to complete all Learning Plans (Learning Plans identify the Learning Acxtivities, Performance tasks, Performance Assesment Activities and tests that must be completed). Learning Plans are provided by instructors and each Learning Activity is initiled by an instructor on the Learning Plan as you complete it. Some Learning Activities and Performance Activities may be completed with a partner and rated by an instructor. You must complete all Performance Assesment Activities without assistance. STUDENT MUST HAVE A VALID DRIVERS LICENSE AND HAVE COMPLETED 602-171.

Course Content and Suggested Timeline:---------- TOTAL ALLOTED TIME 150 hours
Learning Plan 1, includes: 17 Learning Activities, 1 Performance Activitiy ----------10 hours
Learning Plan 2, includes: 14 Learning Activities, 1 Performance Activitiy----------10 hours.

Learning Plan 3, includes: 21 Learning Activities, 2 Performance Activities---------- 15 hours.
Learning Plan 4, includes: 29 Learning Activities, 2 Performance Activities---------- 40 hours.
Learning Plan 5, includes: 9 Learning Activities, 3 Performance Activities---------- 40 hours.

Special Needs Statement
If you have any special needs or concerns, please contact your faculty advisor or the special needs instructor or the special needs instructor on your campus.
(Racine : Linda Mahony or Peggy Jude)

AUTOMATIC TRANSMISSIONS/TRANSAXLES 602-173
Learning Design

AUTOMATIC TRANSMISSIONS/TRANSAXLES 602-173
Learning/Teaching Plans

Learning Plan 1
FUNDAMENTALS

Purpose/Overview
The technician must have a solid foundation of the basic princilpes of hydraulics and planetary gearing to diagnose automatic transmission concerns. The technician must also perform the services that are required to maintain the proper operation of automatic transmissions and transaxles.

Learning Plan Information

Title:	FUNDAMENTALS
Developer(s):	William Fell
Date:	11/24/2005

Performance Expectations

Target Competency (ies)

1. **Relate the Fundamentals of Automatic Transmission and Transaxle Operating Principles.**

   Linked External Standards
   Diagnose general transmission and transaxle

   Linked Core Abilities
   Communicate clearly and effectively

   Performance Standards

   Criteria
   - o Relate the Fundamentals of Automatic Transmission and Transaxle Operating Principles.

   Conditions for Assessments
   - o Student will score 70% or better on ASE style test.

2. **Perform Transmission and Transaxle Maintenance and Adjustment**

   Linked External Standards
   Maintain and adjust transmission and transaxle

   Linked Core Abilities
   Act responsibly
   Work cooperatively

   Performance Standards

   Criteria
   - o Inspect, adjust or replace throttle (TV) linkages or cables, check gear select indicator (as applicable). P-1
   - o Service transmission; perform visual inspection; replace fluids and filters. P-1

   Conditions for Assessments
   - o Student will demonstrate a level 3 or better skill rating.

Learning Activities

_____1. COMPLETE ASE style pre-test
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. OBTAIN and REVIEW. Todays Technician AUTOMATIC TRANSMISSIONS and TRANSAXLES chapters 2,3,5, and 7)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. READ, Lesson 1; Chapter 2, DRIVETRAIN THEORY
Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. ANSWER, Chapter 2 Review Questions (have instructor correct)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. CORRECT, Review Questions as directed
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. READ, Lesson 1; Chapters 39 & 40, AUTOMOTIVE TECHNOLOGY
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____7. ANSWER, Chapter Review Questions (have instructor correct)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____8. CORRECT, Chapter Review Questions as directed
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____9. VIEW, STST VIDEO - Lesson 1, INTRODUCTION to AUTOMATIC TRANSMISSION/TRANSAXLES.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____10. ANSWER, STST, Lesson-1 INTRODUCTION to AUTOMATIC TRANSMISSION/TRANSAXLES. Review Questions (have instructor correct)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____11. READ, Todays Technician AUTO. TRANS. & TRANSAXLES Chapter 3 GENERAL THEORIES OF OPERATION in CLASS ROOM manual.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____12. ANSWER, Chapter 3 Class room review questions. (Have instructor correct)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____13. CORRECT, Review questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____14. READ, Todays Technician AUTO. TRANS. & TRANSAXLES Chapter 5 TRANSMISSION DESIGNS in CLASS ROOM MANUAL.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____15. ANSWER, Chapter 5 Class room manual review questions. (Have instructor correct)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____16. CORRECT, Review questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____17. COMPLETE PERFORMANCE ACTIVITY # 1 TRANSMISSION/TRANSAXLE MAINTENANCE
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____18. HAVE INSTRUCTOR COMPLETE PROJECT EVALUATION FORM, (ATTACH R.O.).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____19. PERFORMANCE RATING for Activity #1_____ (determined by points earned on PROJECT EVALUATION FORM)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____20. COMPLETE LESSON ONE FUNDEMENTALS TEST.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities
_____1. COMPLETE On-Car Transmission/Transaxle Maintenance, Reaserch and Record procedures for a second

Learning Plan 2
PLANETARY GEARS

Purpose/Overview
The planetary gear system is the heart of the automatic transmission. The technician must understand the operating principles of planetary gears to properly diagnose operating malfunctions.

Learning Plan Information

Title: PLANETARY GEARS
Developer(s): Bill Fell
Date: 12/08/2005

Performance Expectations

Target Competency (ies)

1. **Relate the Fundamentals of Automatic Transmission and Transaxle Operating Principles.**

   Linked External Standards
   Diagnose general transmission and transaxle

   Linked Core Abilities
   Communicate clearly and effectively

   Performance Standards

   Criteria
   - o Relate the Fundamentals of Automatic Transmission and Transaxle Operating Principles.

   Conditions for Assessments
   - o Student will score 70% or better on ASE style test.

2. **Perform Transmission and Transaxle Maintenance and Adjustment**

   Linked External Standards
   Maintain and adjust transmission and transaxle

   Linked Core Abilities
   Act responsibly
   Work cooperatively

   Performance Standards

   Criteria
   - o Inspect, adjust or replace throttle (TV) linkages or cables, check gear select indicator (as applicable). P-1
   - o Service transmission; perform visual inspection; replace fluids and filters. P-1

   Conditions for Assessments
   - o Student will demonstrate a level 3 or better skill rating.

Learning Activities

_____1. OBTAIN UNIT 2, Read chapter 8, GEARS AND SHAFTS (TODAYS TECHNICIAN AUTOMATIC TRANSMISIONS & TRANSAXLES Class room)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. ANSWER, Chapter 8, Review Questions (have instructor correct)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. CORRECT, Chapter 8, Review Questions as dirrected

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____4. PARTICAPATE IN STUDY GUIDE REVIEW with INSTRUCTOR

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____5. VIEW THOMSON LEARNING VIDEO HYDRAULIC TORQUE MULTIPLIERS & PLANETARY GEAR SETS

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____6. ANSWER Video HYDRAULIC TORQUE MULTIPLIERS & PLANETARY GEAR SETS review questions.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____7. COMPLETE LESSON TWO PLANETARY GEARS TEST

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. COMPLETE FUNDAMENTALS TEST WITH A MINIMUM 70% SCORE

Learning Plan 3
HYDRAULIC PRINCIPLES and AUTOMATIC SHIFTING

Purpose/Overview
The automatic transmission is a hydro-mechanical device that uses hydraulic pressures and flow to control the planetary gears, torque convertor and control operating tempertures. The technician must understand the principles of hydraulics to pinpoint the cause of hydraulic related mechanical malfunctions.

Learning Plan Information

Title:	HYDRAULIC PRINCIPLES and AUTOMATIC SHIFTING
Developer(s):	Bill Fell
Date:	12/08/2005

Performance Expectations

Target Competency (ies)
1. **Relate the Fundamentals of Automatic Transmission and Transaxle Operating Principles.**

Linked External Standards
Diagnose general transmission and transaxle

Linked Core Abilities
Communicate clearly and effectively

Performance Standards

Criteria
- o Relate the Fundamentals of Automatic Transmission and Transaxle Operating Principles.

Conditions for Assessments
- o Student will score 70% or better on ASE style test.

Learning Activities
_____1. READ, Auto. Trans. & Transaxles Chapter 4 ELECTRONIC CONTROLS (Class room manual).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____2. ANSWER Chapter 4 Review Questions (Have instructor correct).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____3. CORRECT, Chapter Review Questions as directed
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____4. VIEW, Delmar Thomson Learning VIDEO, HYDRAULIC SYSTEMS & ELECTRONIC AUTOMATIC TRANSMISSIONS.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____5. ANSWER video Review Qestions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____6. READ, Auto. Trans. & Transaxles Chapter 6 TORQUE CONVERTERS and PUMPS. (Class room manual)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____7. ANSWER Chapter 6 Review Questions (Have instructor correct).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____8. CORRECT, Chapter Review Questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____9. VIEW, STST VIDEO, TORQUE CONVERTER CLUTCHES.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____10. ANSWER, STST, TORQUE CONVERTER CLUTCHES, Review Questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____11. VIEW, STST VIDEO FLUID PUMPS.

Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____12. ANSWER, STST VIDEO FLUID PUMPS review questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____13. STST POST TEST SCORE_____
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____14. COMPLETE LEARNING PLAN 3, HYDRAULIC FUNDAMENTALS TEST
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____15. READ Chapter 7 HYDRAULIC CIRCUITS and CONTROLS.(Class room manual)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____16. ANSWER, Chapter 7 review questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____17. CORRECT, Rview questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____18. READ, Chapter 9 REACTION and FRICTION UNITS. (Class room manual).
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____19. ANSWER, Chapter 9 review questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____20. CORRECT, Review questions.
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____21. COMPLETE Hydraulic Principles test
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:
_____22. HYDRAULIC FUNDAMENTALS TEST- SCORE
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities
_____1. COMPLETE HYDRAULIC FUNDAMENTALS TEST WITH A MINIMUM 70% SCORE
_____2. COMPLETE STST POST TEST WITH A MINIMUM 70% SCORE

Learning Plan 4
TRANSMISSION SERVICING and REPAIR

Purpose/Overview
The automatic transmission is a very sophisticatated device and should only be opened for repair after a Statagey Based Diagnostic procedure has been performed. This procedure should eliminate possible engine or external causes. The technician must be able to interpret the technical information and follow strict procedures when performing transmission repairs.

Learning Plan Information

Title:	TRANSMISSION SERVICING and REPAIR
Developer(s):	Bill Fell
Date:	12/08/2005

Performance Expectations

Target Competency (ies)
3. **Perform In-Vehicle Transmission and Transaxle Repair**

Linked External Standards
Repair in-vehicle transmission and transaxle

Linked Core Abilities
Act responsibly
Work cooperatively

Performance Standards

Criteria
- o Repair in-vehicle transmission and transaxle
- o Inspect, adjust or replace (as applicable) vacuum modulator; inspect and repair or replace lines and hoses. P-3
- o Inspect, repair, and replace governor assembly. P-3
- o Inspect and replace external seals and gaskets. P-2
- o Inspect extension housing, bushings and seals; perform necessary action. P-3
- o Inspect, leak test, flush, and replace cooler, lines, and fittings. P-1
- o Inspect and replace speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers. P-3
- o Inspect and test, adjust, repair or replace transmission related electrical and electronic components (includes computers, solenoids, sensors, relays, switches, and harnesses). P-1
- o Inspect, replace, and align powertrain mounts. P-3

Conditions for Assessments
- o Student will demonstrate a level 3 or better skill rating.

4. **Perform Off-Vehicle Transmission and Transaxle Repair**

Linked External Standards
Repair off-vehicle transmission and transaxle

Linked Core Abilities
Act responsibly
Work cooperatively

Performance Standards

Criteria
- o Repair off-vehicle transmission and transaxle
- o Remove and reinstall transmission and torque converter (rear-wheel drive). P-2
- o Remove and reinstall transaxle and torque converter assembly. P-2
- o Disassemble, clean, and inspect transmission/transaxle. P-1
- o Inspect, measure, clean, and replace valve body (includes surfaces and bores, springs, valves, sleeves, retainers, brackets, check-balls, screens, spacers, and gaskets), and torque valve body bolts. P-2
- o Inspect servo bore, piston, seals, pin, spring, and retainers; determine necessary action. P-3
- o Inspect accumulator bore, piston, seals, spring, and retainer; determine necessary action. P-3
- o Assemble transmission/transaxle. P-1
- o Inspect converter flex plate, attaching parts, pilot, pump drive, and seal areas. P-2
- o Measure torque converter endplay and check for interference; check stator clutch. P-2
- o Inspect, measure, and replace oil pump assembly and components. P-3
- o Check torque converter and transmission cooling system for contamination. P-1
- o Measure endplay or preload; determine necessary action. P-1
- o Inspect, measure, and replace thrust washers and bearings. P-2
- o Inspect oil delivery seal rings, ring grooves, and sealing surface areas. P-2
- o Inspect bushings; replace as needed. P-2
- o Inspect and measure planetary gear assembly (includes sun, ring gear, thrust washers, planetary gears, and carrier assembly); replace as needed. P-2
- o Inspect case bores, passages, bushings, vents, and mating surfaces; determine necessary action. P-2
- o Inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; perform necessary action. P-2
- o Inspect, measure, repair, adjust or replace transaxle final drive components. P-2
- o Inspect and reinstall parking pawl, shaft, spring, and retainer; determine necessary action. P-3
- o Inspect clutch drum, piston, check-balls, springs, retainers, seals, and friction and pressure plates; replace as needed. P-2
- o Measure clutch pack clearance; adjust as needed. P-1
- o Air test operation of clutch and servo assemblies. P-1
- o Inspect roller and sprag clutch, races, rollers, sprags, springs, cages, and retainers; replace as needed. P-2
- o Inspect bands and drums; adjust or replace as needed. P-3

Conditions for Assessments
- o Student will demonstrate a level 3 or better skill rating.

Learning Activities

_____1. READ, Chapter 4 ELECTRICAL and ELECTRONIC SYSTEM DIAGNOSIS and SERVICE (Shop manual)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. READ, Chapter 6 TORQUE CONVERTER and OIL PUMP SERVICE. (Shop manual)
Properties
Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. READ, Chapter 7 GENERAL HYDRAULIC SYSTEM SERVICE. (Shop manual)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____4. READ, Chapter 8 GEAR and SHAFT SERVICE. (Shop manual)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____5. READ, Chapter 9 FRICTION and REACTION UNIT SERVICE. (Shop manual)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____6. HAVE INSTRUCTOR ASSIGN A Mercedes/Chrysler trans to you.

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____7. COMPLETE A REPAIR ORDER for an out of car Overhaul a Mercedes/ Chrysler transmission, include labor and parts (Master O/H kit and oil).

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____8. COMPLETE PERFORMANCE ACTIVITY 2, TRANSMISSION DISASSEMBLY, INSPECTION and REASSEMBLY following the references provided, EXPLAIN POWERFLOW, Locate CLUTCH APPLY PASSAGES and make all checks as directed in the lab guide. Have instructor initial guide where directed. (NOTE; THE LAB GUIDE MUST BE COMPLETED BEFORE THE PROJECT EVALUATION FORM CAN BE COMPLETED)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____9. INSTALL TRANSMISSION on TESTER (ASK INSTRUCTOR FOR DIRECTION) NOTE IMPROPER INSTALLATION OR TESTING PROCEDURES COULD BE HAZARDOUS)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____10. HAVE INSTRUCTOR COMPLETE PROJECT EVALUATION FORM, (ATTACH POWERFLOW SUMMARY CHART and R.O.).

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____11. PROJECT EVALUATION SCORE._____

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____12. COMPLETE WRITTEN TEST

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____13. TEST SCORE_____

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____14. COMPLETE A REPAIR ORDER for PERFORMANCE ACTIVITY 3

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____15. COMPLETE PERFORMANCE ACTIVITY 3, TRANSMISSION DISASSEMBLY, INSPECTION and REASSEMBLY following the references provided, EXPLAIN POWERFLOW, CREATE A POWERFLOW SUMMARY CHART, and make all checks as directed in the lab guide. Have instructor initial guide where directed. (NOTE; THE LAB GUIDE MUST BE COMPLETED BEFORE THE PROJECT EVALUATION FORM CAN BE COMPLETED)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____16. INSTALL TRANSMISSION on TESTER (ASK INSTRUCTOR FOR DIRECTION) NOTE IMPROPER INSTALLATION OR TESTING PROCEDURES COULD BE HAZARDOUS)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____17. HAVE INSTRUCTOR COMPLETE PROJECT EVALUATION FORM, (ATTACH POWERFLOW SUMMARY CHART and R.O.).

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____18. PROJECT EVALUATION SCORE._____

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____19. COMPLETE A REPAIR ORDER for Activity 4

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____20. COMPLETE PERFORMANCE ACTIVITY 4, TRANSMISSION DISASSEMBLY, INSPECTION and REASSEMBLY following the references provided, demonstrate all checks as directed in the lab guide, and have instructor initial guide where directed. (NOTE; THE LAB GUIDE MUST BE COMPLETED BEFORE THE PROJECT EVALUATION FORM CAN BE COMPLETED)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

21. INSTALL TRANSMISSION on TESTER (ASK

OR TESTING PROCEDURES COULD BE HAZARDOUS)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____22. PERFORMANCE RATING for Activity #4 (determined by points earned on PROJECT EVALUATION FORM)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____23. INSTALL TRANSMISSION on TESTER (ASK INSTRUCTOR FOR DIRECTION) NOTE IMPROPER INSTALLATION OR TESTING PROCEDURES COULD BE HAZARDOUS)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

Assessment Activities

_____1. COMPLETE PERFORMANCE ACTIVITY 2 AND ACHIEVE A MINIMUM SKILL RATING OF 3 ON THE PROJECT EVALUATION FORM.

_____2. COMPLETE PERFORMANCE ACTIVITY 3 AND ACHIEVE A MINIMUM SKILL RATING OF 3 ON THE PROJECT EVALUATION FORM.

Learning Plan 5
AUTOMAIC TRANSMISSION/TRANSAXLE DIAGNOSIS

Purpose/Overview

The diagnosis of the automatic transmission/transaxle requires the the technician to follow a Stratgey Based Diagnostic procedure to locate the Root Cause of the malfunction. He must be able to use sophisticated electronic and hydraulic diagnosis equipment and coordinate this with various vehicle operating conditions or road tests.

Learning Plan Information

Title:	AUTOMAIC TRANSMISSION/TRANSAXLE DIAGNOSIS
Developer(s):	Bill Fell
Date:	12/08/2005

Performance Expectations

Target Competency (ies)

5. **Perform General Transmission and Transaxle Diagnosis**

Linked External Standards

Diagnose general transmission and transaxle

Linked Core Abilities

Think critically and creatively

Performance Standards

Criteria

- o Diagnose general transmission and transaxle
- o Identify and interpret transmission concern; assure proper engine operation; determine necessary action. P-1
- o Diagnose unusual fluid usage, level, and condition concerns; determine necessary action. P-1
- o Perform pressure tests; determine necessary action. P-1
- o Perform lock-up converter system tests; determine necessary action. P-2
- o Diagnose electronic, mechanical, hydraulic, vacuum control system concerns; determine necessary action. P-1
- o Diagnose noise and vibration concerns; determine necessary action. P-3

Conditions for Assessments

- o Student will demonstrate a level 3 or better skill rating.

Learning Activities

_____1. COMPLETE A REPAIR ORDER for Activity 5 (INCLUDE DIAGNOSIS PROCEDURES)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____2. COMPLETE PERFORMANCE ACTIVITY 5, DIAGNOSE TRANSMISSION CONCERN, REMOVE, DISASSEMBLY, INSPECT, REPAIR, REASSEMBLY and REINSTALL following the references provided, demonstrate all checks as directed in the lab guide, and have instructor initial guide where directed. (NOTE; THE LAB GUIDE MUST BE COMPLETED BEFORE THE PROJECT EVALUATION FORM CAN BE COMPLETED)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____3. COMPLETE PERFORMANCE ACTIVITY 5, TRANSMISSION DISASSEMBLY, INSPECTION and REASSEMBLY following the references provided, demonstrate all checks as directed in the [illegible]

directed. (NOTE; THE LAB GUIDE MUST BE COMPLETED BEFORE THE PROJECT EVALUATION FORM CAN BE COMPLETED)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____4. PERFORMANCE RATING for Activity #4 (determined by points earned on PROJECT EVALUATION FORM)

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

_____5. COMPLETE ASE A2 SAMPLE TEST and RECORD SCORE HERE_____

Properties

Cycle: Group Size: Focus: Environment: Content Type: Intelligence: Learning Style: Brain: VAK: Notes:

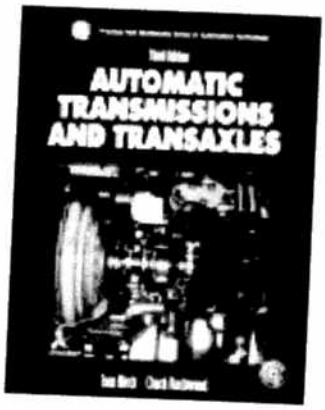
Assessment Activities

_____1. COMPLETE PERFORMANCE ACTIVITY 5 AND ACHIEVE A MINIMUM SKILL RATING OF 3 ON THE PROJECT EVALUATION FORM.

_____2. COMPLETE ASE A2 SELF-STUDY TEST WITH A MINIMUM 85% SCORE

_____3. COMPLETE ASE A2 SAMPLE TEST WITH A MINIMUM 70% SCORE

Automatic Transmissions and Transaxles, 3/E



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