

CATALOG INFORMATION

Dept and Nbr: DET 188                      Title: HEAVY-DUTY POWER TRAIN  
Full Title: Heavy-Duty Power Train Systems  
Last Reviewed: 1/22/2018

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.25	17.5	Lecture Scheduled	39.38
Minimum	3.00	Lab Scheduled	2.25	8	Lab Scheduled	39.38
		Contact DHR	0		Contact DHR	0
		Contact Total	4.50		Contact Total	78.75
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 78.75

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable  
Grading:                      Grade Only  
Repeatability:              00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly:                      DET 88

**Catalog Description:**  
In depth study of heavy duty drivetrain. Course covers theory, operation, diagnosis, service and overhaul of clutches, manual transmissions and rear axle assemblies.

**Prerequisites/Corequisites:**

**Recommended Preparation:**  
Eligibility for ENGL 100 or ESL 100 and Course Completion or Concurrent Enrollment in DET 179

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: In depth study of heavy duty drivetrain. Course covers theory, operation, diagnosis, service and overhaul of clutches, manual transmissions and rear axle assemblies. (Grade Only)  
Prerequisites/Corequisites:  
Recommended: Eligibility for ENGL 100 or ESL 100 and Course Completion or Concurrent Enrollment in DET 179  
Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:

<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
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<b>CSU Transfer:</b>	Effective:	Inactive:
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<b>UC Transfer:</b>	Effective:	Inactive:
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**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

**Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Inspect, diagnose and repair heavy duty drivetrain components
2. Interpret and understand repair manuals for repair of drive train components

**Objectives:**

At the conclusion of this course, the student should be able to:

1. Explain the operation of, evaluate and perform repairs on the following components:
  - a. clutches
  - b. manual transmissions
  - c. automatic transmissions
  - d. drivelines
  - e. differentials and final drives
  - f. electronic transmission controls.
2. Use technical references properly, including repair and parts manuals.
3. Discuss and apply personal, shop, and environmental safety procedures.

**Topics and Scope:**

- I. Power Transmission
  - A. Power transmission theory
  - B. System operation
  - C. System components
- II. Clutches
  - A. Single disc clutches
  - B. Twin disc clutches
  - C. Clutch controls
  - D. Torque converters
- III. Manual Transmissions
  - A. Gear identification

- B. Gear ratios
- C. Single countershaft transmissions
- D. Twin countershaft transmissions
- IV. Automatic Transmissions
  - A. Torque converters
  - B. Operation principles
  - C. Shift control
- V. Driveshaft Assemblies
  - A. Universal joints
  - B. Drive shafts
  - C. Drive line angles
- VI. Differentials and Final Drives
  - A. Single speed differentials
  - B. Multi-speed differentials
  - C. Differential locking devices
  - D. Simple and planetary final drives
- VII. Electronically Controlled Transmissions
- VIII. Power Train Service, Diagnosis, and Repair
  - A. Repair and parts manuals
  - B. Technical service bulletins
- IX. Safety
  - A. Personal
  - B. Shop
  - C. Environmental

All topics are covered in both the lecture and lab parts of the course.

### **Assignment:**

#### Lecture-Related Assignments:

1. Read 25 to 50 pages a week
2. Ten to fifteen exams including final

#### Lab-Related Assignments:

1. Inspect and adjust clutch assemblies
2. Disassemble, inspect and reassemble a transmission
3. Disassemble, inspect and adjust a final drive assembly
4. Complete NATEF (National Automotive Technicians Education Foundation) recommended task sheets
5. Daily work logs (work assigned, work completed)

### **Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Daily Work Logs
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Writing 0 - 25%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Task sheets of transmission disassembly, inspection, and assembly

Problem solving  
10 - 25%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Clutch inspection, Final drive adjustments

Skill Demonstrations  
10 - 25%

**Exams:** All forms of formal testing, other than skill performance exams.

Exams including final

Exams  
30 - 50%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

None

Other Category  
0 - 0%

### **Representative Textbooks and Materials:**

Fundamentals of Medium/Heavy Duty Commercial Vehicle Systems. Duffy, Owen and Wright, Gus. Jones and Bartlett. 2016

Fundamentals of Mobile Heavy Equipment. Wright, Gus and Duffy, Owen and Heard, Scott.. Jones and Bartlett. 2019

Instructor prepared materials