

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE
ACADEMIC AFFAIRS

Course Number: ATO-242 Class/Lect. Hours: 2 Lab Hours: 1 Credits: 3 Dept.: Automotive Technology
 Course Title: Manual Transmission, Drive Line and 4X4 Semester: Fall Year: 2019

Course Description, Prerequisite, Corequisite: The main objectives of ATO-242 is the study of the operation and repair of manual transmissions, four wheel drive (4WD or 4X4) transference cases, all wheel drive (AWD) transference cases and front and rear differentials. ATO-242 Driveline and 4X4 Operations will also study driveshafts, halfshafts, automatic and manual wheel hubs and the electronic controls associated with all of the above components. Understanding component operations will be the focus in the classroom and laboratory hands-on activities that will provide diagnosis and repair procedures to be performed on lab vehicles. Scan tools will be used to perform self tests and monitor sensor and actuator performance tests on various systems. ATO-242 will reinforce a systematic and logical, problem-solving approach, using electronic service publications to repair complex systems.

Prerequisite(s): ATO 113 and ATO 122
 Corequisite(s): ATO 242L

OBJECTIVES/COMPETENCIES

Course Objectives	Competencies
1. Explain clutch operation and service. 2. Show a working knowledge of a manual transmission. (Continued)	1. Be able to identify all components of a clutch system. 2. Show ability to diagnose a poorly operating clutch system. 3. Have an understanding and demonstrate how to replace a clutch and restore a vehicle to normal operation. 1. Have the ability to identify all the working parts of manual transmission. (Continued)

Course Objectives	Competencies
<p>3. Have a good understanding of four wheel drive vehicles.</p> <p>4. Having a working knowledge of the operation of a differential.</p> <p>5. Know how to service drive shaft and constant velocity axels.</p>	<ol style="list-style-type: none"> 2. Describe the proper operation of a synchronizer assembly and disassemble a damaged component using powerflow. 3. Understand and diagnose a transmission with a shifter malfunction. 4. Disassemble and reassemble a manual transmission so that proper repairs can be made. <ol style="list-style-type: none"> 1. Understand the operating principles behind multiple styles of transfer cases. 2. Know the mechanical differences of 4x4 high and low. 3. Be able to explain the operation of many styles of locking wheel hubs 4. Explain the electronic operation incorporated in today's 4X4 vehicles. 5. Know the differences between 4X4 and all-wheel drive systems. <ol style="list-style-type: none"> 1. Explain how spider gears and side gears operate to allow speed changes during cornering. 2. Know what back lash, preload and running patterns in a good differential should be. 3. Be able to disassemble (replace as needed) and reassemble a rear end gear with all the proper measurements. 4. Understand how to explain and service locker type differentials 5. Safely replace a pinion shaft seal without complete differential reconstruction. <ol style="list-style-type: none"> 1. Understand vibrations caused by drive shafts. 2. Perform universal joint replacement on a driveshaft. 3. Show how to replace a CV joint axel assembly.