

SOUTHEAST COMMUNITY COLLEGE
TRANSPORTATION DIVISION
JOHN DEERE CONSTRUCTION & FORESTRY EQUIPMENT TECH
COURSE SYLLABUS
December 12, 2022

I. CATALOG DESCRIPTION

Course Number: JDCE2330
Course Title John Deere C&F Mechanical Power Trains
Prerequisite(s): JDCE1220, JDCE1240

Catalog Description: This course explains the theory of power transmission from engine to traction wheels. Including the design and function of gears, planetary gear sets, bearings, clutches, torque converters, axles, differentials, final drives, drive lines, manual transmissions and powershift transmissions used in John Deere construction equipment. Identify power flows, calculate gear ratios, understand the relationship of power, torque and speed. Topics include power train related electrical and hydraulic systems utilized for braking, shifting and powertrain management. Hands on lab activities include disassembly, inspections, critical adjustments, and reassembly of manual transmissions, powershift transmissions, axles, differentials, and final drives. Safety while working with powertrain components, presses, pullers, and potential stored energy hazards will be practiced.

Credit Hours: 6.0
Class Hours: 45
Lab Hours: 135
Total Contact Hours: 180

II. COURSE OBJECTIVES: *Course will:*

- A.** Explain the design and function of basic power train components including shafts, gears, bearings and seals.
- B.** Explain how power is transferred through fluid drives, friction drives and gears.
- C.** Describe various gear types and their applications.
- D.** Explain how gear ratios relate to speed and torque.
- E.** Explain the design and function of sliding gear, collar shift and synchronized manual transmissions.
- F.** Provide the opportunity to trace power flows through gear sets and calculate gear ratios.
- G.** Explain service and repair procedures for drive clutches.
- H.** Demonstrate how to adjust shaft endplay, bearing preload, pinion depth and gear backlash.
- I.** Explain the design and function of hydraulic systems for transmissions used in John Deere construction equipment.
- J.** Explain the design and function of electronic and power train management systems for powershift transmissions used in John Deere construction equipment.
- K.** Explain torque converter design, function and application.
- L.** Provide the opportunity to disassemble, inspect and assemble Deere construction equipment transmissions following the correct service procedures.
- M.** Explain the design and function of differentials, final drives, and drivelines.

- N. Provide the opportunity to disassemble, inspect and assemble axles and differentials used in Deere construction equipment following the correct service procedures.
- O. Demonstrate various diagnostic practices and procedures used to diagnose power train related issues.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

A. STUDENT LEARNING OUTCOMES: *Student will be able to:*

1. Service basic power train components including shafts, gears, bearings and seals.
2. Understand how power is transferred through fluid drives, friction drives and gears.
3. Identify various gear types and understand the characteristics and function of gears in multiple applications.
4. Understand how gear ratios affect speed and torque.
5. Understand sliding gear, collar shift and synchronized manual transmission characteristics, design and operation.
6. Trace power flows through gear sets to help identify and diagnose transmission malfunctions and component failures.
7. Service and repair dry designed, wet designed and multi disk friction drive clutches.
8. Adjust shaft endplay, bearing preload, pinion depth and gear backlash accurately.
9. Understand the design and function of transmission hydraulic systems used in Deere construction equipment to aid in diagnostics and repair.
10. Understand the design and function of power shift transmission electronic and power train management systems used in Deere construction equipment to aid in diagnostics and repair.
11. Test and diagnose torque converter related power train issues.
12. Disassemble, inspect, repair and assemble Deere construction equipment transmissions following the correct service procedures.
13. Repair final drives, and drivelines.
14. Disassemble, inspect, repair and assemble axles and differentials used in Deere construction equipment following the correct service procedures.
15. Use diagnostic practices and procedures to diagnose power train related issues.

B. GENERAL EDUCATION LEARNING OUTCOME:

GELO 3: Critical Thinking & Problem Solving

1. Collect, identify, interpret and analyze data.
2. Synthesize information to arrive at reasoned solutions to problems.

IV. CONTENT/TOPICAL OUTLINE

- A. Power trains – How they work
- B. Shafts, gears, bearings and seals
- C. Clutches
- D. Manual transmissions
- E. Manual transmission lab
- F. Power shift transmissions
- G. Power shift transmission lab
- H. Torque converters
- I. Axles and differentials
- J. Axle and differential lab
- K. Final drives
- L. Power train diagnostics

V. INSTRUCTIONAL MATERIALS

Required text(s): Service Advisor (made available in the classroom)
FOS Power Trains

Other material(s): Required tool set, safety glasses (regulation Z87), leather shoes, John Deere uniform, colored pencils, notebook, writing instruments, calculator

VI. METHODS OF PRESENTATION/INSTRUCTION

A. Methods of presentation typically include a combination of the following:

1. Small and large group discussion
2. Video presentations
3. Demonstrations
4. Project boards
5. Flip charts
6. Handouts
7. Observations
8. Field trips

VII. METHODS OF EVALUATION

A. Methods of evaluation typically include a combination of the following:

1. Notebook (if required)
2. Quizzes
3. Tests
4. Lab grades
5. Reflection assignments
6. Lab/classroom presentations

Grading will follow the SCC Standard Grade Scale Policy. See **Course Information Document** for specific details on how the course grades are calculated.

VIII. SPECIFIC COURSE REQUIREMENTS:

- A. Students must complete all tests, projects, assignments, and notebook (if required).
- B. Students must earn a final grade of 70% (2.0) or higher.
- C. Program safety rules will be followed. See the **Course Information Document** for any additional safety rules established by the instructor.
- D. Safety belts will be worn at all times, on or in any motorized vehicle, if equipped.
- E. Attendance and participation. See **Course Information Document** for attendance and participation policy.