AGTC 125: POWER TRAINS

Proposer:

Name:	Email:
Charles Abee	charlesa@cos.edu

Effective Term:
Spring 2025

Credit Status:
Credit - Degree Applicable

Subject:
AGTC - Agricultural Technology

Course Number:
125

Discipline:

And/Or	(	Discipline	)
Or	(	Agricultural Engineering (Equipment and machinery, farm mechanics)	
Or		Agricultural Production (Animal science, plant science, beekeeping, aquaculture)	)

Catalog Title
Power Transmission Systems

Catalog Description
In this course students will learn about the systems involved in moving power produced by the engine to the drive wheels. Students will learn the components, operation and troubleshooting of various transmissions, clutches, differentials, and final drives found in agriculture machinery.

Method of Instruction:
Laboratory
Lecture and/or Discussion

Course Units/Hours:

Course Units Minimum:
3

Lecture Hours Minimum (week)
2

Lab Hours Minimum (week)
3

Activity Hours Minimum (week)
0

Total Contact Hours Minimum (semester)
87.5

Total Outside Hours Minimum (semester)
70

Total Student Learning Minimum Hours (semester)
157.5

Repeatability:
No

Open Entry/Exit:
No

Field Trips:
Not Required

Grade Mode:
Standard Letter

TOP Code:
011600 - * Agricultural Power Equipment Technology

SAM Code:
C - Clearly Occupational

Course Content

Methods of Assessment:
Mulitple choice tests
Problem solving assignments or activities
Problem solving quizzes or exams
Project
Skill demonstrations

Course Topics:

	Course Topics
1	Power Train Theory
2	Gears- Identification of types of gears advantages and disadvantages of each
3	Bearings-identification, application and adjustment
4	Torque Convertors- components, operation, testing and troubleshooting
5	Manual Transmissions-principles, shifting controls and adjustments
6	Powershift transmission- principles, multiple clutch operation, accumulators, hydraulic valving and oil flow
7	Clutches- identification and operation
8	Electronically controlled transmissions- principles, electronic over hydraulic, diagnosis and troubleshooting
9	Hydrostatic Transmissions- principles, control systems including IVT, CVT and E23
10	Driveshafts
11	Differentials- components, locking methods and adjustments
12	Final Drives- Types, Front Wheel Drives, Four Wheel Drives and Adjustments
13	Braking Systems
14	Maintenance
15	Troubleshooting failure analysis and technical writeups

Course Objectives:

	Course Objectives
1	Students will be able to diagram power flow through a power transmission.
2	Students will be able to identify power transmission components such as gears, bearings, clutches, solenoids, servos and synchronizers.
3	Be able to identify the power transmission type and explain its operation.

4	Recognize hybrid and electric drives systems and machines as they relate to safety concerns.
5	Perform adjustments to transmissions as instructed in OEM service manual information.
6	Use service information to test and/or troubleshoot a powershift transmission and verify it is or is not within OEM specifications.
7	Set and measure preload, endplay and backlash for a specific component using OEM manuals and service information.
8	Follow flow and troubleshooting charts to correctly identify the operation of a specific units system and troubleshooting methods used by the OEM.
9	Demonstrate adjustment procedures on hydrostatic drives.
10	Recognize driveline components, and explain the effects of driveline angle.
11	Setup and adjust a differential with a new ring and pinion and bearings.
12	Perform adjustments on final drives according to OEM standards.
13	Adjust and repair basic brake components
14	Identify all electric, hydraulic, pneumatic and mechanical symbols used in power train units.

Course Outcomes:

	Course Outcomes
1	Identify all of the components found in a power train on a tractor or agricultural machine.
2	Perform maintenance and adjustments on power train components such as transmissions, clutches, differentials or finals drives using OEM procedures and standards.
3	Perform basic troubleshooting and repair procedures on power train components such as final drive transmissions and differentials.

Assignments:

Assignment Type:	Details
Reading	Students will read technical service bulletins about power trains systems.
Writing	Students will have to write a service report on repairs performed to a power train system
Lab	Students will have to replace a clutch in a power train
Homework	Students will have to research and compare different types of transmissions.

Textbooks or other support materials

Resource Type:	Details
Books	Heavy Equipment Power Trains and Systems, 2nd Edition, Timothy Dell Copyright 2024 ISBN 978-1-68584-445-5

Equity Review:

Yes

Transferable to CSU

Yes - Proposed

Transferable to CSU Justification

Transfer justification 2a and 2b

2a. This course deals with a great deal of physics, hydraulics and electrical theory. There are many different kids of transmissions found on agricultural equipment so students will need to learn the concepts that all these operate around. This will require them to research on OEM web portals and diagram power flow through the transmissions. It will require students to read technical update bulletins and apply what they have read to both application in diagnosing and repairing systems but also to be able to communicate to a customer both orally and in writing.

2b. This course takes students well above the entry level of a technician. Many times employers have to send employees to training specifically in power transmissions. The skills learned in this course would be very valuable to students as they would come into the jobsite with advanced training. The theories and skills that are learned and practiced in this course allow students to take laws and theories and apply them to a real life situation. Transmissions function electrically, hydraulically and mechanically students will have to have a strong grasp of all 3 of these concepts in order to be successful in this course. The students are not only learning the theoretical piece but then have to take the theoretical piece and apply it for real world results as expected by an employer.

CSU General Education
Transferable to CSU

Other Degree Attributes
Degree Applicable
Not a Basic Skills Course

Banner Title:
Power Trains

Course Control Number:
CCC000441539