



## TRANSMISSIONS — HCEM 2115

### A. Course Description

- **Credits:** 4.00
- **Lecture Hours/Week:** 1.00
- **Lab Hours/Week:** 3.00
- **OJT Hours/Week:** 0
- **Prerequisites:** None
- **Corequisites:** None
- **MnTC Goals:** None

This is a technical course designed to promote understanding of powershift transmissions used in heavy equipment industry. Theory related to powershift transmissions and torque converters, along with basic fundamental principles of hydraulics, torque multiplication, gear ratios, disassembly, assembly, and adjustment procedures are covered. Prerequisites: HCEM1101 and HCEM1130 or instructor's approval

### B. Course Effective Dates: 3/22/98 – Present

### C. Outline of Major Content Areas

As noted on course syllabus

### D. Learning Outcomes

1. analyze operation of torque converter
2. assemble planetary powershift transmission
3. assemble torque converter
4. calibrate an electric transmission
5. describe fluid flows
6. develop rebuild parts list
7. disassemble powershift planetary transmission
8. disassemble torque converter
9. display shop safety
10. explain bearing types
11. explain clutch packs
12. explain fluid flow through torque converter
13. explain gear ratios
14. explain operation of control valve

15. explain operation of directional clutch
16. explain operation of speed clutch
17. explain planetary gearing
18. explain planetary transmission power flows
19. explain powershift transmission operation
20. explain standard type transmissions
21. identify gear types
22. identify torque converter components
23. identify types of transmission fluids
24. inspect planetary transmission parts
25. inspect torque converter parts
26. perform planetary transmission clutch air test
27. perform stall test
28. test and adjust powertrain pressures
29. test converter pressures
30. test lube pressures
31. test main pressure
32. troubleshoot an electronic transmission
33. use specialized tooling

**E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

**F. Learner Outcomes Assessment**

As noted on course syllabus

**G. Special Information**

None noted