A. **Course Description**

- **Credits:** 2.00
- **Lecture Hours/Week:** 1.00
- **Lab Hours/Week:** 1.00
- **OJT Hours/Week:** 0
- **Prerequisites:** None
- **Corequisites:** None
- **MnTC Goals:** None

This course covers the introduction to electrical circuits and magnetic circuits, both AC and DC. The student will use mathematics to calculate voltage, resistance, and current in each type of circuit. This course is an introduction to the use of formulas needed to do the calculations that the lineworker may encounter in this field. The introduction to the magnetic circuits will be the basis for transformer application. The safety aspects of calculating voltages and currents will be used to identify the exposure in such applications that could be a safety hazard.

Prerequisites: None

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

C. **Outline of Major Content Areas**

   As noted on course syllabus

D. **Learning Outcomes**

1. apply delta system characteristics
2. apply left hand rule
3. apply right hand rule
4. apply wye system characteristics
5. calculate circuit average values
6. calculate circuit effective values
7. calculate circuit maximum values
8. calculate parallel circuit currents
9. calculate parallel circuit resistance
10. calculate series circuit current
11. calculate series circuit resistance
12. calculate series circuit voltage
13. calculate wire resistances
14. compare system protection equipment AC versus DC monitoring
15. define AC current
16. define AC sources
17. define DC current
18. define DC sources
19. define a combination circuit
20. define a parallel circuit
21. define a series circuit
22. define a solenoid
23. define a sucking solenoid
24. define counter electro motive force
25. define electromagnetism
26. define magnetic induction
27. define rectified AC current
28. determine battery polarities
29. determine circuit polarities
30. determine coil polarities
31. determine magnetic polarities
32. explain AC generation
33. explain a complete circuit
34. explain an open circuit
35. explain difference of potential
36. explain in phase effects
37. explain induction principles
38. explain leading effects
39. explain phase angles
40. identify AC current lagging voltage
41. identify AC current leading voltage
42. identify an AC sine wave
43. identify current and voltage directions
44. identify current and voltage in phase
45. identify resistances in combination
46. identify resistances in parallel
47. identify resistances in series

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

F. Learner Outcomes Assessment

As noted on course syllabus
G. Special Information

None noted