BIOMEDICAL INSTRUMENTATION I — BMET 2210

A. Course Description

- **Credits:** 4.00
- **Lecture Hours/Week:** 2.00
- **Lab Hours/Week:** 2.00
- **OJT Hours/Week:** 0
- **Prerequisites:** None
- **Corequisites:** None
- **MnTC Goals:** None

This course studies the various technologies used in the medical care field. Areas of study will cover the use of various test equipment, performing preventive maintenance and the use of testing equipment for maintaining proper operation. Students will also learn to read schematics and following instructions in service manuals for performing test and maintenance. Each class will have a lecture component on a specific type of instrumentation following the syllabus.

B. Course Effective Dates: 5/21/14 – Present

C. Outline of Major Content Areas

   As noted on course syllabus

D. Learning Outcomes

1. Classify lasers by ANSI and LIA safety standards
2. Demonstrate charging procedures for common batteries
3. Describe a neural network and how it enhances medical images
4. Describe fiber-optics loss modes
5. Describe ground referenced and isolated power systems
6. Describe interfacing units
7. Describe principles of electro surgery machines
8. Describe procedures for safely handling electro surgery machines
9. Describe reflection, refraction, diffraction and scattering phenomena
10. Describe the Internet and how it is used in health care
11. Describe the expert system
12. Describe the principles of a medical cathode ray oscilloscope
13. Describe the principles of a recording potentiometer
14. Describe the principles of servomechanism recorders
15. Describe the types of batteries used in medical equipment
16. Describe types of lasers
17. Discuss the physics of ultrasound
18. Draw a DAS in laboratory instrumentation
19. Draw circuits used to generate electro surgery waveforms
20. Explain function of centrifuges
21. Inspect and evaluate the performance of ultrasonic equipment
22. List and describe types of writing systems in mechanical recorders
23. List factors that affect biological interaction with ultrasound
24. List testing requirements for portable plug connected devices
25. List testing requirements for receptacles and wiring
26. List the health effects of x-ray and nuclear radiation exposure
27. List the properties and measurements of x-rays
28. List uses of diagnostic and therapeutic x-ray and nuclear medicine equipment
29. Maintain battery operated equipment
30. Operate an ultrasonic transducer
31. Operate and maintain hemodialysis machines
32. Operate centrifuges
33. Perform all experiments in the LK-upp Experiment manual
34. Set up and test a monitoring station
35. State the limitations of batteries
36. State the purpose, uses, and operation of auto analyzers, blood cell counters, blood gas analyzers, chromatographs, colorimeters, densitometers, photometers, and spectrophotometer
37. Test NIBP units
38. Test a defibrillator
39. Test an ECG
40. Test an infusion pump
41. Test electro surgery machines

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

F. Learner Outcomes Assessment
   As noted on course syllabus

G. Special Information
   None noted