BMME 765
Advanced Biomedical Instrumentation
Course Syllabus

1. *Department*: Biomedical Engineering *Number*: BMME 765 *Credit Hours*: 3
Title: Advanced Biomedical Instrumentation
Elective

2. *Course Description*:

The fundamentals of designing new biomedical instrument. This included interfacing microprocessors, physiological transducers and user interfaces. Practical circuit design problems are presented along with software/firmware applications. In this course the student will design a novel biomedical instruments and perform initial clinical tests. student projects. Project documentation, references, reports, and results are combined in a project webspace.

3. *Prerequisite(s):* BMME 111.

4. *Textbook(s) and/or other required material*:
Class notes and handouts by the instructor.

5. *Course objectives. By the end of this course, the student should be able to:*
- Design and test a novel medical instrument.
- Students will be given a design project that will involve physiological sensors, signal processing electronics and computer interfaces. They will fabricate this instrument and perform initial clinical test.

6. *Topics covered (number of lectures per topic, based on 45 50 -minute lectures per semester)*:
- Introduction (1)
- IBM - PC architecture (1)
- Parallel port interfacing (1)
- D/A techniques (2)
- A/D techniques (2)
- VB programming (2)
- Stamp programming (1)
- Digital Filtering (1)
- Serial/Parallel/Game port interfacing (1)
- Transducer interfacing (1)
- Graphics-Software (1)

- Graphics-Hardware (1)
- Analysis of Capacitive transducer (1)
- LAN architecture (1)
- Ethernet interfaces (1)
- LAN programming, PDA programming (1)
- Examples of Microcomputer based instruments Audiometer, Telemedicine, Surgery Robotics, monitors/graphics (1)
- RF/IR transmission techniques (1)
- Non-linear correction techniques (1)
- Microcomputer bus structures- USB, blue tooth, spread spectrum (1)
- Networks (1)
- Malpractice, Ethics (1)
- Project Reports (1)

7. *Class/laboratory schedule (sessions per week and duration of each session)*:

Two classroom sessions per week and an open laboratory where students work on their project.

8. *Date of preparation and person(s) who prepared this description*:

Henry S. Hsiao, Ph.D. 12/21/2005