[A-3]COURSE SYLLABUS

1. Course Description (Approximately 100 words)

This course covers the basic and advanced principles, concepts, and operations of medical sensors and devices. The origin and nature of measurable physiological signals are studied, including chemical, electrochemical, optical, and electromagnetic signals. The principles and devices to make the measurements, including design of electronic instrumentation, will be rigorously presented. This will be followed by realistic design and experimentation with amplifiers for biopotential measurements. There are laboratories session to give students hands on experience with electronic components, sensors, biopotential measurements and testing therapeutic instrumentation. The final part of this course will cover emerging frontiers of cellular and molecular instrumentation.

2. Course Goals and Objectives (Approximately 100 words)

Upon successful completion of this subject students should be able to:

Learn several signals that can be measured from the human body. Specific examples include temperature, electrical, and pressure signals.

Understand how noise from the environment, instruments and other physiologic systems can create artifacts in instrumentation and be able to design components to condition the signals.

Understand theory and design on signal conditioning (wheatstone bridges; amplifiers, filters). Design filters necessary to condition and isolate a signal. Understand how signals are converted from analogue to digital and stored in a computer or presented on an output display.

Review the cardiac, respiratory and muscular physiological systems. Study the designs of several instruments used to acquire signals from living systems. Integrate information learned

3. Textbook (Title, Author, Publisher, Year of Publication, etc.)

Biomedical Instrumentation: Technology and Applications 1st Edition by R. S. Khandpur (Author

Introduction to Biomedical Instrumentation: The Technology of Patient Care 1st Edition by Barbara Christe (Author)

4. Reference

Biomedical Instrumentation: Technology and Applications 1st Edition by R. S. Khandpur (Author

5. Course Requirements and Grades

EXAMINATION = 70%
ASSIGNMENT = 20%
C.A.T. = 10%

6. Course Calendar

Week	Main Content
1	BIOMEDICAL SIGNALS
2	ELECTRODES
3	ASSISTIVE DEVICES, CARDIAC SYSTEM AND MONITORS
4	RADIOLOGICAL EQUIPMENTS
5	SURGICAL SCOPY AND DIATHERMY EQUIPMENTS
6	PHYSIOLOGICAL EFFECTS OF HF RADIATION
7	C.A.T.
8	ULTRASONIC INSTRUMENTS
9	NEONATAL INSTRUMENTS
10	PHOTOTHERAPY
11	BIOTELEMETRY
12	TELEMEDICINE
13	SAFETY MEASUREMENTS (for lessons 11 and 12)
14	EXAMINATION