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| Course Number and Name | | | | | | | | | | | | |
| BBM405 & Bio Sensors and Transducers | | | | | | | | | | | | |
| Credits and Contact Hours | | | | | | | | | | | | |
| 3 & 45 | | | | | | | | | | | | |
| Course Coordinator's Name | | | | | | | | | | | | |
| Mr.Vijayaragavan | | | | | | | | | | | | |
| Text Books and References | | | | | | | | | | | | |
| Text Books: | | | | | | | | | | | | |
| 1. Doebelin. E. O, Measurment Systems, McGraw Hill Book Co. 1998 | | | | | | | | | | | | |
| 2. Renganathan S, Transducer Engineering, Allied Publishers, Chennai,2000. | | | | | | | | | | | | |
| 3. https://www1.ethz.ch/lbb/Education/Biosensors/Lecture_1_overview.pdf | | | | | | | | | | | | |
| Course Description | | | | | | | | | | | | |
| 1. Understand the purpose of measurement, the methods of measurements, errors associated with measurements. | | | | | | | | | | | | |
| 2. Know the principle of transduction, classifications and the characteristics of different transducers and study its biomedical applications | | | | | | | | | | | | |
| Prerequisites | | | | | | Co-requisites | | | | | | |
| Biology for Engineers | | | | | | Nil | | | | | | |
| required, elective, or selected elective (as per Table 5-1) | | | | | | | | | | | | |
| Required | | | | | | | | | | | | |
| Course Outcomes (COs) | | | | | | | | | | | | |
| CO1: Describe the purpose and calibration methods. | | | | | | | | | | | | |
| CO2: To study the basic characteristics of transducers. | | | | | | | | | | | | |
| CO3:Know the principle of transduction, classifications and the characteristics of different transducers and study its biomedical applications | | | | | | | | | | | | |
| CO4:Remember and understand the concepts, types, working and practical applications of important biosensors. | | | | | | | | | | | | |
| CO5: Know some of the commonly used biomedical transducers. | | | | | | | | | | | | |
| Student Outcomes (SOs) from Criterion 3 covered by this Course | | | | | | | | | | | | |
| COs/SOs | a | b | c | d | e | f | g | h | i | j | k | l |
| CO1 | M | H | M | H | H | M | H | | | L | M | |
| CO2 | M | H | M | H | H | M | H | | | L | M | |
| CO3 | M | H | M | H | H | M | H | | | L | M | |
| CO4 | M | H | M | H | H | M | H | | | L | M | |
| CO5 | M | H | M | H | H | M | H | | | L | M | |
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| List of Topics Covered | | | | | | | | | | | | |
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UNIT I SCIENCE OF MEASUREMENT 9

Units and Standards - calibration methods - statics calibration - classification of errors, error analysis - statistical methods - odds and uncertainty.

UNIT – II CHARACTERISTICS OF TRANSDUCERS 9

Static characteristics - accuracy, precision, sensitivity, linearity etc - mathematical model of transducers - zero first - order and second - order transducers - response to impulse step, ramp and sinusoidal inputs.

UNIT – III VARIABLE RESISTANCE TRANSDUCERS 9

Principle of operation, construction details, characteristics and applications of resistance potentiometers, strain gauges, resistance thermometers, thermistors, hot-wire anemometer, piezoresistive sensors and humidity sensors.

UNIT - IV BIOSENSORS - PHYSIOLOGICAL RECEPTORS - J RECEPTORS 9

Chemoreceptors, Baroreceptors, Touch receptors, Biosensors - Working Principle and Types, Applications.

UNIT - V OTHER TRANSDUCERS 9

Piezoelectric transducers, magnetostrictive transducer, IC sensor digital transducers - smart sensor - fibre optic transducers.