BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
INSTRUCTION DIVISION
FIRST SEMESTER 2015-2016
Course Handout

Date: 3rd August 2015

In addition to part -I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : BITS F215
Course Title : Applications of Bio-Medical Instrumentation Techniques in Healthcare

Instructor-in-charge : **R. Mahesh**, Instructor: **Sharad Shrivastava**

1.**Scope and Objective of the Course:**

This exciting course has been developed for science and engineering graduates who have interests or appreciate the emerging area of biomedical / clinical engineering. The course focuses on providing an awareness and opportunity on innovative approaches to research and design in biomedical engineering. As healthcare delivery has become increasingly dependent on advanced technology, this course is expected to provide an insight and create an interest on growing international need for Engineers with good design, entrepreneurial skills. This course will mainly focus the application of biomedical instrumentation techniques in healthcare with an emphasis on design project to inculcate an inspiration of learning by doing , among students.

Today's medical instruments are complicated and diverse, as they incorporate electronic systems for sensing, transducing, manipulating, storing, and displaying data or information. Medical diagnostics today more and more rely on detailed and accurate measurements of a vast number of physiologic parameters for diagnosing illnesses and prescribe complicated procedures for treatment. While medical instruments acquire and process information and data for monitoring patients and diagnosing illnesses, medical devices use electrical, mechanical, chemical, or radiation energy for achieving a desired therapeutic purpose, maintaining physiologic functions, or assisting a patient's healing process. Development of novel clinical diagnostic, therapeutic, and prosthetic devices based on advances in physiology research, materials, electronics, and computational capabilities are current areas of research in this industry.
This course may not cover in depth mechanistic details (assuming that the students have adequate prior knowledge gathered in first two years of course-work), the focus will be on appreciating the application of biomedical instrumentation techniques in healthcare.

2.**Text Book,: Since this course covers diverse fields, no specific text material is mentioned.**

Reference Book: RS Khandpur , Handbook of Biomedical Instrumentation, Tata McGraw Hill Education Private Limited, New Delhi

3.**Course Plan:**

	Topic	No. of Lect. *
1.	Introduction to Applications of Bio-Medical Instrumentation Techniques in Healthcare	3
2.	Transducers and Biomedical Instrumentation systems	3
3.	Introduction to Biomechanics	3
4.	Diagnostic Techniques	3
5.	Prosthetic Devices and Therapies	2
6.	Design of a prosthetic (Knee Prosthetic)	2

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* Discussion on design project and latest developments in the field of biomedical instrumentation and seminar presentations will be held, during rest of the contact hours.

5. Additional information:

• Emerging trends and updates have to be obtained from selected journals; hence it is mandatory to refer related journals and review articles and other e-sources.

6. Evaluation Scheme:

Component	Weightage (%)	Duration	Date & Time	Remarks
1. Mid-Sem. test and/or OB	25	90 min.	7/10 8:00 - 9:30 AM	CB
2. **Design Project.	30	---------- continuous ----------		
3. Seminar(s)	10	-------- to be announced in class---------		
3. *Assignment(s), etc.	10	---------- continuous ----------		

CB: Closed Book ; OB: Open Book

* Assignments, Seminars will be based on advanced topics. Assignment(s) may be practical / theory oriented for which two copies of type-written report in a standard format should be submitted as per deadline(s) that would be announced, therein. It may also include a viva and or a seminar presentation. However all assignments /reports would be completed by 24th Nov., 2015. It is necessary that all students stick to time schedule and DO NOT postpone submission of assignments/reports.

** Details of Design Project will be discussed in class. It would also include report, seminar cum viva, prototype and its justification.

* As this is an application oriented course, more stress will be laid upon latest information available for different primary and secondary sources such as latest edition of books, journals, articles published and research findings reported in standard literature sources. The class room information would give latest developments and their applications in the field of therapy. Hence only reference to text / reference material would not suffice and students are advised to take a note of the same. As self-learning and innovative thinking are emphasized, this provides an opportunity to explore and experiment on viable ideas of societal significance.

All evaluation components are equally important, irrespective of weightage. Hence, students failing to attend or absenting themselves in one or many of the evaluation components may become ineligible for obtaining a valid grade at the end of the semester . Attendance in all contact sessions are all equally important as they are all integral components of learning, irrespective of weightage.

Students are strongly advised to keep away from absenting themselves from all aforementioned contact sessions.

7. Notices: Notices concerning the course will be displayed on the Mech. Engg./ Pharmacy. Group N.B. only.

8. Chamber Consultation Hour: To be announced in the class.

9. Make-Ups :
Make-Ups are not given as a routine. It is solely dependent upon the genuineness of the circumstances under which a student fails to appear in a scheduled evaluation component. In such circumstances, prior permission should be obtained from the Instructor-in-Charge. In no case the make-up application be slipped inside the chamber of the instructor-in-charge. The decision of the Instructor-in-Charge in the above matter will be final.

10. Mid-Sem. Grading: Mid-Semester grading will be displayed after completion of 30-40 % of evaluation components.

Instructor-in-Charge
BITS F215