BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
Instruction Division

FIRST SEMESTER 2016-17
Course Handout (Part – II)

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 F415

Course Title   :   **Introduction to MEMS**

Instructor-in-charge: **SACHIN U BELGAMWAR**

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

The course introduces the basic concepts in MEMS (Micro Electromechanical Systems) with a view to address a class of students from science and engineering disciplines. The discussion on topics like MEMS design, Microfabrication, Microfluidics, Microrobotics and Microsensors have been structured in the course plan. The objective of the course is to equip the students from various aspects and with basic knowledge of the area of MEMS.

2. **Text Book:**

T1. Tai-Ran Hsu, *MEMS and Micro systems Design and Manufacture*, Tata McGraw Hill, 2002.
T2. GK Anantha Suresh, et. al, Micro and Smart Systems, Wiley-India, 2010.

3. **Reference Books:**

(a)   Nitaigour P. Mahalik, *MEMS*, Tata McGraw Hill, 2007

(b)   Marc Madou, *Fundamentals of Microfabrication*, CRC Press, 2002.

(c)   Chang Liu, *Foundation of MEMS*, Pearson Education Inc., NJ, 2006

(d)   Nadim Maluf , *An Introduction to Microelectromechanical Systems Engineering* , Artech House, 2000.

(e)   Stephen D. Senturia, *Microsystem Design* , Kluwer Academic Publishers, 2001

4. Course Plan:

Topic	No.of Lectures	Chap. Sec.
(1) Overview of MEMS and Microsystems	2	Ch. 1(T1), Ref (a)
(2) Working principles of micro-systems	4	Ch. 2(T1), Ref (a)
(3) Engg. Science for micro-system design and fabrication	2	Ch. 3(T1), Ch.3 (T2)
(4) Engg. Mechanics for Micro-system Design	3	Ch. 4(T1)
(5) Thermofluidic Engg. & Micro-system Design	4	Ch. 5(T1)
(6) Scaling Laws in Miniaturization	4	Ch. 6(T1)
(7) Materials for MEMS and Microsystems	3	Ch. 7(T1), Ref. (a)(b)
(8) Micro-system fabrication Processes	5	Ch. 8(T1), Ref. (a) (b)
(9) Micro-manufacturing	5	Ch. 9(T1), Ref. (a) (b)
(10) MEMS Packaging	1	Ch. 11 (T1), Ch. 8(T2)
(11) Lab sessions/Project work	5	

Total   38

5. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Remarks
Mid-sem	90 min	30	13/10 2:00 - 3:30 PM	Closed book
Project/Term Paper&Seminar& Continuous Assignments and Assigments on COMSOL		30	Continuous throughout the semester	---
Comprehensive	3 hrs.	40	12/12 FN	Partial Open Book

6. **Chamber Consultation Hour:** To be announced in the class.

7. **Notices:** ME Notice Boards.

8. Make–up: Make-up will be given on **genuine** grounds only. Prior application should be

made for seeking the make-up examination.

Instructor-In-Charge