

**INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM**

INTRODUCTION OF NEW COURSE

Course Title	MICRO ELECTRO MECHANICAL SYSTEMS	Course No (will be assigned)				
Specialization	Electronics Engineering	Structure (LTPC)	3	0	0	3
Offered for	UG/PG	Status	Core <input type="checkbox"/>	Elective <input checked="" type="checkbox"/>		
Faculty		Type	New <input checked="" type="checkbox"/>	Modification <input type="checkbox"/>		
Pre-requisite		To take effect from	July 2011			
Submission date	May 2011	Date of approval by AAC				
Objectives	MEMS technology offers many exciting opportunities in miniaturization of elements in a wide range of applications. MEMS based sensors and actuators are constantly introduced into new products and new markets are expected to become affected by MEMS technology in the near future. The diversity and complexity of this technology demands a wide knowledge base from a prospect researcher. Topics include: Material properties, surface chemistry, micro-fabrication techniques, sensor and actuator principles and the know-how regarding already existing technologies. The goal of this course is to provide the participant the needed background to comprehend existing technology and the tools to design and execute MEMS fabrication for different applications .					
Contents of the course (With approximate break up of hours)	Introduction to MEMS & Microsystems, Introduction to Microsensors, Evaluation of MEMS, Microsensors, Market Survey, Application of MEMS MEMS Materials, MEMS Materials Properties, Microelectronic Technology for MEMS, Micromachining Technology for MEMS, Micromachining Process, Etch Stop Techniques and Microstructure, Surface and Quartz Micromachining, Fabrication of Micromachined Microstructure, Microstereolithography MEMS Microsensors -Design, Principle and Technology- Thermal, Micromachined Microsensors - Mechanical, MEMS Pressure and Flow Sensor, Micromachined Flow Sensors, MEMS Inertial Sensors, Micromachined Microaccelerometers for MEMS MEMS Accelerometers - Design, Principle and Technology- Temperature Drift and Damping Analysis Piezoresistive Accelerometers - Design, Principle and Technology- MEMS Capacitive Accelerometer, MEMS Capacitive Accelerometer Process, MEMS Gyro Sensor MEMS for Space Application, Polymer MEMS & Carbon Nano Tubes, Wafer Bonding & Packaging of MEMS Interface Electronics for MEMS, MEMS for Biomedical Applications (Bio-MEMS), Introduction to RF MEMS and Nano Electro Mechanical Systems (NEMS)					
Text and References	<ol style="list-style-type: none"> 1. Fundamentals of Microfabrication: The Science of Miniaturization, 2nd ed., M. J. Madou, CRC Press, 2002 2. MEMS and NEMS: Systems, Devices, and Structures, Sergey Edward Lyshevski, CRC Press; 2008 3. Practical MEMS: Design of microsystems, accelerometers, gyroscopes, RF MEMS, optical MEMS, and microfluidic systems, Ville Kaajakari, Small Gear Publishing, 2009 4. MEMS & Microsystems: Design, Manufacture, and Nanoscale Engineering, 2nd Edition, Tai-Ran Hsu, McGraw Hill, March 2008 5. Fundamentals of Microfabrication and Nanotechnology, Third Edition, Three-Volume Set, Marc J. Madou, CRC Press, 2011 					