Nanotechnology, Science and Applications

Swayam Prabha Course Code – M61

PROFESSOR'S NAME	Dr. PrathapHaridoss
DEPARTMENT	Department of Metallurgy and Material Science
INSTITUTE	Indian Institute of Technology Madras
COURSE OUTLINE	This course will familiarize the student to the science related to various phenomena observed at the nanoscale. Following an introduction to the basic ideas of nanoscience and nanotechnology, several examples will be discussed which highlight the impact of nanoscale on various properties of technological interest. Technologies built on these phenomena will be discussed.

COURSE DETAILS

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1.	Module1_L1	Nanotechnology Science and Applications - Introduction
2.	Module1_L2	Nanotechnology : A Walk through History
3.	Module1_L3	Discussion on Feynman's talk on Nanotechnology
4.	Module2_L4	Discussion on Feynmanâ€™s talk on Nanotechnology Part II
5.	Module2_L5	Impact of the Nanoscale on Thermodynamic considerations
6.	Module2_L6	Phase Diagrams and Stable Phases
7.	Module2_L7	Calorimetry
8.	Module3_L8	Zirconia - ZrO2
9.	Module3_L9	Experimentally Investigating the Hall-Petch Relationship
10.	Module3_L10	Impact of the Nanoscale on the Hall-Petch

		Relationship
11.	**Module4_L11**	Impact of the Nanoscale on Mechanical Properties
12.	**Module4_L12**	Superplasticity and the Nanoscale: Background
13.	**Module4_L13**	Superplasticity and the Nanoscale: Experimental Aspects
14.	**Module5_L14**	Severe Plastic Deformation and the Nanoscale: Experimental Utility
15.	**Module5_L15**	An Approach to Prepare Bulk Nanostructures
16.	**Module5_L 16**	Nanosized Ferroelectrics
17.	**Module6_L17**	Impact of the Nanoscale on Optical Properties
18.	**Module6_L18**	Experimental Approach to Study Impact of The Nanoscale on Optical Properties
19.	**Module6_L19**	Impact of the Nanoscale on Optical Properties: Measurements
20.	**Module7_L20**	Nanocomposites
21.	**Module7_L21**	Effect Of Nanoscale on Magnetic Properties: Potential Useof Biomaterials
22.	**Module7_L22**	Effect of Nanostructure on Damping Properties
23.	**Module8_L23**	Carbon
24.	**Module8_L24**	Carbon Nanotubes
25.	**Module8_L25**	Graphene, a 2D Nanomaterials
26.	**Module9_L26**	Live Session 25-09-2019

List of reference material/ books:

Name and contact details of two referees for the course: