From the Academic Year 2018-2019

VASAVI COLLEGE OF ENGINEERING (A)

DEPARTMENT OF CHEMISTRY

B.E. VI SEMESTER

Open Elective: Introduction to Nano Materials and Applications

Instruction : 1Hour / Week	SEE- Marks : 50	Course Code : OE600CH
Credit : 1	CIE- Marks : 30	SEE- Duration : 2Hours

OBJECTIVES	OUTCOMES
The course will enable the students:	**At the end of the course students should be able to:**
1. To introduce the concept of nano materials and their properties 2. To familarise the various methods of preparation and characterization 3. To focus up on the applications	1. Able to select appropriate method for preparation of nano materials 2. Apply the knowledge of applications in specific field.

UNIT-I: Introduction and Types:

Concepts of nano materials and their importance- Classification of nano materials: quantam dots, nano wires, nano rods, nano cells and nano composites.

CNTs- SWCNT, MWCNT - Shapes of SWCNT- Applications of CNTs.

Effect of nano dimentions on material behaviour: Catalytic, optical, electrical and mechanical properties.

UNIT-II: Preparation, Characterization and Applications:

Top down and Bottom up approaches: Ball milling, Vapour deposition (CVD and PVD), Laser ablation, Solgel and Liquid solid reaction methods.

Characterisation: TEM and SEM

Applications: Nano electronics, Micro and nano electromechanical systems(MEMS/NEMS), Nano sensors, Nano catalysts, Water treatment and the environment, Energy, Defence and space applications, Nano medical applicaions, Automative Industry, Cosmotics and Consumer goods.

Books:

1. Baldev raj, “Text book of Nano science and nano Technology”, University press, IIM-2012
2. “Wiley Engineering Chemistry Second edition”, Wiley Publishers.
3. P.C.Jain and Monica Jain, “A text book of Engineering Chemistry”, (New Edition) Dhanpat rai & Sons.
4. Shasi Chawla, “Text Book of Engineering Chemistry”, Dhanpat Rai Publishing Company, NewDelhi (2008).

Suggested Reading:

1. NPTEL Video lectures
2. Cao, **“**Nanostructures and Nanomaterials: Synthesis, Properties and Applications”, (World Scientific Series in Nanoscience and Nanotechnology)