

SSLC, HSE, DIPLOMA, B.E/B.TECH, M.E/M.TECH, MBA, MCA

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## **OCH551 INDUSTRIAL NANOTECHNOLOGY**

### DETAILED SYLLABUS

#### **OBJECTIVES**

- To elucidate on advantages of nanotechnology-based applications in each industry
- To provide instances of contemporary industrial applications of nanotechnology
- To provide an overview of future technological advancements and increasing role of nanotechnology in each industry

#### **UNIT I NANO ELECTRONICS**

Advantages of nano electrical and electronic devices –Electronic circuit chips – Lasers - Micro and Nano Electromechanical systems – Sensors, Actuators, Optical switches, - Data memory –Lighting and Displays – Batteries - Fuel cells and Photo-voltaic cells – Electric double layer capacitors – Lead-free solder – Nanoparticle coatings for electrical products

#### **UNIT II BIONANOTECHNOLOGY**

Nanoparticles in bone substitutes and dentistry – Implants and Prosthesis – Nanorobotics in Surgery –Nano sensors in Diagnosis– Neuro-electronic Interfaces– Therapeutic applications

#### **UNIT III NANOTECHNOLOGY IN CHEMICAL INDUSTRY**

Nano catalyts – Smart materials – Heterogenous nanostructures and composites – Nanostructures for Molecular recognition (Quantum dots, Nanorods, Nanotubes) – Molecular Encapsulation and its applications – Nanoporous zeolites – Self-assembled Nanoreactors

#### **UNIT IV NANOTECHNOLOGY IN AGRICULTURE AND FOOD TECHNOLOGY**

Nanotechnology in Agriculture -Precision farming, Smart delivery system – Insecticides using nanotechnology – Potential of nano-fertilizers - Nanotechnology in Food industry

#### **UNIT V NANOTECHNOLOGY IN TEXTILES AND COSMETICS**

Nanofibre production - Electrospinning – Controlling morphologies of nanofibers – Tissue engineering application– Polymer nanofibers - Nylon-6 nanocomposites from polymerization - Nano-filled polypropylene fibers - Nano finishing in textiles (UV resistant, antibacterial, hydrophilic, self-cleaning, flame retardant finishes) – Modern textiles Cosmetics – Formulation of Gels, Shampoos, Hairconditioners

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