

1154CE106 (VTUR15)	GREEN TECHNOLOGY AND SMART BUILDINGS	L	T	P	C
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COURSE CATEGORY: Institute Elective

A. PREAMBLE :

To understand the principles and mechanisms of green and smart building concepts.

B. PRE-REQUISITES:

- NIL

C. COURSE EDUCATIONAL OBJECTIVES:

Students undergoing this course are expected to:

- Understand the different methodologies to recover certain resources and energy from waste.
- Differentiate the mechanical, biological and thermos-chemical methods of energy recovery from waste.
- Outline the waste management hierarchy and recycling possibilities for a given waste stream.

D. COURSE OUTCOMES:

Upon the successful completion of the course, learners will be able to

CO	STATEMENT	K LEVEL
CO1	Explain the basic concepts of smart buildings.	K2
CO2	Outline the functions of sensors and actuators.	K2
CO3	Classify and compare the advanced building materials.	K2
CO4	Illustrate the different types of smart building systems.	K2
CO5	Contrast the uses of nano technology in green building materials.	K2

E. CORRELATION OF COS WITH POS:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L				L							
CO2	L				L							
CO3	L				L							
CO4	L				L							
CO5	L				L							

G. COURSE CONTENT:

UNIT I INTRODUCTION TO SMART MATERIALS AND STRUCTURES 9

Introduction to smart buildings - Basic concepts - Cost analysis of buildings – Introduction to smart building - Green buildings – Techniques - Merits.

UNIT II ACTUATOR TECHNIQUES 9

Actuator and actuator materials – Piezoelectric and Electrostrictive Materials – Magneto structure Material – Shape Memory Alloys – Electrorheological Fluids– Electromagnetic actuation – Role of actuators and Actuator Materials.

UNIT III ADVANCED BUILDING MATERIALS 9

Aluminum, glass, fabric, various types of finishes and surface treatments, Construction chemicals – Sealants, engineering grouts, mortars, admixtures and additives, green Concrete.

UNIT IV BUILDING SYSTEMS 9

Lighting – Day lighting; ventilation – Natural ventilation; indoor air quality; heating/cooling – Geothermal; passive and active systems for energy production and conservation; water conservation – Grey water reuse, water saving plumbing fixtures.

UNIT V NANOMATERIALS FOR GREEN SYSTEMS 9

Green materials, biomaterials, biopolymers, bioplastics, and composites Nanotech Materials for Truly Sustainable Construction: Windows, Skylights, and Lighting. Paints, Roofs, Walls and Cooling. Multifunctional Gas Sensors, Biomimetic Sensors, Optical Interference Sensors Thermo-sensors, light sensors, and stimulus-responsive smart materials Nanomaterials.

TOTAL: 45PERIODS

A. LEARNING RESOURCES:

a) TEXT BOOKS:

1. Brain Culshaw – Smart Structure and Materials Artech House – Borton. London, 1996.

b) REFERENCES

1. Srinivasan, A.V and Michael McFarland. D, “Smart Structures – Analysis and Design”Cambridge University Press, 2001.