

Nirma University
School of Technology, Institute of Technology
B. Tech (Instrumentation and Control Engineering)

L	T	P	C
3	0	0	3

(Open Elective for All Branches)

Course Code	2ICOE26
Course Title	Building Automation

Course Learning Outcome:

At the end of the course, students will be able to –

- illustrate the need and concept of building automation
- implement the plan for building automation.
- prepare the specification and select components of building automation system

Syllabus

**Teaching
Hours**

UNIT 1: Introduction to Building Automation

05

Concept and application of Building Automation (BA), requirements and design considerations of BA. effect on efficiency of building services operation. architecture and components of BA.

UNIT 2: HVAC system

10

Different components of HVAC system like heating, cooling system, chillers, AHUs, compressors and filter units and their types. Operational efficiency and economics, role of automation in HVAC operation, concept of district cooling and heating.

UNIT 3: Lighting and Access control systems

10

Various components of lighting systems, efficient use of electricity, lighting control systems, components of electrical power distribution in buildings, stable and uninterrupted power supply, components of CCTV system like cameras, cables, etc., concept of automation in access control system

UNIT 4: Fire & Alarm system **05**

Different fire sensors, smoke detectors and their types, CO and CO₂ sensors, Fire control panels, design considerations for the FA system concept of IP enabled fire & alarm system, design aspects and components of PA system

UNIT 5: Energy management system **05**

Bureau of Energy Efficiency (BEE) standards, concept of energy management system, role of automation in energy saving, solar power generation and its integration in building, concept of Green Building and its certification

UNIT 6: Vertical transportation System **05**

Structure of lift and escalator, traffic analysis, lift drives, supervisory control and remote monitoring of lift, safety aspects

UNIT 7: Implementation of Building Automation **05**

HMI/SCADA Systems, Programmable logic controller, communication principles, Data network and protocol, Bacnet Protocol.

Self Study:

The self study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self study contents.

References:

1. Jim Sinopoli, Smart Buildings, Butterworth-Heinemann imprint of Elsevier, 2nd Edition., 2010.
2. Albert Ting Pat So, WaiLok Chan, Intelligent Building Systems, Kluwer Academic publisher, 3rd Edition., 2012.
3. Reinhold A. Carlson, Robert A. Di Giandomenico, Understanding Building Automation Systems, Published by R.S. Means Company, 1991.