SEMESTER S5

BUILDING AUTOMATION

Course Code	PEEIT526	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Theory

Course Objectives:

1. Familiarize with the components and technologies involved in a typical Building Automation System.
2. Study computer-based control system installed in building that controls and monitors the total MEP (Mechanical – Electrical – Plumbing) and security Structure

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SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	**Introduction:** Concept and application of Building Management System (BMS) and Automation, requirements and design considerations and its effect on functional efficiency of building automation system, architecture and components of BMS.	8
2	**Building Automation Hardware:** controllers, sensors, actuators, communication network. Application to lighting control: Use of light sensors and occupancy sensors Building Automation Software, Communication protocols, Building Management Systems (BMS)	10
3	Human Comfort: Human comfort zones, Effect of Heat, Humidity, Heat loss. The use of active technologies for improving the performance of air	8

	conditioning and ventilation systems. Pre-cooling strategies, energy recovery wheels, thermal storage systems and dehumidification technologies. Processes: Heating Process & Applications	
4	Introduction to Security Systems, Concepts. Concept of automation in access control system for safety, Physical security system with components, RFID enabled access control with components Energy Management: Energy Savings concept & methods, Lighting control, Building Efficiency improvement, Green Building Concept and Examples.	**10**

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	**15**	**10**	**10**	**40**

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End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Understand and analyze current philosophy, technology, terminology, and practices used in building automation	**K1**
CO2	To understand the various hardware and software used in building automation	**K1**
CO3	To evaluate energy management and communication for efficient Building Management System	**K2**
CO4	To understand different safety and security standards for building management system.	**K2**
CO5	To understand and apply various technologies used for space heating and cooling to improve comfort	**K2**

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Note: *K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											2
CO2	3											2
CO3		2										
CO4	3	2										
CO5		2										

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Smart Buildings	Jim Sinopoli	Elsevier	2nd Edition, 2010
2	Understanding Building Automation Systems	Reinhold A. Carlson, Robert A. Di Giandomenico.	R.S. Means Company	1st 1991
3	Intelligent Building Systems	Albert Ting-Pat So, WaiLok Chan	Kluwer Academic publisher	3rd, 2012
4	Design of Special Hazards and Fire Alarm Systems	Robert Gagnon	Thomson Delmar Learning	2nd, 2007

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	HVAC Control in the New Millennium	Hordeski, Michael F	Fairmont press	1st,2001
2	Process Control, Instrument Engineers Handbook	Bela G. Liptak	Chilton book co	3rd , 2013

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Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
	https://www.youtube.com/watch?v=74STe1I_Vm4 https://www.youtube.com/watch?v=xSMZ2WLK3Fo https://www.youtube.com/watch?v=xSMZ2WLK3Fo