



Kot Bhalwal, Jammu



Model Institute of Engineering
& Technology (Autonomous)
Course File

COURSE HANDOUT

Green Building Infrastructure and Architecture (CE-604)

CIVIL-6th SEMESTER

ACADEMIC YEAR (2024-25)

Dr. Bhagwan Das

Assistant Professor

Department of Civil Engineering



Department of Civil Engineering

Model Institute of Engineering & Technology (Autonomous)

Kot Bhalwal, Jammu - 181122

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Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1





Kot Bhalwal, Jammu

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
CE-604	Green Building Infrastructure and Architecture	Core	4	3	1	0	50	100	150

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Practice advanced intelligent building technologies.
CO2	Describe the concept of Green building.
CO3	Explain the techniques for energy in building Design.
CO4	Describe the underlying principles, operation and maintenance of the energy efficient building.
CO5	Discuss characteristics and limitations of various automation systems in buildings.

Unit-I

Green Building Concepts and Practices: Principles of planning, Relevant building by laws, site selection for buildings, orientation of buildings, common errors in planning, Provision of rain water harvesting. Green Building Materials and Equipment in India, Important Sustainable features for Green Building.

(10 Hours)

Unit-II

Principles of Planning Green building: Indian Green Building Council, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation Principles of green building, Selection of site and Orientation of the building , usage of low energy materials , effective cooling and heating systems , effective electrical systems, Natural building design consideration.

(10 Hours)

Unit-III

Energy management in services: Energy in building design, Energy efficient and environment friendly building. Thermal phenomena, thermal comfort, Indoor Air quality, passive heating and cooling systems. Energy Analysis- Active HVAC systems. Energy audit - Types of audit, energy flow diagram and consumption. Identification of wastage -Priority of conservative measures, Maintenance of Management Programme.

(10 Hours)

Unit-IV

Building energy conservation technologies: Standards of energy efficiency in buildings. Trends in energy consumption. Energy efficiency measures in buildings: approaches, materials and equipment, operating strategies, evaluation methods of energy savings. Optimum selection of energy sources. Air-to-air energy recovery.

(10 Hours)

Unit-V

Control systems in buildings: Introduction to automatic control systems, control issues related to energy conservation, interior air quality and thermal comfort in buildings – Ventilation. Classification of HVAC control system: selection and size of sensors, actuators, and controllers. Practical HVAC control system Designing and turning controllers – Building automation systems, design for security.

(10 Hours)



Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Advanced Technology for Smart Buildings	James Sinopoli	Artech House	2016
2.	Smart Buildings Systems for Architects, Owners and Builders Business Strategy	James M Sinopoli.	Butterworth Heinemann	(2009)

Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Passive Solar House: The Complete Guide to Heating and Cooling Your Home	James Kachadorian	Chelsea Green Publishing	2 nd , (2006)

COURSE PLAN

Unit-I Green Building Concepts and Practices

S.No	Topics	Recommended Books
1	Principles of planning	Book 1, Ch.1
2	Energy efficient and environment friendly building.	Book 1, Ch.3
3	Site selection for buildings	Book 2, Ch 13
4	Orientation of buildings	Book 2, Ch 13
5	Common errors in planning	Book 2, Ch 13
6	Provision of rain water harvesting	Book 1, Ch 1
7	Green Building Materials and Equipment in India	Book 2, Ch.17
8	Important Sustainable features for Green Building.	Book 2, Ch 13

Unit-II Principles of Planning Green building

8	Indian Green Building Council	Book 2, Ch.17
9	Benefits Experienced in Green Buildings	Book 2, Ch.17
10	Launch of Green Building Rating Systems	Book 2, Ch.17
11	Residential Sector	Book 1, Ch.3
12	Market Transformation Principles of green building	Book 2, Ch 13
13	Selection of site and Orientation of the building	Book 2, Ch 13
14	Usage of low energy materials	Book 1, Ch.3
15	Effective cooling and heating systems	Book 2, Ch.3
16	Natural building design consideration.	Book 2, Ch 13

Unit-III Energy management in services

16	Energy in building design	Book 2, Ch.12
17	Perfect competition and pricing	Book 2, Ch.14
18	Thermal phenomena & thermal comfort.	Book 2, Ch.3
19	Air quality, passive heating and cooling systems.	Book 2, Ch.3
20	Energy Analysis- Active HVAC systems.	Book 2, Ch.3
21	Types of audit, energy flow diagram and consumption.	Book 2, Ch.17
22	Identification of wastage -Priority of conservative measures	Book 2, Ch.17
23	Maintenance of Management Programme.	Book 1, Ch.5



Unit-IV Building energy conservation technologies		
22	Standards of energy efficiency in buildings.	Book 2, Ch.17
23	Trends in energy consumption	Book 2, Ch.17
24	Efficiency measures in buildings	Book 2, Ch.17
25	Operating strategies	Book 2, Ch.17
26	Evaluation methods of energy savings	Book 2, Ch.17
27	Optimum selection of energy sources.	Book 2, Ch.17
28	Air-to-air energy recovery	Book 2, Ch.17
Unit-V Control systems in buildings		
29	Introduction to automatic control systems	Book 2, Ch.5
30	Control issues related to energy conservation	Book 2, Ch.5
31	Interior air quality and thermal comfort in buildings	Book 2, Ch.3
32	Classification of HVAC control system:	Book 2, Ch.3
33	Practical HVAC control system Designing and turning controllers	Book 2, Ch.3
34	Building automation systems	Book 1, Ch. 20
35	Design for security	Book 2, Ch.9

ADDITIONAL WEB RESOURCES

1.	MOOC: Greening the Economy: Sustainable Cities https://www.coursera.org/programs/civil-dept-faculty-learning-program-ly4eh/learn/gte-sustainable-cities?collectionId=jJjBE
2.	NPTEL: Video lectures on Managerial Economics Lecture series by Prof. Avolika Agrawal Department of Architecture & Planning, IIT Roorkee. https://archive.nptel.ac.in/courses/124/107/124107011/

GRADING AND ASSESSMENT

- **Sessional Test:** 20 marks
- **Assignment:** 20 marks
- **Attendance:** 10 marks
- **Final Examination:** 100 marks

COURSE POLICIES

- **Attendance:** Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity:** MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions:** Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**
Friday (12:05 PM - 12:55 PM)
- **Contact Information**
bhagwandas.civ@mietjammu.in