

Siruseri IT park, OMR, Chennai - 603103

LESSON PLAN							
Department of Physics							
Name of the Subject	Physics for Civil Engineering			Name of the handling Faculty	Mrs. V.Shobana		
Subject Code	PH3201			Year / Sem	I Year / II Sem		
Acad Year	2021-2022			Batch	2021-2025		
<b>Course Objective</b>							
To introduce the principles of thermal, acoustics, optics and new materials for civil engineering applications							
<b>Course Outcome</b>							
Upon completion of this course, the students will							
CO1 - have knowledge on the thermal performance of buildings							
CO2 - acquire knowledge on the acoustic properties of buildings							
CO3 - get knowledge on various lighting designs for buildings							
CO4 - gain knowledge on the properties and performance of engineering materials and							
CO5 - understand the hazards of buildings.							
<b>Lesson Plan</b>							
Sl. No.	Topic(s)	T / R*	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC / etc )	Blooms Level (L1-L6)	CO	PO
		Book					
<b>UNIT I - THERMAL APPLICATIONS</b>							
1	Principles of heat transfer, steady state of heat flow	T2 / R1	1	PPT	L1	CO1	PO1
2	Conduction through compound media-series and parallel	T2 / R4	1	PPT	L2	CO1	PO1
3	conductivity of rubber tube and powder materials	T2 / R1	1	BB	L2	CO1	PO2
4	Heat transfer through fenestrations, thermal insulation and its benefits	T2 / R4	1	BB	L3	CO1	PO3
5	Heat gain and heat loss estimation, factors affecting the thermal performance of buildings	T2 / R1	1	PPT	L3	CO1	PO1
6	Thermal measurements, thermal comfort	T2 / R1	1	PPT	L3	CO1	PO4
7	Indices of thermal comfort, climate and design of solar radiation	T3 / R4	1	PPT	L4	CO1	PO4
8	Shading devices - central heating,	T3 / R4	1	PPT	L3	CO1	PO3
9	Problems	T2 / R1	1	BB	L5	CO1	PO2
<b>Suggested Activity: Assignment / Case Studies / Tutorials/ Quiz / Mini Projects / Model Developed/others Planned if any</b>							
Assignment							
<b>Evaluation method</b>							
Marks out of 10							
<b>UNIT II - VENTILATION AND REFRIGERATION</b>							
10	Principles of natural ventilation	T2 / R4	1	BB	L2	CO2	PO1
11	Ventilation measurements	T2 / R4	1	BB	L5	CO2	PO3
12	design for natural ventilation	T2 / R4	1	BB	L3	CO2	PO1
13	Window types and packaged air conditioners	T2 / R4	1	BB	L4	CO2	PO6
14	chilled water plant	T2 / R4	1	BB	L3	CO2	PO3
15	fan coil systems, water piping	T2 / R4	1	PPT	L4	CO2	PO4
16	Cooling load, Air conditioning systems for different types of buildings	T2 / R4	1	PPT	L5	CO2	PO5
17	Protection against fire to be caused by A.C.Systems.	T2 / R4	1	PPT	L3	CO2	PO7
18	Problems	T2 / R4	1	BB	L5	CO2	PO2
<b>Suggested Activity: Assignment / Case Studies / Tutorials/ Quiz / Mini Projects / Model Developed/others Planned if any</b>							
Assignment							
<b>Evaluation method</b>							
Marks out of 10							

UNIT III -ACOUSTICS AND LIGHTING DESIGNS							
19	Methods of sound absorptions	T3 / R4	1	PPT	L2	CO3	PO1
20	Absorbing materials - noise and its measurements	T3 / R4	1	PPT	L3	CO3	PO1
21	Sound insulation and its measurements	T3 / R4	1	BB	L2	CO3	PO3
22	Impact of noise in multi-storeyed buildings.	T2 / R4	1	BB	L3	CO3	PO1
23	Visual field glare	T3 / R4	1	BB	L3	CO3	PO6
24	Colour – luminous efficiency function - Visual field glare, colour - day light calculations	T3 / R4	1	BB	L4	CO3	PO4
25	Day light design of windows, measurement of day-light and use of models and artificial skies	T3 / R4	1	PPT	L5	CO3	PO7
26	Principles of artificial lighting, supplementary artificial lighting.	T3 / R4	1	PPT	L3	CO3	PO5
27	Problems	T2 / R4	1	BB	L5	CO3	PO2
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any Assignment							
Evaluation method Marks out of 10							
UNIT IV - NEW ENGINEERING MATERIALS							
28	Composites - definition and classification	T1 / R4	1	BB	L1	CO4	PO1
29	Fibre reinforced plastics (FRP) and fiber reinforced metals (FRM)	T1 / R4	1	PPT	L3	CO4	PO3
30	Metallic glasses	T1 / R4	1	PPT	L3	CO4	PO1
31	Shape memory alloys	T1 / R4	1	PPT	L3	CO4	PO1
32	Ceramics - Classification - Crystalline - Non Crystalline	T1 / R4	1	PPT	L4	CO4	PO5
33	Bonded ceramics, Manufacturing methods - Slip casting - Isostatic pressing - Gas pressure bonding	T1 / R4	1	PPT	L4	CO4	PO4
34	Properties - thermal, mechanical, electrical and chemical	T2 / R4	1	BB	L2	CO4	PO5
35	Ceramic fibres - ferroelectric and ferromagnetic ceramics	T2 / R4	1	PPT	L4	CO4	PO7
36	High Aluminium ceramics.	T1 / R4	1	PPT	L5	CO4	PO2
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any Assignment							
Evaluation method Marks out of 10							
UNIT V - NATURAL DISASTERS							
37	Seismology and Seismic waves	T1 / R2	1	PPT	L1	CO5	PO1
38	Earth quake ground motion - Basic concepts and estimation techniques	T1 / R2	1	PPT	L2	CO5	PO1
39	Site effects - Probabilistic and deterministic Seismic hazard analysis	T1 / R2	1	BB	L4	CO5	PO2
40	Cyclone and flood hazards	T1 / R2	1	BB	L4	CO5	PO3
41	Fire hazards and fire protection	T1 / R2	1	PPT	L4	CO5	PO3
42	Fire-proofing of materials	T1 / R2	1	PPT	L4	CO5	PO7
43	Fire safety regulations and fire fighting equipment	T1 / R4	1	PPT	L3	CO5	PO6
44	Prevention and safety measures	T1 / R4	1	PPT	L3	CO5	PO4
45	Problems	T1 / R4	1	PPT	L5	CO5	PO5
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any Assignment							
Evaluation method Marks out of 10							
Content Beyond the Syllabus Planned							
1	Ferrites						
2	Superconductors						

Text Books														
1	Alexander, D. “Natural disaster”, Springer (1993).													
2	Budinski, K.G. & Budinski, M.K. “Engineering Materials Properties and Selection”, Prentice Hall, 2009.													
3	Severns, W.H. & Fellows, J.R. “Air conditioning and Refrigeration”, John Wiley and Sons, London, 1988.													
4	Stevens, W.R., “Building Physics: Lighting: Seeing in the Artificial Environment, Pergaman Press, 2013													
Reference Books														
1	Gaur R.K. and Gupta S.L., Engineering Physics. Dhanpat Rai publishers, 2012.													
2	Reiter, L. “Earthquake hazard analysis - Issues and insights”, Columbia University Press, 1991.													
3	Shearer, P.M. “Introduction to Seismology”, Cambridge University Press, 1999.													
4	Senthil Kumar G. “ Physics for Information Science”, VRB Publications Pvt. Ltd, 2017													
5	P.Mani, “Physics for Civil Engineering”, Shri Dhanam Publisher, 2018													
Website / URL References														
1	Factors affecting acoustics of buildings - <a href="https://youtu.be/fHBPvMDFyO8">https://youtu.be/fHBPvMDFyO8</a>													
2	FRP fabrication - <a href="https://youtu.be/WgwDI1oQQNc">https://youtu.be/WgwDI1oQQNc</a>													
3	Earth quake ground motion - Basic concepts - <a href="https://www.iris.edu/hq/inclass/uploads/videos/V_006_seismiclinky.mp4">https://www.iris.edu/hq/inclass/uploads/videos/V_006_seismiclinky.mp4</a>													
Blooms Level														
Level 1 ( L1 ) : Remembering				Lower Order Thinking	Fixed Hour Exams	Level 4 (L4) : Analysing				Higher Order Thinking	Projects / Mini Projects			
Level 2 (L2) : Understanding						Level 5 (L5) : Evaluating								
Level 3 (L3) : Applying						Level 6 (L6) : Creating								
Mapping syllabus with Bloom's Taxonomy LOT and HOT														
Unit No	Unit Name				L1	L2	L3	L4	L5	L6	LOT	HOT	Total	
Unit 1	THERMAL APPLICATIONS				2	3	4	0	1	0	9	1	10	
Unit 2	VENTILATION AND REFRIGERATION				2	4	3	0	1	0	9	1	10	
Unit 3	ACOUSTICS AND LIGHTING DESIGNS				1	4	4	0	1	0	9	1	10	
Unit 4	NEW ENGINEERING MATERIALS				1	4	4	0	1	0	9	1	10	
Unit 5	NATURAL DISASTERS				2	4	3	0	1	0	9	1	10	
Total					8	19	18	0	5	0	45	5	50	
Total Percentage					16.00	38.00	36.00	0.00	10.00	0.00	90.00	10.00	100.00	
CO PO Mapping														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	3	3	2	1	-	-	-	-	-	-	-
CO3	3	2	3	2	3	1	1	-	-	-	-	-	-	-
CO4	3	2	3	1	3	3	3	-	-	-	-	-	-	-
CO5	3	3	3	1	2	3	1	-	-	1	-	1	-	-
Avg	3	3	3	2	3	2	2	-	-	1	-	1	-	-
Justification for CO-PO mapping														
CO1	Applying the concepts of Thermal performance of buildings in Engineering field strongly (PO1) helps to analyze the problems. This will further help to solve complex problems to some extent (PO4). Air conditioning systems for different types of buildings may be useful in multidisciplinary setting as a team work (PO9) and may weakly help in communication.													
CO2	Applying the fundamentals and applications of Architectural Acoustics in Engineering field strongly (PO1) helps in problem analysis to greater extent. This may help in design and development of solutions and in investigating the complex problems (PO4). PO5 attributes to the usage of modern tools weakly and to assess the health and safety of society as well as environment and sustainable development.													
CO3	Concepts of various Lighting Design attribute to strong Engineering knowledge (PO1). This will help in problem solving (PO2), design and development of solution (PO3) and in investigation of complex problem (PO4) weakly. Developing simple model helps to learn the techniques (PO5) weakly. PO7 helps to understand the impact of principles of artificial lighting .													
CO4	While understanding the nature, properties and application of New Engineering materials, strong Engineering knowledge (PO1) is developed. This will help in problem solving (PO2), design and development of solution (PO3). Ceramics help to conduct investigation of complex problems (PO4) and in applying appropriate techniques and tools with an understanding of the limitations (PO5) weakly. PO7 helps to understand the impact of High Aluminium ceramics to environment.													
CO5	Understanding of various Hazards attributes to strong Engineering knowledge (PO1). This will help in problem solving (PO2) strongly, design and development of solution (PO3) and in investigation of complex problem (PO4) weakly. Selecting suitable algorithm helps to learn the commercial software (PO5) weakly. Application of reasoning helps to assess the society, health and safety (PO6) weakly. PO7 gives the knowledge of engineering solutions in society and environment. (PO10) and PO12 recognizes the need for life-long learning weakly.													

<b>3</b>	<b>High level</b>	<b>2</b>	<b>Moderate level</b>	<b>1</b>	Low level
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Name & Sign of Subject Expert :V.Shobana					
Head of the Department :					

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