

COURSE NAME: Electrical Engineering

COURSE CODE: EE

SEMESTER: SIXTH

SUBJECT NAME: Illumination Engineering (Elective for EE)

SUBJECT CODE:

Teaching and Examination Scheme:

TEACHING SCHEME			EXAMINATION SCHEME					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
04	-	02	03	100	-	--	25@	125

- External

@ - Internal

NOTES:

- 1) **Two tests each of 25 marks to be conducted as per the schedule given by the MSBTE .**
- 2) **Total of test marks for all the theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW) .**

RATIONALE: -

This subject is included to teach the students various aspects of illumination and illumination schemes. Students will be able to apply principles & laws of illumination. Students will have the knowledge of various types of lamps, lighting accessories & control circuit and their applications. He/she will become aware of his/her role in designing and installing illumination equipment as per new illumination trends. With changing life style and interest in recent trends in illumination, there is vast scope for illumination engineers to innovate and cater to the needs of domestic, commercial and industrial consumers. With experience one can start own business in the field of illumination engineering.

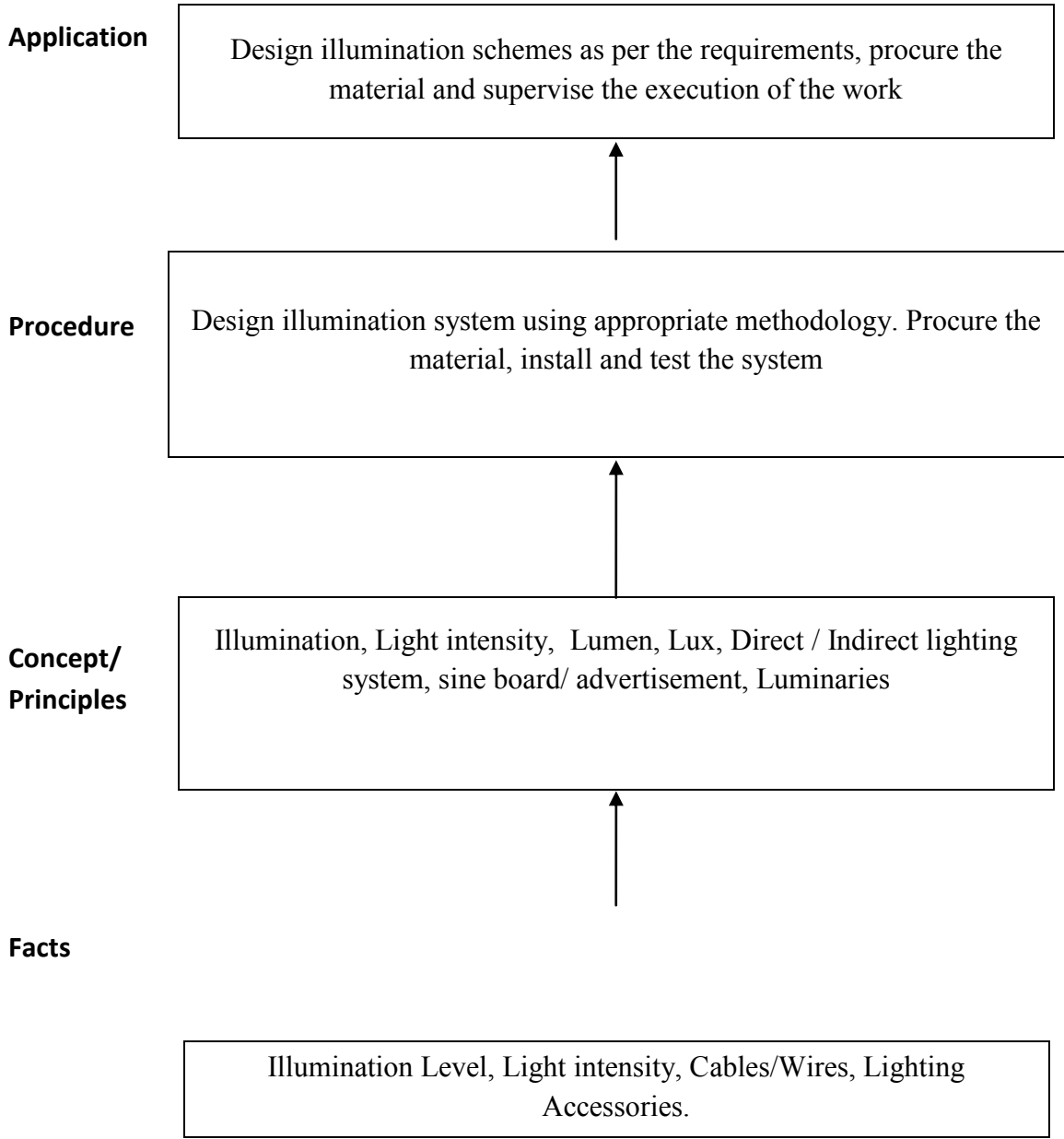
GENERAL OBJECTIVES:

The Students will be able to:

1. Understand the meaning of the terms used in illumination engineering
2. Realise the requirements of various types of consumers
3. Study requirements of illumination levels for various applications.

4. Understand the requirements of illumination equipment and accessories for different applications

LEARNING STRUCTURE:



Theory:

Name of the topic and Contents	Hours	Marks
<p>1. Fundamentals of Illumination</p> <p><u>Specific Objectives</u></p> <ul style="list-style-type: none"> ➤ Identify and measure the level of illumination ➤ Design illumination schemes ➤ Use IEI standards for illumination schemes <hr style="border-top: 1px dashed black;"/> <ul style="list-style-type: none"> • Fundamentals of Illumination • Illumination terminology: Illumination, Light intensity, Lumen, Lux • Laws of Illumination (Simple numerical) • Features of good Illumination scheme • Advantages of good Illumination scheme 	06	08
<p>2. Lamps & Lighting Accessories</p> <p><u>Specific Objectives</u></p> <ul style="list-style-type: none"> ➤ Differentiate between the various types of lamps. ➤ Collect technical data of lamps and lighting accessories ➤ Identify mountings arrangement for light sources <hr style="border-top: 1px solid black;"/> <ul style="list-style-type: none"> • Types of lights: <ul style="list-style-type: none"> a. Visible light b. Ultraviolet light c. Infrared light • Types of lamps: <ul style="list-style-type: none"> a. Incandescent lamp b. ARC lamps – ac & dc arc lamp c. Fluorescent lamp d. Mercury vapour lamp , HPMV lamp, Mercury iodide lamp e. Sodium vapour lamp f. Neon lamp , Neon Sign Tubes 	12	20

<ul style="list-style-type: none"> g. Halogen lamp h. CFL Lamps i. Metal halides lamp j. LED lamps k. Special purpose lamps • Construction , working principle advantages and disadvantages of all lamps • Comparison between incandescent & Florescent lamps • Lighting schemes: selection of lamp, illumination efficiency , glare & power consumption <ul style="list-style-type: none"> a. Direct & Indirect b. Semi direct & semi indirect c. General lighting scheme • Lighting calculation methods <ul style="list-style-type: none"> a. Watt /m2 method b. Lumens or light flux method c. Point to point method (Simple numerical) 		
<p>3 Illumination Control & Control Circuits</p> <p><u>Specific Objectives</u></p> <ul style="list-style-type: none"> ➤ <i>Select controlling methods of brightness/colour of light source as per requirements</i> ➤ <i>Select proper light source as per application</i> ➤ <i>Design control circuit for illumination.</i> <hr/> <ul style="list-style-type: none"> • Purpose of lighting control • Working principle and operation of : • Dimmer - <ul style="list-style-type: none"> a. Resistance type dimmer b. Salt water dimmer • Dimmer Transformer <ul style="list-style-type: none"> 1) Auto transformer dimmer 2) Two winding transformer dimmer • Electronic Dimmer : working principle and operation <ul style="list-style-type: none"> a. Thyrister operated dimmer b. Triac operated dimmer • Control of Enhance Lighting • Methods used for light control : • Control circuits for lamps : single lamp controlled by single switch, two switches, • Single Lamp control by two point method , three point method & four 	10	16

<p>point method</p> <ul style="list-style-type: none"> • Polar curve : its meaning and applications for designing the lamps 		
<p>4` Illumination for Interior Applications</p> <p><u>Specific Objectives</u></p> <ul style="list-style-type: none"> ➤ <i>Select lux level required for every working plane as per application</i> ➤ <i>Calculate total lux level required for the working plane</i> ➤ <i>Selection to proper light source</i> • Standards for various situations in Interior Illumination • Methods for Designing illumination schemes • Design considerations for Interior location of Residential Commercial, Industrial premises • Design Illumination scheme for different Interior locations of Residential, Commercial, Industrial unit • Numerical on above sub topics 	12	20
<p>5 Illumination for Outdoor Applications</p> <p><u>Specific Objectives</u></p> <ul style="list-style-type: none"> ➤ <i>Select proper wattages for light source as per its illumination efficiency</i> ➤ <i>Locate specific mountings of lighting sources for outdoor applications</i> ➤ <i>Consider effect of environmental conditions for working hours of light sources</i> • General requirements for lighting schemes Specific requirements for above schemes • Factory Lighting • Street Lighting • Flood Lighting • Railway platform Lighting • Lighting for Advertisement/Hoardings • Sports Lighting • Simple numerical based on design of simple schemes 	12	20

<p>6 Lighting for Special Applications</p> <p><u>Specific Objectives</u></p> <p>➤ <i>Understand use of special purpose lamps</i></p> <p>➤ <i>Select proper lamps in order to save energy</i></p> <hr/> <ul style="list-style-type: none"> • Lighting schemes and general requirements for : • Agricultural & Horticultural applications • Health Care Centers and Hospitals • decorative lighting • stage lighting • Aquariums & Shipyards 	12	16
Total	64	100

PRACTICALS:

Intellectual Skills:

1. Apply different designing skill.
2. Select proper equipment.

Motor Skills

1. Measurement of illumination.
2. Drawing skill.

List of Assignments:

1. Measure illumination by lux meter.
2. Prepare a report on Market survey for various lighting accessories.
3. Study the different lighting accessories and lamps & there working
4. Illumination scheme for Residential Installation.
5. Illumination scheme for Commercial Installation.
6. Illumination scheme for Industrial Installation.

7. Illumination scheme for Flood Lighting.

LEARNING RESOURCES:

1. Books:

Sr. No.	Name of the Author	Title of the book	Edition	Name of the Publisher
1.	N.V.Suryanarayana	Utilisation of Electrical Power		Wiley Eastern Limited
2.	Jack I. Lindsey	Applied illumination engineering		The Fairmont Press Inc.
3.	R.H. Simons & Robert Bean	Lighting Engineering & applied calculations		Architectural Press (ISBN0750650516)

2. ISO, IS, BS standards, Data Sheets, IE Rules Handbook
IS 2418,9974,9900,2218,5077,4012,4013,1885,1947,4347,6665,3287,1777,3646,2672,10894,
1944,10322,2140

3. www.onlinefreebooks.net
www.ies.org/shop/
www.opticalres.com/lt/illuminationfund.pdf