

Course Name : Diploma in Electrical Engineering**Course Code : EE****Semester : Sixth****Subject Title : Illumination Engineering****Subject Code : 17639****Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
04	--	02	03	100	--	--	25@	125

NOTE:

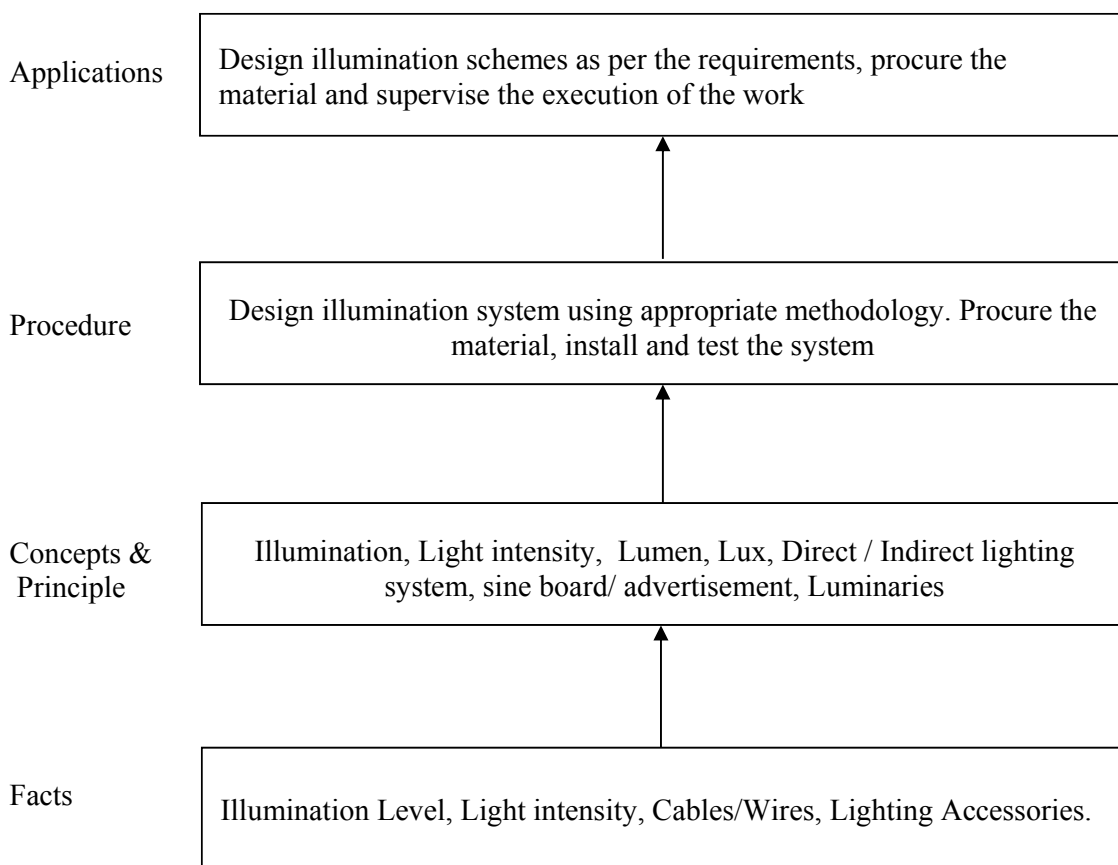
- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)

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:

Topic and Contents	Hours	Marks
Topic 1. Fundamentals of Illumination Specific Objectives <ul style="list-style-type: none"> ➤ Identify and measure the level of illumination ➤ Design illumination schemes ➤ Use IEI standards for illumination schemes <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
Topic 2. Lamps & Lighting Accessories Specific Objectives <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 • 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 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) 	12	20
Topic 3. Illumination Control & Control Circuits Specific Objectives <ul style="list-style-type: none"> ➤ Select controlling methods of brightness/colour of light source as per requirements 	10	16

<ul style="list-style-type: none"> ➤ Select proper light source as per application ➤ Design control circuit for illumination. <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. Thyristor 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 point method • Polar curve : its meaning and applications for designing the lamps 		
Topic 4. Illumination for Interior Applications Specific Objectives <ul style="list-style-type: none"> ➤ Select lux level required for every working plane as per application ➤ Calculate total lux level required for the working plane ➤ Selection to proper light source • 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
Topic 5. Illumination for Outdoor Applications Specific Objectives <ul style="list-style-type: none"> ➤ Select proper wattages for light source as per its illumination efficiency ➤ Locate specific mountings of lighting sources for outdoor applications ➤ Consider effect of environmental conditions for working hours of light sources • 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
Topic 6. Lighting for Special Applications Specific Objectives	12	16

<ul style="list-style-type: none"> ➤ Understand use of special purpose lamps. ➤ Select proper lamps in order to save energy. <hr/> <ul style="list-style-type: none"> • Lighting schemes and general requirements for : <ul style="list-style-type: none"> • Agricultural & Horticultural applications • Health Care Centers and Hospitals • decorative lighting • stage lighting • Aquariums & Shipyards 		
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. Estimate and compare luminous efficiency of incandescent and compact fluorescent lamp.
2. Compare performance of magnetic and electronic ballast. Estimate the energy saving with electronic ballast.
3. Understand energy efficient illumination equipments.
4. Design illumination scheme for any one of the following. (A) Flat (B) Bungalow (C) Row House and similar
5. Design illumination scheme for any one of the following. (A) Mall (B) Cloth shop (C) Restaurant (D) Showroom.
6. Write a report on illumination scheme used in industry by visiting small or medium industry.
7. Conduct illumination assessment in workplace using luxmeter
8. Understand biological implication of artificial illumination.

Learning Resources:**1. Books:**

Sr. No.	Name of the Author	Title of the Book	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 (ISBN 0750650516)

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