5106 – ILLUMINATION ENGINEERING

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
Lectures	Practical	Credits			Theory		Practical Ex.	Total
3	1	4	25	-	3 Hrs.	100		125

Pre-requisite	Source	Semester	Theory	Test	Total	TW	PR	Gr Total
NIL	ELL		75	25	100	25	-	125

Rationale: This course enables a learner to understand the principles of a good lighting scheme, the characteristics of different types of illuminating sources and their specific applications. It also helps a learner to design the lighting scheme for indoor as well as outdoor installations.

COURSE CONTENTS	Hrs	Mks
1. INTRODUCTION OF LIGHT Types of illumination, day lighting, supplementary artificial lighting & total lighting, Quality of good lighting, factors affecting the lighting –shadow, glare, reflection, colour rendering & stroboscopic effect. Methods of artificial lighting - lighting system –direct, indirect, semi direct, semi indirect. Lighting scheme- general and localised.	10	16
2. MEASUREMENT OF LIGHT Definition of luminous flux, luminous intensity, lumen, candle power, illumination, M.H.C.P., M.S.C.P., M.H.S.C.P. lamp efficiency, brightness or luminance, Laws of illumination – Inverse square law and Lambert's Cosine law, illumination at horizontal and vertical plane from point source, concept of polar curve. Calculation of luminance and illumination in case of linear source, round source and flat source.	12	20
3. DESIGN OF INTERIOR LIGHTING Definitions of maintenance factor, uniformity ratio, direct ratio, coefficients of utilisation and factors effecting it/illumination required for various work planes (As per I.S.I.) , space to mounting height ratio, Types of fixtures and related terms used for interior illumination such as DLOR and ULOR, Selection of lamp and luminance, Selection of various factors such as utilisation factor ,reflection factor maintenance factor (from IS code and standard table). Determination of lamp lumen output taking into account voltage and temperature variation, Calculation of wattage of each lamp and number of lamps needed, layout of lamp luminaire, Calculation of space to mounting height ratio. Indian standard recommendation and standard practices for illumination levels in various areas (such as work plane, near vicinity and far vicinity), special feature for entrance, staircase, corridor lighting and industrial building.	15	24
4. DESIGN OF OUTDOOR LIGHTING A) Street lighting- Types of street and their level of illumination required, terms related to street and street lighting, Types of fixtures used and their suitable application, Various arrangements in street lighting, requirements of good street lighting, Selection of lamp and luminaire, calculation of their wattage, number and arrangement, calculation space to mounting height ratio, calculation of illumination level available on road. B) Flood Lighting- Terms related to flood lighting, Types of fixtures and their suitable applications, selection of lamps and projector. Calculation of their wattage and number, their arrangement, calculation of space to mounting height ratio. Recommended method for aiming of lamp.	15	32
5. SPECIAL FEATURES OF AESTHETIC LIGHTING Monument and statue lighting, sports lighting, hospital lighting Auditorium lighting	12	08

Total	64	100

DEMONSTRATIONS:

1. Identification of various lamps such as incandescent, fluorescent tube, halogen, mixed, light, HPSV, HPMV and Neon lamp and study of their construction and characteristics such as efficiency, colour rendering effects, effects of voltage variation on their performance, starting and restriking time, starting voltage.
2. Determination of reflection/absorption factor of various surfaces such as mirror, plane glass,
3. Measuring and plotting of illumination intensity of light source (with incandescent lamp in vertical and horizontal plane with and without fittings)w.r.t. their angular position w.r.t. vertical axis of lamp fitting.
4. To study the indoor stadium lighting system.
5. To study open air stadium lighting system.
6. To study monumental lighting system.
7. To study industrial lighting scheme.
8. Planning of lighting scheme.
9. To study a swimming pool lighting system.
10. To study air port lighting system.

REFERENCE BOOKS

1. Lighting by D.C. Pritchard
2. Lamps and lighting by M.A. Cayless and Marsden.
3. Applied illumination Engineering by Jack L.Lindsay FIES
4. IS Code 3646 (Part I, II and III)