EDUCATION COMMITTEE

Scholarships in Lighting Education

The Education Committee has finalised the disbursement of scholarships for the current year. The evaluation of the students was done on the basis of 3 criteria – Financial Condition, Knowledge of Lighting Engineering and Academic Results.

The examiners at Kolkata were Mr. Biswajyoti Joarder, Mr. Ratan Ganguly, Mr. P.K. Majumdar and Mr. Rajat Roy; at Bangalore, Mr. Bhavani Prasad, Mr. M.S.N. Swamy and Mr. Biswajyoti Joarder and at Mumbai, Mr. K. Naveen, Mr. Rajesh Naik and Mr. Biswajyoti Joarder.

The scholarship recipients are given below:

Sucharita Dalui	Hooghly Engg.& Tech.College
Gourab Das	Hooghly Engg.& Tech.College
Sudipa Nandi	Hooghly Engg.& Tech.College
Prabal Kanti Ghosh	Jadavpur University
Ankita Bhaduri	Hooghly Engg.& Tech.College
Ajoy Kumar Khata	Hooghly Engg.& Tech.College
Partha Ghosh	Calcutta University
Amarjeet Kumar Prasad	Hooghly Engg.& Tech.College
Ranjan Mondol	Jadavpur University
Saroj Kumar Ghosh	Jadavpur University
Soumyadeep Chatterjee	Hooghly Engg.& Tech.College
Abhishek Anand	Manipal Institute of Technology
Chirantan Kumar	Jadavpur University

Prizes for Student Projects

The Committee had decided to evaluate and give prizes for the student projects at the Undergraduate and Post-Graduate levels. The projects were evaluated on six criteria:

Merit of the project in terms of practical approach
Involvement of candidates
Knowledge of the subject lighting (related to the project)
Innovative ideas
Progress of the project and
General knowledge on Lighting Engineering

The synopses of the prizewinning projects are given below

First Prize UG Level

Solar Powered Interior Lighting System: Solid State Lighting With Color Control for Accent Lighting.

In our project we explore the avenues of illumination using LED's. We have incorporated high intensity power LED's of 1W rating at present. We may advance to the use of 3W power LED's at a later stage depending upon its availability in the market. The lumen output of an RGB module of 1W rating has been found to be 50 lumens/watt. We plan to make a lamp of around 600 lumens.

Using solar panel of appropriate wattage output, the battery will be charged through an energy efficient power converter stage. The power converter stage will be controlled by a microcontroller to optimize the output power under variable Sun's insolation conditions.

The controller 1C in use is PIC 18F2550 and the driver used is 1C 5940. These 1C's will be programmed to produce many different colour outputs from the RGB LED lamp. It is also possible to control the light intensity of this lamp by these 1C's. PIC 18 microcontrollers have the following advantages:

High computational performance at an economical price-with the addition of high endurance/ enhanced flash memory. In addition to these features the family introduces design enhancements that make these microcontrollers a logical choice for many high performance, power sensitive applications.

TLC 5940 has 16 channels each of which has an individually adjustable 4096 step grayscale PWM brightness control and a 64 step constant current sink (dot correction). This adjusts the brightness variations. This IC also indicates a discontinuity as well as over temperature condition.

An appropriate thermal protection would also be designed for the lamp as each 1W module will take at least 350mA of current.

In the later stage of the project we are also going to incorporate a wireless connection between the controller and the LED lamp. It would thus be possible to control the billion colour outputs of the lamp by just using a remote control.

The complete demonstration model using locally available resources will cost in the range of Rs. 8000 to 10,000.

Kokila Duraisamy, Dipti Lohchab, Simranjit Singh Sandhu, Amit Srivastava

Department of Electrical Engineering, Fr. C. Rodrigues Institute of Technology, Vashi, Navi Mumbai

Guide: Prof. Sushil Thale

Second Prize UG Level

A Project on Hospital Lighting:

Hospitals are structurally complex. There are numerous areas, which are distinctly different in the nature of the tasks performed. Each area has its own specific need for illumination. Also lighting schemes are versatile in a hospital and medical science has to be blended with illumination engineering in order to achieve a competent design. Hospital Lighting concerns the lighting of various functional (both medical and non-medical) areas of hospital interior, as well as the hospital exterior. The design has been accomplished using Dialux 4401, lighting design software. Average and maximum values of illuminance for particular areas have been consulted from IS 3646 mainly, and ILA (International Lighting Academy) prescribed table of illuminance. Then the area has been designed according to the prescribed illuminance. Overall Uniformity has been given great importance. Efforts have always been to maintain it as 0.7 or higher in case of general lighting in indoors areas. For localized general schemes it is maintained higher

than 0.6. From the point of conservation of energy, each lighting solution is designed for minimum value watts/sq.m. In order to utilise the natural light mostly, a scheme of daylight linking has been proposed. Individual lighting needs and the functional nature of the different areas have been emphasised. When designing the lighting for wards, i.e. the area for the patients, along with the sufficiency of examining light, the cosiness and reassuring nature of the lighting has been kept in mind. Again, when the lighting is designed for staff, cool daylight has always been the choice as it enhances activeness in staff, which increases their efficiency and drive for work. Public areas like the reception and entrance have been designed not only to satisfy their lighting needs, but towards the branding of those areas as distinctive landmarks to attract people. The light sources and control gears are chosen accordingly. Some of the areas are combined. They are used both as public areas and staff areas. These are treated specially and directional lighting has been used in order to satisfy their combined needs. In the case of the exterior, the design concentrates on the fact that this area should be clearly visible from the neighborhood, and distinct as well as inviting. All the special areas like Operation Theatre, X-Ray rooms etc. have treated carefully according to their special functional nature. In doing all this, overall cost efficiency has been maintained at the maximum level possible.

Sucharita Dalui, Ankita Bhaduri, Sudipa Nandi,
Gourab Das, Amarjeet Prasad
Hooghly Engneering.and Technical College
Under the guidance of Mrs. Debadyuti Banerjee

3rd Prize UG Level

A Project on Office Lighting:

Lighting systems for offices must be cost effective and provide a comfortable, productive and energy efficient workplace.

The plan of the office is made with Autocad'07. The entire lighting design is made with the software DIALUX 4.4.The office lighting design on which the project is based consists of the following rooms.

At first there is a reception which is quite large and decorative, so we have used recessed luminaires with T8 lamps. Beside the reception there are two toilets side by side and the two are separated by a partition. Immediately next to the toilet there is the employee's room whose design is based on an open office plan. As this is a large room we have to consider the power consumption, uniformity, total cost and the lux value and considering all this we have used suspended luminaires with TFL. The window should be large enough for good ventilation and should be tinted wherever needed so that direct or indirect glare does not occur on VDUs. The furnishing of furniture should also be taken care. The colour and texture of the walls, ceiling and floor should be of light colour so that higher reflectance is achieved and a lower number of luminaires are required to achieve the required lux level than would have been required if dark colour was applied. Excessive use of smooth surfaces should be avoided as it may produce glare. Glare has been avoided by using appropriate luminaires. Dimmers using photo sensors are used to minimize power consumption by regulating the lighting level during the 24 hour cycle. In front of the employee's room there are two rooms. One room is the store room and the

other is the MD's room. The MD's room should be the most decorative and clean. On the walls we have used decorative wooden planks and on the floor red carpet is used. Here we use recessed TFL luminaires in addition to localized lighting to maintain low power consumption and a good uniformity ratio, as it is an essential requirement of good lighting design. Beside the MD's room there is a toilet. In the toilets, we have used LED type surface mounted luminaires, as the present demand is for low power consumption and LED is the best solution. After designing we get the photometric results as output from DIALUX.

Subir Biswas, Soumyadeep Chatterjee, Ajay Kr. Khata, Prashant Kumar
Hooghly Engneering.and Technical College
Under the guidance of Mrs. Debadyuti Banerjee

1st Prize PG Level

Industrial Shed Lighting

Good lighting does not mean only providing lux level at working planes, it is providing right light at the right time along with uniform distribution of light. Industrial lighting not only includes Industrial Shed lighting but also includes Office area lighting, Lab area lighting etc.

Industrial area lighting is guided by IS. But in the practical field of application, lux levels at different areas are sometimes decided by the client himself. For this particular project, area wise illumination levels were decided by the client.

This is an electronic goods manufacturing industry. So in comparison to other industries, the illumination level requirements will be much higher. Particularly for the lab areas, illumination level is most important along with uniformity and CRI of the light source.

The complete design has been done on the lighting software and accordingly the fixtures are positioned in the AutoCAD drawing. It is very practical that sometimes the number of fixtures as per calculations cannot be positioned in the actual area due to structural constraints. So it is the aesthetic considerations that are taken into consideration at that time.

Dipayan Nath,
M.E. Illumination Engineering,
Jadavpur University.

2nd Prize PG Level

Energy Efficient Lighting Design of Academic Building

The project is the Total Lighting Design (Indoor & Outdoor) and Electrical Installation of the Academic Building of Dr. R. Ahmed Dental College & Hospital (Under Construction) in Kolkata. It is going to be a six-storied building.

Design Approach: In the old building mainly T12 and Incandescent have been used for lighting. Now at first in different rooms the average illumination levels have been taken from the IS chart. The above illumination level can be achieved by using different lighting software. In the case of indoors mainly fluorescent lamps T8 and T5, and CFLs

of 11 watt, 18 watt, 36 watt can be used. For T8 only Super 80 of Philips is used. For beautification LEDs can be used. As it is going to be an energy efficient building the design is done considering Energy Conservation Building Code (ECBC) and National Building Code of India. Every floor consists of different types of rooms. For example the ground floor consists of seventeen types of rooms (H.O.D. Room, Teachers' Room, Oral Surgery Ward Male & Female, Emergency Room, Radiology, Dark Room, General Waiting Room, Faculty Room, O.T. Bed, Emergency O.T. Seminar Room, Dental Chair, etc.).

To achieve proper illumination the seminar hall is designed with 5 nos. of 2x18 watt CFLs and 2 nos. of 1x11 watt CFLs. All others rooms are designed with other types of lamps and luminaires of different companies.

Another part of the project is the electrical installation of the total building. At first wiring of every floor is done. After that SPNDB & Power Distribution box (PDB) is placed. From the single line power diagram of each floor the total load has been calculated. This load is checked according to Energy Conservation Building Code. From this connected load considering Diversity Factor (DF) the utilized load has been calculated. Thus the transformer is selected according to load, considering 25% extension load in future.

Animesh Bhattacharya,
M.E. Illumination Engineering, Jadavpur University

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No suitable candidate was found by the Committee for the 3rd prize.