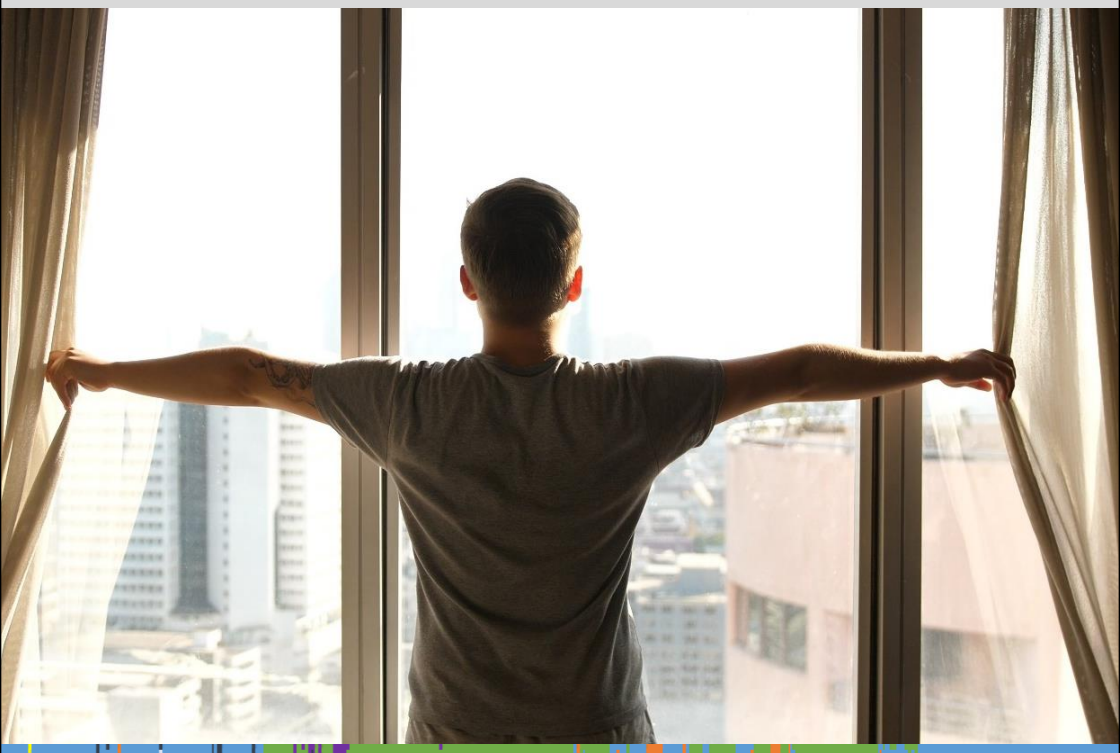
Professional Certificate Program

Daylighting Beyond Energy Efficiency



Blended Learning Program
Six Weeks | 8 June – 14 July 2024

CPP | CEPT UNIVERSITY

CEPT PROFESSIONAL PROGRAMS

CEPT Professional Programs (CPP) aims to bridge the gap between academics, practice, policy-making, and implementation through short certificate programs. The mission of CPP is to support individual and organizational learning by creating opportunities to acquire new skills and capabilities, thus allowing professionals to stay relevant in the current knowledge-based global context. It will achieve this by offering professional development, continuing education, and up-skilling opportunities for professionals and in-service persons across disciplines concerned with urban development and the built habitat.

CPP draws from the expertise and capacity of the accomplished faculty at CEPT University, enhanced further by experts and practitioners from the field. Its programs are built on deep research, vast consultancy projects, and innovative pedagogies. CPP offers a repertoire of short programs and topic-focused programs across disciplines of architecture, design, planning, and management with immersive learning approaches combining interactive lectures, case studies, and peer-to-peer exchanges.

ABOUT THE PROGRAM

This 6-week long program looks at daylight requirements in buildings which have been historically viewed from an energy efficiency perspective. This program will help practitioners get up-to-date on **health effects of daylight and lighting inside** building and how to optimize occupant wellbeing alongside energy performance goals. We shall take a close look at technologies that are often associated with high performance buildings – **LED Lighting** and **high-performance glazing** from the point of view of occupant health and wellbeing. The program shall culminate in a whole building, project level perspective on making optimal choices.

Some example questions that will be addresses in this program:

- **Why luminous efficacy maybe driving us to unhealthy lighting design?**
- **How do we optimize windows for daylight access and controlling heat gains?**
- **Is there a conflict between occupant health and energy efficiency goals?**

PROGRAM STRUCTURE

The program will be conducted in blended learning mode **over 6 weekends** in two modules:

Module A) Concept development through experimentation and computer simulations. Module B) Practice and application at whole building scale.

In Module A we shall examine:

1. **Changing the definition of 'daylit buildings'** with a growing understanding of biological effects of light, past and present daylight metrics such as Waldram's Sky component, Sky View Factor, DF, UDI, sDA LEED v4, sDA LEED 4.1, ECBC 2017, EU 17037, WELL circadian lighting shall be brought into play. Properties of daylight relevant to building designers would be explained with state-of-the-art lab demos. Participants will learn from and experiment with two unique **artificial skies on the CEPT campus and** study the effect of films and light fixtures on the spectral distribution of light, to fully understand the relation between wavelength of light and biological pathways for sleep onset and hormonal release/suppression cycle.

2. Maximizing daylight availability in buildings through envelope design and planning, while balancing the need for sun control. We will work with **custom grasshopper workflows** to demonstrate potential pathways for doing so.

3. How can **LED lighting support health needs** in deep-section buildings? An array of industry experts will enrich discussion on the present and future of electric lighting in India, especially from the point of view of occupant health and energy efficiency.

Module B shall be case study based with the following learning objectives:

1. Balancing energy use and occupant wellness
2. Compare contrasting design pathways to energy-efficient and healthy buildings

PROGRAM FACULTY

Prof. Minu Agarwal
Program Director

Minu Agarwal (PhD) is an Adjunct Assignment Professor at CEPT University, India in the area of **daylighting and electric lighting** in buildings. She holds a doctoral degree from École Polytechnique Fédérale de Lausanne (EPFL), Switzerland (2020) and Masters from Carnegie Mellon University, USA (2007). She has worked as an energy performance specialist on over 50 commercial office and institutional buildings in the USA and worked as a reviewer for the GBCI (Green Building Certifications Institute) alongside her consulting work.

Her **key projects** include the Hawaii preparatory academy, Hawaii, the first building to ever achieve the Living Building Challenge, Eighth Avenue Place, Calgary, Canada's first LEED Platinum high-rise office building and La Jolla Project, San Diego, a large-office net-zero energy building. Her current professional affiliations include IDA (International Dark-Sky Association), ASHRAE and IBPSA.

Prof. Rajan Rawal
Program Faculty

Rajan Rawal (PhD) is a Professor at the Faculty of Technology CEPT University and a senior advisor at the Center for Advanced Research in Building Science and Energy (CARBSE), CEPT Research and Development Foundation (CRDF). His work emphasis is on **energy performance of buildings and cities** and **architectural science education**.

He is a member of various technical core committees of the Bureau of Energy Efficiency – Ministry of Power, National Building Codes, and voluntary green building rating programs. Prof. Rawal contributes to International Energy Agency EBC Annex 69 on low-energy building and thermal comfort and EBC Annex 87 on Energy and Indoor Environmental Quality Performance of Personalized Environmental Control Systems. He teaches energy-efficient built environments, energy policy, energy modelling and simulations at the postgraduate programs. His current focus of work is on Passive Design Strategies, Net Zero Energy Buildings and Communities, Urban microclimates, Embodied Carbon in Buildings, Personal Thermal Comfort Systems and Practices of Adaptive Thermal Comfort Models.

GUEST SPEAKERS

Dr. Aicha Diakite-Kortlever
Guest Speaker

Aicha Diakité-Kortlever is a **lighting engineer specializing in daylighting**, sustainable urban planning, and environmental modeling. She holds degrees in Electrical Engineering from the Technical University of Berlin (Germany) and Poznan University of Technology (Poland). Her work has been recognized with prestigious awards including the H.-J.-Helwig Prize and the Hans-Peter-Willumeit Award. In her current work, she is **focusing on proposing new spectral sky models** to integrate daylighting strategies into urban design for improved well-being.

Dr. Priji Balakrishnan
Guest Speaker

Priji Balakrishnan is a researcher, educator and environmental designer. Her research expertise is in design and **computational workflows of daylight, comfort and energy at architectural and urban scales**. Priji's current work looks at measuring and modelling the equatorial light, researching strategies to design with contextual information of daylight. She holds a PhD from Singapore University of Technology and Design (SUTD) and Master's from the Architectural Association School of Architecture (AA) in Sustainable Environmental Design.

Dr. Sneha Jain
Guest Speaker

Sneha Jain's research intersects **architecture, technology, and sustainability**. Currently working as a postdoctoral scholar in the civil and environmental engineering department at Stanford University, Sneha earned her PhD from EPFL, Switzerland, where she delved into the impact of eye physiology and daylight color on human visual comfort in office environments. Presently, her work revolves around broader aspects of **occupant well-being in low-income housing**.

GUEST SPEAKERS

Linus Lopez
Guest Speaker

Linus is Director, Design Matrix & Design Objects since earning his Bachelor of Engineering (B.E.) degree in 1991. **He specializes in electrical services design for diverse projects**, including hospitals, hotels, airports, housing communities, and more, all emphasizing sustainable practices. With a Master's degree in Architectural Lighting and Design Management, he has led over 200 architectural lighting projects. He is also a **professional Member of the International Association of Lighting Designers (IALD) and president of LiDAI.**

Harmeet S. Issar
Guest Speaker

Harmeet Singh Issar, Director at Design Matrix & Design Objects, possesses expertise in Lighting Design, Lighting Controls, and Lighting Education. He graduated in electronics engineering in 2002 and soon became one of the pioneers of solid-state lighting with Philips Lighting. Overseeing more than 200 projects since then, his work includes lighting **master planning for Lucknow, prominent hotel projects across India, Africa, and Southeast Asia**, and revitalizing the City Palace in Jaipur for night tourism.

Sudeshna Mukhopadhyay
Guest Speaker

Sudeshna Mukhopadhyay serves as the Vice President at Havells India Ltd., specializing as a Lighting Strategy and Learning Consultant. **With over 34 years of expertise in Lighting design, standards, education, and product technology, she is a renowned figure in the field**. As an experienced business professional, she has excelled globally, collaborating with leading architects and designers on landmark projects in India and the Asia-Pacific region. Her contributions extend beyond practice; she serves on national regulatory committees, co-guides PhD research, and lectures at prestigious institutions like IIT Kharagpur and IIT Mumbai.

PROGRAM CALENDAR - 2024

Days	Description	Contact Hrs	Mode
Week 1 8th- 9th June 9:00 AM – 12:00 PM	**What is a daylit space?** Introduction to structural framework of daylight metrics and expanding definition of daylit spaces/buildings.	6 hours	Online
Week 2 14thJune(Friday) 12:00 PM – 6:30 PM 15thJune(Saturday) 9:00 AM – 4:30 PM	**Maximizing quantity and quality of lighting:** Physical properties of visible light shall be discussed under three heads - Quantity, Spectral distribution and direct/diffused. Each of these properties would be explained with lab demos using spectrophotometer and other light measuring devices.	12 Hours	On-Campus
Week 3 22nd – 23rd June 9:00 AM – 12:00 PM	**Maximizing daylight access at site and building scale:** We shall look at **key drivers of daylight access**. - sky view factor and orientation. Demonstration of outside-in approach to lighting design. Participants will calculate important daylight indicators at of various massing schemes using Rhino + Ladybug tools to identify the best scheme.	6 Hours	Online
Week 4 29th – 30th June 9:00 AM – 12:00 PM	**Daylight access while doing sun control through window sizing and design**. This is an age old optimization problem that is a challenge. We shall explore this at the window scale. Participants will need to assimilate the given models, data and select a design that truly maximises daylight access.	6 Hours	Online

PROGRAM CALENDAR - 2024

Days	Description	Contact Hrs	Mode
Week 5 6th – 7th July 9:00 AM – 12:00 PM	**How can LED lighting support human health?** SPD of common LED chips, how blue LEDs revolutionized LED lighting. Further we shall discuss if **LEDs can do the job of daylight.** Photopic lux to Melanopic lux conversion will be done. **LPD regulations in commonly applicable energy standards and potential conflicts with glare free lighting** and lighting to support circadian systems. In an example private office, participants will implement Super ECBC compliant lighting schemes, calculate W/m2, UGR, Vertical Illuminance and EML at the occupant's eye. Data from the whole class will be collected to assess feasibility of low energy solutions that are visually comfortable and support human health.	6 Hours	Online
Week 6 13th-14th July 9:00 AM – 12:00 PM	**Is there an energy penalty to good daylight design?** Example 1: What do you get from every 1m2 of window area? This exercise will show which aspects of performance are related linearly to window area. Example 2: We shall also do a whole building scale problem – to meet health and energy related prerequisites what are potential pathways.	6 Hours	Online

ADMISSIONS AND APPLICATIONS

Application Process	Online applications have already commenced. To apply visit the CPP website http://cpp.cept.ac.in/ and submit the online application form.
Application Deadline	**10 May 2024** The deadline for this program is indicative. Applications will be considered as they are received, and seats will be allotted on a first come first serve basis. Admissions will be closed once all seats are full
Program Dates	8 June- 14 July 2024 (Online & On-Campus)
Who can Apply?	The program is open for Professionals with a bachelors in Architecture or Engineering. The following levels of work experience are suited for the program. Work experience in the field of daylight or lighting is preferred. • 1.5+ years of building performance-related consulting work (Daylight or thermal simulations) • **OR** Project experience on at least 5 green-certified building projects • **OR** Lighting designer with 1.5+ years of work experience • **OR** Research experience of 3 years • **OR** Teaching experience of 3 years.
Fees	**INR 38,500/-** + GST (Inclusive of welcome kit and working lunch during on-campus modules.)
Certificate	Participants will receive a certificate from **CEPT University** on successful completion of the program with a minimum of 80 percent attendance.

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CEPT University

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