3D Printing for Lighting

Interactive Online Course



Expand Your 3D Printing Knowledge with the LRC

Additive manufacturing (AM), more commonly known as 3D printing, is poised to revolutionize the lighting industry. This 5-week live and interactive online course is designed to help participants understand the application of 3D printing to the design, development, and manufacturing of lighting, as well as learn more about both the lighting and 3D printing industries.

Who Should Take This Course?

- Lighting industry professionals who want to learn more about the use of 3D printing in the design, development, and manufacturing of lighting components and products, including fabrication of cost-effective unique parts that cannot be made using traditional manufacturing methods.
- 3D printing industry professionals interested in the application of 3D printing technology to lighting.
- Anyone who wants to better understand the possibilities and impacts of 3D printing in lighting product lines, including:
 - o Equipment and materials manufacturers
 - Product and innovation managers
 - o Industrial designers
 - o Engineers
 - o Product developers
 - o Research and development professionals

Course Objectives

At the conclusion, participants will be able to:

- Appraise the value of 3D printing for manufacturing lighting systems
- Understand the 3D printing process from design to manufacture and post-production of components as it applies to lighting systems
- Characterize the lighting market size; the performance requirements of electrical, mechanical, optical, and thermal components in lighting systems; and the needs of different lighting applications
- Compare the most common methods of 3D printing processes and technologies, and the pros and cons of each related to the fabrication of various lighting components
- Assess material, print parameter, and finishing requirements for fixture components and systems
- Design a 3D-printed component for a fixture and learn the steps involved to characterize and optimize the designed component
- Understand the process that goes into testing, evaluating, and quantifying the performance of 3D-printed lighting componentss

Course Certificate

Participants who successfully complete the course will be awarded a certificate from the Lighting Research Center including 15 continuing education units (CEUs).

Lighting Research Center

Course Description

The course will provide training in the application of 3D printing to the design, prototyping, and manufacturing of lighting system components, and give participants the knowledge and skills needed to begin using this technology in their own companies.

There will be both weekly, in-person instruction hosted by course faculty (i.e., weekly, approximately 2.5-hour live, interactive sessions), via an internet-based conferencing system (WebEx), as well as supplemental activities and assignments to be completed by course participants throughout the course period.

Schedule

The online course consists of five sessions. Below is a summary of each session. Detailed descriptions and dates can be found on the course website.

Session 1: Introduction to the 3D printing process, including its pros, cons, and benefits as compared to other manufacturing processes. The session will provide an overview of the lighting and 3D printing markets size, trends, and growing applications.

Session 2: Comparison of 3D printing processes and technologies, including an overview of the various types of 3D printing technologies and the pros and cons of each in terms of rate, quality, value engineering, and flexibility. As part of this session, each participant will design an optical component, which will be printed by the LRC and returned to each participant for evaluation.

Session 3: Optical component printing, including a review of the printing process for both transmissive and reflective optical components, as well as 3D printing design and fabrication parameter pitfalls, tips, and suggestions.

Course instruction will include collaborative, handson activities using physical components and parts provided by the LRC. Course participants will work interactively with course faculty in live, remote laboratory sessions. Participants will also design components which will be printed at the LRC and returned to participants for evaluation.

The course will begin on January 25, 2023, and will run through February 22, 2023. Classes will meet on five Wednesdays from 11:00 AM to 1:30 PM US Eastern Time. A more detailed schedule of course activities, presentations, and assignments will be provided upon registration for the course

Following Session 3, participants will design a fixture envelope that incorporates an optical element, heat sink, and LED module to create an LED lighting product. The design and the necessary 3D printing files will be emailed to the LRC to be printed and returned to each participant after completion of the course session.

Session 4: 3D printed heat sink design and printing, including an overview of thermal management theory, analysis of thermal performance of heat sink components, heat sink build orientation, print parameters, application orientation-related performance, and the effects of LED junction temperature on light output, color, and other factors.

Session 5: Measurement and analysis of 3D-printed components. This session will include an interactive lesson on photometry and thermal measurements; light output and beam quality evaluations; and LED junction temperature calculation and analysis on the participant-designed fixture envelope with the optical, thermal, and light sources.

3D printing area for research, demonstrations, and live online education

Cost & Registration

The cost of this 5-week course is \$1,200. A 50% discount is available to employees of ASSIST 3D Printing for Lighting consortium members. Registration availability is limited.

For more course details and to register, visit https://www.lrc.rpi.edu/education/outreachEducation/3d.asp



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