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 6-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:
  - Equipment and materials manufacturers
  - Product and innovation managers
  - Industrial designers
  - Engineers
  - Product developers
  - Research and development professionals

Lighting Research Center

Course Objectives

At the conclusion of the course, 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 lighting fixture components and systems
- Design, characterize, and optimize a 3D-printed component for a lighting fixture
- Test, evaluate, and quantify performance of 3D-printed lighting components

Course Certificate

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

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 two- to three-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 six-week course period.

Course instruction will include collaborative, hands-on 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 additively manufactured at the LRC and returned to participants for evaluation as part of the course sessions.

The course will begin on September 8, 2021, and will run through October 20, 2021. Classes will meet on six Wednesdays from 12:00 PM to 2:00 PM US Eastern Time. A more detailed schedule of course activities, presentations, and assignments will be provided upon registration for the course

Schedule

The online course consists of six live 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.

Session 3: 3D object creation with computer-aided design (CAD), including a review of slicing software programs and requirements. As part of this session, each participant will design an optical component. The design will be emailed to the LRC to be additively manufactured and returned to each participant for evaluation in a later course session.

Session 4: Optical component printing, including a review of the printing process for transmissive and reflective optics, as well as design and fabrication parameter pitfalls, tips, and suggestions. This session will also include course faculty leading participants through the measurement and evaluation of 3D-printed optical components.

Session 5: 3D printing heat sink design and printing, including an overview of thermal management theory, thermal performance analysis of heat sink components, heat sink build orientation, print parameters, application orientation performance, and the effects of LED junction temperature. Following this session, each participant will design a heat sink for an LED lighting product and email it to the LRC to be additively manufactured and returned to each participant for evaluation.

Session 6: 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.

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

Cost & Registration

The cost of this 6-week course is $1,950. 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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