



Course Agenda

Measurements for Laser Safety (L-240) A Hands-on Training Program

DAY ONE: Radiometric Units & Power/Energy Measurements

- 8:00 am Registration / Continental Breakfast
- 8:30 am Review of Laser Technology
Laser Fundamentals
Laser Output Characteristics
Laser Types and the Output Characteristics of Each
(CW, pulsed, Q-switched, mode-locked; gas, solid state)
Radiometric Quantities and Units
Power and Pulse Energy
Beam Spatial Characteristics
Laser Safety Terminology
- 9:30 am Fundamentals of Laser Measurements
Laser Power and Energy Measurements
Detector Types and Applications
Accuracy of Measurements
- 10:00 am Laboratory Experimental Series
Measure Output Power of CW Lasers
(Argon, HeHe, Nd:YAG, diode)
Measure Output characteristics of Pulsed Lasers
(Chopped Argon, AO Q-switched Nd:YAG)
- 12:00 pm LUNCH
- 1:00 pm Laser Beam Profiles
Diameter of Gaussian Beams ($1/e$ and $1/e^2$)
Descriptions of Other Beam Shapes
(Elliptical, rectangular, others)
Discussion of Measurement Techniques
- 2:00 pm Laboratory Experimental Series
Determine Beam Profile and Size by Scanning the Detector
Determine Beam Diameter by Measuring Transmission
Through an Aperture
- 4:30 pm End of Day



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DAY TWO: Beam Profile and Divergence

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| 8:00 am | Sign In / Continental Breakfast |
| 8:30 | am Beam Divergence
The Near Field and the Far Field
Diameter of Focused Beams
Discussion of Measurement Techniques |
| 9:00 am | Laboratory Experimental Series
Determining Divergence by Measuring Diameter at the Focal Point of a Lens
Measuring Beam Divergence with a Ronchi Ruling |
| 12:00 pm | LUNCH |
| 1:30 pm | More Difficult Measurements
Measurement Techniques for Diode Lasers
Measurement Techniques for Low-Divergence Beams
Temporal Measurements
Discussion of M2 Measurements |
| 2:00pm | Laboratory Experimental Series
Measure the Divergence of a Diode Laser with Attached Collimating Optics
Measure the Divergence of a Low-Divergence Beam
Measure the Divergence of an IR Beam |
| 4:30 pm | End of Day |



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DAY THREE: Standards and Classification Measurement Methods

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| 8:00 am | Sign In / Continental Breakfast |
| 8:30 am | Product Standards
Classification Measurements
Radiance and Extended Sources |
| 10:00am | Discussion Session - Results of Each Experiment Discussed
Additional Techniques - Burns, Photographs, Video, Others |
| 11:00 am | Discussion Session - Questions, Answers
Discussion of Selected Measurement Problems |
| 12:00 pm | LUNCH |
| 1:00 pm | Optional Laboratory and Discussions
Discussions of Specific Measurement Problems Posed by Students |
| 3:45 pm | Evaluations / Certificates |
| 4:00 pm | End of Course |