CSUN | ENVIRONMENTAL HEALTH AND SAFETY

Laser Safety Program

Laser Safety Officer (LSO)
Telephone: 818-677-2401

Laser Use Authorization (LUA) Form: L-01

Part I – Laser Registration

NOTE: All lasers of Class 3B and Class 4 must be registered with the Environmental Health and Safety Department.

- Please complete this form for each Class 3 B or 4 laser you plan to acquire (or already have) and email to ehs@csun.edu .
- An email confirmation will be sent to the applicant within seven days of receipt of Part I: Laser Registration.
- Approval is required before putting laser into operation. Allow 30 days from receipt of completed LUA application, Part I and Part II.

Section A: Laser Holder and General Information					
Principal Investigator:					
Office Phone No:		E-mail address:			
Laser Operator(s): (Check all that apply)	☐ Paid Staff/Faculty ☐ Enrolled students ☐ Volunteer Employees ☐ Visitors				
Laser Manufacturer:		☐ CSUN Fabricated Laser			
Model Number:		Serial Number:		CSUN Property #	
Type of Laser Equipment:					
Type of Registration	☐ New Laser/laser system acquisition or installation ☐ Alteration/transfer/status change of an existing laser system* (Explain in *Comments* section below.)				

Section B: Location and Laser Details				
Department:		Building:		Room Number:
Laser Classification (Check One):	☐ **Class 3B** (5-500 mW) or (≤ 125 mJ pulsed) ☐ **Class 4** (>500 mW) or (> 125 mJ pulsed)			
Active Medium (i.e., Argon, Ruby, Nd:YAG, Diode):				
Tunable Laser? (Check One)	☐ Yes ☐ No	*Details*		
Wavelength(s) (nanometers):				
Beam Divergence	**mrad**			
Beam Diameter at laser output:	**mm**			
Purpose and Frequency of Use: → ☐ Research ☐ Classroom				
☐ Continuous Wave	Average Power (W):		Maximum Power (W)	
☐ Repetitively Pulsed	Energy per Pulse (J)		Pulse repetition frequency (Hz)	
☐ Single Pulse	Pulse duration (nsec)		Pulse width (s)	
☐ Q-Switched	Peak Pulse Power (W)		Peak Power Density (W/cm^2)	

Please check all items that apply to your operation:

☐ Invisible Beam (IR or μν)	☐ High Voltage (660V)	☐ Multi-Use Room	☐ Public Theater
☐ Exposed Beam Path	☐ Beam Focusing Optics	☐ Outdoor use	☐ Creative Arts
☐ CSUN Modified Laser	☐ Frequency-doubling Crystal	☐ Laser Cutting/Welding	☐ 3-D Printer

Comments

Laser Use Status ☐ Ready to Use ☐ In Storage (useable, stored) ☐ Needs Repair (not useable)

PI Signature: _____ Date: _____

By manually signing this form or printing my name electronically, I acknowledge that all statements are true and accurate. If requested, an actual signed document can and will be provided.

*Alterations include any changes(s) that substantially increases or decreases the output or wavelengths produced. Relocation from one work space to another or transfer to a new owner is also an "alteration".

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(FOR DOUBLE-SIDED PRINTING)

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Part II – Laser Use Details-Required for LUA

FOR LASERS MOTHBALLED AND NOT USED:

1. This laser is in storage and not in use. _____ *Initials*
2. I understand that I will notify the LSO if there is any change, such as prepare it for use or if I dismantle/discard or sell/transfer it.
3. If I decide to put this laser/laser system into use I will fill out Part II of the LUA application and submit it to the LSO.

A. Diagram of laser or laser system set up.

Show location of beam stops, interlocks, shielding, mirrors and other relevant details or attach drawing.

B. Administrative

Please attach written safe operating procedures (SOPs) for such tasks as **Alignments**, **Emergency Shutdown**, **Powering-up and Laser Eyewear Use** with this LUA application.

By my signature, I acknowledge that I may not begin using the laser until my Laser Use Authorization has been approved by the Laser Safety Officer.

Laser Use Authorization Holder Signature _____ **Date** _____

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C. Security and Access Control

GOAL: Preventing unauthorized people from entering the laser control area

1. How will you prevent unauthorized users from entering the control area? How will you protect visitors, custodians or other "civilians" when the laser is operating? *Examples: Locks on doors, warning lights, signs, training.*

GOAL: Preventing the laser beam from leaving the optics table or controlled area

2. Describe your interlocks or other engineering controls. *Examples: Interlocked doors or gates, use of beam stops or dumps, barriers, and shields (opaque and fire resistant).* If none, explain your alternative methods.

GOAL: Preventing unauthorized access or accidental contact with the laser beam of non-laser users in the room/area.

3. Describe the engineering or management controls you will have in place to prevent room occupants contact with the laser beam. *Examples: infrared and ultraviolet sensor cards, infrared viewers, partitions, lab rules, barriers on optics table to protect users working at computers, etc.*

D. Personal Protective Equipment

1. Is eye protection required for entry or certain tasks? ☐ Yes ☐ No If no eye protection will be required, please explain.

2. When will you require laser users to wear eye protection?

			Specify details (if applicable)	What wavelength(s) are you protecting against?	Duration of Exposure	Specify eyewear required*
At all times when using the laser?	☐ YES	☐ NO				
During alignment?	☐ YES	☐ NO				
For entry into control area?	☐ YES	☐ NO				
For entry to room? (incl. visitors)	☐ YES	☐ NO				

3. Specify the type of protective eyewear available to laser users in this area.

	Brand	Model	Rated Wavelength	O.D.	Rated Wavelength	O.D.	Rated Wavelength	O.D.
A								
B								
C								
D								
E								

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Appendix: Hazard Assessment Guide

Evaluating a work operation for operational efficiency and potential safety hazards is one of the basic responsibilities of a lab manager and, in fact, is a basic component of Cal-OSHA's required Illness and Injury Prevention Program. Performing a hazard assessment to identify work hazards is essential to creating a safe work area. Before you can minimize risks, you need to know what the risks are. The chart below summarizes hazards and protective measures common to laser operations.

1. Example of a hazard assessment

Common Laser Beam Hazards	Indirect Laser Hazards	Protective measures that minimize risk of injury
Beam crossing a pathway Invisible beams (infrared, ultraviolet) Person leaning across a beam path Contact from escaping beams ▪ *Damaged or burned clothing* ▪ *Burned or damaged skin or eyes* ▪ *Escaping beam causing combustible materials to burn – fire hazard* ▪ *Damage to walls and equipment* **Direct or reflected viewing of beam** ▪ *flash blindness* ▪ *temporary vision loss* ▪ *damaged cornea* ▪ *burned retina*	**Reflective surfaces** ▪ Jewelry ▪ Mirrors ▪ Shiny metal objects **Toxic or pressurized chemicals** ▪ Off-gassing of dyes and chemicals ▪ Hazardous chemical exposure ▪ Compressed gases ▪ Cryogenic fluids ▪ Explosion of high pressure lamps **Electrical** ▪ High voltage ▪ Electric shocks ▪ Electrical fires	▪ Securing beam stops ▪ Shielding to contain stray beams ▪ Using low power alignment lasers ▪ Restricting access ▪ Wearing eye protection ▪ Warning signs clearly posted ▪ Mapping the beam path(s) ▪ Removing jewelry ▪ Using interlocks ▪ Training ▪ Locking out during maintenance ▪ Using lowest practical power ▪ Consistently enforcing safe practices

2. Note commonly observed unsafe practices that cause <u>preventable</u> laser accidents:

- Not wearing protective eye wear during alignment
- Misaligned optics and upwardly directed beams
- Malfunctioning equipment
- Improperly handling high voltage components of the laser system
- Lack of consideration for non-beam hazards – electric shock is the main cause of serious injury and death
- Bypassing interlocks and housing on doors and laser
- Turning on the power supply accidentally – not following required lockout procedures
- Wearing the wrong eye wear for the laser being used
- Operating unfamiliar equipment – lack of training and awareness of risks
- Intentionally exposing unprotected personnel – horseplay

3. Example of an SOP for alignment with included hazard assessment

Laser users can prevent laser-related accidents. According to the former LSO at Lawrence Berkeley National Laboratory, 60% of laser accidents in research settings occur during the alignment process.

Task: Alignment

Potential Hazards	Protective Measures	SAMPLE: Alignment Procedures
1. Beam hitting an eye 2. Beam hitting flammable or combustible materials 3. Injury to visitors 4. Beam escaping confines of the optics table	▪ Isolate the area during alignment ▪ Choose the correct eye wear ▪ Wear the provided eye wear ▪ Mark the back side of each beam stop ▪ Double-check beam stop locations ▪ Use the lowest practical power setting ▪ Take off jewelry ▪ Set beam paths below eye level of people working in the area ▪ Clearly mark any beam directed out of a horizontal plane ▪ Don't allow unauthorized or unnecessary people in the room during alignments	1. Put up a shielding curtain. 2. Make sure warning sign "***Keep Out. Alignment in progress***" is visible. 3. Put on the orange UVEX laser goggles. 4. Check beam stop locations and secure them. 5. Power up the system. 6. Take the He-Ne alignment laser and align the beam as required. 7. Identify and terminate each and every stray beam coming from any optical component moved. 8. Make sure beam paths are at a safe working height below the eye level of the user(s) before you leave.

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