The following policy represents a commitment from the University Safety Office to assist departments to understand Florida Tech's policy on laser usage and safety. Each section explains in detail the responsibilities of various personnel, different classes of lasers and their safety procedures, and emergency procedures.

This guide also provides steps on how to fill out paperwork necessary for the use of lasers.

Please keep a copy of this guide in every department.

Scope

Due to the growing use of lasers on campus, the University Safety Office has developed the following Laser Use and Safety Policy. This policy includes selected requirements expected to be used by University personnel using or observing any lasers or laser facilities. Please consult the Florida Administrative Code 64E-4.001-.016 for a complete listing of rules and regulations governing the use of lasers at Florida Institute of Technology. (Reference Appendix A) add link to .pdf of State Laser Code 64E-4

Laser Use and Safety Policy

Responsibilities

Principal Investigator
The Principle Investigator (PI) is the faculty directing the research. The PI

- Is responsible for the safe use of lasers in the PIs laboratory.
- Shall notify the University Safety Office upon purchasing, leasing or putting into operation a class III B or IV laser device or lower class device with an embedded class III B or IV laser.
- Shall fill out a Florida Tech registration form
- Shall notify the University Safety Office and Laser Safety Officer (LSO) of any changes in the operational status, such as location changes, laser de-servicing, and or modifications to any laser equipment that may change the classification number.
- Shall dispose of unserviceable, unwanted lasers in accordance with university waste disposal policy as a universal waste.
- May assign each laser facility and is responsible to ensure the proper training and background of Laser Operators.
- Will supply Personal Protective Equipment as designated by the University Safety Office.
• Will develop, maintain, and update, as needed, all operating, alignment, and emergency procedures (Standard Operating Procedures or SOP's) for the lasers and facility under the PI's control
• Supervise all spectators, visitors and personnel with access to the facility to ensure against unauthorized entrance or accidental exposure to laser radiation

_Laser Operators_

The individual user (laser operator) shall observe all safety precautions and operating procedures while using class III B or IV lasers and shall inform the PI, LSO, University Safety Office of any apparent safety problems associated with the use of the laser. The laser operator shall be responsible for:

• Following laboratory administrative, alignment, and SOP's while operating lasers and reading safety instructions in laser equipment operator's manuals.
• Keeping the PI fully informed of any departure from established safety procedures. This includes notification of an exposure incident.
• Attending the Basic Laser Safety Training Course.
  ○ Contact the University Laser Safety Officer at X7349 to schedule course.
• Registering for the mandatory medical surveillance program for the use of Class III B or IV lasers.

_Laser Safety Officer_

The Laser Safety Officer (LSO) shall

• Coordinating compliance efforts with chapter 64E-4, FAC.
• Have jurisdiction over all aspects of hazard prevention and control of laser radiation and have the authority to suspend any operation that constitutes a radiation health hazard to the equipment operators, University personnel, or the general public.
• Conduct annual lab inspections to ensure that safety requirements are followed.
• Authorize laser lab use areas.
• Provide assistance in evaluating and controlling hazards.
• Ensure that all personal protective equipment is properly maintained.
• Update the Florida Tech Laser Use and Safety Policy when necessary.
• Maintain all records of lasers and laser operators.
• Ensure the proper registration of all class III B and IV lasers.
• Maintain Hazard Evaluations, filed in the University Safety Office.
• Ensure the provision of laser safety training for personnel who are assigned to an area where lasers are operated.
• Ensure that all personnel have completed the Basic Laser Safety Training.
• Act as the contact for the University Safety Office.
• Report all incidents involving safety violations or injury to the University Safety Office and Risk Management official.
• Participate in accident investigations involving lasers.
• Coordinate the medical surveillance program.
• Coordinate a Laser Safety and Policy Committee (LSPC) and biannual committee meetings.

_Laser Safety and Policy Committee_

The Laser Safety and Policy Committee (LSPC) was established for the purpose of acting as an advising and approval panel for the laser safety program. The program is designed to manage the use of lasers on
campus, and to control the hazards associated with their use. The committee also serves to evaluate any state or federal regulations that affect the users of lasers at Florida Institute of Technology.

The LSPC is made up of a minimum four members; the LSO, the USO and two to three Principal Investigators or Affiliate company's investigators trained and experienced in the safe use of lasers. The Chairperson is appointed from one of the selected members. There is no routine rotation of Committee members. Add web link to list of members

The scope of the Committee's jurisdictions includes the Florida Institute of Technology's campus and approved off-campus sites. The Committee has the overall responsibility for the laser safety program to ensure compliance with all local, state and federal regulations and guidelines. Specific duties of the LSPC include:

- Determine and approve all policies regarding the laser safety program.
- Act as technical advisor to the LSO.
- Revoke operator's privilege in case of serious and repeated violations of regulations.
- Prescribe special conditions, as may be necessary, such as additional training and/or instructions, designated or limited use areas, etc.
- Review all state laser regulations to determine their impact on the Florida Tech community.
- Review all reports that are submitted to the committee by the LSO.
- Hold a committee meeting at least once every six months. Any member may call meetings at any time.
- A quorum must be present for the LSPC to authorize actions.

Registration

All class III B and IV lasers shall be properly registered with the Laser Safety Officer prior to installation and use. Registration is accomplished by completing a copy of the Laser Registration form and returning it to the Laser Safety Officer. These forms will be available on the Safety website at a later date. Form for registration is in forms guide of this policy.

All laser workers must be registered with the Laser Safety Officer prior to using any laser. Registration is accomplished by notifying this officer, via memorandum, of the names and work locations of these individuals.

All newly registered lasers and facilities must be inspected and approved for operation by the University's LSO prior to beginning laser operations.

Medical Surveillance

Individuals operating Class I, II, or III A are exempt from eye exams.

Laser operators or individuals who will work in areas where there may be exposure to laser radiation from Class III B or Class IV lasers must have a baseline eye examination within two years prior to using the laser.

Arrangements can be made by calling the Laser Safety Officer. Form for medical examination is in forms guide of this policy.
An eye exam is not required when an individual laser user terminates his or her work in a laser laboratory unless the employee has a known laser injury to the eye.

**Exposure Incidents**

If an exposure incident occurs, the Laser Safety Officer must be notified by the PI or the person operating the laser.

If the incident causes an injury or could potentially have caused an injury, the person or persons who have received an exposure should inform their supervisor and have an eye exam performed, if necessary.

Laser Safety and Policy Committee (LSPC) will investigate all incidents and an incident report will be written. Incident Report is in forms guide of this policy.

**Record Keeping**

Training records, hazard evaluations, inventory and registration documentation, incident reports, and inspection reports are to be located in the University Safety Office. Records of individual eye exams are maintained in the University Safety Office.

**Personal Protective Equipment**

Eye Protection: The PI who operate or supervise the operation of a laser are responsible for determining the need for laser eye protection for a particular laser. The LSO will approve all eyewear. If required, eye protection will be provided for staff and visitors to the area.

Body Protection: Protective gloves and clothing must be worn during the operation of Class IV lasers, where the possibility exists for laser injury to parts of the body other than the eyes.

Respiratory Protection: Respirators or ventilation (hood or fume extractor) is required if lazing can produce toxic fumes, particulate, or viable biological material.

**Posting Laser Use Areas**

All laser use areas containing Class III or greater lasers shall be posted with the appropriate signs. Class I and Class II laser facilities are not required to be posted. Use the following guidelines for posting of Class III and Class IV lasers:

Facilities containing Class III A and III B lasers shall have postings at every entrance which contain the text "VISIBLE AND/OR INVISIBLE LASER RADIATION- AVOID DIRECT EXPOSURE TO BEAM", "CLASS III A LASER PRODUCT" or "CLASS III B LASER PRODUCT". An activation warning system indicating the laser is energized and operating should be at the entryway and viewable by the laser operator for class 3B lasers.

Facilities containing Class IV lasers shall have postings at every entrance, which contain the text "LASER RADIATION- AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION", "CLASS IV LASER PRODUCT". An activation warning system indicating the laser is energized and operating shall be at the entryway and viewable by the laser operator.
NOTICE signs are to be posted when maintenance procedures increase the risk of exposure.

General Laser Safety Rules

The general rules below are to be followed by all personnel, visitors, and spectators to ensure maximum safety. A Laser Safety, Self-Audit Checklist is available for PI’s and Laser Operators in the forms section of this procedure.

- The minimum laser radiant energy or laser power level required for the application should always be used.
- Emergency response procedures must be in plain view in all laser facilities.
- All facilities must have an openly available set of operating procedures (SOP’s) for each individual laser that have been approved by the LSO.
- A qualified technician must perform servicing for a laser or laser system.
- Lasers are to be operated in well-lighted areas, if at all possible, to minimize possible eye damage.
- Flash lamps used with solid state lasers should be shielded.
- Never leave an operating laser unattended.
- Never work alone in the facility. Always use the buddy system.
- Written approval from the PI on record with the LSO is required if work is to be preformed when a paid university staff member is not in the building overseeing the work. Any work done after normal work hours (8AM to 5 PM) must be pre-coordinated with the LSO.
- To minimize direct eye exposure observe these precautions:
  ✓ Do not intentionally look directly into laser beam or at specular reflection, regardless of its power.
  ✓ Minimize specular reflection.
  ✓ Terminate beam path at end of its useful path.
  ✓ Clearly identify the beam path(s) and ensure that they do not cross populated areas or traffic paths.
  ✓ Locate the beam path at a point other than eye level when standing or when sitting at a desk.
  ✓ Orient the laser so that the beam is not directed toward entry doors or aisles.
  ✓ Securely mount laser systems on a stable platform to maintain the beam in a fixed position during operation and limit beam traverse during adjustments and alignments.
  ✓ Jewelry must not be worn in a controlled laser area.
  ✓ Visual alignment of laser systems while the laser is operating should not be attempted. If possible, lasers should be powered down during alignment.

Specific Safety Requirements

Each laser and laser facility must be designed to ensure that maximum protection is afforded to the operator. Control measures shall be devised and taken to ensure minimal exposure to the eyes and skin from hazardous laser radiation.

Class I Lasers
Class I lasers require no controls, though it is advisable not to needlessly expose the eyes to direct Class I laser radiation.
If the laser has not been labeled by the manufacturer, attach a label on the laser with its classification and relevant warning information.

**Class II Lasers**

Class II lasers require an affixed housing or control panel and appropriate warning labels. These labels shall include "Caution- AVOID EXPOSURE" label near the aperture and a Class II warning logo for class II pulse lasers.

**Class III A, III B and Class IV Lasers**

A permanent laser controlled area must be established for all class III B and IV lasers and laser facilities and must meet the following criteria:

- Each area must be under the direct supervision of the PI and LSO.
- Access to the area must be supervised. The entrance to the doors must be closed at all times. There should be a barrier between the door and laser area.
- The area must have appropriate signs posted.
- All potentially hazardous beams in the area must be terminated in an appropriate beam stop.
- A panic button or control-disconnect switch must be available to deactivate the laser in the event of an emergency in the area.
- All optical paths that can allow the beam to exit the control area must be covered or restricted in a manner that prevents transmission of laser radiation.
- If a beam is to exit the controlled area, the PI and LSO shall ensure the beam path is limited to controlled air space.

All Class III A, III B and Class IV lasers require the following controls:

- Protective eyewear designed for the specific laser being used must be worn by all individuals having access to Class III A, III B, or IV laser radiation during operation. Protective gloves, clothing and shields must also be worn, as appropriate, when the possibility exists for laser injury to parts of the body other than the eyes.
- All protective housings must remain in place to prevent exposure from any source other than the defined aperture unless the protective housing interferes with necessary laser operation.
- The protective housing must be interlocked to prevent exposure of personnel to unnecessary laser radiation. Interlocks must be checked during routine inspections to ensure they are functioning properly. The interlock must not be overridden during normal operation.
- Laser interlocks shall be designed to prevent firing of the laser. This shall be accomplished by an interlock that disables the power supply or interrupts the beam (for example, shutters). Class III B and IV must be provided with a key-switch interlock that, when removed, prevents the operation of the laser, and disables the power supply.
- Adjustments or servicing shall not cause an interlock to become inoperative or allow radiation outside the protective housing unless a laser control area is established.
- If interlocks must be bypassed during maintenance, a temporary Laser Control Area must be established.
- A master switch (either a key or coded access) must be provided that, when removed, must make the laser inoperable. Authority for access to the master switch must be with the principal investigator and/or the LSO.
- Since viewing portals and collecting optics may increase the hazards, all devices must incorporate a means to maintain laser radiation emitted through them at or below safe levels. The LSO shall determine the potential hazard and take proper safety measures.
• Beam stops or attenuators must be permanently attached and capable of preventing output emission when the laser is on standby.
• If at all possible, the interaction area, that is the area where the primary beam or secondary beam irradiates the sample material, should be enclosed and equipped with a safety interlock so that the laser cannot be operated unless the interlock is in place.
• If possible, all Class IV lasers with exposed beam paths should be fired remotely.
• All lasers must have an "Avoid Exposure" label near the aperture, a warning label on the laser in accordance with Control of Non-ionizing Radiation Hazards, Chapter 64E-4.3a(6), FAC, and warnings posted in or around the laser facility.
• Disconnection of fiber optics must take place in a laser-controlled area.
• If any engineering controls listed above cannot be accomplished, or will impede the nature of the research, administrative controls should be formulated by the PI and submitted to the LSPC for approval.

Emergency Response Procedures for Injuries Caused by Laser Radiation

Response during normal working hours

Contact the school nurse X8078 for a referral to Florida Eye Associates. Transport the injured person to the clinic or directly to Florida Eye Associates as directed by the School nurse.

If transportation is not available, call the Security X8111 and request assistance. Describe to the dispatcher the exact location where you and the injured person will be when the assistance arrives.

Report the incident to the Laser Safety Officer as soon as possible. The Laser Safety Officer will forward the information to University Risk Management for Workers Compensation approval and the University Safety Office.

Response after normal working hours

If an incident occurs after normal working hours, call the Security X8111 with the following information:

• Your name and if assistance is required.
• Location, building name and room number where the injured person is located.
• The name of the injured person and any symptoms noted.
• The exact location where you and the injured person will meet the emergency responder.
• Ask the University Police to contact the Laser Safety Officer as soon as reasonably possible. The Laser Safety Officer will forward the information to University Risk Management for Workers Compensation approval and the University Safety Office.

Controlling Associated Hazards

Many chemical and physical hazards other than laser radiation can be found in the laser area that must also be adequately controlled.


Electrical Equipment and Systems

Always be aware of the high risk of injury and fire during laser operations because of the presence of electrical power sources.

The installation, operation, and maintenance of electrical equipment and systems must conform to standards stated in the National Electric Code (NFPA 70-2002). Contact Facilities for assistance.

Lighting

Adequate lighting is necessary in controlled areas.

If lights are extinguished during laser operation, provide control switches in convenient locations or install a radio-controlled switch.

Luminescent strips/tape should be used to identify table and equipment corners, switch locations, aisles, etc.

When ambient light is not sufficient for a safe egress from a laser area during an electrical power failure, install emergency lighting.

Ionizing and Non-ionizing Radiation

A laser operation may involve ionizing radiation that originates from the presence of radioactive materials or the use of electrical power in excess of 15kV.

Prior to the use of any radioactive material with a laser system, approval must be obtained from the Campus Radiation Safety Officer. If radioactive material is present in the laser system, "Caution-Radioactive Material" signs must be prominently displayed. If X-rays are generated a "Caution-X-Rays" sign must be posted.

Microwave and radio frequency (RF) fields may be generated by laser systems or ancillary equipment.

Contact the Laser Safety Office for evaluation of these hazards before starting an operation.

Hazardous Materials

Bring into the laser area only those hazardous materials that are essential for the operation or experiment.

All hazardous materials must be used, stored and controlled in accordance with current EPA, FDEP and OSHA rules. Consult Materials Safety Data Sheets (MSDS) and the University Safety Officer for information.

Do not allow laser beams and strong reflections to impinge on combustible materials, explosives, highly flammable liquids or gases or substances that decompose into toxic products under elevated temperatures, without providing adequate controls that have been approved in writing by the LSCP.
Conduct or sponsor tests that establish the effects of beam interactions with hazardous materials. Findings can be used to determine safe parameters for laser operation.

**Dyes and Solutions**

Dye lasers normally use a lasing medium composed of complex fluorescent organic dye dissolved in an organic solvent. These dyes vary greatly in toxicity, mutagenicity, and potential carcinogenicity.

All dyes must be treated as hazardous chemicals. Most solvents suitable for dye solutions are flammable and toxic by inhalation and/or skin absorption.

- Obtain MSDS sheets from the manufacturer for all dyes and solvents.
- Use and store all dyes and solvents in accordance with MSDS sheets, EPA and FDEP rules.
- Prepare and handle dye-solutions inside a chemical fume hood.
- Wear personal protective equipment as described in the MSDS sheet.
- Pressure test all dye laser components before using dye solutions. Pay close attention to tubing connections.
- Install spill pans under pumps and reservoirs.
- Keep dye-mixing areas clean.

**Converting to a Class I Enclosure**

Any laser or laser system can be converted to a Class I enclosed laser by including all of the following controls in the laser system design. These controls will effectively enclose the laser, thus preventing personnel contact with emitted radiation while permitting unrestricted access into the area.

**Protective Housing**

House the laser system within a protective enclosure to prevent the escape of laser radiation above the maximum permissible exposure (MPE).

The protective housing must prevent personnel access to the laser system during normal operations.

Personnel entering the enclosure to perform maintenance or adjustment tasks must be made aware of the higher risk laser class.

**Safety Interlocks**

Install safety interlocks wherever the protective enclosure can be opened, removed or displaced.

When activated, these interlocks must prevent a beam with radiant energy above the maximum permissible exposure (MPE) from leaving the laser or lasing system.

Service adjustments or maintenance work performed on the laser system must not render the interlocks inoperative or cause exposure levels outside the enclosure to exceed the MPE, unless work is performed in a laser area with limited access and appropriate safeguards.
Fail-Safe Design

The protective enclosure and the laser system must be designed and fabricated so that if a failure occurs, the system will continue to meet the requirements for an enclosed laser operation.

Modifications to commercial laser systems must be evaluated. Contact the University Laser Safety Officer for an evaluation. If modifications change the safety controls, a revised SOP will be required.

Attenuated Viewing Window

Use viewing windows containing a suitable filter material that will attenuate the transmitted laser radiation to levels below the MPE under all conditions of operation.

Warning Signs and Labels

Label the enclosure with "Caution-Enclosed Laser" signs.

Attach a label directly to the laser that gives the laser classification in the absence of an enclosure. Make sure that the laser label can immediately be seen when the enclosure is opened.

Acronyms

FAC – Florida Administrative Code  
LSCP – Laser Safety and Policy Committee  
LSO – Laser Safety Officer  
MPE – Maximum Permissible Exposure  
MSDS – Material Safety Data Sheet  
PI – Principle Investigator  
RF – Radio Frequency  
SOP – Standard Operating Procedure

Definitions

Class I: Any laser meeting the standards as defined in 64E-4.002(10), FAC and 64E-4.002(11), FAC; a laser that poses no threat of biological damage.

Class I Enclosure: An enclosure or protective housing for a laser or laser system where the entire beam path is enclosed and which prevents the emission of laser radiation levels during operation above of the applicable Class I accessible emission limits. Opening or removing the enclosure or protective housing provides additional access to laser radiation above a Class I accessible emission limit.

Class II: Any laser meeting the standards as defined in 64E-4.002(12), FAC. A low power visible light laser or laser system which can emit radiant power exceeding Class I for the maximum duration inherent in the design or intended use of the laser, but not exceeding 1 mW or, in the case of repetitively pulsed laser, not exceeding a Class I accessible emission limit for a 0.25 second exposure limit.
Class III A: Any laser meeting the standards as defined in 64E-4.002(13), FAC. A medium power laser or laser system which has an output power between one and five times the Class I accessible emission limits for wavelengths less than 0.4 micrometers or greater than 0.7 micrometers, or the Class II accessible emission levels for wavelengths greater than 0.4 micrometers and less than 0.7 micrometers.

Class III B: A medium power laser or laser systems which has an output power greater than that defined for Class III A, but having less than 0.5 W for all continuous wave laser types for periods greater than or equal to 0.25 seconds or having levels less than 10 J/cm-2 for exposures less than 0.25 seconds.

Class IV: Any laser meeting the standards as defined in 64E-4.002(14), FAC. A high powered laser or laser system that requires control measures to prevent exposure to the eye and skin from the direct and reflected beam.

References


Florida Administrative Code, Control of Non-Ionizing Radiation Hazards, Chapter 64-E4.001-.016

Forms Guide

Form LSP – A1: Laser Registry
Form LSP – A2: Medical Certification - Laser Physical
Form LSP – A3: Incident Review Report
Form LSP – A4: Laser Safety, Self-Audit Checklist
LASER REGISTRY – Page 1 of 2

I. PI Information

Principal Investigator _____________________________
Office Phone _______________________________

Department _________________________________
Home Phone _______________________________

E: Mail _________________________________
Cell Phone _______________________________

Date _________________________________

II. Personnel who use laser system (Check box or list users)

[ ] None: System is not operational

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<tr>
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<td>Student / Staff</td>
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III. Laser System Information

1. Do users wear safety goggles? _______________________________

2. Are goggles available for visitors? _______________________________

3. Goggle Type/Manufacturer _______________________________

4. Service for laser: in-house (Y/N) _______________________________

5. Contract service company's name _______________________________

6. Is there a written SOP available? _______________________________

Complete table below:

Form LSP- A 1
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<td>System Operational (Yes/ No)</td>
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<td>Type (CW,Pulsed)</td>
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<td>Description (ie; He-Ne,ND: YAG)</td>
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<tr>
<td>Wavelength(s)</td>
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<td>Maximum Power/Peak Power (Watts or Joules)</td>
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<td>Pulse Duration (repetition rate)</td>
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<td>Emerging Beam Dimensions (mm)</td>
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<td>Use (holography, alignment, etc.)</td>
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## Medical Certification - Laser Physical

**Candidates / Employee Data**  
(Please print)

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<th>(First name)</th>
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**Employee/Student ID#**  
Phone

*I understand compliance with the Florida Institute of Technology Laser Use and Safety Policy and all other safety procedures is required to be certified to operate a laser.*

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<th>Signature</th>
<th>Date</th>
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**I. Laser Eye Exam for Laser Equipment Operators:**

1) The objectives of medical surveillance for Class III B and IV lasers personnel are:
   
a) Establish a baseline
b) Compare ocular findings after exposure accident with baseline

2) Baseline should include
   
a) Ocular history (include past eye history and family history of eye problems, medications, current refraction prescription, documentation of medical conditions, or use of medications that may increase photosensitivity)
b) Visual acuity (near and far vision) with and without corrective lens.
c) Detailed fundoscopic exam with documented findings or fundoscopic photograph.
d) Refraction
e) Amsler grid or similar test for macular function (assessing for distortions and scotomas)
f) Contrast sensitivity (glare sensitivity)
g) Optional glaucoma screen - recommended
h) Skin examination and history of dermatologic abnormalities for workers with a history of photosensitivity

3) Exam results must be discussed with the candidate and copies made available to them or their physician upon written request.

4) Copy of the Exam Results will be forwarded to Florida Institute of Technology, University Safety Officer. These records are required by law to be maintained for 30 years.

**II. Physician to complete**

1) For initial, exit and incident related examination a complete eye exam with retinal photograph has been performed on the above candidate.

2) Result of Examination
   - [ ] Within normal limits - May work in laser area.
   - [ ] Deviation from Normal *
     - [ ] Candidate may work in laser area
     - [ ] Candidate may Not work in laser area **

* Please provide a narrative of all abnormal findings to Florida Institute of Technology, University Safety Officer. Within two weeks of exam.

** Florida Institute of Technology, University Safety Officer was notified by phone at 674-8000 on date

**III Attending physician Signature**  
Date


**CERTIFICATION PERIOD - No expiration date**

**RETURN THIS FORM TO:**

<table>
<thead>
<tr>
<th>Requestors Name</th>
<th>Phone</th>
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Form LSP- A 2
Instructions for Incident Review Report
Reporting is key to improving everyone’s safety. Even minor injuries are warnings that something happened that wasn’t planned. Unless we know about injuries, or even those incidents that don’t result in injuries (referred to as “Close calls”), we can’t correct the problem that led to the incident. Left uncorrected, it can easily happen again, and it may be more serious the next time. Help management, and everyone around you, by reporting every incident that causes, or has the potential to cause, an injury. The Laser Safety and Policy Committee (LSPC) will investigate and determine what can be done to prevent a recurrence.

A close call is an event that had the potential for personal injury or major equipment damage, but that only lead to equipment damage.

Reporting will consist of having all parties present fill out an investigation form.
Incident Review Report

Name of person making the report: ____________________________

Title or Position: _________________________________________

Supervisor: _______________________________________________

Person(s) involved in the incident: ___________________________

Date and Time of the incident: ______________________________

Building or location of incident _____________________________

Task being done when the incident occurred: ___________________

Witnesses: ________________________________________________

Describe how the incident occurred: _________________________

Describe physical injuries ___________________________________

Date and time medical attention was sought ___________________

Name of doctor and health care facility: _______________________

Describe property damage __________________________________

Estimate of property damage (if known) _______________________

Describe what could have been done to prevent an incident of this type. ___________________

_________________________________________________________

Signature: ___________________________ Date _________________

Form LSP- A 3
## Laser Safety
Self-Audit Checklist

Building _________ Room _________ Principal Investigator ____________

Audit Performed by __________________________ Date ____________

### A. Administrative

<table>
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<tbody>
<tr>
<td>1. Lasers are classified appropriately (2, 3a, 3b, 4a, 4b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Standard operating procedures are available</td>
<td></td>
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<tr>
<td>3. Alignment procedures are available</td>
<td></td>
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</tr>
<tr>
<td>4. Viewing cards are used for alignment</td>
<td></td>
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</tr>
<tr>
<td>5. Laser users attended appropriate training</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6. Lasers are included in inventory &amp; registered</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### B. Labeling and Posting

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>NA</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Certification label present</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Class designation and appropriate warning label present</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3. Radiation output information on label</td>
<td></td>
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</tr>
<tr>
<td>4. Aperture label present</td>
<td></td>
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<tr>
<td>5. Appropriate warning/danger sign at entrance to laser area</td>
<td></td>
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<tr>
<td>6. Warning posted for invisible radiation</td>
<td></td>
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</tbody>
</table>

Page 1 of 3

Form LSP- A 4
# Laser Safety - Self-Audit Checklist (Page 2 of 3)

## C. Control Measures

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>NA</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Protective housing present and in good condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Beam attenuator present</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. Laser table not at eye level when seated or standing</td>
<td></td>
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<tr>
<td>4. Beam is enclosed as much as possible</td>
<td></td>
<td></td>
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<tr>
<td>5. Beam not directed toward doors or windows</td>
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<tr>
<td>6. Beams are terminated with fire-resistant beam stops</td>
<td></td>
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<tr>
<td>7. Surfaces minimize specular reflections</td>
<td></td>
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<tr>
<td>8. Controls are located so that the operator is not exposed to beam hazards</td>
<td></td>
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</tbody>
</table>

## D. Personal Protective Equipment

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>NA</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Eye protection is appropriate for wavelength</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Eye protection has adequate OD</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. Warning/indicator lights can be seen through protective filters</td>
<td></td>
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</tbody>
</table>

## E. Class 3b and 4 Lasers

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>NA</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interlocks on protective housing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Service access panel present</td>
<td></td>
<td></td>
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<tr>
<td>3. Limited access to spectators</td>
<td></td>
<td></td>
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<tr>
<td>4. Nominal hazard zone determined</td>
<td></td>
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<tr>
<td>5. Operators do not wear watches or reflective jewelry while laser is operating</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>6. Viewing portals present where MPE is exceeded</td>
<td></td>
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</tbody>
</table>
### F. Class 4 Lasers

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>NA</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Failsafe interlocks at entry to controlled area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Area restricted to authorized personnel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Laser fires remotely?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4.</td>
<td>If present, curtains are fire-resistant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Area designed to allow rapid emergency egress</td>
<td></td>
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</tr>
<tr>
<td>6.</td>
<td><strong>Pulsed</strong>- interlocks designed to prevent firing of the laser by dumping the stored energy into a dummy load</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td><strong>CW</strong>- interlocks designed to turn off power supply or interrupt the beam by means of shutters</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8.</td>
<td>Operators know not to wear ties around the laser</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Panic button ((nonlockable disconnect switch) installed on Class 4 lasers to allow rapid deactivation of the laser</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### G. Non-Beam Hazards

<table>
<thead>
<tr>
<th></th>
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<th>N</th>
<th>NA</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>High voltage equipment appropriately grounded</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>High voltage equipment located away from wet surfaces or water sources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>High voltage warning label in place</td>
<td></td>
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</tr>
<tr>
<td>4.</td>
<td>Compressed gases secured</td>
<td></td>
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</tr>
<tr>
<td>5.</td>
<td>Respiratory PPE evaluated?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6.</td>
<td>Respirator PPE in good condition?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>