**ANNEX 1 - LASER INVENTORY**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Location** | **Model / System** | **CW / Pulsed** | **Wavelengths** | **Power**  **(mW)** | **CLASS** |
|  |  |  |  |  |  |
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Only include Class 3B and class 4 lasers in this list:

School / Department /Center:

Laboratory Safety Supervisor (LSS) or expert user:

Signed:

Date /\_ /\_

**ANNEX 2 - REGISTRATION FORM FOR LASER USERS**

|  |  |
| --- | --- |
| SURNAME | FORENAME |
| TITLE [Ms, Mr, Dr, Prof] | COLLEGE |
| EMAIL | TELEPHONE |
| SCHOOL / DEPARTMENT / RICU | SUPERVISOR |

|  |
| --- |
| LASER SYSTEMS TO BE USED\* |
|  |
| TYPE OF WORK PERFORMED USING LASERS\*\* |
|  |
| LOCATIONS / LABORATORY\*\*\* |
|  |

\*Note: if you do not know this at this at the time of registration please inform the RPO when you are aware of the systems you will be working with.

\*\* This can be teaching, demonstration or research related.

\*\*\* This can be research or teaching labs, you can provide building name and laboratory name or room number if possible.

|  |  |
| --- | --- |
| DECLARATION | |
| I have now completed the University Cork College Laser Safety registration process and I am now fully aware and understand the risks to myself and others involving CLASS 1M, 2, 2M, 3R, 3B and 4 Laser systems. I am also aware that the addition of focusing optics may change the CLASS of the laser system to a higher one. Further, I undertake to adhere to College safety procedures and rules to adopt all measures to minimize the risks to both myself and all others when using such lasers when in the vicinity of such lasers. | |
| Signature | Date |

|  |  |  |
| --- | --- | --- |
| OFFICE USE ONLY | | |
| Training course attended | Test passed | RPO signature |

**ANNEX 3 - USE OF CLASS 1M, 2/2M, AND 3R LASERS**

**HAZARD AND RISK ASSESSMENT**

|  |  |  |  |
| --- | --- | --- | --- |
| **Assessor Name** | **Email** | **Assessment**  **Number** |  |
| **School / Department / Room** | **Tel:** | **Date of**  **Assessment** |  |

Without the use of magnifying optics 1M devices do not pose an eye hazard, neither do 2M or Class 2 devices as long as you do not stare into the beam (eye protection is normally afforded by the aversion responses). An eye hazard is possible if there is: exposure in excess of more than 0.25 seconds from Class 2/2M lasers; exposure to Class 1M/2M; or if Class 3R lasers are viewed directly. Risk of eye injury is low. There is no skin or fire hazard.

**BRIEF DESCRIPTION OF THE WORK ACTIVITY INVOLVING THE LASER**

|  |  |
| --- | --- |
| **LASER SPECIFICATIONS:** | |
| **Manufacturer** |  |
| **Model** |  |
| **Maximum Power (mW)** |  |
| **Wavelength Range** |  |

|  |  |  |
| --- | --- | --- |
| **OPTICAL AND NON OPTICAL HAZARDS** | | |
| Detail the significant risks and the control measures for any optical and non-optical hazards | **Hazard/ Risk** | **Control Measure** |
|  |  |

|  |  |
| --- | --- |
| **CONTROLS MEASURES** | |
| **Do!** |  Follow the manufacturer’s safety instructions   Take care when operating the laser system   Leave the laser on only when necessary   Restrict unauthorized use   Terminate the beam at the end of its useful path |
| **Do Not!** |  Do not point towards anyone deliberately   Do not point towards mirrored surfaces that may cause unintended reflections   Never look directly into the laser aperture or the beam when on   Do not use optical components to focus the beam unintentionally   Never allow unauthorized use of the laser |

**ANNEX 4 - USE OF CLASS 3B & 4 LASERS HAZARD & RISK ASSESSMENT**

Class 3B and Class 4 lasers are capable of causing serious eye injury if the beam is accidently viewed either directly or specular reflections. Diffuse reflections of a high‐powered CLASS 4 laser beam can cause permanent eye damage. High‐powered laser beams, CLASS 4, can burn exposed skin, ignite flammable materials, and heat materials that release hazardous fumes, gases, debris, or radiation. Equipment and optical apparatus required to produce and control laser energy may also introduce additional hazards associated with high voltage, high pressure, cryogenics, noise, and other forms of radiation, flammable materials, and toxic fluids. It is imperative that each proposed experiment or operation involving a laser must be evaluated to determine the hazards and risks involved. Based on this evaluation the appropriate safety measures and controls required must be implemented and adhered to the full.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S1** | **Assessor Name** | **Email:** | **Assessment**  **Number** |  |
| **School / Department/Room** | | **Tel:** | **Date of**  **Assessment** |  |

**S2 DESCRIPTION OF THE WORK ACTIVITY INVOLVING THE LASER(S)**

Please provide a brief description of the laser set up and the purpose, including duration of the project

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S3** | **LASER SPECIFICATIONS:** | | | |
|  | | **Laser 1** | **Laser 2** | **Laser 3** |
| **LASER CLASS 3B or 4** | |  |  |  |
| **Manufacturer** | |  |  |  |
| **Model** | |  |  |  |
| **Type of Emission CW or Pulsed** | |  |  |  |
| **Maximum Power (mW)** | |  |  |  |
| **Maximum Pulse Energy (joules)** | |  |  |  |
| **Wavelength Range (nm or µm)** | |  |  |  |
| **Wavelength in Use (nm or µm)** | |  |  |  |
| **Pulse Repetition Rate (Hz)** | |  |  |  |
| **Beam shape (circular, square, ellipse)** | |  |  |  |
| **Diameter or dimensions (mm)** | |  |  |  |
| **Beam Divergence (milli-radians)** | |  |  |  |

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| **S4** | **IDENTIFICATION OF ADDITIONAL OPTICAL AND NON-OPTICAL HAZARDS** | | | | |
| **HAZARD** | | **If yes give details and control measures to reduce risk** | | | |
| Electrical  YES NO | |  | | | |
| Laser Dyes used  YES NO | |  | | | |
| Compressed or Toxic Gases  YES NO | |  | | | |
| Cryogenic fluids  YES NO | |  | | | |
| Fumes/Vapours/Laser  Generated Air Contaminants  from Beam / Target interaction?  YES NO | |  | | | |
| UV and Visible Radiation/ Plasma Emissions  YES NO | |  | | | |
| Explosion Hazards  YES NO | |  | | | |
| Ionising Radiation (X‐rays)  YES NO | |  | | | |
| Other Hazards unidentified above  YES NO | |  | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **S5** | **PERSONS WHO MAY BE AT RISK** | | |
|  | Name |  | Position |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |

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| --- | --- |
| **S6** | **INSTRUCTION AND TRAINING** |
| All registered Laser users must receive appropriate training and instruction from and expert user on the  Laser systems they intend to use. | |
| Briefly specify the instruction and training arrangements for the Laser systems including name of the trainer  and what is typically covered. | |

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| --- | --- | --- | --- | --- | --- |
| **S7** | **MEASURES TO REDUCE LEVEL OF LASER HAZARD RISK** | | | | |
| Are open or partially  enclosed beams used during the following circumstances? | | 1 | Initial setting up and alignment of the  optical components. | | YES NO N/A |
| 2 | Addition of other components such as  laser beams or samples | | YES NO N/A |
| 3 | Day to day normal operation | | YES NO N/A |
| 4 | During servicing | | YES NO N/A |
| Are there protocols /  procedures to control risks from the ocular an skin hazards presented by the lasers? | | 1 | Initial setting up and alignment of the  optical components. | | YES NO N/A |
| 2 | Addition of other components such as  laser beams or samples | | YES NO N/A |
| 3 | Day to day normal operation | | YES NO N/A |
| 4 | During servicing | | YES NO N/A |
| List the operating procedure you are currently using, with references / dates and location.  **ALL OPEN BEAM WORK MUST HAVE AN APPROPRIATE PROTOCAL AND OPERATING PROCEDURE** | | | |  | |
| **S8** | **LASER PROTECTIVE EYEWEAR** | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| List the wavelength that the eyewear is intended to be used for, the type of emission D I R M, and the scale  number stating the code LB for full or R for alignment protection. | | | | | |
| Quantity | Location | Manufacturer and code | Wavelength | DIRM | Scale No. |
|  |  |  |  |  |  |
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| **S9** | **EMERGENCY ACTION** | |
| In case of emergency it is important to understand what needs to be done to stabilise, make safe an area  and to provide aid to any injured persons. Never place yourself in danger only complete these tasks if it safe to do so. Further protocols given in the general safety statements of your location must be consulted. | | |
| Situation | | Appropriate action |
| Fire | |  Switch off the power supply to the laser if it is safe to do so   Do not put yourself in danger   Activate the fire alarm   As long as it does not compromise your safety you can attempt to extinguish the fire with the appropriate equipment provided   Evacuate to an assembly point |
| Laser Eye Injury | |  If it is an injury to yourself seek help from a colleague immediately, you may well be in shock.   Turn off the laser if possible or ask your colleague to do so   Call 1999 the college emergency number if you require and ambulance   Even if you think your injury is very minor you should go to the Accident  & Emergency, Cork University Hospital, Wilton, Cork . Telephone 021 454 6400 |
| Accidental release of  particulates or vaporised materials into the air | |  Switch off the power supply to the laser if it is safe to do so   Do not put yourself in danger   Ventilate the area while taking care not to inhale any of the air  contamination |
| **REPORT ALL ACCIDENTS TO THE RADIATION PROTECTION OFFICER! Be aware of those who may be able to administer first aid in your area, their names and contact details should be listed in your local safety policy statement.** | | |

**ANNEX 5 - LASER SAFETY SCHEME OF WORK**

This is an example of a Laser safety scheme of work applicable to a typical university laboratory setting. It can be used as a template for a more specific scheme more appropriate to your particular situation. **S1 Name of School/Department/Unit/Institute/RICU**

**Laboratory/Room/Activity**

Before commencing work with Class 3B/4 lasers, you must read this document, and sign the sheet at the end to confirm this and that you have understood the content and you agree to abide by the protocols contained herein.

**Purpose and Structure of this document**

The principal aim of this document is to outline the elements of *good laser practice* as they apply specifically to experiments currently being undertaken in the above laboratory. General aspects of laser safety are covered in sections of the manuals accompanying the lasers and in the GUIDANCE NOTES ON THE SAFE USE OF LASERS AT UNIVERSITY COLLEGE CORK.

The document is structured as follows: at the top level (this sheet) an overall description is made of laser research activity in this laboratory. The user is then referred to a number of accompanying documents under two headings: Laser types in use and Safety Protocols.

**S2 Description of Activity, experimental work and its purpose**

Four types of situation have been identified which require separate safety protocols, where appropriate:

• Setting up;

• Adding new elements to;

• Day‐to‐day operation of the experiment;

• Maintenance of the laser system.

|  |  |  |
| --- | --- | --- |
| **S3** | **Lasers in Use** | |
| **LASER** | | **Reference to completed Hazard/Risk Assessment** |
| **1** | |  |
| **2** | |  |
| **3** | |  |
| **4** | |  |
| **5** | |  |