



SAFE USE OF LASERS POLICY

Date	Purpose of Issue / Description of Change	Equality Impact Assessment Completed
26 th May 2005	Initial Issue	
15 th July 2022	Reviewed and approved by the Health, Safety and Emergency Management Task Group	26 th February 2019, reviewed June 2022
6 th March 2024	Reviewed by the Radiation H&S Sub Committee	
21 st March 2024	Amendments reviewed and approved by the Health, Safety and Emergency Management Committee	

Policy Officer	Senior Responsible Officer	First Approved By	Date
Head of Health, Safety & Campus Wellbeing	Chief Operating Officer	Health & Safety Committee	26 th May 2005

This Policy will be reviewed in 2027

1. INTRODUCTION

A laser is a man-made, high intensity optical radiation light source which produces an intense, coherent monochromatic, narrow beam of light.

A typical laser beam might only spread out by 1 m when shone onto a surface 1 km away. As light also travels in straight lines, this makes lasers useful for guiding, for example a 'pointer' to highlight something in a presentation. Laser beams are also used to read information, for example CDs and DVDs, some are also capable of heating materials, making them useful in surgery and for cutting metals and other industrial materials.

All lasers are potentially hazardous. Laser serves as an almost ideal point source of intense light the most common injuries are to the eye. In addition, some lasers, because of their thermal properties can cause tissue damage as well as creating the potential for fire, explosion and noxious or hazardous fumes and vapours if used for welding or cutting.

2. POLICY STATEMENT AND SCOPE

It is the policy of Bangor University, so far as is reasonably practicable, but in accordance with the relevant statutory requirements and good practice, to ensure the health and safety of staff, students, and visitors to the University.

This Policy states the requirements placed on the University and its Colleges and Professional Services with regards to the safe use of lasers.

The Policy applies to:

- The University and its Colleges and Professional Services.
- All lasers of Class 3R, 3B and 4.
- All staff, students, contractors, and visitors who could encounter and / or operate lasers whilst working, studying, or visiting the University.

The Policy does not apply to:

- The use of other potentially hazardous light sources as defined by the Artificial Optical Radiation Regulations.

3. RELATED POLICIES AND LEGISLATION

In addition, to those general duties in law, the University and its constituent Colleges and Services, have a specific obligation under the Control of Artificial Optical Radiation at Work Regulations (AOR) to ensure no person is harmed because of laser operations.

[REFER TO 'SAFE USE OF ARTIFICIAL OPTICAL RADIATION LIGHT SOURCES POLICY' FOR ALL OTHER LIGHT SOURCES¹](#)

4. DEFINITIONS / TERMINOLOGY

For the purpose of this Policy the following terms and definitions apply:

- Artificial Optical Radiation (AOR): Includes light emitted from all artificial sources ie light in all its forms such as ultraviolet, infrared and laser beams, but excluding sunlight.

¹ See: www.bangor.ac.uk/hss/inflink/artificialopticalradiation.php.en

- Laser: Is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The term "laser" is an acronym for "light amplification by stimulated emission of radiation".
- Laser Safety Officer (LSO): Member of staff appointed to undertake the duties outlined in Section 10.
- Supervisor: Those staff working with lasers and those in a supervisory role with responsibility for others operating the laser.

5. DUTIES OF THE UNIVERSITY

The University will:

- a. Through this Policy and supplementary documents establish a management system that complies with legislation and controls associated with the safe use of lasers.
- b. Appoint a suitable qualified and / or experienced Laser Safety Officer (LSO) who will advise the University on all safety matters concerned with the use of lasers and carry out duties as detailed in Section 10.
- c. Delegate, in line with the University's health and safety management system, the duty to implement this Policy to Deans of College and Directors of Professional Services.

6. THE UNIVERSITY RADIATION H&S SUB COMMITTEE

The Radiation H&S Sub Committee is responsible for reviewing and overseeing the implementation of this Policy and will consider and act upon reports received from Health and Safety, Campus Services, the LSO, and individual Colleges / Services where necessary.

7. COLLEGES / PROFESSIONAL SERVICE RESPONSIBILITIES

Each College and Service must introduce the following management arrangements to make sure lasers, used within their areas of control are operated safely:

- a. Identify and establish class of lasers operated within their area of control.
- b. Use the lowest possible power laser to achieve teaching and research objectives.
- c. Ensure an appropriate Risk Assessment, Local Rules and Safe Operating Procedures for laser operations are in place (includes teaching activities).
- d. Ensure lasers operating at Class 3b and 4 are not acquired without the prior knowledge of the LSO.
- e. Register all Class 3b and 4 Lasers with the LSO, prior to use, using Form LF1 (Appendix).
- f. Provide appropriate information, instruction, and training to laser operators and those affected by laser operations. For example:
 - i. Risks associated with laser operations.
 - ii. Local Rules (to include this Policy and associated Information Sheet).
 - iii. Risk Assessment / Safe Operating Procedures.
 - iv. Responsibilities to themselves and others affected by their activities.
 - v. The action to take if they are exposed to a laser beam.
 - vi. The use of Personal Protective Equipment and the specific type to be used and for which laser.

- g. Ensure all laser installations and operations are suitably risk assessed, with the assessment approved by the LSO, such that no significant risk remains.
- h. Ensure only competent persons operate lasers.
- i. Ensure Supervisors and others in a supervisory role working with lasers understand their responsibilities as detailed in Section 12 to ensure the correct and safe operation of lasers associated with their work.
- j. Ensure recorded, 3 monthly checks are undertaken of safety critical devices i.e., equipment safety interlocks.
- k. Ensure all laser Accidents & Incidents are reported to Health and Safety.

When operating Class 3R, 3B or 4 Lasers:

- l. Ensure the use of all Class 3R lasers are suitably risk assessed.
- m. Establish and sign Class 3B / 4 'Designated Areas' as required (Section 9).
- n. Ensure all Class 3B / 4 lasers are enclosed or confined by means of laser tubes, fibre or interlocked enclosure.
- o. Ensure all Risk Assessments, Local Rules, Safe Operating Procedures etc are approved by the LSO before work starts (includes teaching activities).
- p. Ensure a protocol, approved by the LSO, is in place for all laser alignment and adjustment processes that may increase the risk of exposure, e.g., where the overriding of interlocks is required.
- q. Seek the advice and approval of the LSO before any laser procurement, and on supply ensure the laser is Registered (LF1 Form, Appendix) as required with the LSO.
- r. Ensure the laser is re-registered annually with the LSO thereafter and or if other changes arise e.g., relocation and change of use.
- s. Ensure any person before working with a Class 3B / 4 laser (Laser Workers):
 - i. Receives appropriate training as defined by the LSO.
 - ii. Signs the 'Declaration' stating they have read the Local Rules etc.
 - iii. Is 'Registered' as a Laser Worker with the LSO (LF2 Form, Appendix).
- t. Inform the LSO of any changes in Laser Workers and / or disposal of lasers (LF3 Form, Appendix).
- u. Maintain local records e.g., Risk Assessments, Local Rules, Safe Operating Procedures, maintenance, Declarations and details of registered Laser Workers and lasers.

When hiring-in or utilising 3rd parties for laser use

- v. Ensure the use of lasers by contractors, visiting shows and for entertainment and surveys are suitably risk assessed, with protocols employed to prevent any risk to people. This would include use of Laser Cubes where a detailed protocol and risk assessment is required.

8. SIGNAGE AND CLASS 3B / 4 LASER DESIGNATED AREAS

Lasers must be labelled to immediately highlight the Class of laser and necessary precautions.

Note: Work with Class 1, 2 and 3R lasers (i.e., lasers with a power output below 5 mW) are not normally required to be in a Laser Designated Area.

All work with Class 3B / 4 lasers must take place in a restricted 'Laser Designated Area' where hazards can be effectively controlled. This includes:

- i. Displaying the appropriate laser warning sign.
- ii. Signing the entrance as a 'Laser Designated Area'.
- iii. Ensuring information regarding the specific PPE for the laser Class is given.
- iv. Restricting access to authorised persons i.e., trained, Registered Laser Workers, with additional access controls in place during laser alignment, as applicable.
- v. Posting relevant Local Rules, Risk Assessments, Safe Operating Procedures in the area.

9. LASER ENCLOSURES – For Class 3B / 4 Lasers

All Class 3B / 4 lasers must be operated in an enclosure or utilising other mechanisms to enclose the beam, to prevent accidental contact or diffraction / reflection. Open 3B and 4 beams are not permitted unless justified by a risk assessment, demonstrating there is no reasonably practicable alternative to enclosure and that control arrangements and safe systems are suitable and sufficient.

10. LASER SAFETY OFFICER (LSO)

The LSO acts in an advisory capacity regarding laser safety to the University. As part of this role, the LSO oversees the University's laser safety procedures to ensure suitability and compliance with this Policy and legislative requirements. This includes:

- a. Providing Supervisors and Laser Protection Supervisors (LPSs) with appropriate training and instruction.
- b. Advising LPSs and / or Supervisors as required, including the procurement and safe operation of lasers.
- c. Approving Laser Workers (Class 3B, 4) and Lasers (Class 3B, 4).
- d. Maintaining the Central Register of Lasers and Laser Workers (Class 3B, 4 lasers).
- e. Ensuring appropriate documentation is in place for laser operations e.g. Risk Assessments, Local Rules, Safe Operating Procedures.
- f. Inspection of all new Laser Designated Areas and associated safety arrangements e.g. signage, specific PPE provision for the laser Class, enclosures, interlocks.
- g. Periodic auditing of laser facilities and controls.

11. LASER PROTECTION SUPERVISOR (LPS)

Colleges / Services operating several Class 3R, 3B, 4 lasers should, if possible, appoint a suitably experienced staff member to act as the LPS. Following training, provided by the LSO, the LPS will be responsible for assisting their Dean of College / Director of Professional Service to supervise and monitor the general day-to-day control of lasers to ensure compliance with this Policy.

12. SUPERVISORS AND LONE LASER USERS

Those in a supervisory role with responsibility for others operating an applicable laser and those who are the sole user of a laser must ensure the correct and safe operation of lasers seeking the advice of the LSO as necessary. This includes:

- a. Ensuring lasers are suitable for the activity, with the advice and approval of the LSO given before procuring or acquiring any Class 3B or 4 lasers.

- b. Ensuring undergraduates working with lasers use the minimum power laser practicable and that appropriate controls to manage risk are in place.
- c. Ensuring suitable training is provided to laser operators.
- d. Labelling all lasers and demarcating 'Laser Designated Areas' as required.
- e. Checking personal protective equipment provided is suitable for the Class of laser with details of the specific type to be worn given.
- f. Preparing and displaying suitable Risk Assessments, Safe Operating Procedures and Local Rules for the laser and laser activities.
- g. Registering all Class 3B, 4 lasers with the LSO (LF1 Form, Appendix).
- h. Completing the Laser Survey Form (LF1 Form, Appendix) for all new set ups using Class 3R, 3B and 4 lasers and annually thereafter for Class 3B/4 lasers or immediately if other changes arise e.g planned relocation.
- i. Informing the LSO of lower-Class lasers if planned modifications could affect 'collimation'.
- j. Registering Laser Workers with the LSO, with the Declaration signed (LF2 Form, Appendix).
- k. Ensuring Class 3B, 4 lasers are always used in an enclosure unless otherwise agreed with the LSO and as part of a risk assessed activity.
- l. Monitoring arrangements to confirm lasers are used in compliance with this Policy, Risk Assessments, Local Rules etc.
- m. Informing the LSO of any changes in lasers or Laser Workers (LF3 Form, Appendix).
- n. Undertaking recorded, 3 monthly checks of safety critical devices i.e., interlocks.
- o. Ensuring Accidents and Incidents are reported and investigated accordingly.

13. RESPONSIBILITIES: STAFF, STUDENTS, CONTRACTORS AND VISITORS

As with those duties placed upon the University and its Colleges / Services, staff, students, visitors, and contractors also have responsibilities in law. With regards to this Policy, they must:

- a. Observe this Policy, Risk Assessments, Local Rules, Safe Operating Procedures, and other associated guidance to ensure lasers are operated safely.
- b. Follow all management controls implemented by their College / Service.
- c. Attend training as required.
- d. Only operate lasers they have been instructed and / or trained and authorised to operate.
- e. Not interfere with or mis-use systems put in place to protect against exposure to lasers.
- f. Wear personal protective equipment correct for the laser Class to protect them against laser risks.
- g. Report all Accidents & Incidents and other concerns immediately to their Supervisor, LPS (if appointed), LSO or other appropriate person.

14. EQUALITY ASSURANCE

Every effort must be made to support individuals, so they are treated equally. However, in some very rare instances, there may be a requirement to treat 'persons with a protected characteristic' differently to ensure lasers are operated safely and to safeguard the health, safety and well-being of others who could be affected. In such circumstances, adjusted control and direct supervision should be considered before restricting activities.

15. FURTHER INFORMATION AND PRACTICAL GUIDANCE

The following Information Sheet is available which provides practical guidance on the action Colleges / Professional Services need to take to meet the requirements of this Standard:

- Information Sheet: Safe Use of Lasers.

16. REVIEW AND AUDIT PROCEDURES

Health and Safety, Campus Services will carry out general and periodic audits to assess compliance against this Policy Standard and legislation in general.

Colleges / Professional Services must periodically review their own procedures to ensure the requirements of this Policy Standard are implemented, suitable and effective.

In addition, the University's Health, Safety and Emergency Management Committee may from time to time review the effectiveness of the University's system for the management of lasers across Colleges and Professional Services.

End.



LF1: REGISTRATION OF LASER EQUIPMENT CLASS 3R, 3B / 4

Supervisor to complete this Form and the *Laser Survey Form* for all Class 3R, 3B and 4 lasers and submit to the LSO for approval.

School / Service			
Laser Make			
Model		Type	
Serial No		Class	
Power		Wavelength	
Building		Room	

Proposer (Supervisor (or other) responsible for laser system)	
Name	

Laser a new acquisition? YES - complete A, NO – complete B (delete as appropriate)				
A	Anticipated date of first use:			
	Outline work to be undertake and persons involved (UG, PG, PhD, Staff etc):			
	FOR CLASS 3R, 3B, 4 LASERS:			
	Laser Survey attached (see over)	YES	NO	If NO explain:
B	Risk Assessment attached	YES	NO	If NO explain:
	Detail changes in use / status of the laser / location			

AUTHORISATION

Supervisor			
Name			
Signature		Date	

Laser Safety Officer			
Name			
Signature		Date	



LF1: LASER SURVEY FORM - CLASS 3R, 3B / 4

Supervisor to submit this Form with the *Registration of Laser Equipment Form* for all set ups involving Class 3R, 3B and 4 lasers **before** the laser is put into use for the first time and **annually** thereafter for all Class 3B / 4 lasers.

School		Location	
Make		Model	
Type		Serial No	
Wavelength		Max Power & Class	
Experiment Summary			

	Precautions	Class 1 / 1M	Class 1C	Class 2/2M	Class 3R	Class 3B	Class 4
Physical/Engineering Controls	Door signage (standard warning symbol and including highest class of laser in use)						
	Emission Indicator						
	Remote Interlock						
	Key Control						
	Beam Shutter						
	Beam Stop						
	Beam Level (avoiding eye level if user seated or standing nearby)						
	Beam Enclosure (interlocked enclosure, shielding, covers, flight tubes etc)						
Administrative Controls	Open Beam Working – justified in Risk Assessment if not prevented via engineering controls						
	Laser Labels (on equipment, close if device small)						
	Eye Protection (specific type correct for the laser is available, stored correctly, undamaged, labelled)						
	Protection Clothing (eg for skin)						
	Paperwork (Risk Assessments, SOPs, MPE Calcs., High Risk Tasks covered (eg alignment)						
	Laser Users Registered & Trained (recorded)						

Additional Controls (engineering / administrative)	
Recommended Actions	
Completed by	Signature



LF2: LASER WORKER REGISTRATION FORM - CLASS 3B / 4

The Supervisor must return this Form **before** work with lasers commences to the Laser Safety Officer (LSO), so workers can be added to the Laser Worker Register. Laser Workers must sign the 'Declaration'. Authorization relates only to the laser installation listed.

Laser Worker	<i>Title</i>	<i>Forename</i>		<i>Surname</i>		
School / Service						
Location of Laser						
Laser Type & Class						
Commencing Date				Expiry Date		
Staff / Student Category	Academic Staff	<input type="checkbox"/>	Research Staff	<input type="checkbox"/>	Technical Staff	<input type="checkbox"/>
	Postgraduate	<input type="checkbox"/>	Other	<input type="checkbox"/>	Specify	

LASER WORKER DECLARATION (*MUST be signed before any work with laser commences*)

Tick

	The Supervisor has discussed specific safety issues and instructions, including training and supervisory requirements related to my laser work
	I have read and understood the Risk Assessments, Safe Operating Procedures and Local Rules that are relevant to the laser(s) I will be working with
	I understand the control measures to be implemented, including any specific eye and skin protection for laser Class
	I understand access restrictions in Designated Laser Areas and the operation of the laboratory door interlocks and any equipment-related interlocks and enclosures (e.g. on laser compartments)
	I know the location and capabilities of laser safety equipment (beam stops, moveable shielding, enclosures, laser eye protection, gloves, etc.) in the laboratory
	I understand I must not interfere with, or mis-use lasers and systems put in place to protect against exposure to lasers. This includes never overriding or intentionally not using interlocks, enclosures.
	I understand the procedure to follow if I suffer, or suspect I have suffered, a laser-related eye injury

Laser Worker		
Name	Signature	Date

Supervisor		
<i>I will ensure suitable and sufficient arrangements are in place to ensure the health and safety of the Laser Worker. This includes Risk Assessments, Local Rules, Safe Operating Procedures, training and supervision.</i>		
Name	Signature	Date

Laser Safety Officer		
Name	Signature	Date

