LASER SAFETY

Health, Safety and Compliance Arrangement

March 2025

Contents

Document title		
Laser Safety		
Document author and department		
James Coyne | Laser Safety Officer		
Approving body		
Health, Safety and Wellbeing Committee		
Date of approval		
12/03/2025		
Review date		
3 yearly or earlier if required		
Edition no.		
2		
ID Code		
UOP-HS-A-14		
Date of effect		
12/03/2025		
EITHER For public access online (internet)? *Tick as appropriate*		**YES**
For public access on request copy to be mailed *Tick as appropriate*		**YES**
OR For staff access only (intranet)? *Tick as appropriate*		**NO**
Password protected *Tick as appropriate*		**NO**
External queries relating to the document to be referred in the first instance to the Health, Safety and Compliance Team: email hsservicedesk@port.ac.uk		
If you need this document in an alternative format, please email hsservicedesk@port.ac.uk		

Introduction

Definition of a Laser:

A laser or laser product is any item that is; or contains a laser as described in BS EN 60825-1.

This Laser Safety Arrangement is intended to ensure a safe working environment for anyone who uses, purchases, installs, maintains or comes into contact with lasers or laser containing equipment as part of University business. These arrangements are intended to ensure that the University of Portsmouth is compliant with current legal requirements and best practice for the Control of Artificial Optical Radiation Regulations (AOR) and Provision and Use of Work Equipment Regulations (PUWER).

Responsibilities

Health, Safety and Compliance

Health, Safety and Compliance are responsible for:

1.1 Provide, and keep updated, polices, arrangements and guidance to ensure any statutory requirements for laser safety are met.

1.2 Ensure effective communication on laser safety with relevant services and departments.

1.3 Provide competent advice and support on laser safety to the University.

1.4 Ensure appropriate monitoring oversight for compliance with laser safety regulations, particularly regarding open beam working with Class 3B and 4 lasers.

1.5 Provide reports as appropriate to the University Health and Safety Committee on laser safety performance.

1.6 Advise on laser safety training provided to key role holders and laser users, and ensure adequacy through routine review.

1.7 Maintain records of training for laser safety roles.

1.8 Lead on and coordinate visits by external agencies such as the Health and Safety Executive.

1.9 Maintain an inventory of laser systems in use across the University.

1.10 Ensure that services and schools adhere to the University Policy and Arrangements by carrying out routine auditing and monitoring.

Senior Managers (Deans, Directors, Associate Directors and Heads)

Senior Managers are responsible for ensuring:

1.11 This arrangement is effectively implemented in their areas of responsibility.

1.12 Lasers and laser equipment are suitable for the task / activity and only used by individuals who are competent ensuring adequate information, instruction, training and supervision.

1.13 Lasers and laser equipment are subject to inspection, testing and maintenance regimes, appropriate to the inherent risks and complexity of the equipment in line with the manufacturer's instructions.

1.14 Provide evidence of maintenance and repair of laser equipment to the LSO and Health, Safety and Compliance Team on an annual basis.

Faculty Managers

Faculty Managers are responsible for ensuring:

1.15 Ensure that a Laser Safety Supervisor (LSS) is appointed, where laser work is undertaken.

1.16 Support any decisions taken by the Laser Safety Officer (LSO) regarding suspending work due to unsafe practices.

1.17 Ensure that LSSs have sufficient training, experience and knowledge, as well as time and resources, to enable them to assist in undertaking the measures required to meet relevant statutory and University provisions

1.18 Ensure that no laser work is undertaken prior to appropriate university approval.

1.19 Require that new facilities and modifications are notified to the LSO for approval.

1.20 Ensure that internal safety monitoring is in place in accordance with this arrangement and ensure reports from the LSO are considered by the faculty health, safety and wellbeing committee.

Managers, Supervisors and Academics

Managers, Supervisors and Academics must ensure that:

1.21 The safety management of laser systems under their control, meets the requirements of University laser safety arrangements.

1.22 Ensure that any new or modified laser systems or facilities are notified to the LSS and LSO, and the appropriate laser survey has been carried out with any recommendations being actioned.

1.23 Ensure that any open beam working with Class 3 or 4 lasers that has not been eliminated by engineering means, has been suitably justified and approved by the LSO.

1.24 Ensure suitable and sufficient training and supervision related to the work being carried out with the laser system is completed and recorded; in accordance with this arrangement.

1.25 Where health and safety is being compromised, suspend the activity pending a further assessment and notify the LSO and Health, safety and Compliance Team in accordance with the Health and Safety Escalation Arrangement.

1.26 Report any significant failings relating to the local laser system risk assessment process to senior managers, LSS and LSO.

1.27 Ensure any defects in infrastructure are reported to local management or Estates as appropriate;

1.28 Appropriate risk assessments are carried out and action taken to reduce the risks as far as is reasonably practicable.

1.29 Health surveillance is implemented and carried out where required.

1.30 Lasers and laser equipment have appropriate markings and warnings and that all faulty or defective equipment is reported and taken out of use.

1.31 All employees and students are aware of the actions required to ensure safe working practices are followed.

1.32 Inductions are carried out for staff and students, with records of the training provided including equipment specific training.

1.33 Ensuring that inspections, maintenance and servicing are carried out, reported and recorded (where appropriate) as recommended by manufacturer's instructions.

1.34 Work and safety systems (such as risk assessments, safe systems of work and standard operating procedures), work processes and resources (including supervisory staff, training, instructions etc) are in place and monitored.

Laser Safety Officer

The Laser Safety Officer (LSO) is responsible for the following:

1.35 Be the appointed competent advisor for all matters relating to laser safety at the university.

1.36 Contribute and provide advice to the University Health, Safety and Wellbeing Committee.

1.37 Where health and safety is being compromised, suspend the activity pending a further assessment and report this to the Health, Safety and Compliance Team.

1.38 Support the investigation of incidents related to laser activity.

1.39 Support any Enforcement Authority visits and enquiries related to laser activity.

1.40 Be aware of and, if appropriate, maintain records of all laser products (including the identification, specification, class and purpose of the laser product; and any special requirements or restrictions relating to its use).

1.41 Monitoring compliance with the organisation's procedures for ensuring safe laser use, maintaining appropriate written records, and take immediate and appropriate action in respect of any non-compliance or apparent inadequacy in such procedures.

1.42 To co-ordinate laser equipment and related work, in consultation with the University's external Laser Safety Advisor (LSA).

1.43 Assess and evaluate the need for Laser Safety Supervisors where necessary and ensure these are appointed.

1.44 To develop and maintain arrangements, procedures and guidance in consultation with key stakeholders following the approved governance framework.

1.45 To assist in identifying training and where appropriate organise/develop training.

Laser Safety Supervisors

The Laser Safety Supervisors (LSS) has responsibility for assisting the LSO in promoting understanding and compliance with the University's health and safety arrangements and is responsible for the following:

1.46 Monitor the local management of laser safety to meet the requirements as set out in university policy and associated arrangements.

1.47 Attain and maintain their competence by attending appropriate internal or external training in line with university requirements.

1.48 Inform the LSO of any new laser facilities or equipment.

1.49 Ensure new, modified or relocated laser systems are registered and notify the LSO.

1.50 Carry out surveys of new, modified or relocated laser systems, reviewing that appropriate laser risk assessments and where relevant, satisfactory justification of any open beam working with Class 3 or 4 lasers, are in place and review annually.

1.51 Ensure that the inventory of laser systems held by the Laser Safety Officer is kept up-to-date and accurate.

1.52 Advise and support laser safety training for new laser users and ensure that training records are robustly kept in accordance with university policy.

1.53 Participate in monitoring undertaken by the Health, Safety and Compliance Team and report on laser safety of the areas they are responsible for and highlight significant failings, incidents, etc.

1.54 Provide support and technical input in the investigation of any accident, incident or enforcement action relating to laser safety.

1.55 Where health and safety is being compromised, suspend the activity in conjunction with the Laser Safety Officer pending a further assessment.

Employees and Students (Users)

All University staff and students working with lasers must ensure that:

1.56 They comply with instruction, information and training they receive.

1.57 They report any safety hazards and incidents to their line manager and the Health, Safety and Compliance Team using the online reporting portal.

1.58 They use lasers and laser equipment safely and where appropriate maintain the equipment in accordance with manufacturers' instructions.

1.59 They do not, intentionally or recklessly, interfere with or misuse lasers and / or laser equipment provided by the University.

1.60 Complete the university's introductory training course on the Safe Use of Lasers as well as any other relevant training to the laser systems they will be using.

1.61 Ensure they have been registered formally as a laser user.

1.62 Implement all safety control measures identified for their work and use personal protective equipment as directed by the local risk assessment and procedures.

Arrangements

Governance and Assurance

The University Health, Safety and Wellbeing Committee is the University's oversight and compliance committee on laser safety for the University and will provide assurance to the University Executive Board. Specifically:

- Review relevant laser safety arrangements within the University to ensure compliance with current legislation, and to recommend any actions necessary to improve compliance and / or performance.

- Consider and advise on laser safety reports and compliance of projects and facilities across the University arising from monitoring activities.

Procurement and Acquisition

All purchases of lasers and laser equipment must conform to the University procurement processes in addition to further requirements for ensuring this type of equipment will be safe and suitable for the purpose it is being purchased for.

The following requirements relate to both the purchase and acquisition of all lasers and laser equipment. Wherever possible Class 1 and 2 laser products should be used. Where it is necessary to use open source Class 3B or Class 4 products (not contained in equipment), these will need to have suitable engineering controls such as full enclosure.

Lasers and Laser equipment must be purchased from a reputable company and must conform fully with BS EN 60825-1 (Safety of Laser Products Part 1. Equipment Classification and Requirements) in hazard classification and labelling requirements.

Ahead of the purchasing of any laser system or product, which contains a Class 3 or higher laser, guidance must be sought from the LSS/LSO on the suitability of the plans for the prospective laser equipment and experiment. Due diligence checks must be undertaken to ensure that any equipment to be purchased is compliant with relevant British legislation and standards and is safe to use. The prospective owner / manager (Principal Investigator (PI) for research projects or Responsible Person (RP) for teaching purposes) of the equipment shall be responsible for the equipment being safe to use as well as all necessary engineering controls, such as interlocks, laser warning lights, etc. The RP / PI shall be liable for any further costs in ensuring the safety of the equipment should it not arrive in a state whereby it is safe to use. This extends to any additional costs related to safety, such as the purchasing and maintenance of necessary specialist PPE, such as laser safety eyewear. Other cost considerations also include the initial commissioning, regular servicing and maintenance of the equipment and disposal of the equipment at the end of its useful life.

Prior to use of any laser systems or products which operate a Class 3 or Class 4 laser shall pass through a formal registration and approval system. The laser must be registered through the Health, Safety and Compliance Team (Hornbill), surveyed by the LSS / LSO and suitably risk assessed.

The risk assessment must be formally reviewed by the RP / PI, LSS / LSO and before any work may begin. For laser products or systems that are Class 3R or below, please see “Application of policy to low-risk laser experiments”.

All laser work is subject to a suitable and sufficient assessment of the risks (see the university Arrangement for Risk Assessment). The risk assessment shall consider the hazards related to the laser radiation itself, as well as other “non-beam hazards” that arise from the laser experiment, e.g. electrical, mechanical, chemical, etc. If there are hazards risk assessed outside the Laser Risk Assessment, those other risk assessments must be clearly referenced e.g. COSHH assessments may be recorded separately.

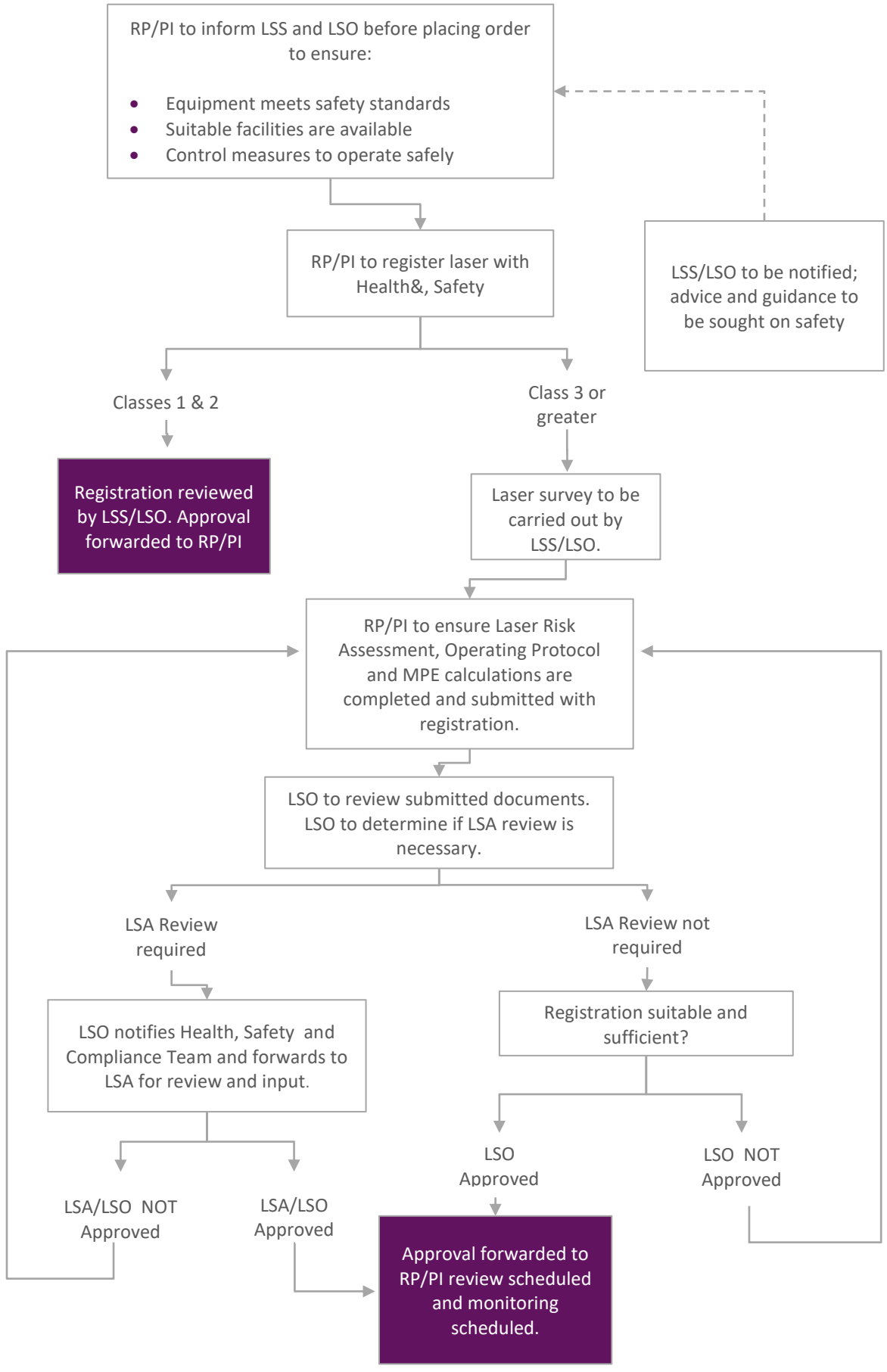
Application of Policy to Low Risk Laser Experiments

For laser products classed as 1 or 2 at purchase, but contain a >Class 3R laser system, the PI should ensure, ahead of first use, that any prospective users cannot accidentally or easily access the beam during normal use. Lasers that are purchased as 3R must initially be surveyed by the LSS/LSO, but do not need to be registered, and annual surveys are not required.

If the above statement is true and/or the laser system is Class 1 or 2, then it is not necessary to follow certain laser registration or monitoring processes. Such systems are thus exempt from:

- Formal registration with the H&S Department
- Specific Laser Risk Assessment (a standard activity risk assessment can be used)
- Laser survey
- Monthly checks (as there will be no safety-critical features involved)

Procurement and Acquisition Flow Process



A risk assessment should include the following:

- For open source lasers, as part of the risk assessment it may be necessary to measure or calculate the levels of artificial optical radiation to which the employee / student is exposed.
- The calculations should include the level, wavelength and duration of exposure.
- Exposure limit values.
- Potential effects on the health and safety of employees / students resulting from interactions between artificial optical radiation and photosensitising chemical substances.
- Indirect effects of exposure such as temporary blinding, explosion and fire.
- Availability and use of alternative equipment designed to reduce levels of exposure.
- The risk assessment must consider class 3B and 4 lasers that are classified in accordance with relevant IEC (International Electrotechnical Commission) standard and any artificial optical radiation source that is capable of presenting the same level of hazard.
- Any risk of adverse health effects to the eyes and skin must be eliminated or reduced to as low a level as is reasonably practical. This may include introducing technical measures such as interlocks, shielding or enclosure, access restrictions, suitable maintenance programmes, design and layout of work stations, signage and as a last resort, availability of personal protective equipment (goggles).
- Information, instruction, training and supervision requirements for the equipment.
- Used in accordance with manufacturer's specific requirements.
- Suitable emergency procedures should be in place in case of fire or accidental laser strike to the eye.

Emergencies

Any emergency actions in relation to the safe use of laser systems must be in writing and laser workers trained in the action to be taken, e.g., in the case of a laser eye strike, critical equipment defect / breakdown, chemical exposure / spillage. Emergency action cards (grab cards) must be in place and nearby the experimental set-up. Action cards shall contain information about the laser energy / power and wavelength, and these should be carried by the injured person and presented to the healthcare provider in the event of an emergency.

Emergency procedures should be practiced. It may be appropriate to have emergency stop buttons in place. If equipment is to be left unattended, particularly out of hours, emergency contact details and other relevant details must be provided.

Following a laser related emergency, a HS1 report must be submitted and an investigation will be carried out by the LSO and Health and safety Compliance Team. Depending on the circumstances and severity, investigations may be escalated to the University Health, Safety and Wellbeing Committee.

Training Requirements

All staff and students using lasers or laser equipment provided by the University, as part of their employment, study or research, must complete training in the safe use and maintenance of the laser or laser equipment they are to use. Users must be provided with information and instructions relating to the use of the laser equipment including any relevant additional information on associated risks such as ventilation, noise, fumes, dusts, vibration, biological etc. All training in relation to lasers or laser equipment must be recorded.

There should be a local induction process in place to ensure that new staff are trained in the safe use of lasers / laser equipment and understand the process for pre-use inspection and fault reporting as well as emergency procedures and first aid.

As part of the procurement process, training should be provided by the manufacturer on laser equipment purchased. This should include maintenance and inspection regime, safe use of laser equipment and good operational practice. This should be recorded.

Role	Minimum Training
Laser Users	For users of low-risk systems, the UoP Laser User Safety Training course must be completed and refreshed every 3 years. For users of Class 3 and 4 systems, completion and certification of Laser User Safety Training must be completed. Local induction and training specific to laser systems being used must be undertaken. Re-certification must be completed every 3 years.
Responsible Persons / Principle Investigators	Appropriate scientific and lab experience, completion of the university Laser User Safety Training Course for class 3 and 4 systems. Knowledge of local arrangements for the safe management of lasers.
Laser Safety Supervisors	Appropriate practical experience working with the classes of lasers typically used in their School / Service. Will be expected to undertake appropriate certified training as identified by the Health, Safety and

	Compliance Team plus completion and certification of the UoP Laser User Safety Training Course.
Laser Safety Officer	Significant practical experience in working with Class 3B and 4 laser systems. Ideally experienced in the LSS / LSO role. Will be expected to undertake appropriate certified training as identified by the Health, Safety and Compliance Team.

Records of all training and instruction shall be kept for both the LSO and LSS and at School or Service level for RP / PI's and laser users. The university has a duty to ensure workers are competent to carry out their work tasks and where competency has not been attained, appropriate supervision must be in place. The user's manager / supervisor is responsible for managing this.

Monitoring Compliance

To ensure high standards of laser safety are maintained, monitoring and inspections are to be carried out in all areas in line with the University's Policy. Monitoring must be carried out at both School / Service Level and University level, records of monitoring must be kept, and the responsible person must ensure that actions are being followed up and completed.

Laser workers shall inspect all safety critical devices (including interlocks, shielding, eyewear, etc.) before use. A formal check of functionality and condition of all safety-critical equipment, as well as laser safety eyewear, shall be performed and documented. Annual laser surveys are required for Class 3B and 4 laser systems.

Element to be monitored	Lead	Tool	Frequency	Reporting Arrangements
Responsibilities as per arrangement	Head(s), Line Manager(s), Those with Line Management Responsibilities, Faculty Managers and Health and Safety Coordinators	Determined by each individual School/service.	Periodically at least Annually or following a significant change or incident, whichever soonest.	Faculty Health, Safety and Wellbeing Committee(s) quarterly reports and minutes of meetings submitted to University Health, Safety and Wellbeing Committee.
Arrangement Suitability, Effectiveness	Health, Safety and Compliance, Occupational Health,	Audit and Inspection Programs	Periodically at least every three years or following a	University Health, Safety and Wellbeing Report, Audit reports and inspection

and Implementation	Laser Safety Officer / Laser Safety Supervisors	Staff News, HSC Newsletters, Communications. All details including risk assessment, SSW's, SOP's, COSHH and health surveillance procedure are covering the training provision.	significant change or incident, whichever soonest.	reports. Occupational Health reports submitted to University Health, Safety and Wellbeing Committee.
Incidents and Complaints	Senior Manager/Managers in conjunction with Health, Safety and Compliance	Incident reports, reviews and investigation. Risk Register(s). Occupational Health cases and data analysis of statistical management information.	When reported; ad-hoc and periodically when necessary.	University Health, Safety and Wellbeing Report, Individual incident reports and Faculty quarterly reports.

Legislation

Legal duties to adopt and maintain safe methods of working are placed on both employers and employees by general health and safety legislation, principally by the Health and Safety at Work etc Act and the Management of Health and Safety at Work Regulations.

The Artificial Optical Radiation Regulations are the key relevant regulations relating to lasers and require the University to eliminate, or reduce as far as is reasonably practicable, the risk of adverse health effects to the eyes or skin of workers from exposure to harmful laser radiation. In addition, laser systems are considered to be work equipment and therefore the requirements of PUWER (Provision and Use of Work Equipment Regulations) and the Supply of Machinery (Safety) Regulations apply.

The key sector-specific laser safety guidance is 'The Safe Use of Lasers in Education and Research (AURPO – Association of University Radiation Protection Officers)'. It is expected that the University approach is in line with this guidance which is endorsed by the Health and Safety Executive.

BS EN 60825 Parts 1, 2 and 4 relate to safety of laser products:

- Part 1: Equipment and Classification and requirements

- Part 2: Safety of optical fibre communications
- Part 4: Laser guards

Medical lasers are subject to special provisions, and revised guidelines on their use have been published by the Department of Health.

The work equipment provided by the University may fall under more than one set of regulations. The relevant key sets of legislation are:

- The Health and Safety at Work Act (HASWA)
- The Management of Health and Safety at Work Regulations (MHSWR)
- The Provision and Use of Work Equipment Regulations (PUWER)
- The Electricity at Work Regulations (EAWR)
- The Control of Artificial Optical Radiation at Work Regulations
- The Health and Safety (Safety Signs and Signals) Regulations
- The Personal Protective Equipment at Work Regulations
- The Reporting of Injuries, Diseases and Dangerous occurrences Regulations

Associated Documents

University Arrangements

- Accident Reporting
- First Aid

University Forms

- Job Hazard Form

University Guides

- Procurement Webpage
- Health Safety and Compliance Escalation Process

Health and Safety Executive Guides

Guidance for Employers on the Control of Artificial Optical radiation at Work Regulations (AOR) 2010

www.hse.gov.uk/radiation/nonionizing/employers-aor-pdf

British Standards

BS EN 60825-1; 2014 + a11:2021 Safety of Laser Products. Part 1 Equipment classification and requirements.

PD IEC TR 60825-14: 2022 Safety of Laser Products – A User's Guide

Technical Guidance Notes

Association of University Radiation Protection Officers (AURPO) Guidance on the Safe Use of Lasers in Education and Research

Document Control

This arrangement is issued and managed by the Health, Safety and Compliance Team.

Change Record

Version	Author	Date	Amendment
1.0	Jill Rice (Laser Safety Officer)	April 2022	Policy draft
2.0	James Coyne (LSO)	November 2024	Policy draft review

Reviewers / Contributors

Version	Name	Role	Date
2.0	Jon Latter	Deputy Health, Safety & Compliance Manager	November 2024