Laser Safety Procedure

Section 1 - Purpose and Scope

(1) This Procedure outlines the requirements for safe use of lasers and laser risk management in The University of Queensland (UQ) and applies to all UQ workers including staff, students, visitors, volunteers and contractors working with lasers and in accordance the Work Health and Safety Act 2011 and Work Health and Safety Regulation 2011.

(2) This Procedure should be read in conjunction with the Laser Safety Guideline and other UQ safety procedures, where applicable. It supports the Health, Safety and Wellness Policy.

Section 2 - Process and Key Controls

(3) Users of laser equipment must comply with the following measures at UQ:

a. for all classes of lasers (see Laser Safety Guideline for information on classes):
    i. lasers are classified and labelled appropriately according to Australian Standard: AS/NZS IEC 60825.1:2014 Safety of Laser Products Part 1: Equipment Classification and Requirements (access via Standards Databases through UQ Library);
    ii. used in accordance with manufacturer specifications; and
    iii. lasers are not wilfully or recklessly misused or interfered with.
b. for Class 4 lasers used in medical, cosmetic or related procedures:
    i. compliance with additional regulatory requirements.
c. for all Class 3 and 4 lasers:
    i. a UQ laser registration form is submitted;
    ii. lasers are listed in the UQ Register of Radiation Apparatus;
    iii. risk assessments in UQSafe are completed prior to the task commencement;
    iv. training is completed prior to use;
    v. training records are kept locally;
    vi. Personal Protective Equipment (PPE) is available and used by all users involved in the laser process if higher order controls have not eliminated the risk of injury to eyes or skin; and
    vii. emergency procedures are in place.

Section 3 - Key Requirements

Risk Assessment and Standard Operating Procedure (SOP)

(4) Class 1 and 2 lasers are low risk and are to be used, maintained and disposed of in accordance with manufacturer instructions. Class 3 and 4 lasers are hazardous to the eye and are subject to more controls. The users of class 4 laser apparatus used to carry out a medical, cosmetic procedure or a related practice, which could be reasonably used on a person, must ensure compliance with Queensland Radiation Safety Act 1999, Radiation Safety Regulation 2021 and

relevant Radiation Safety Standards 2021 and are therefore subject to additional regulatory requirements as specified in this Procedure.

(5) Laser workers and their Supervisors must complete a risk assessment prior to using lasers in UQSafe.

(6) Appropriate SOPs and emergency procedures are developed, documented and provided to laser workers in the Organisational Unit where lasers are used (refer to the Laser Safety Guideline for more information). The risk assessment and SOP must consider the use of the hierarchy of controls to provide the greatest level of risk mitigation.

Laser Registration

(7) A Laser Registration Form must be completed when a class 3 or 4 laser is first supplied to the area and sent to the local Health, Safety and Wellness Manager (HSW Manager) or Work Health and Safety Coordinator (WHSC).

Laser Labelling

(8) All classes of laser equipment require radiation labels to warn people of the hazards involved with the radiation source. The requirements for labelling lasers are described in AS/NZS IEC 60825.1:2014 Safety of Laser Products Part 1: Equipment Classification and Requirements (see Laser Safety Guideline for more information).

Controlled Area with Warning Signage

(9) For all Class 3 and 4 laser use, a controlled area must be clearly sign posted with warning signs and appropriate wording as prescribed for the class of the laser. The local Laser Safety Officer (LSO) contact information is to be displayed (see Laser Safety Guideline for more information).

Laser Safety Training

(10) Before operating a Class 3 or 4 laser system, a laser user must be trained appropriately. A written Standard Operating Procedure (SOP) must be made available to all persons who operate the laser. The Manager or Supervisor must ensure workers are competent to use the laser safely (see Laser Safety Guideline for more information).

Register of Radiation Apparatus

(11) Lasers are defined as a radiation apparatus under the Radiation Safety Act 1999 and therefore are included in the UQ register of radiation apparatus, both ionising radiation and laser apparatus. This register is a central shared document, e.g., via MS Teams that is maintained and kept up to date by the Laser Safety Officer (LSO), Radiation Safety Officers (RSO) and UQ Radiation Protection Consultant (RPC). The content of the register includes list of UQ - radiation apparatus (ionising radiation and class 3 and 4 Laser Apparatus and a laser pointer with a power output of more than one milliwatt) and associated radiation safety protection plan (RSPP), LSO, Radiation Safety Officers, licences and equipment and premise certification.

Lasers used in Medical, Cosmetic or Related Procedures

Possession Licence

(12) The Radiation Safety Act 1999 requires any person who possesses Class 4 lasers that could reasonably be used to carry out a diagnostic, therapeutic or cosmetic procedure, to hold a Possession Licence. UQ has a Possession Licence approved by the Queensland Radiation Health (QRH) to covers Class 4 lasers.

Laser Radiation Safety and Protection Plan (RSPP)

(13) The laser RSPP is a document submitted by a Possession Licence applicant which specifies the actions to be undertaken by the applicant, if a Possession Licence is granted, which will ensure that persons and the environment,

are protected from the harmful effects of radiation as a result of the applicant's radiation practice. RSPPs prepared by the local Laser Safety Officer (LSO) in consultation with the RPC must then be approved by the QRH. UQ has an approved RSPP for lasers.

Laser Safety Officer (LSO)

(14) A certified LSO must be appointed to oversee the laser practice in their Organisational Unit.

(15) To be a certified LSO, the person must complete an accredited training course and submit an application to QRH for assessment. Upon approval from QRH, an LSO certificate will be issued to the applicant by QRH. The person must inform the RPC when they receive the certificate, so the RPC can update the register of radiation apparatus. Note the above application form is titled Radiation Safety Officers – you tick the relevant laser related practice box/s.

(16) Information on the role of the LSO at UQ can be found in the 'Laser Safety Officer (LSO) or Another Competent Person' provisions below.

Use Licence

(17) The Act requires all persons who use Class 4 lasers to hold Use Licences. Use Licences are granted by QRH. A use licence authorises the holder to use specified types of radiation sources for a specified purpose

Approval to Acquire

(18) Organisational Units wishing to purchase new class 4 lasers must complete an Approval to Acquire (ATA) issued by QRH prior to the purchase. This form is submitted to QRH with a copy to the RPC. The local LSO can assist with the application and provide advice.

(19) When the laser arrives, the register of radiation apparatus is to be updated by the local LSO.

Approval to Relocate

(20) If a Class 4 laser is to be permanently relocated to a place outside of Queensland, Approval to Relocate a radiation source must be in place prior to the arrival of the laser.

(21) The LSO must notify QRH within seven days of the laser being received. Until this confirmation is received, the laser will remain the responsibility of UQ. The register of laser apparatus is to be updated accordingly by the local LSO.

Certification

(22) The local LSO must organise certification of the laser units and the premises by an accredited person regularly (annually, every three or five years).

Disposal

(23) Class 4 lasers must be disposed of in accordance with the Regulation.

(24) The LSO must ensure that:

a. the laser equipment is rendered permanently inoperable, incapable of being repaired, and incapable of producing radiation;
b. all laser warning signs are removed;
c. notice is given to QRH within seven days after disposal; and
d. the register (see 'Register of Radiation Apparatus' provisions (clause 11) above) is updated.

LSO for Lasers used for Purposes other than for Medical, Cosmetic or Related Procedures

(25) For lasers used in non-medical, cosmetic or related procedures, a competent LSO should be appointed by the Organisational Unit where Class 3 or 4 lasers are in use.

Laser Purchase

(26) The worker purchasing the laser must ensure the laser is purchased in accordance with UQ Procurement Policy and Safe Procurement and Acquisition of Plant and Equipment Procedure and where relevant, the 'Register of Radiation Apparatus' provisions (clause 11) above. The laser must meet the requirements in AS/NZS IEC 60825.1:2014 Safety of Laser Products Part 1: Equipment Classification and Requirements (access via Standards Databases through UQ Library). The worker should consult local LSO, HSW Manager, WHSC or RPC before placing an order.

In-house Constructed Laser Unit

(27) An in-house constructed laser (Class 3 or Class 4) unit must be assessed by local LSO or RPC to ensure it is safe to use and in accordance with the UQ Electrical Safety Procedure. A risk assessment must be completed in UQSafe prior to the laser unit being used.

Research Project Involving Class 4 Lasers

(28) This provision only applies to Class 4 lasers used for research purposes in medical, cosmetic or related procedures. The workers must prepare Laser Radiation Research Project Assessment Form and submit to at least one of the following: LSO, HSW Manager or WHSC for approval. The form is then sent to the RPC prior to the laser unit being used (see Laser Safety Guideline for more information).

Laser Beam Alignment

(29) Laser beam alignment must be performed by authorised workers. Refer to the Laser Safety Guideline for further information.

Laser Pointer

(30) A laser pointer with a power output of less than one milliwatt (Class 1) as a pointing tool may be used during teaching activities. People using a laser pointer with a power output of more than one milliwatt require a permit to possess or use the laser pointer in accordance with the Weapons Act 1990, unless being used for activities associated with astronomy and the user is a member of an approved astronomical association (e.g. Astronomical Association of Queensland). Regardless of the power output of the device, no laser pointer can be carried or used in a public place without a reasonable excuse.

Safety Officer Appointment Form

(31) The Safety Officer Appointment Form must be completed for each person appointed as a Laser Safety Officer and forwarded to HSW Manager.

Incident and Injury Reporting

(32) All incidents or near misses must be report to the Supervisors, local LSO and in UQSafe as soon as possible after the incident. If a worker's eyes or skin is exposed to Class 3 or 4 lasers, the worker should be assessed immediately by a doctor, with referral to an ophthalmologist if required

(33) In the event of an actual or suspected laser exposure, or a possible failure of a protective measure which may have led to an incident, the use of the laser should be terminated immediately, pending outcome of an investigation and implementation of related corrective actions.

(34) Class 4 laser incidents which involve medical, cosmetic or related procedures must follow the incident reporting procedures specified in the approved RSPP. A written incident report (UQSafe report can be used) is to be produced by the worker or local LSO and submitted to the HSW Division who will notify QRH within seven days of the occurrence of all dangerous events.

(35) Any notifiable incident will be reported to the Regulator through the HSW Division. Local personnel must not submit such a report to the Regulator directly.

Section 4 - Roles, Responsibilities and Accountabilities

Possession Licensee

(36) UQ has been granted three Possession Licences for the radiation sources under the Act. The Possession Licensee is responsible for ensuring compliance with both the legislation and specific licence conditions.

a. The Chief Operating Officer of UQ is the nominee for one possession licence that encompasses the majority of UQ's radiation equipment, radioactive substances and Class 4 lasers used in medical, cosmetic or related procedures.
b. Director, Centre for Advanced Imaging (CAI) is the licence nominee of another possession licence for the radiation equipment and radioactive substances used in CAI.
c. Director of the Herston Imaging Research Facility (HIRF) is the licence nominee of the third possession licence for the radiation equipment and radioactive substances in HIRF.

(37) The Possession Licensee can nominate a nominee to carry out activities on their behalf and this can be any senior executive member. To be nominated, the senior executive member must contact the HSW Division so the process can be completed and QRH be informed of the nomination.

Nominee or Head of Organisational Unit

(38) The Nominee or Head of Organisational Unit must ensure:

a. a person competent and knowledgeable regarding Class 3 and Class 4 lasers used for other purposes in the Organisational Unit is appointed (this can be an LSO or other competent person);
b. appropriate safety systems, including induction, instruction, supervision and training, are implemented and that the requirements of the relevant legislation are complied with in regard to lasers and laser work;
c. sufficient resources are available to manage the safety of the lasers; and
d. class 3 and 4 lasers are included in the register of radiation apparatus is kept and updated (see 'Register of Radiation Apparatus' provisions (clause 11) above).

(39) In addition, when a class 4 laser is used for medical, cosmetic or related procedures, the Nominee or Head of Organisational Unit must ensure:

a. appropriate licences are in place;
b. all users work at all times within the limitations of their licences;
c. compliance with any conditions imposed on the Possession Licensee;
d. the version of the RSPP being used has been approved by QRH, and is being followed;
e. a certified LSO is appointed;
f. laser apparatus and premises continue to comply with the relevant Radiation Safety Standard;

g. approvals issued by QRH are obtained prior to acquiring or relocating a Class 4 laser to a place outside Queensland;
h. the LSO is carrying out their functions properly appropriately so that the Possession Licensee is able to be adequately appraised of the laser safety status of the practice at all times;
i. QRH is advised in writing of the disposal of a Class 4 laser apparatus within seven days; and
j. immediately notify QRH through Health, Safety and Wellness Division after an incident, either orally or in writing. If the notice is given orally, written confirmation must be provided within seven days.

Laser Safety Officer (LSO) or another Competent Person

(40) For Class 4 lasers used for medical, cosmetic or related procedures, a certified LSO must be appointed to oversee the laser practice in the Organisational Unit and an LSO or other competent person should be appointed where Class 3 and 4 lasers are used for other purposes. The Safety Officer Appointment Form must be completed and forwarded to HSW Division.

(41) The LSO or other competent person is responsible for:

a. ensuring a risk assessment (for Class 3 or 4 lasers) in UQSafe;
b. monitoring compliance within the Organisational Unit for ensuring safe laser use;
c. terminating any activity or process that presents an immediate danger to life or health;
d. providing or arranging laser safety training;
e. providing professional laser safety advice to relevant workers;
f. ensuring radiation warning signs are displayed and are in good condition;
g. providing appropriate PPE;
h. all laser apparatus are correctly classified according to AS/NZS IEC 60825.1:2014 Safety of Laser Products Part 1: Equipment Classification and Requirements;
i. an appropriate fire extinguisher is available in the premises where the laser apparatus is used;
j. maintaining appropriate records, including worker training record and a register of Class 3 and Class 4 lasers;
k. reporting any incident through UQSafe and to the Head of Organisational Unit and the RPC;
l. participate in any incident investigation; and
m. develop emergency management plans.

(42) In addition, the LSO for Class 4 lasers used in medical, cosmetic or related procedure must ensure:

a. the Laser Radiation Research Project Assessment Form is completed and reviewed then forwarded to RPC for approval;
b. they have a current LSO Certificate issued by QRH;
c. all workers have read, understood, and are complying with the approved RSPP; and
d. appropriate licences and compliance certificates are in place.

Radiation Protection Consultant (RPC)

(43) The RPC provides overall guidance to all UQ workers on matters pertaining to laser safety. The RPC monitors the implementation of UQ's RSPPs (where applicable) as approved by the regulatory authority, provides support for radiation governance and compliance across UQ and monitors compliance with laser safety legislation.

(44) The RPC is the primary source of advice and expertise for:

a. laser legislative and scientific requirements;

b. RSPPs (where applicable);
c. laser research project approvals;
d. overall guidance to LSOs; and
e. laser safety training for radiation users.

HSW Manager or Work Health and Safety Coordinator (WHSC)

(45) In the absence of a local LSO, the HSW Manager or WHSC is responsible for providing Organisational Unit with information regarding education, advice and support. Other local LSOs or the RPC should be consulted on safe practices where the HSW Manager and/or WHSCs has no experience with laser safety.

Supervisor

(46) Supervisors, including academic Supervisors of Higher Degree by Research students, are responsible for ensuring workers:

a. are provided with appropriate induction, training and supervision;
b. comply with this Procedure;
c. are trained and competent to use lasers safely;
d. complete risk assessments prior to the use of lasers;
e. develop SOPs; and
f. ensure all incidents involving lasers are reported are investigated.

Laser User

(47) Users must:

a. assist the Supervisor in preparing a risk assessment in conjunction with the LSO and have it approved prior to the work commencing.
b. be familiar with the risk assessment and relevant SOP;
c. have completed training in the use of the laser equipment;
d. ensure the laser is classified and the labels are appropriate;
e. use appropriate laser safety glasses or face shield where applicable (general lab rules for PPE apply);
f. perform a visual inspection of the laser system to check for damage or safety issues prior to power up is initiated and report any safety issues to the LSO;
g. tag out the laser if the laser system is faulty or not functioning as expected and report to the LSO;
h. put up sufficient and appropriate warning signs for the laser work;
i. follow local procedures when using lasers in non-UQ facilities;
j. be familiar with emergency procedures and follow these procedures in an emergency;
k. not disable any interlocks or other safety mechanisms fitted unless authorised to do so; and
l. report any incident to the LSO, record the incident in the UQSafe and assist with incident investigation.

(48) In addition, a worker using Class 4 lasers for medical, cosmetic or related procedures must:

a. have their work reviewed by the LSO, HSW Manager or WHSC and RPC prior to commencement of work, using the Laser Radiation Research Project Assessment Form. Note: this form will be only required for research involving Class 4 lasers in medical, cosmetic or related procedures;
b. hold a licence, issued under the Act, with an authority to use laser apparatus for diagnostic, therapeutic or cosmetic purposes;

c. comply with the conditions of the licence issued under the Act;
d. only use laser apparatus for the range of procedures specified on the licence;
e. ensure that they are authorised by the Possession Licensee to use the laser apparatus for the specified procedure;
f. comply with the approved RSPP;
g. use the safety devices and personal protective equipment as required by the RSPP; and
h. report any contravention of the RSPP to the Possession Licensee through the LSO.

Health, Safety and Wellness Division

(49) Health, Safety and Wellness Division (HSW Division) is responsible for maintaining the required level of central oversight and assurance by:

a. employing an RPC to oversee the safe management of laser use at UQ;
b. assessing whether organisational units and UQ workers can demonstrate compliance with UQ Laser Safety Procedure, guidelines, RSPP and licence conditions, where applicable; and
c. reporting to Queensland Radiation Health (where applicable) and investigating any incidents, as required.

Laser Safety Officer Network

(50) This is a formal network of UQ LSOs. The forum allows the RPC and LSOs to consult on, and review regulatory, organisational and technical laser matters at UQ.

(51) The LSO Network meets four times a year and is chaired by the RPC. All participants are invited to contribute discussion and presentation items for the meeting. The LSO community provide secretariat duties as needed. All presentations and minutes are retained by Health, Safety and Wellness Division.

Section 5 - Monitoring, Review and Assurance

(52) The RPC oversees radiation safety arrangement at UQ and reviews the specific aspects of radiation safety regularly. Local LSOs or other competent person communicate radiation safety issues to the RPC as required.

Section 6 - Recording and Reporting

(53) Organisational Units and Supervisors should review the register of radiation apparatus to ensure information accuracy and provide updated laser registration to the HSW Division as required.

(54) Record requirements are met in accordance with this Procedure.

(55) Local LSOs, HSW Managers and WHSCs are responsible for reporting any deficiency or non-compliance within the Organisational Unit to the HSW Division.

(56) Risk assessments, incidents and hazards will be recorded and reported in UQSafe.

Section 7 - Appendix

Terms	Definitions
Accredited Person (Equipment and Premises Compliance Tester)	Is an individual with skills, knowledge and experience in assessing laser sources or premises. A person who has a related Accreditation Certificate (issued by QRH) is allowed to issue Certificates of Compliance.

Terms	Definitions
Controlled Area	In which access is restricted for the purpose of protection from laser radiation.
Laser	A device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The word "laser" is an acronym for "light amplification by stimulated emission of radiation".
Laser Class 3 and 4	Lasers that are hazardous to the eye and are subject to more controls as part of this Procedure.
Laser Safety Officer (LSO)	A person who is knowledgeable and competent in the assessment and control of laser hazards and has responsibility and authority for oversight of the control of laser hazards.
Possession Licence	A licence, issued under the Act, to possess a radiation source for a radiation practice.
Radiation Protection Consultant (RPC)	A qualified expert appointed by the responsible person to supervise radiation safety activities and to ensure radiation safety. An RPC is deemed to have the authority to implement procedures and to intervene in situations where safety has been or is being compromised.
Radiation Safety and Protection Plan (RSPP)	Is the risk management plan for a particular type of radiation practice. The relevant RSPP must be complied with by all users and other persons involved in the practice.
SOP	Standard Operating Procedure: A set of step-by-step instructions compiled by an organization to help workers carry out routine operations.
UQ workers	For the purposes of this Procedure includes: • staff – continuing, fixed-term, research (contingent funding) and casual staff members; • contractors, subcontractors and consultants; • visiting academics and researchers; • academic titles holders, visiting academics, Emeritus Professors, adjunct and honorary title holders, Industry Fellows and conjoint appointments; • Higher Degree by Research students; and • volunteers and students undertaking work experience.
Use Licence	A licence, issued under the Act, to use a radiation source to carry out a radiation practice.
WHSC	Work Health and Safety Coordinator.

Status and Details

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Effective Date	4th January 2023
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Enquiries Contact	Health, Safety and Wellness Division