

University of Glasgow
School of Engineering

Local Safety Arrangements – Control and Power Teaching, Equipment and Research Laboratories – Rankine Building levels 3, 5 and 6

Introduction

The Control Teaching, Equipment and Teaching Laboratories house a range of expensive experiment and computing equipment, which is distributed throughout the three laboratory areas. Each laboratory area has a distinct function within the department. The Control Teaching Laboratory is used for undergraduate and postgraduate teaching and for project work. It contains an experiment area for practical laboratory sessions and a computer cluster. The Control Equipment Laboratory is used for project work on particular experimental apparatus, which is housed in this area. The Control Research Laboratory is used by postgraduate students undertaking control and systems related research studies. The three laboratories are run by approximately ten members of technical and academic staff and are used by a changing population of approximately two hundred users. A wide range of activities are carried out in each of the three laboratories and these are listed below: -

Control Teaching Laboratory

- Undergraduate and postgraduate control experiments – involving control of servomotors, process trainers and system frequency response analysis.
- Undergraduate and postgraduate computer simulation and control design experiments.
- Projects in control and simulation of dynamic systems.
- Electromechanical experiments.
- Signal Processing.
- Tutorial sessions.
- Word processing.
- Presentation Preparation.
- Network use i.e. e-mail and internet access.

Control Equipment Laboratory

- Research projects in control and simulation of dynamic systems – equipment includes helicopter test rig, twin tank systems, inverted pendulum.
- Real-time implementation and evaluation of control designs for physical systems.
- Data acquisition for simulation model validation.
- Equipment maintenance.
- Technician working areas.
- Equipment storage.

Control Research Laboratory

- Postgraduate PhD research through computer oriented studies.
- Presentation preparation.
- Word processing.
- Network use i.e. e-mail and internet access.
- Network connections for level 5.

Access to Laboratory Equipment and Processes

The Control Teaching Laboratory is a general access area of the Rankine Building during normal working hours. Students using the computing facilities within the lab do not need constant supervision. However, students undertaking experiments outwith normal laboratory sessions will have to contact laboratory staff in the first instance before they begin working. The main door to the laboratory remains unlocked during normal working hours.

The Control Equipment Laboratory is a restricted area of the Rankine Building. Users undertaking experiments will have to contact laboratory staff in the first instance before they begin working in this area. Following which they have to follow the Terms and Conditions of use for the apparatus they plan to use. The main door to the laboratory remains unlocked during normal working hours.

The Control Research is a restricted area of the Rankine Building and only staff and postgraduate research students are allowed access. All authorised users are issued with a key to gain access to this area at any time during the day. The main door to this area remains locked when the laboratory is not in use.

Laboratory users from outside the university and from other research groups within the Department are given access to these laboratories provided they can demonstrate a real need to access equipment and computing facilities. The rules for working outwith normal working hours are described later in this document.

Users must not attempt to use ANY of the laboratory equipment before they check with staff that they are authorised equipment users and have received the appropriate level of training. Laboratory users must inform staff of the experimental equipment they wish to use in the laboratories. New users must undergo an induction course on how to operate the particular apparatus they wish to use. The chief technician shall give this induction course and it shall involve discussion about safety procedures and equipment (e.g. fire extinguishers) within the laboratories.

Visitors and Contractors

The agreed policy within the Control research group is that as much notice as possible should be given of impending visits by individuals from other organisations and contractors. Two methods are available for informing staff of forthcoming visits

- Send an e-mail to the Chief Technician or Laboratory Guardian.
- Visit the Control Equipment Laboratory and enter the relevant details in the visitors book

Authorised laboratory users **MUST NOT** give access to unauthorised laboratory users at ANY time of the day. This particularly applies to individuals working outwith normal working hours.

All contractors must contact a member of the laboratory staff before they do any form of work within the laboratory. The member of staff will inform them of relevant safety issues and will ensure that any work they propose to do will not interfere with laboratory operations. This is particularly important for work being done on electrical supplies and the ventilation systems.

Working Outwith Normal Working Hours

Anybody wishing to work in the Control Teaching and Research Laboratories outwith normal working hours must be an authorised laboratory user and should in the first instance contact the laboratory staff. They will issue them with a set of *Late Working Rules* and ask them to sign a *Late Working Agreement* to verify they have read, understood and agree to comply with the

rules. A member of staff must witness this form. The signature is valid for a period of six months.

In the case of the Control Equipment Laboratory, NO user may use the equipment within this area outwith normal working hours unless they have been authorised by the Laboratory Guardian. Use of equipment in this area would require supervision by an authorised member of staff. Such supervision must be arranged well in advance. If authorisation and supervision have been arranged then the user will follow the procedures outlined for the Control Teaching and Research Laboratories.

Access to the equipment storage cupboard is strictly prohibited outwith normal working hours.

Health and Safety Information

Health and safety information on all aspects of the laboratory is available from laboratory staff in the area. Information is updated and acted upon as it becomes available from the Health and Safety Executive and the University Safety and Environmental Protection Service. Should there be a need to disseminate urgent health and safety information to laboratory users then this will be done via e-mail and by posting appropriate warning notices.

General laboratory safety issues

The laboratory houses a range of expensive and potentially dangerous equipment. Laboratory users are therefore given clear instructions that they must not tamper with equipment in any way. Should there be a need to change equipment operating conditions from those normally in use, this must be done in conjunction with laboratory staff.

Eating and drinking is prohibited throughout the Control Teaching and Equipment Laboratories. The only exception is the designated technician area located in the Equipment Laboratory. Smoking is not permitted anywhere in level 5.

Laboratory staff make every effort to promote a tidy and clean working environment throughout the three laboratory areas.

Laboratory users and staff are made aware of the hazards that can arise from improper use of equipment.

Electrical safety

Lab users are made aware of the fact that they must not tamper with ANY items of electrical equipment. This particularly applies to large items of equipment such as the 3 DOF Helicopter Experiment, which have substantial power supplies, but also applies to smaller items of equipment such as computers, which sometimes require to undergo memory upgrades or have additional I/O boards installed. Modification to computers should only be carried out after consulting with laboratory staff.

Small items of electrical equipment undergo annual electrical checks by technician staff.

Equipment and air conditioning plant maintenance

Some of experimental equipment within the laboratory is maintained under annual service agreements with instrument companies. The remaining items of equipment are not covered in this way and are maintained by laboratory staff. Every effort is being made to ensure that all technical staff receive appropriate training to meet the maintenance needs for all items of equipment within the laboratory. Several days each year are designated maintenance days and staff carry out routine maintenance and receive training on maintenance techniques during these

periods. Staff only carry out maintenance techniques once they have completed the appropriate training.

The air handling systems within the three laboratories are maintained on a service contract.

Fire safety

In the event of a fire or the fire alarm sounding, laboratory users are instructed to leave the laboratory areas by the quickest escape route. Maps illustrating the escape routes and the location of fire fighting equipment can be found next to the main exits of each of the Laboratory areas. Users are encouraged to familiarise themselves with these maps.

The Safety and Environmental Protection Service provide annual fire fighting demonstrations and senior laboratory users are encouraged to attend these sessions.

Manual Handling – moving new and existing equipment

Laboratory users are advised that for safety reasons laboratory staff must be involved in the movement of all large items of equipment. Staff will also supervise the arrival of new items of equipment often in conjunction with representatives from the equipment supplier.

First aid and emergency procedures

Tom O'Hara and Kenneth McColl are trained first aiders in Level 5. In the event of an accident lab users should firstly call for assistance and then where possible endeavour to provide assistance. External assistance can be obtained by dialling EXT 4444 from any telephone. This contacts the security department who will contact the appropriate emergency services.

Incident reporting and investigation

All accidents arising within the laboratory or any aspect of laboratory activities must be reported immediately to laboratory staff who are instructed to complete a Department Accident Form.

Procedures for highlighting safety concerns

Any concerns about safety within the laboratory should in the first instance be raised with technical and academic staff in the area. These concerns should be reported to the Chief Technician and/or the Laboratory Guardian. In the unlikely event that highlighted safety concerns are still not acted upon to the user's satisfaction, he or she is entitled to write to the Department Safety Co-ordinator who will inform the Department Safety Committee. They will decide whether further action is needed and will ensure that any recommendations are implemented.