

Electrical Safety Policy

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Approval History

Version	Reviewed by	Amendment history	Approved by	Date
1.0	Clive Batchelor Estates and Facilities Management	First Draft (old format)	Health and Safety Committee Executive Board	February 2016
2.0	George Tsardakas Estates and Facilities Management	Second Draft; Minor amendments (2018 format)	Health and Safety Committee	19 October 2018

1	Introduction
1.1	Purpose
1.1.1	Electricity is the most useful source of energy throughout the world for lighting, power and data, and is used safely by millions of people on a daily basis. However, if not managed correctly, or misused, it presents a serious hazard that can cause injury or death. This document sets out the University policy for electrical safety.
1.2	Scope
1.2.1	The use of electricity is common to Estates & Facilities, Academic Faculties, staff, contractors, students and visitors to the University. Therefore this Electrical Safety policy is applicable in part to everyone using electrical equipment in the University.
1.2.2	This policy includes arrangements for electrical power supplies, distribution, and connection of hard-wired installations including machinery and electrical equipment; selection and procurement of electrical equipment; equipment designed and built in the University; student projects; electrical equipment in flammable and explosive atmospheres; visual inspection and testing of portable appliances; and personal equipment and their use in residences.
1.3	Definitions
1.3.1	High Voltage (HV) – Voltages over 1,000 Vac or 1,500 Vdc. The University HV networks are supplied at 11,000 volts ac 3-phase.
1.3.2	Low Voltage (LV) – Voltages below 1,000 Vac or 1,500 Vdc. The University LV systems are supplied at 415 volts ac 3-phase, and 230 volts ac single phase.
1.3.3	Extra Low Voltage (ELV) – Voltages below 50 Vac or 120 Vdc.
1.3.4	Reduced Low Voltage (RLV) – 110 Vac centre tapped to earth (55 Vac to earth).
1.3.5	Portable Appliance – any portable, transportable or moveable appliance, machinery, or research equipment plugged in to the electrical distribution system through a socket outlet.
1.3.6	<p>Effects of Electrical injuries</p> <p>The effects of electric injuries are well documented in HSE guidance. A brief summary follows:</p> <ul style="list-style-type: none"> • Electric shock resulting from current flowing through the body can cause muscular spasm, heart stoppage, breathing paralysis, and deep burns. • Overheating cables, equipment or appliances can cause burns, fire or explosion. • Arcing can cause very rapid UV skin burns and blindness. • Uncertified electrical equipment in hazardous areas may cause ignition of flammable or explosive atmospheres. • Systems and machinery can operate erratically or run out of control due to electrical faults or electromagnetic interference, causing physical injury. • Exposure to radio-frequency electrical energy can lead to deep-seated heating of body tissue, with resulting scars or organ damage <p>The extent of electrical shock damage to the body depends on a number of physiological factors and environmental conditions however, higher voltages present much greater risk of serious injury or death.</p>
1.3.7	Occupational Health, Safety and Environment is defined as “the measures and systems aimed at preventing harm and ill health to those at work, whilst protecting the environment from damage that could result from work practices.”
1.3.8	<p>Competent person</p> <p>A competent person has the necessary skills, knowledge, attitude, training and experience to undertake the role effectively.</p>

1.3.9	<p>Training and Briefing</p> <p>Training is equipping staff, students (and others where the University has a duty-of-care) with relevant skills to deal appropriately with a given Health and Safety situation.</p> <p>Briefing is informing such persons of relevant knowledge in relation to Health and Safety.</p> <p>Training and briefing will be made available in a range of formats according to the needs of the trainee and different groups of staff, students and others.</p>
1.3.10	<p>Accessibility</p> <p>The duty to make reasonable adjustments, as far as possible, to ensure that all staff and students (and others where the University has a duty-of-care) with a disability have equal access to everything they need to do a job or studies as those persons without a disability.</p>
2	<p>Policy</p>
2.1	<p>Principles</p>
2.1.1	<p>Policy Statement</p> <p>The University will ensure that all necessary safety precautions are undertaken with respect to electricity and electrical equipment in line with regulations and guidance – as outlined in the following principles</p>
	<p>(1) The High Voltage networks shall be managed by E&FM electrical engineers in accordance with the HV Management Plan, with all work carried out by HV Approved Contractors. High Voltage systems must only be switched or worked on by Authorised Persons and Competent Persons.</p>
	<p>(2) Low voltage fixed wiring installations shall be designed, installed and maintained in accordance with the statutory Regulations, British Standards, the Wiring Regulations, and established practice of the UK electrical industry. Fixed wiring installations must only be worked on by qualified electricians and engineers.</p>
	<p>(3) Electrical equipment procured by the University for standard use in academic buildings and residences shall be CE marked, compatible with the UK supply, and comply with the Electrical Equipment (Safety) Regulations 1994. Specialist equipment for use in explosive atmospheres, radiology and medical purposes, and lifts shall be supplied in compliance with their particular Regulations. Bespoke or innovative equipment for research which falls outside of international or national standards must nonetheless comply with the fundamental safety requirements of the Regulations.</p>
	<p>(4) Electrical equipment made, repaired or modified in the University must comply with the Electrical Equipment (Safety) Regulations 1994 and its design, safety and operation documented and certified safe for use by a competent electrical engineer.</p>
	<p>(5) Student projects encompassing electrical power are supervised by Academic Tutors and Laboratory Managers. Projects are normally set at safe extra low voltage levels but any potentially hazardous projects will be subject to risk assessment.</p>
	<p>(6) Portable appliances shall be inspected and tested according to HSE and IET guidelines. Fixed electrical equipment in academic buildings, plant rooms and residences shall be maintained in accordance with a planned preventative maintenance routine.</p>
	<p>(7) Power tools for use on construction sites shall either be cordless or supplied from a reduced low voltage supply.</p>
2.1.2	<p>Policy Procedures</p>
	<p>(1) High voltage networks</p> <p>The University is supplied at High Voltage and the 11kV distribution network extends to substations in Stag Hill and Manor Park. System details and drawings of the HV distribution systems are held and maintained by E&FM.</p>

	<p>The HV networks are managed by the University electrical engineers in accordance with the HV Management Plan. Inspection and testing of the 11kV distribution system and sub-stations is carried out by specialist HV contractors appointed by the University. This contract is managed by Estates and Facilities Management.</p> <p>HV substations are identified with warning notices and kept locked by E&FM. Access to substations is controlled by Permit to Access or Permit to Work. Only the Principal Electrical Engineer, Authorised Persons and engineers of the HV Approved Contractor are allowed into the HV substations unless accompanied. High Voltage systems must only be switched or worked on by HV Authorised Persons and Competent Persons.</p>
	<p>(2) Fixed distribution systems</p> <p>The low voltage fixed distribution systems at the University are designed, installed and maintained in accordance with BS7671:2018 the IET Wiring Regulations. E&FM are accredited by the National Inspection Council of Electrical Installation Contractors as a conforming body for inspection and testing, with the Principal Electrical Engineer as the principal duty holder and a Qualified Supervisor who carries out inspections and maintains the documentation. The frequency of inspection and testing is carried out to Guidance Note 3 of the Wiring Regulations for educational establishments every 5 years. The schedule of testing and the test records are held by E&FM.</p> <p>LV substations are identified with 415V warning notices, kept locked by E&FM and access controlled by Permit to Work. Fixed wiring installations must only be worked on by qualified electricians and engineers.</p> <p>Hard-wired plant, machinery and equipment is permanently connected to the electrical supply at 415 volts ac 3-phase. All plant and machinery shall be fitted with local isolators as required in the Wiring Regulations.</p>
	<p>(3) Portable appliances</p> <p>Portable appliances must be formally inspected and tested at intervals and must display a test label indicating the test date. New appliances should be visually inspected and labelled before being put into service.</p> <p>The frequency of testing of portable appliances varies according to risk assessment depending upon the class of equipment and the environment in which it is used; in accordance with Table 1 of the Code of Practice for In-service Inspection & Testing of Electrical Equipment, HSE guidance HSG107 Maintaining Portable Electrical Equipment, and INDG236 Maintaining Portable Electric Equipment in Low-risk Environments.</p> <p>Portable appliance testing must be carried out by specialist approved contractors, staff or co-opted students who have attended recognised PAT training. PAT testers require a level of competency set out in the University of Surrey document Electrical Safety Guidance and Best Practice.</p> <p>Any portable appliance that fails either a visual inspection or a formal test must be disconnected, withdrawn from service, marked as 'Unsafe – Not to be used', and either made safe by a competent electrician or disabled and disposed of according to University waste disposal requirements.</p> <p>E&FM carry out portable appliance testing for central departments and residences. Faculties arrange for portable appliance testing of their own equipment.</p>
	<p>(4) Personal equipment on campus and in residences</p> <p>The University recognises that students bring their own laptop computers, tablets, and mobile phones chargers onto the campus. There is no objection to sensible use of personal equipment providing it conforms to EU standards and is compatible with the UK 230V, 50Hz electrical supply.</p> <p>The requirements for portable electrical appliances brought into residences by residents are set in the Residents Guide incorporating the Conditions of Residence. Students personal</p>

	<p>equipment is not considered to be within the workplace and not PAT tested by the University.</p>
	<p>(5) Procurement of equipment</p> <p>Standard electrical equipment procured or leased new shall be CE marked for use within the EU, compatible with the UK supply voltage and frequency, and comply with the Electrical Equipment (Safety) Regulations 1994.</p> <p>Specialist equipment for use in explosive atmospheres, radiology and medical purposes, and lifts shall be supplied in compliance with their particular Regulations.</p> <p>Bespoke or innovative research equipment, for which international or national standards do not yet exist, must nonetheless comply with the fundamental safety requirements of the Regulations. The University in conjunction with suppliers of the equipment must satisfy themselves as to the compliance of the electrical equipment with the Regulations. Second hand equipment does not necessarily have to be CE marked.</p>
	<p>(6) Design, build, repair and modification</p> <p>Electrical equipment, apparatus or devices made in the University must comply with the Electrical Equipment (Safety) Regulations 1994, but does not require CE marking for use within the University. The design, safety and operation of the equipment must be documented, reviewed and certified safe for use by a competent electrical engineer. Equipment under 50 Vac or 75 Vdc is exempt.</p> <p>Repairs carried out in the University must be undertaken appropriately according to the relevant British Standard with particular attention to insulation, electrical protection (fuses etc.) and earthing. Where possible repairs should be carried out in dedicated workshops by competent persons.</p> <p>Modifications to equipment need to be assessed by a competent engineer to determine whether the modifications have introduced risks or hazards which were not present in the original design, and act accordingly.</p>
	<p>(7) Student projects</p> <p>Student projects using or generating electrical power are supervised by Academic Tutors and Laboratory Managers. Any projects above safe extra low voltage levels or with particular hazards such as exposed parts, stored energy, radiated electromagnetic fields, or emitting laser energy shall be subject to a risk assessment by a competent electrical engineer and/or radiation specialist.</p>
	<p>(8) Electrical equipment in Hazardous Areas</p> <p>Hazardous areas (where an explosive atmosphere may occur due to flammable gases or volatile liquid vapours) are classified according to BS EN 60079-10-2015. Electrical equipment for installation or use in hazardous areas must conform to the necessary standards Ex i (intrinsically safe), Ex d (flameproof), or Ex n (low temperature non-sparking) according to the area classification Zone 0, Zone 1 or Zone 2. Hazardous area installations must be approved by a competent electrical engineer</p>
	<p>(9) Construction site tools</p> <p>The preferred system for use on construction and refurbishment sites around the University is to use cordless battery powered tools, or those that operate from a reduced low voltage supply with automatic disconnection comprising a 110 Vac centre-tapped to earth (CTE) supply transformer so that the maximum voltage to earth does not exceed 55V.</p>
	<p>(10) Maintenance</p> <p>Electrical equipment in academic buildings is maintained by the Faculties. HV and LV distribution equipment, plant and machinery in plant rooms is maintained by E&FM.</p>

	<p>Lighting, power and domestic equipment such as ovens, hobs and irons in the University residential blocks are maintained by E&FM. The frequency of maintenance and inspection and testing routines are defined in a planned preventative maintenance system.</p> <p>Damaged or defective equipment must be repaired or replaced. Old or obsolete equipment will be subject to planned replacement based on age and condition, as determined by a competent electrical engineer.</p>
	<p>(11) Disposal</p> <p>Equipment must be disposed of in accordance with the EU Waste Electrical and Electronic Equipment (WEEE) Directive and where applicable the Hazardous Waste Directive. Refer to the University H&S document “A – Z guidance for Hazardous Waste Management” for guidance on disposal of electrical goods.</p>
2.2	Roles and Responsibilities
2.2.1	<p>Director of Health & Safety</p> <p>This Policy is monitored and regularly reviewed by the Director of Health and Safety, reporting to the Health and Safety Committee.</p> <p>The Director will also be responsible for reporting incidents under RIDDOR.</p>
2.2.2	<p>Estates and Facilities</p> <p>Estates and Facilities Management (E&FM) are responsible for power supplies, distribution, and connection of hard-wired installations including machinery and electrical equipment throughout the University. E&FM specify new electrical installation projects, and operation and maintenance of existing installations and equipment.</p> <p>The Director of E&FM is accountable for ensuring that their staff and contractors understand what they can do, and must not do, in relation to electrical distribution and electrical equipment and that staff who carry out electrical work are competent to do so.</p> <p>The Head of Building Services is the University's designated competent person for electrical supply and distribution systems and for equipment connected to these systems.</p> <p>The Head of Building Services sets the required level of competency for those working in electrical systems, and inspection and testing. In addition the University has appointed named persons as competent engineers for operational control of these systems.</p> <p><u>Appendix 1 details Designated Post Holders.</u></p>
2.2.3	<p>Faculties</p> <p>The Faculties are responsible for provision of electrical equipment and PAT inspection and testing within their faculty premises and laboratories. Faculties and Directorates are responsible for provision of electrical equipment and PAT testing in their premises. Responsibilities for these are outlined in the local arrangements.</p> <p>The Faculties also have competent electrical engineers among their academic and technical staff who supervise student projects; design, build, repair and modify equipment; and carry out PAT testing.</p>
2.2.4	<p>HV Management</p> <p>The Head of Building Services is responsible for authorising works to the University's HV and LV electrical infrastructure, equipment and systems, and appointing staff Authorised Persons. The Authorising Engineer is the primary contact with the District Network Operator (UK Power Networks).</p> <p>Authorised Persons are qualified electrical engineers with the necessary technical knowledge, training and experience to switch HV and LV systems and work safely on them. The University AP's are responsible for the practical implementation, management and operation of switching HV and main LV supplies in the University Estates and Buildings.</p>

2.2.5	<p>HV Approved Contractor</p> <p>Operation, maintenance and switching of the University HV networks is contracted to a specialist HV Approved Contractor. Any activity involving High Voltage networks requires strict safety rules for switching, isolation and working. The Approved Contractor shall work to their own safety rules and procedures at all times.</p> <p>The University Head of Building Services and HV Approved Persons may authorise works to proceed, but control of safety during High Voltage works is solely held by the Approved Contractor and rests with their AP's and Senior AP's.</p>
2.2.6	<p>Staff, Students and Visitors</p> <p>In normal working conditions, mains socket outlets may be used safely by staff, students and visitors in the same manner as in their homes. However all users in the workplace and residences have a duty to be vigilant and report any wear or damage to plugs, sockets, switches, flexible power cords and equipment which may expose people to danger.</p> <p>Staff and students using items of personal equipment on the campus are responsible for ensuring that they comply with European and British Standards and they are in a safe condition to use.</p>
3	Governance Requirements
3.1	Implementation / Communication Plan
3.1.1	<p>The policy will be made available on the University Policy Website.</p> <p>Electrical Safety will be communicated to relevant Faculty Staff, Residential Managers, E&FM staff, (including electricians and engineers), and electrical contractors by via E&FM intranet site, and training where required.</p> <p>Relevant information will be made available in the Health and Safety Handbook and Health and Safety intranet pages.</p>
3.2	Exceptions to this Policy
3.2.1	<p>Electrical supply assets in the University belonging to the District Network Operator (UK Power Networks) remain their own property, under their control, and this policy does not apply.</p>
3.3	Review and Change Requests
3.3.1	<p>This Policy is regularly reviewed by the Director of Health and Safety; and the Building Services Manager (E&FM).</p> <ul style="list-style-type: none"> ➤ Minor changes will be reviewed through Estates H&S Committee, and approved through Health and Safety Committee; ➤ Major changes will be reviewed through Estates H&S Committee, approved through Health and Safety Committee and submitted to Executive Board for approval, if required. <p>Review will generally be every three years or in line with any relevant changes to Legislation (if sooner). Health and Safety Consultative Committee will be consulted during the review process, as required.</p>
3.5	Legislative context
3.5.8	<p>This Policy complies with the requirements of the Health and Safety at Work Act 1974 and other associated legislation, noted in <u>Appendix 2</u>.</p>
3.5.9	<p><u>Health and Safety Policy Legal Statement</u></p> <p>This policy sets out to comply with the required 'duty of care' placed upon the University. Under Health and Safety Law a 'duty of care' is generated between organisations and individuals when carrying out activities that could foreseeably cause harm.</p> <p>The primary duty of care is owed through the employer-employee relationship in which the</p>

	<p>employer owes a duty of care to ensure that work activities that could result in harm to the employee are assessed and controlled. That duty of care is put into practice by the line management responsibilities as set out in the hierarchy of the organisation.</p> <p>This duty of care cannot be delegated away; instead the act of delegation must be accompanied by a realistic and workable system of monitoring or supervision to ensure that the delegated task has been adequately implemented (i.e. the responsibility is not met by giving directions; it is met when those directions have been confirmed as carried out). The result is a cascade of delegated accountability that runs through the organisation via the line management network, accompanied by a system of monitoring, supervision and feedback.</p> <p>The duty of care extends to assurance that services provided by others (be they another department of the University or contractors) are undertaken safely. The level of assurance required should be commensurate with the risk of the activity.</p> <p>In addition, anyone carrying out an activity owes a duty of care to anyone who may be put at risk by the activity, such as students, staff and visitors.</p>
3.6	Stakeholder Statements
3.6.1	<p>Equality: Consideration is given to the protected characteristics of all people groups identified in the Equality Act 2010. The protected characteristics are gender, age, race, disability, sexual orientation, religion/belief, pregnancy and maternity, and marriage/civil partnership.</p> <p>The University recognises the need for specific measures to ensure the health and safety of each of these groups. This policy and all other associated Health and Safety related policies take this into account.</p>
3.6.2	<p>Health & Safety: This Policy forms part of the overarching statement on health and safety for the University.</p>
3.6.3	<p>Executive Board, Health and Safety Committee, Estates Health and Safety Committee and Health and Safety Consultative Committee</p> <p>Changes to this policy will be reviewed and approved at the appropriate level; in line with policy guidance.</p>

Appendix 1

Designated Post Holders

The following persons are the appointed Electrical Engineers for E&FM: Head of Building Services (HV Authorising Engineer) Electrical Engineer: (HV Authorised Person) Engineering Maintenance Asst. Electrical	
The following persons are the appointed NICEIC Duty Holders for the University: NICEIC Principal Duty Holder: Head of Building Services NICEIC Qualified Supervisor: Electrical Engineer	
The Approved Contractor currently appointed to carry out operation and maintenance of the high voltage distribution system and sub-stations is: UK Power Networks Services The Approved Contractor provides HV Authorised Persons, Senior Authorised Persons and Competent Persons and operates to their own procedures for working on HV networks.	

Appendix 2

List of Associated Legislation

In addition to the Health and Safety at Work Act, 1974 – the Electrical Safety policy will comply with the requirements of the following:

Electricity at Work Regulations

Electricity at Work Regulations (1st April 1990, published under Health and Safety at Work Act, 1974). The Regulations impose duties in respect of all electrical systems, equipment and conductors. The Regulations require all electrical equipment and systems to be designed, installed and maintained to prevent danger “so far as is reasonably practicable”. The Electricity at Work Regulations cover all electrical apparatus whether portable or fixed, and of any voltage or current.

Wiring Regulations

BS 7671:2018. ‘The Wiring Regulations’, published by the IET 18th Edition (effective January 2019).

There is a long-established precedent that compliance with the Wiring Regulations may be used to claim compliance with the statutory requirements in law. These regulations set out requirements for design, testing and inspection of new LV installations, alterations and extensions, and periodic inspection and testing in maintenance.

Electrical Installation Condition Report

Code of Practice for In-service Inspection and Testing of Electrical Equipment, published by the IET, 4th Edition (2012), applies to the fixed wiring installation in buildings. Recommended frequency of inspection and testing of portable electrical appliances is set out in Table 1. The inspection and testing activity for each building or facility is encapsulated in an Electrical Installation Condition Report.

Portable Appliance Testing

HSG 107 Portable Appliance Testing provide guidance for managers, electricians and users for maintaining and inspection and test of portable, movable or transportable electrical equipment to prevent danger. Examples include power tools, office and IT equipment, cleaners equipment, domestic appliances and similar equipment used in laboratory, teaching, faculty and construction environments. IET Code of Practice for In-service Inspection & Testing of Electrical Equipment provides further practice guidance.

HSE Guidance

HSR 25 Guidance on the Electricity at Work Regulations – 2015. HSR 25 sets out the Regulations and gives technical and legal guidance on them to highlight the nature of the precautions in general terms and help duty holders achieve high standards of electrical safety in compliance with the duties imposed.

Electrical Equipment Safety

Electrical Equipment (Safety) Regulations 1994 applies to manufacture of electrical equipment designed or adapted for use in the workplace between 50 and 1,000 volts ac, or 75 and 1,500 volts dc. This would apply for example to apparatus made in-house for laboratory use in research, testing or teaching. Separate regulations apply for equipment for use in an explosive atmospheres and equipment for radiology and medical purposes.

Hazardous Areas

Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016 apply to all equipment intended for use in explosive atmospheres, and certification ensures that the equipment or protective system is fit for its intended purpose.

Electromagnetic Fields

The Control of Electromagnetic Fields at Work Regulations 2016 sets out minimum requirements for exposure of workers to risks from electromagnetic fields.

HSG281:July 2016 A guide to the control of Electromagnetic Fields at Work Regulations 2016 For persons who have duties under the regulations provides guidance on how the requirements on how the regulations should be met.