

Mechanical and Aerospace Engineering

Postgraduate Student Handbook 2018/19

Faculty of Engineering MSc

- Advanced Mechanical Engineering with Industrial Placement

The contents of this booklet are as far as possible up to date and accurate at the date of publication. Changes and restrictions are made from time to time and the University reserves the right to add to, amend, or withdraw courses and facilities, to restrict student numbers and to make any other alterations as it may deem desirable and necessary. Changes are published by incorporation in the University Regulations.

It is the responsibility of each individual student to become familiar with University Regulations which apply to them, and in particular with any changes made to their Course Regulations in their later years of attendance:

<https://www.strath.ac.uk/sees/educationenhancement/qualityassurance/universityregulations/>

Advanced Mechanical Engineering with Industrial Placement

Introduction

The University of Strathclyde has existed in various forms in Glasgow since 1796 and is recognised as one of the largest and most important institutions in the field of engineering education and research in the UK, and located in the centre of Glasgow - Scotland's commercial and industrial capital.

The Faculty of Engineering comprises 8 departments, covering all major engineering areas: Architecture, Biomedical Engineering, Chemical & Process Engineering, Civil & Environmental Engineering; Design, Manufacture & Engineering Management; Electronic & Electrical Engineering; Mechanical & Aerospace Engineering and Naval Architecture, Ocean & Marine Engineering. The Graduate School of Engineering has recently been formed to co-ordinate postgraduate training across the Faculty.

The MSc in Advanced Mechanical Engineering courses have been developed to provide high calibre mechanical engineering graduates with an in-depth technical understanding of advanced mechanical engineering topics, together with professional skills that will allow them to contribute effectively in developing company capabilities. The programmes are designed to make students more employable. Students joining the course will have the opportunity to select up to 9 technical/specialist classes, and at least 3 professional (generic) classes.

Engineering involves the creative process of turning knowledge of science and technology into products, services, and infrastructure that benefit society. For example, the energy sector is currently undergoing major changes, providing significant technological challenges and offering excellent career prospects for well-qualified engineers. The role of engineering is crucial in developing efficient technologies that can help protect the environment while contributing to competitiveness and economic growth.

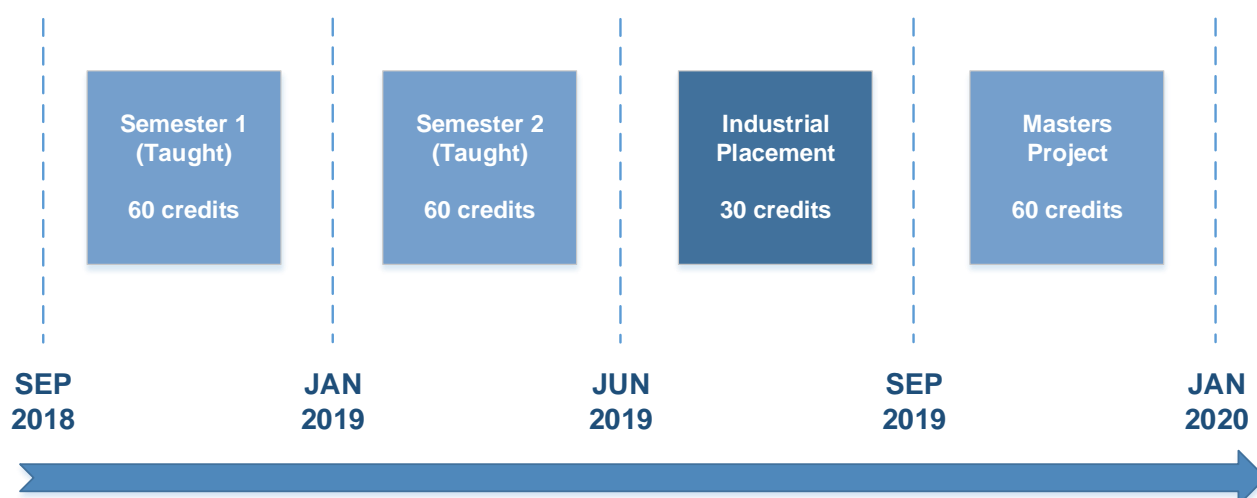
This course is particularly suitable for Graduate Engineers in the following sectors:

- o Chemical, Petrochemical & Process Engineering
- o Design Engineering
- o Energy & Power Generation
- o Manufacturing
- o Oil & Gas
- o Power Plant
- o Renewable Energies

Course Structure

Course Structure

The course structure is illustrated in the following figure:



Taught Classes (120 credits)

Specialist Instructional Modules (At least 80 credits)

Specialist instructional modules focus on different technical aspects allowing multidisciplinary tailored learning to suit individual needs. The choice will be limited by initial qualifications.

Generic Instructional Modules (At least 30 credits)

Students can select from a range of generic modules which are available to provide other skills which are considered necessary for professional engineers.

When choosing technical/generic modules, individuals will discuss the options with the programme advisor who must approve the student's curriculum before it can be finalised.

The Department cannot guarantee that all modules will be available in any given academic year as availability will depend on both student demand and resource constraints. However, a reasonable choice will be offered at any given time.

Industrial Placement (30 credits)

Students will undertake an industrial placement in the period after you have completed the taught part of your degree, but before your MSc project. The Department will support you in making applications for industry placements. **Please note that it is the student's responsibility to secure a work placement.**

Dedicated support sessions tailored to meet the needs of this programme have been arranged with Career Services staff and details of these will be shared with students after they have registered on the course. These sessions will help students submit applications, prepare for interviews and provide guidance to help students prepare for the work placement environment.

Students will be supported by the University while on placement and will be allocated an academic supervisor who will act as the point of contact during the placement.

Individual Project (60 credits)

On successful completion of 120 credits of taught modules and the industrial placement, students undertake a project which entails the production of a dissertation. This individual project involves an in-depth study and production of a thesis – it may be focused on an idea informed by the industrial placement,

or aligned to one of the many areas of research strengths within the Department.

Please note: Students who fail to accumulate 210 credits over the programme duration will be transferred and considered for an award of MSc/Postgraduate Diploma or Certificate in an appropriate Mechanical Engineering programme.

Contact Information

Department of Mechanical & Aerospace Engineering University of Strathclyde James Weir Building 75 Montrose Street Glasgow G1 1XJ Scotland, UK	Academic Dr W Nicholls Programme Advisor of Studies/ Director of Postgraduate Studies E: w.d.nicholls@strath.ac.uk T: +44 141 574 5086	Postgraduate Administrators Ms Emma McAulay Ms Diane McArthur E: mae-pg@strath.ac.uk T: +44 141 548 2039
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We hope you do not encounter any problems during your study, however, please do not hesitate to contact the administrative team at mae-pg@strath.ac.uk

Student Support Services

There are numerous support services within the University and these are detailed in the University Student Handbook which is available to all new students through the University's [Advice and Support Team](#). The student handbook will provide you with valuable and important information at the start of your course and during your study period, and can be accessed at: [Strathlife – The Student Journey handbook](#)

Information and student forms are also available on the Student Experience and Enhancement Services website at: <http://www.strath.ac.uk/sees>

IMPORTANT:

Please familiarize yourself with the University and course handbooks. You may also wish to refer to the relevant University and Course Regulations for postgraduate study:

<https://www.strath.ac.uk/sees/educationenhancement/qualityassurance/universityregulations/>

THE ONUS IS ON THE STUDENT TO READ ALL UNIVERSITY COMMUNICATIONS. FAILURE TO DO SO COULD POSSIBLY HAVE AN IMPACT ON YOUR STUDIES, IF YOU HAVE NOT READ INFORMATION PARTICULARLY RELATED TO [POLICIES AND PROCEDURES](#)

Practical Library Session

It is essential to know how to use and exploit the various resources of information on offer by the University Library. If you wish to attend a practical lab session, these will be held on

Wednesday 26 September 2-4 pm held in [Curran Building](#), CU522
Thursday 27 September 10–12 noon held in [Curran Building](#) CU321 A&B

There is no requirement to register for these sessions, but if you wish any further information, please contact the Faculty Librarian: [Sally Bell](#)

For further information on the library, please visit [Library Tours](#)

Myplace (Learning Resource)

The University's virtual learning environment (VLE) is called [MyPlace](#). It is accessed using your student DS username and password.

Myplace delivers online resources and activities designed to enhance learning. The pages may include assessments, online discussion learning materials (e.g lecture slides) and class news. All the classes that you are registered for will automatically appear on MyPlace once your class registrars make them available to you.

For information on other University learning resources, please visit the [Library](#) webpage

Semester Dates 2018/19

Semester 1: 10 September 2018 – 4 January 2019
Christmas Vacation: 22 December 2018 – 2 January 2019

Semester 2: 7 January – 17 May 2019
Spring Vacation: 1 April – 12 April 2019

The University is CLOSED on the following dates:

24 September 2018
22 December 2018 - 2 January 2019
19 April and 22 April 2019
6, 27 May 2019
12, 15 July 2019

IMPORTANT: Information on key dates are available at: <https://www.strath.ac.uk/keydates2018-19/keydates2018-19/>

Student Affairs

General University regulations are published on the University website.

Students should also be aware of the information available regarding "[Policies and Procedures](#)", which is available on the Student Experience and Enhancement Services website.

Academic Dishonesty:

The University regards academic dishonesty as a serious offence. Allegations of academic dishonesty will be fairly assessed and appropriate action will then be taken. An allegation that has been dismissed as a disciplinary offence may still incur an academic penalty for poor scholarship.

The University is aware that there are a variety of temptations for students to engage in academically doubtful or dishonest activities during formal examinations, or in relation to assignments, practical work, dissertations or thesis preparation. In setting assessed assignments of whatever form, all teaching staff actively consider how to minimise the opportunities for students to cheat. Promoting a general climate of academic integrity within the student body is important.

Please read the "[Academic Dishonesty Guide](#)" for Examples of Academic Dishonesty

Absence and Voluntary Suspension:

Further full information on Absence and Voluntary Suspension, please visit the Student Experience and Enhancement Services webpage:

<http://www.strath.ac.uk/sees/studentpolicies/policies/attendance/absenceandvoluntarysuspension/>.

Examinations:

Students who fail to present themselves for an examination at the time and place published will be deemed to have forfeited that opportunity to sit the examination; except that in cases of absence through illness or other sufficient cause the Board of Examiners will take into consideration documentary evidence in assessing a candidate's position.

Students must sit all terminal tests and examinations unless prevented by illness, in which case a medical certificate must be produced.

Further guidance on Examinations is available: <http://www.strath.ac.uk/exams/examfaqs/>

Academic Appeals:

Please refer to the [Appeals Procedure](#), before submitting an appeal to the Faculty Office - Engineering:

Personal Circumstances:

It is important that you familiarise yourself with the University's full [Personal Circumstances Procedure](#)

We wish to draw your attention to a few particular points relating to Personal circumstances:

You should back up your work, and this should not be on a memory stick or external hard drive only, as these possibly could be stolen, perhaps with the laptop. Therefore we strongly advise students to use an online storage system which provide appropriate protection of data. The University provides an optional storage service called **One Drive** which is available to students.

Full details of how to access, this can be found at:

<https://www.strath.ac.uk/ithelpdesk/helptopics/email/office365/>

Reminder:

The University Personal Circumstances and Academic Appeals Procedure do **NOT** accept computer failure and lack of back up as grounds for discounting attempts or appealing:

Circumstances that will NOT be considered:

Students should note that the Faculty's Personal Circumstances Board will not consider circumstances which students are expected to cope with as part of a properly managed workload, or would not normally have a significant impact on academic performance. Boards will also normally disregard circumstances which the student could reasonably have avoided, where the student could have taken measures to reduce their impact, or are no different from the circumstances facing a significant number of other students. The following are examples of circumstances which would *not* normally be considered:

- Inadequate planning to cope with last-minute delays and missing deadlines because of computer difficulties, or transport difficulties;
- Losing work not backed up, failure of a single data source;

IMPORTANT:

The above Student Affairs Information is a brief guide to some of the important Policies and Procedures information, which will assist you during your study at Strathclyde.

Please familiarize yourself with the University and course handbooks. You may also wish to refer to the relevant University and Course Regulations for postgraduate study:

<https://www.strath.ac.uk/sees/educationenhancement/qualityassurance/universityregulations/>

THE ONUS IS ON THE STUDENT TO READ ALL UNIVERSITY COMMUNICATIONS. FAILURE TO DO SO COULD POSSIBLY HAVE AN IMPACT ON YOUR STUDIES, IF YOU HAVE NOT READ INFORMATION PARTICULARLY RELATED TO [POLICIES AND PROCEDURES](#).

Student Staff Liaison Committee

Feedback will be provided by staff, this may be during class time, in the form of marks, written comments or verbal assessment. You may also wish to email the Class Registrar or Course Director for feedback.

Students also have the opportunity to feedback their comments to staff. At the start of the academic year, the department will contact students to ask for 2 students, to volunteer to sit on the Student-Staff Liaison Committee (SSLC), which normally sits twice a year, once in each semester. The meetings will be minuted, and actions noted.

For further information please refer, to [Student Representation guidance](#).

Requests to sit Examinations off-campus

Your attention is drawn especially to the following:

All students are expected to attend for examination at the University of Strathclyde on the dates and times scheduled, including mid-semester assessments (such as class tests). Only EXCEPTIONALLY will permission be given for students to sit examinations out-with the University.

Events such as holidays, family gatherings, or other personal appointments do not constitute exceptional reasons for exam purposes. In addition, sporting commitments will only be considered for students who are officially registered on the Elite Athlete Programme.

Permission will **NOT** be granted by the Department in the following cases:

- if a student wishes to leave the University during/prior to the end of an examination period
- where a student has a resit examination (all students must attend resits in Glasgow in person)

NOTE – arrangements to travel overseas must not be made until you know that you have passed all classes for the current academic year. Students who choose to make travel arrangements (such as purchasing non-flexible/changeable airline tickets) prior to receiving official results at the end of the academic year, must return to the University of Strathclyde in Glasgow during the resit diet to carry out examinations on campus for any failed classes.

Where necessary and where provisionally agreed in principal by the PG Exam Co-ordinator, requests to take an examination at a BONA FIDE institution other than this University (normally one of our overseas exchange institutions or a British Council Office) should be formally made in writing via the Exam Co-ordinator.

This request must be made no later than SIX WEEKS prior to the start of the examination diet. Once permission, in principle, has been granted you must thereafter arrange for written communication to be sent by an authorised person at the proposed examination site confirming that the institute is prepared to act for the University of Strathclyde in this matter and giving a contact name, telephone number, e-mail address and full postal address. **NB: Post box addresses are not suitable as exam papers will be transported by courier.** This written communication must reach your Year Adviser no later than FOUR WEEKS prior to the start of the examination diet. Your request and the statement from the “authorised person” mentioned above are then sent by the departmental Examination Co-ordinator to the Director of Professional Services from whom formal approval must be obtained. **Examination papers cannot be sent abroad unless the above procedure has been followed.**

For all MAE classes with codes beginning “16” and “ME” the MAE Examination Co-ordinator is:
Donna Fairley, donna.fairley@strath.ac.uk

Names of Examination Co-ordinators for other Departments may be obtained from the ‘Students’ section on the Disability Service webpage <http://www.strath.ac.uk/disabilityservice/> or from the relevant Department.

You should also note that you will be liable for all expenses incurred and fees charged (if any) by the overseas institution.

Curriculum

Curriculum:

All students shall undertake an approved curriculum as follows:

- no fewer than 210 credits including the Industrial Placement and the Project and including no fewer than 30 from the classes in List A and no fewer than 80 from the classes in List B

List A Module Descriptors, and those indicated on Page 14, can be viewed through the Class Catalogue:

<http://but.mis.strath.ac.uk/classcatalogue/>

MAE Level 5 and Postgraduate Module descriptors indicated in **List B** are available to view at:

<http://www.strath.ac.uk/engineering/mechanicalaerospaceengineering/student-information/>

Please refer to Undergraduate MDFs for Level 5 classes

University timetables: www.strath.ac.uk/timetables will provide information on date/times/location of classes.

Please check prior to attending the class for any changes.

LIST A

Generic Modules

EF927	Design Management	(SEM1)
EF929	Financial Engineering	(SEM2)
AB975	Sustainability	(SEM1)
EF931	Project Management	(SEM1)
EF932	Risk Management	(SEM2)
EV939	Environmental Impact Assessment	(SEM2)

LIST B

Specialist Modules:

16587	Pressurised Systems	(SEM2)
ME507	Machinery Diagnosis and Condition Monitoring	(SEM1&2)
ME514	Advanced Topics in Fluid Systems Engineering	(SEM2)
ME517	Spaceflight Systems	(SEM2)
ME526	Engineering Plasticity	(SEM1)
ME527	Introduction to Engineering Optimisation	(SEM2)
ME528	Control Systems Design	(SEM1)
ME947	Materials for High Temperature Applications	(SEM1 Distance Learning)
ME926	Nuclear Power Systems	(SEM2)
ME928	Energy Systems Analysis	(SEM1)

Aerospace (Compulsory for AME with Aerospace MSc, optional for others):

16598	Aerodynamic Performance	(SEM1&2)
16599	Aerodynamic Propulsion Systems	(SEM2)
ME512	Spaceflight Mechanics	(SEM1)

Energy (Compulsory for AME with Energy Systems MSc, optional for others):

ME927	Energy Resources and Policy	(SEM1)
ME929	Electrical Power Systems	(SEM1)
ME930	Energy Modelling and Monitoring	(SEM1)

Materials (Compulsory for AME with Materials MSc, optional for others):

16565	Engineering Composites	(SEM2)
ME523	Polymer and Polymer Composites	(SEM1)
ME931	Industrial Metallurgy	(SEM2)

Power plant Technologies (Compulsory for AME with PPT MSc, optional for others):

ME923	Gas & Steam Turbines	(SEM 2 Distance Learning)
ME929	Electrical Power Systems	(SEM 1)
ME950	Boiler Thermal Hydraulics	(SEM 2 Distance Learning)

Important:

1. It is possible to take up to 20 credits from classes outwith those listed above with the approval of the Course Adviser.
2. Students are expected to finalise their curriculum as soon as possible at the start of semester, changes beyond the 3rd week of semester are strongly advised against.
3. Normally the balance of credits between semester 1/ semester 2 should be either 60 / 60 or 50 / 70.

Students may undertake up to 20 modules relevant to their course, from another Department. Examples of these are:

Department of Design Management and Engineering Management (DMEM):

Note: there are limitations on numbers for these classes and you should contact the class registrar

DM928 Enterprise Resource Planning
DM934 Design Methods
DM943 Sustainable Product Design and Manufacture
DM944 Product Costing and Financial Management
DM945 Systems Thinking and Modelling
DM946 Micro- and Nano-Manufacturing
DM947 Advanced Forming Technology and Systems
DM948 Advanced Materials and Production Technology
DM949 Design of Experiments for Process Optimisation
DM952 Autonomous Sensing, Learning, and Reasoning
DM953 Lean and Green Logistics
DM985 Remanufacturing
DM986 Mechatronics Systems Design Techniques
DM991 Organisational Buying Behaviours and Structures
DM992 Strategic Procurement Management

Department of Naval Architecture, Ocean and Marine Engineering (NAOME):

NM948 Subsea Systems and Installation
NM958 Risers and Mooring Lines
NM966 Marine Pipelines
NM833 Renewable Marine Energy Systems
NM977 Subsurface Technology

Department of Biomedical Engineering:

BE900 Tissue Mechanics
BE903 Cardiovascular Devices
BE916 Introduction to Biomechanics
BE923 Haemodynamics for Engineers
BE924 Medical Robotics

Other modules out with the above selection will be at the discretion of the Programme Advisor of Studies whom the student should contact prior to selection.

Industrial Placement

In this part of the course, students undertake a supervised, 12-week industrial placement. This component is valued at 30 PG credits.

Students will undertake an industrial placement in the period after you have completed the taught part of your degree, but before your MSc project. The Department will support you in making applications for industry placements. **Please note that it is the student's responsibility to secure a work placement.**

Dedicated support sessions tailored to meet the needs of this programme have been arranged with Career Services staff and details of these will be shared with students after they have registered on the course. These sessions will help students submit applications, prepare for interviews and provide guidance to help students prepare for the work placement environment.

Students will be supported by the University while on placement and will be allocated an academic supervisor who will act as the point of contact during the placement.

Student Charter for Industrial Placement

The Department will endeavour to support you by working with you to provide:

- a programme of support to enable you to develop the knowledge and skills needed to secure a work placement;
- opportunities to reflect on your learning, the skills you are developing and action required to address development needs;
- access to opportunities to develop your skills and advise you in your attempts to gain experience through the University of Strathclyde Career Service;
- assistance for you to seek access to employer networking opportunities, events and presentations;
- access to information on placement opportunities and to understand what employers are looking for to enable you to create opportunities to put yourself in a competitive position within the recruitment and selection process;
- One-to-one support with job hunting, application, CV and cover letter development and with preparing for interviews and assessment centres through the Careers Service;
- support whilst on work placement and on your return to the University to help you review your progress, reflect on your learning and development needs arising from your placement experience;
- a named contact (University of Strathclyde) who will support you during the work placement and help you review your learning and achievements; your work place supervisor should be the first point of contact for any problems that arise during your work placement.

We expect you to:

- fully participate in programme of support offered by the Department and Careers Service and attend all planned sessions;
- complete any tasks by the due date; be punctual, arriving ready for the start of all sessions;
- be a self-managing, motivated career professional, taking responsibility for your own professional development and making full use of the range of services and support provided to help you secure a work placement;
- recognise that it is your responsibility to secure a placement, take action early on in your course to understand the competitive UK job market and prepare for making applications for placements;
- prepare for employer networking and other events by researching the employers you plan to approach and preparing questions in advance to ensure that you make the most of the opportunity;
- meet the norms and expectations for professional conduct in the particular area of work you are undertaking (whilst at University and when on work placement) and take action to seek guidance in the event of any uncertainty about the standards of behaviour expected;
- ensure that your personal presentation (including written) is at all times professional and business like when dealing with employers and employer related organisations; wear appropriate business attire for any face to face contact with employers or their representatives;
- raise any concerns you have about your programme of learning with an appropriate person (e.g. programme advisor for the academic element and work place supervisor when on work placement) as soon as possible;
- make full use of the support provided by the University and specifically the Careers Service.
- complete all work placement documentation by the deadline and declare any difficulties and/or disabilities that may impact on your performance at work.
- to honour the agreed duration of the placement (agreed at time of contract between the student and

placement provider) and work professionally throughout this period. Under certain circumstances, should the student or placement provider need to finish the placement earlier, the student will then move to the student project part of the Masters programme at the earliest scheduled opportunity. Any changes to the work placement need to be endorsed by the Head of Department.

EF900: Individual Project/Dissertation

In this part of the course, students undertake supervised, individual project work, with the award of MSc being made on the basis of an acceptable report/dissertation submission, and submitting an electronic format as a pdf file as directed by their Project Supervisor. This component is valued at 60 PG credits.

A list of project titles will be distributed during Semester 2. Students will be asked to choose 5 projects from this list and send these to mae-pg@strath.ac.uk. The allocation of these projects will then be managed centrally in the department and students will be notified of their allocated project.

Students are also given the opportunity to come up with a self-generated project. However the student will be entirely responsible for finding a suitable academic in the department to supervise this. Also, if a student is interested in a particular area of research they can approach an academic in this area with a project title. This project may be aligned with the work undertaken during the Industrial Placement.

The Programme Advisor of Studies will hold an introductory project meeting towards the beginning of Semester 2 (date to be confirmed).

PLEASE NOTE: the undertaking of the student project of 60 credits, to qualify for the award of MSc, requires approximately 600 hours of study. Therefore, it is important to note that you should be fully committed to your project during this period. Any request for an extension will only be granted by the Personal Circumstances Board for recognised personal circumstances (see the [University's Personal Circumstances and Appeals policy](#)). **For example, other work commitments will not be considered an adequate reason. Delays due to unavailability of software or hardware required for project delivery will not result in project extension (possible mitigation strategies shall be discussed and agreed directly with the project supervisor).**

PENALTIES FOR LATE SUBMISSION OF PROJECT:

Please ensure that the project is submitted by the deadline. Students missing deadlines may forfeit all the marks associated with the final submission element of the project.

The following points should be noted:

- The Programme Advisor of Studies will remind students of the deadlines and terms of submission at the start of project
- If the student adhered to earlier deadlines for draft submissions which comprised part of the final mark, those marks will be retained
- The procedure for final submission must be followed (for example via MyPlace). Draft submissions will not be considered as the final version, and therefore will not be marked accordingly
- If a project is submitted late, it will be marked as normal and the late submission noted. It can then be considered by the Faculty's Personal Circumstances Board, if personal circumstances have been lodged, and a recommendation made to the Board of Examiners.
- The department will, in the event, of late submission affecting the entire cohort, make a logical and local decision

Please note this does not apply to coursework submitted as part of the assessment for a 10 or 20 credit taught module. In this case, the department will apply local rules on penalties for late submissions.

Graduation

Awards Ceremonies (or Congregations) are held in June/July and October/ November each year, in the Barony Hall. All students hoping to graduate or be presented **MUST** enrol to graduate by completing a form and paying the appropriate fee.

Information and application procedure for Graduation is available at:

<http://www.strath.ac.uk/studywithus/graduation/>

Regulations

The following course regulations should be read in conjunction with the University regulations:
<https://www.strath.ac.uk/sees/educationenhancement/qualityassurance/universityregulations/>

MSc in Advanced Mechanical Engineering with Industrial Placement

Course Regulations

[These regulations are to be read in conjunction with Regulation 19.1]

Admission

Notwithstanding Regulation 19.1.1, applicants shall possess

- (i) a degree (or in the case of direct entry to the degree of MSc, a first or upper second class Honours degree) from a United Kingdom university in Science or Engineering; or
- (ii) a qualification deemed by the Course Director acting on behalf of Senate to be equivalent to (i) above.

In all cases, applicants whose first language is not English, shall be required to demonstrate an appropriate level of competence.

Duration of Study

18 months.

Mode of Study

The courses are available by full-time study only.

Curriculum

All students shall undertake an approved curriculum as follows:

for the degree of MSc – no fewer than 210 credits including EF 900 Project, ME 944 Industrial Placement and including no fewer than 30 from the classes in List A and no fewer than 80 from the classes in List B

List A		Level	Credits
EF 927	Design Management	5	10
EF 931	Project Management	5	10
EF 932	Risk Management	5	10
EF 929	Financial Engineering	5	10
AB 975	Sustainability	5	10
EV 939	Environmental Impact Assessment	5	10
List B			
16 565	Engineering Composites	5	10
16 598	Aerodynamic Performance	5	10
16 599	Aerodynamic Propulsion Systems	5	10
ME 512	Spaceflight Mechanics	5	10
ME 523	Polymer and Polymer Composites	5	10

ME 923	Gas and Steam Turbines	5	10
ME 926	Nuclear Power Systems	5	10
ME 927	Energy Resources and Policy	5	10
ME 929	Electrical Power Systems	5	10
ME 930	Energy Modelling and Monitoring	5	10
ME 931	Industrial Metallurgy	5	10
ME 947	Materials for High Temperature Applications	5	10
ME 950	Boiler Thermal Hydraulics	5	10

Additional Level 5 classes offered by the Department of Mechanical and Aerospace Engineering, listed in Regulation 12.47.9.

Exceptionally, such other Level 5 classes as may be approved by the Course Director.

Students for the degree of MSc only:

EF 900	Project	5	60
ME 944	Industrial Placement	5	30

Examination, Progress and Final Assessment

Regulations 19.1.25 – 19.1.33 shall apply.

The final assessment will be based on performance in the examinations, coursework and the EF 900 Project and ME 944 Industrial Placement where undertaken.

Award

Degree of MSc: In order to qualify for the award of the degree of MSc in Advanced Mechanical Engineering with Industrial Placement, a candidate must have performed to the satisfaction of the Board of Examiners and must have accumulated no fewer than 210 credits, of which 90 must have been awarded in respect of the ME 944 Industrial Placement and EF 900 project.

Transfer

Students who fail to accumulate 210 credits over the programme duration will be transferred and considered for an award of MSc/Postgraduate Diploma or Certificate in an appropriate Mechanical Engineering programme described in Regulations 19.47.27 to 19.47.29.

Appendix 1

Departmental Occupational Health and Safety Arrangements

Emergency telephone numbers (internal) - Extension 2222 or 3333

Emergency telephone number (external) 9/999 Fire/Police/Ambulance

1. Safety Organisation

Health and safety within the Department is organised in accordance with the University Safety Code (Section 6.6 of the University Calendar) which should be studied by all members of staff. All members of staff will be issued with a copy of these Regulations and are required to sign a declaration stating that the Regulations have been read and understood. Supervisory staff should ensure that the attention of students is drawn to the provisions of the Safety Code and Departmental Safety Regulations.

The Head of the Department has ultimate responsibility for all health and safety matters.

Health and safety management is undertaken by the Departmental Safety Convener.

An Area Safety Committee has been formed to monitor health and safety issues within specific areas. The identities of current post-holders and their areas of responsibility can be obtained from Central Services or from the Departmental Safety Convener.

General information on any health and safety matter should be directed to the Departmental Safety Convener in the first instance.

The University's Safety Services Unit can be contacted on Ext 2726.

2. Departmental Safety Committee

A Departmental Safety Committee has been appointed consisting of at least three persons representative of the main groups of staff working in each area and include, where appropriate, at least one student. The Departmental Safety Convener convenes the meetings of the Departmental Safety Committee and acts on its behalf as necessary.

3. Fire

In the event of a General Fire Alarm the procedure is set out in the Fire Regulations posted at every floor of the James Weir Building and any other building you may occupy. Read these carefully and check from time to time for any changes which may be made.

- Fire drills will be held at least once per semester.
- Know the meaning of the audible fire alarms.
- Know every escape route in the building.
- Exit by a different route at each drill.
- Note locations of fire extinguishers - all are clearly marked.

In the event of a fire being discovered:-

- Leave the room, close the door and raise the alarm by activating the nearest "break-glass" fire alarm call point and informing the security wardens (Ext 2222 or 3333).
- If it is safe to do so, use an appropriate fire extinguisher to attack the fire. Do not use water where electrical equipment or flammable liquids are involved.
- In the case of laboratory fires, if it is safe to do so, switch off all electrical and fuel supplies to the equipment involved or, if necessary, to the entire laboratory.
- Do not store combustible materials on or near electric heaters.
- Do not accumulate waste material.

- Keep litter bins covered.
- Keep fire exits clear of obstructions

4. Accident or Illness

Emergency Telephone Numbers - Extension 2222 or 3333

- If possible give immediate assistance to the patient. General First-Aid Guidance notes are contained in all First-Aid boxes. A First Aid box may be found in all of the Departmental Laboratories.
- Get help of colleagues.
- Telephone 2222 or 3333 giving own name and department, exact location (building, floor, room number) and nature of incident.
- Say if a doctor is required.
- Do not move the patient from reported position (unless obviously necessary to avoid further injury) until the arrival of the ambulance services.
- The patient should be accompanied to the hospital by a colleague.

5. Reporting of Accidents and Dangerous Occurrences

All accidents and dangerous occurrences, however apparently trivial, should be reported to the member of staff in charge or to the technician in charge of the laboratory. **The Departmental Safety Convener** should also be informed.

An official Accident or Occurrence Report Form S.1 should be completed for all accidents and dangerous occurrences and sent to the University Safety Officer via the **The Departmental Safety Convener**. Should an incident result in hospital attendance, the Safety Office should be informed by phone as soon as possible.

6. COSHH

Under the Control of Substances Hazardous to Health Regulations 1988 (COSHH), it is incumbent upon anyone involved in the use of hazardous materials to ensure that a safe working practice is agreed upon. No work is permitted until a **RISK ASSESSMENT FORM (S20/S21)** has been completed. Copies of each assessment must be lodged with the Safety Convener.

All staff and relevant students should be acquainted with the Regulations.

Copies of the approved Guidance handbook on COSHH may be obtained from the Safety Convener or the University Safety Office.

Failure to comply with the Regulations may result in that area of activity being shut down BY LAW.

7. Hazardous Operations

Work should not proceed unless a Risk Assessment has been issued and signed.

Suitable protective clothing must be worn for all potentially dangerous operations (e.g. grinding/welding) supplies of which are available from the technician in charge of the laboratory.

All areas in which special hazards exist (e.g. lasers) are clearly marked and entry to these regions is restricted to those personnel having permission to work in them. Refer to the Protection of Eyes Regulations 1974.

All hazardous materials and glassware should only be transported or carried in properly designed safety containers. Winchester should be carried only in proper holders, not in the hand. Passenger lifts should not be used unless special precautions are taken.

8. Permits to Work

All persons, other than trained workshop staff, who wish to use machine tools, hand held tools or welding equipment, etc must have a Permit to Work signed by the Head of Department or his appointed Deputy and an appropriate Academic Supervisor. Permits will only be granted to persons who can show evidence of satisfactory training and relevant experience. Permit holders must liaise with the Laboratory Superintendent before using any equipment. Permit application forms can be obtained from the Departmental Safety Convener.

9. General Laboratory/Workshop Procedure

- Protective clothing and safety glasses must be worn at all times.
- Coat racks or lockers are provided and should be used for outdoor clothing (coats, scarves, etc.).
- Food and drink is not permitted in laboratories or workshops.
- Always use machine guards where provided.
- Clean tools and machines after use and deposit all scrap material in the bins provided.
- Keep litter bins covered.
- Observe and obey No Smoking signs.
- Observe and obey all warning signs.
- Horseplay is forbidden.
- When operating equipment in the laboratories, at least two people should be present. One of these should be a technician or a member of the academic staff. Where working alone is essential, the completion of a Risk Assessment must be performed and endorsed by the Laboratory Superintendent or Academic Supervisor prior to the commencement of such work.
- Avoid loose clothing, long hair and badly fitting footwear.
- Keep all chemicals in suitable storage (see under COSHH).
- Switch off all gas cylinders, water, gas and other taps when not in use.
- Keep labs and workshops tidy.
- Keep floors clean and free of oil and grease deposits.
- Do not obstruct passages, doorways or other thoroughfares.
- Keep clear of overhead lifting-gear.
- Lifting tackle should only be used by trained personnel under the overall supervision of the technician in charge and in accordance with appropriate regulations. Replace all guard rails which may have been removed to facilitate the movement of equipment.
- Do not overload electrical power points.
- Trip hazards, such as trailing cables must not run across working areas.

9.1 Office Areas

- Office areas should be kept clean and tidy and free of trailing electrical cables.
- Cables should be inspected regularly and replaced if the insulation shows signs of wear.
- Materials should not be stored on top of filing cabinets or cupboards particularly near eye level.

- Filing cabinets should be filled from the bottom to ensure stability and drawers kept closed.
- Solvents should only be used in well ventilated areas and kept clear of heat sources.

10. Access to Buildings outwith Normal Hours

See Access to University Premises (Appendix 2) and page 14 of this Handbook.

11. Supervision of Postgraduate and Project Students

Supervisors should establish a mode of working with their students such that the supervisor is aware of and agrees to, each element of work, that safe working practices are agreed and where appropriate set down on paper and that regular, active, supervision is established.

12. Visitors to Laboratories

Visitors to the laboratories who are not accompanied by a member of staff should report to the relevant Laboratory Superintendent.

Maintenance staff should report to the relevant Laboratory Superintendent before commencing work in any laboratory area.

Children under the age of 14 are not normally permitted to enter laboratories or workshops. (See Appendix 2 of this Handbook).

13. Electricity at Work Regulations 1989

All offices, storerooms, workshops and laboratories, of whatever kind, within the Department must comply with these Regulations.

It should be noted that the University's Estates Management Department is responsible for all electrical services in the University, e.g. isolators, sockets and other such fixed equipment and no one may break into the electrical system for any reason without the authorisation of the University Electrical Engineer. Persons involved in the use of, and/or responsible for the use of electrical equipment, must read the Regulations and the University's own handbook entitled "Local Rules for Electrical Safety" (November 1991), a copy of which may be obtained from the Departmental Safety Convener. Work on 'live' equipment is prohibited unless in the most exceptional circumstances; before any such work is undertaken permission in writing must be granted by the Departmental Safety Convener.

14. General Electrical Safety

Open-bar electric fires and non-automatic kettles are not allowed in the University.

Multi-way distribution boards with 13 amp shuttered outlets may be used from a socket provided the total load does not exceed 13 amps and they are designed to BS1363. Adaptors are not permitted.

Plugs must be fitted by, and new equipment inspected by, a competent person, before being taken into service, normally by arrangement with the relevant Laboratory Superintendent. A record of the equipment must be kept (see 15 below). The Departmental Safety Convener may approve members of staff bringing in their own personal electrical equipment (except those banned items shown above), however, such items must also be included in the Departmental inventory of electrical equipment and appropriately inspected and tested (see 15 below).

All staff have individual responsibility to report obviously faulty equipment, e.g. broken plug tops, damaged cables, etc. to their supervisor or directly to the relevant Laboratory Superintendent. Equipment thought to be defective should not be used and must be reported immediately to the relevant Laboratory Superintendent. Such equipment should be removed from service until compliance with Section 15 is established. Users of equipment should regularly inspect for damage to casings, cables and plugs etc. and for loose screws.

Where specific hazards exist in laboratory/workshop areas they will be clearly marked at the direction of the relevant Laboratory Superintendent.

All persons wishing to use new or existing equipment in laboratory areas must liaise with the relevant Laboratory Superintendent before commencing work.

15. Inspection and Testing of Electrical Apparatus

All electrical apparatus is required to be inspected and tested at certain intervals. Portable electrical equipment should not be used unless it possesses an approved PAT label.

All fixed installations are the responsibility of the University Electrical Engineer.

All other equipment which can be plugged into a socket, including extension cables, etc. (and can also include battery operated equipment) is the responsibility of the Head of Department.

The Regulations require records to be kept of the maintenance, inspection and testing of all equipment in some detail for the duration of its working life. These records will be maintained centrally by the Departmental Safety Convener. Advice should be sought from the relevant Laboratory Superintendent prior to the introduction of any new electrical equipment.

16. Control of Noise at Work Regulations 2005

Loud noise at work can damage hearing therefore, measures have to be put in place to prevent or reduce risks from exposure to noise at work. It can also be a safety hazard at work, interfering with communication and making warnings harder to hear.

The Regulations require the employer to assess the risks to your employees from noise at work; take action to reduce the noise exposure that produces those risks; provide your employees with hearing protection if you cannot reduce the noise exposure enough by using other methods; make sure the legal limits on noise exposure are not exceeded; provide your employees with information, instruction and training; carry out health surveillance where there is a risk to health.

The Noise at Work Regulations 1989 have been revised and the new 2005 updated legislation comes into force on 6th April 2006 (with the exception of the music and entertainment sectors where the Regulations come into force on 6th April 2008).

1. The new Regulations require employers to take specific action at certain action values (previously called action levels). These relate to:

- ⌚ the levels of noise employees are exposed to averaged over a working day or week (e.g. use of weekly exposure would be appropriate in situations where noise exposures varied markedly from day to day e.g. gardening staff using power tools on two days of the week); and
- ⌚ the maximum noise (peak sound pressure – noises due to impacts e.g. hammering, pneumatic impact tools) to which employees are exposed in a working day.

Noise levels are measured in decibels (dB) and the following new values are:

a. **Lower exposure action values:**

- ⌚ daily or weekly exposure of **80dB** (previously 85dB);
- ⌚ peak sound pressure of **135dB**.

b. **Upper exposure action values:**

- ⌚ daily or weekly exposure of **85dB**;
- ⌚ peak sound pressure of **137dB**.

Exposure limit values: (these are levels of noise exposure which must not be exceeded)

daily or weekly exposure of **87dB**, peak sound pressure of **140dB**. These exposure limit values take account of any reduction in exposure provided by hearing protection ie personal protective equipment.

2. There is a new specific requirement to provide **health surveillance** where there is a risk to health.

Hearing protection must now be made available where there is exposure above the new lower exposure action value (80dB).

Hearing protection must be worn and a programme of control measures (see below) implemented where there is exposure above the new upper exposure action value (85dB).

Noise assessments will require to be reviewed to take into account the changes in the action levels. (See below).

Health surveillance must be provided for all individuals, staff or students where there is a risk to health from exposure to noise e.g. employees who are likely to be regularly exposed above the upper exposure action values, or are at risk for any reason, e.g. they already suffer from hearing loss or are particularly sensitive to damage. More information on health surveillance is available from the University's Occupational Health Service. If you have any concerns regarding occupational noise induced hearing loss or tinnitus (ringing or buzzing in the ears) please contact the Occupational Health Service on extension (JA) 4824 or email occupationalhealth@strath.ac.uk.

The implementation of these Regulations can be quite complex and advice should be obtained from the Safety Officer by anyone affected by them.

17. Buildings and Equipment

Building structural faults should be brought to the attention of the University's Estates Management Department.

The safety and installation of electrical equipment and the clearance of electrical faults up to the normal 13 Amp socket outlets are the responsibility of the University's Electrical Engineer who is based in Estates Management.

18. Radiation Hazards

Radiation Hazards are the responsibility of the Area Radiation Protection Supervisors. The identities and locations of current post-holders can be obtained from your Departmental Safety Convener.

19. Compressed Gas Safety

Only persons within the Department who have been specifically trained may transport, attach or detach gas cylinders from equipment. These persons will follow the University Guidance on Compressed Gas Safety (15th December 2009).

Appendix 2

Access to University Premises - John Anderson Campus

- 6.7.1 The University Court has approved the following regulations to control access to premises belonging to or in the occupation of the University in order to balance the need for access on the one hand and considerations of general and personal safety (of users), security (of property), and economy (in light, fuel and security staff) on the other.
- 6.7.2 The normal hours of access to departmental accommodation are as follows:
Monday-Friday
Andersonian Library (as stated in Regulation 3.5 of the University Calendar)
Computer Centre 0800-2200
Sports Centre (as stated in the Regulations of the Centre for Sport and Physical Activity)
All other departments 0800-1800
- 6.7.3 Some University buildings may be open beyond 1800 hours. Nevertheless, the normal hours of access for departmental accommodation is 0800-1800 hours. Every other time is considered outwith normal working hours.
- 6.7.4 Saturdays, Sundays and public holidays are considered to be outwith normal hours of access.
- 6.7.5 Academic, senior administrative and academic related staff are granted automatic rights of access outwith normal hours of access (please see the above) to communal accommodation and departmental accommodation within the area with which they are identified.
- 6.7.6 Estates Management personnel are granted automatic rights of access outwith normal hours of access (please see above) to communal accommodation and departmental accommodation, normally by prior arrangement with the Head of Department or other departmental staff responsible for the departmental accommodation. However, obviously, in an emergency, for example, flood, Estates Management staff may have to enter departmental accommodation without prior notification. It is, therefore, imperative that any hazardous operations or particularly hazardous material which by necessity is left on open benches be appropriately labelled.
- 6.7.7 Computer Centre staff are granted automatic rights of access outwith normal hours of access to all areas where that department has computer and communications equipment.
- 6.7.8 University Safety Services personnel are granted automatic right of access to all University accommodation at all times.
- 6.7.9 Research fellows, research assistants, individual postgraduate students and members of the technical, secretarial, clerical and manual staff may be granted rights of access to communal accommodation and departmental accommodation outwith normal hours of access. Buildings may be open until 2200 hours but permission (for those who require it) to enter departmental accommodation is required from the Head of Department or their deputy. Individual undergraduate students may also be granted such rights of access through the same procedure. The levels of access available are as follows:

(1) Unlimited Access

- (i) An unlimited authorisation access card (RED) must be issued by the department and signed by the Head of Department or their deputy and the person being granted access.
- (ii) The department and those areas specified within it which have been authorised for entry must be stated on the card.
- (iii) The card may be valid for up to one year from issue. However, the expiry date must be shown on the card.
- (iv) The card is only valid if used in conjunction with an unexpired student/staff identity card or other photographic identification.
- (v) The card is issued on the understanding that the cardholder has read and understood that part of the appropriate Departmental Safety Regulations pertaining to out of hours working.
- (vi) Unlimited access should only be granted when considered essential by the Head of Department.
- (vii) Requests for red cards for lab access must be accompanied by a risk assessment (S20 form) and a red card request form (see pages 12 and 13) signed by the project supervisor.

ANY BREACH OF REGULATIONS WILL RESULT IN IMMEDIATE CANCELLATION OF OUT OF HOURS ACCESS AND DISCIPLINARY PROCEEDINGS.

Computer Centre Access

- 6.7.10 RED card access needs a countersignature by Computer Centre staff as well as Head of Department signature.

Temporary Rights of Access

- 6.7.11 The Head of a Department or, in their absence, a deputy previously authorised by the Head of Department may, exceptionally, grant temporary rights of access to departmental accommodation, including laboratories and workshops, outwith normal hours of access for a maximum period of one year at a time to a named visitor of not less than 16 years of age in respect of an individual person deemed by the Head of Department on their own responsibility to be suitable.
- 6.7.12 Some departmental equipment may only, by statute, be used by persons over 18 years of age. The Head of Department must ensure the visitor granted access is fully aware of all appropriate University/Departmental Safety Regulations and Procedures including evacuation.
- 6.7.13 The name of the visitor granted access and a note of the duration of the access granted must be lodged with Security Control.
- 6.7.14 Members of staff and students who would normally need RED CARD access are exempt from this requirement when attending social functions authorised by the Head of Department, in departmental rest areas, for example, common rooms, tea rooms, etc. This exemption is only valid until 2200 hours. If it is expected that the function will continue after this time, special permission must be granted by the Chief Operating Officer. Please see Regulation 6.7.15.
- 6.7.15 The Chief Operating Officer may, exceptionally, grant temporary rights of access to persons other than those granted rights of access under previous Regulations for the purpose of attending specific meetings, examinations or other functions on University premises. When temporary rights of access are so granted Security Control must be notified.
- 6.7.16 Departmental Safety Regulations must make adequate provision for the health and safety of all persons using departmental premises outwith normal hours of access as defined in the Regulations above.
- 6.7.17 All persons granted rights of access who use premises outwith normal hours must inform Security Control of their intention to enter, remain in or leave the premises in order that the security staff may arrange for them to be granted access to or exit from the building concerned. They must also record their presence on the premises either by telephoning Security Control or by signing the log book at Security Control (or, in the case of the Royal College, the James Weir or Thomas Graham Building, the log book held at the James Weir Building, Montrose Street entrance) before they enter the premises. All University staff must carry a University staff identity card or other photographic identification. Students must carry a current student identification card plus the appropriate departmental authorisation (for example, BLUE or RED card). Persons using premises outwith normal hours of access may be refused entry or requested to leave by a member of the Security or University Safety Services staff if they cannot show proof of identity.
- 6.7.18 Security staff must check periodically the safety of individuals recorded as being on the premises outwith normal hours of access.
- 6.7.19 Persons using premises outwith normal hours of access must have access to a telephone in order to contact Security Control in the event of an emergency.
- 6.7.20 Operations outwith normal working hours which have been assessed and identified as having a particular risk associated with them must have appropriate control measures in place to handle the foreseeable consequences of the work.
- 6.7.21 Abuse of the system may result in confiscation of the access card and identity card by Security or Safety Services personnel.

Children - Special Access

- 6.7.22 Children (persons under the age of 16) are permitted to enter the office accommodation and sports and recreational facilities of the University during the normal hours of access. Access to University premises is only permitted if accompanied by a parent or other responsible adult. Outwith normal working hours, children may be allowed access to office accommodation only; they must be accompanied by the parent or legal guardian who must directly supervise the child.
- 6.7.23 Children are not permitted to enter laboratories or workshops or other accommodation whose sole means of access is by way of a laboratory or workshop unless for the purpose of attending a supervised course, demonstration or exhibition in which case all sources of potential hazard will have been removed or rendered safe by other means.

Pet Animals

- 6.7.24 Pet animals of any nature may only be brought on to University premises under extraordinary circumstances. A Head of Department, on advice from a Departmental Safety Convener, may exceptionally authorise access to department premises in which case the animal must be kept under the direct supervision of the owner or other responsible person. A guide dog accompanying a blind person will normally be permitted unrestricted access to University premises but the nature of equipment in certain areas may make it necessary to deny access to such guide dogs.

Mechanical and Aerospace Engineering

Request for a Red Card for After Hours Work

(6pm -10pm Mon-Fri;
9am-5pm Sat/Sun & Holidays)

James Weir Building.

Please complete the following and make **two copies of the signed document**. The Safety Convener will retain the original. A copy must be retained by the supervisor and one kept by yourself for reference.

A: Is the Red card (permission for out-of-hours work) being issued to allow the researcher to conduct non-hazardous work and/or paper work i.e. office work?

B: Is the Red card (permission for out-of-hours work) being issued to allow the continuation of practical work in laboratories? A Risk Assessment must also be provided with the Red Card application that outlines measures that will be implemented to ensure out-of-hours work will be conducted safely.

Date

Name

Supervisor(s)

Area(s) of the building to which access is requested (Floors and or labs)
.....

For all persons requesting access for activities associated with A only (no partner required)

In return for permission to be in the building after hours, I agree to register my presence with Security on every occasion that I work out of normal hours (6pm - 10pm Mon-Fri; or 9-5 Sat/Sun or when the Univ. is officially closed)

Signature

For all persons requesting access for activities associated with B.

NOTE: All those requiring laboratory work should complete this section.

In return for permission to be in the building after hours, I agree to register my presence with Security on every occasion that I work out of normal hours (6pm - 10pm Mon-Fri; 9-5 Sat/Sun or when the Univ. is officially closed)

It is understood that I can only work when I have a partner who is prepared to remain in the building until my activity has been completed. The onus is on me to ensure that this person has been identified prior to 6pm weekdays and 6pm Fri for Sat & Sun work or for days when the Univ. is to be officially closed.

The programme of work to be conducted will be discussed in advance and approved by my supervisor or his nominee prior to its commencement.

Signature

Supervisors

It is my wish that the above be provided with permission to work out of normal hrs. Where the researcher has requested access to continue practical work, the programme will have been approved in advance. I understand that I have a duty of care (defined in the area safety regulations Sec. 9) to the researchers under my direction working after hours.

Signature

The department will not be held responsible for any accident or incident which occurs should you deviate from the above. Should you be found within the building working alone after hours on activities covered by section B your permission to work out of normal hours will be withdrawn.