

Mechanical and Aerospace Engineering

# Postgraduate Student Handbook 2023/24

## Faculty of Engineering MSc

- Advanced Materials Engineering
- Advanced Mechanical Engineering (inc. with Aerospace, Energy Systems, Materials and Powerplant Technologies)
- Advanced Mechanical Engineering (Online Learning)
- Advanced Mechanical Engineering with Industrial Placement
- Sustainable Engineering: Renewable Energy Systems and the Environment
- Satellite Data for Sustainable Development

---

***The contents of this Handbook are, as far as possible, up-to-date and accurate at the date of publication, though may be subject to revision. 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 programme during years of attendance:***

***<https://www.strath.ac.uk/studywithus/academicregulations/>***

***Note: “In the unlikely event of any conflict between the General Academic Regulations and other University publications, including Course Handbooks, the Regulations take precedence.”***  
***(extract from University Regulations)***

---

# Contents

## Section 1

<b>Introduction / Welcome from Director of Education .....</b>	<b>5</b>
<b>Academic Year – Key Dates to Note.....</b>	<b>7</b>
<b>Student Support Services.....</b>	<b>8</b>
<i>Academic Programme Advisers</i>	
<i>People in the Department</i>	
<i>Disability</i>	
<i>Staff-Student Liaison Committee (SSLC)</i>	
<i>Problems? – Where to go</i>	
<b>Useful Administrative &amp; Other Information.....</b>	<b>11</b>
<i>Access to Buildings</i>	
<i>Change of Address / Personal Details</i>	
<i>Email Accounts</i>	
<i>Graduation</i>	
<i>Jury Duty Exemption</i>	
<i>Myplace</i>	
<i>References</i>	
<i>Student Complaints</i>	
<i>Student Lifecycle (Student Business / Graduations / Transcripts)</i>	
<i>Student Visas</i>	
<i>Use of Computing Facilities and Resources</i>	
<i>Copyright</i>	
<b>Academic Information.....</b>	<b>15</b>
<i>Attendance/ Absence and Personal Circumstances</i>	
<i>Class Details - Modules and Timetables</i>	
<i>Coursework (including Extensions and Late Submissions policies)</i>	
<i>Examinations (General Information)</i>	
Use of Calculators	
Use of Dictionaries	
Use of Electronic Devices	
Pass mark	
Resit Attempts	
Requests to sit Examinations off campus	

## Section 2

### PGT Programmes

<b>Educational Aims and Programme Regulations.....</b>	<b>21</b>
PGT Programmes Information	
EF900: Individual Project/Dissertation	
Boards of Examiners for PGT Courses	
Library	
Student self-development	
PGT Curriculum	
<b>MSc Advanced Materials Engineering .....</b>	<b>27</b>
<b>MSc Advanced Mechanical Engineering- All on campus streams.....</b>	<b>29</b>
<b>MSc Advanced Mechanical Engineering with Industrial Placement.....</b>	<b>32</b>
<b>MSc Advanced Mechanical Engineering – Online Learning.....</b>	<b>34</b>
<b>MSc Sustainable Engineering: Renewable Energy Systems and the Environment.....</b>	<b>36</b>
<b>MSc Satellite Data for Sustainable Development (January start) .....</b>	<b>47</b>

### Appendices

**Appendix 1 – Departmental Health & Safety Arrangements**

**Appendix 2 - Access to University Premises**

# Introduction

The aim of this Handbook is to provide a brief guide to some essential procedures to assist you during your studies at the University of Strathclyde. The Handbook contains practical information about the University, the Department and your programme of study and is an important reference document which will help you to ensure that your time here is organised efficiently and to maximum benefit.

The University of Strathclyde has existed in various forms in Glasgow since 1796 and received its Royal Charter in 1964. Our institution is recognised as one of the largest and most important in the field of engineering education and research in the UK. We are located in the centre of Glasgow - Scotland's commercial and industrial capital - with four faculties now in existence, Engineering, Humanities & Social Sciences, Science and the Strathclyde Business School.

The Faculty of Engineering comprises of eight 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.

## Welcome from MAE Director of Education

On behalf of all staff in the Department of Mechanical and Aerospace Engineering (MAE), I am thrilled to extend a very warm welcome to all of our new and continuing students. We are particularly excited this year to welcome you all fully back to campus for the first time since the start of the global pandemic.

Engineering is a fascinating, stimulating and rewarding career. Engineers are always in demand in a very wide range of roles and, given the current global challenges we face, never more so than now. Your engineering education at Strathclyde will stand you in the best possible stead and open doors in all sorts of organisations or indeed equip you to start one of your own. Modern life has been shaped by engineers and they are always at the forefront when new demands emerge. It is a wonderful time to be an engineer and study engineering, as we face the challenges of the coming decades.

For those of you who are new to the subject and to studying at university or fully on campus for the first time, you may find the learning environment rather different to previous studies at school or college. Adapting to studying in a university setting can, at the start, be almost as challenging as the technical content of the programme of study itself. I urge all students to think carefully about how you manage your time and to develop effective study methods. If you do and if you approach your studies with diligence, commitment and intelligence, you will build an excellent platform for success both in your studies at Strathclyde and in the fulfilling career that follows. Furthermore, with good time management and study technique, there should be ample time for you to enjoy everything that life at university has to offer and I encourage you to do just that!

This Handbook will provide you with guidance on the operation of the MAE department and is designed to assist you throughout the duration of your studies and to let you know how and where to seek help, should you need it. Also, your Adviser of Studies can help clarify regulations and academic requirements, help and advice on specific modules can be sought from individual Module Registrars and Lecturers, and your Personal Development Adviser can support with general problems, should you encounter any. Please let your Student Representatives know about any persistent issues, which they can convey to the Department through regular meetings of the Staff/Student Liaison Committee.

I hope you find your studies challenging, enjoyable and rewarding, and we look forward to getting to know you and to working with you. We hope you will have an enjoyable and successful time with us.

With very best regards,

**Dr Emma Henderson**  
**Director of Education**

---

## Student Charter

Departmental staff aim to:

- be responsible and responsive in all matters related to students
- respect individual students as partners in the learning process
- maximise learning opportunities
- minimise bureaucracy and ensure the transparency of procedures
- maintain a friendly and caring environment
- operate an efficient information system
- identify clearly the responsibilities of staff and students
- facilitate innovative developments where appropriate
- ensure equality of opportunity for all

---

## Engineering Profession

All programmes in the Department are designed to lead to Chartered Engineer (CEng) status, in that they are accredited by one or more of the professional institutions in the Council of Engineering Institutions. It is your responsibility to exploit this benefit, although staff here will be pleased to help you with advice, form-filling and so on.

You are strongly recommended to begin your own developing association with the professional body you choose by joining up now. It costs little (Student Membership is sometimes free for students on accredited courses). You will keep abreast of changes in UK SPEC and your time as a student will be credited to you when you eventually apply for full membership.

---

## Employability (definition by Careers and Employability Group)

The Strathclyde graduate will be recognised as deeply knowledgeable and adaptable, demonstrating the skills, attributes and confidence to thrive in an evolving, often challenging world. To meet the needs of professions and career pathways, this will be achieved through the design of our curricula and the provision of opportunities for all students to engage in work related activities, entrepreneurial events and programmes and globally conscious initiatives throughout their studies.

# Academic Year – Key Dates to Note

Up-to-date University academic Key Dates are listed at <https://www.strath.ac.uk/keydates/>. This webpage should be used to check the various important term dates.

Please note that the University is **closed** as outlined below - during closures, there is no admittance to most campus buildings and Departments/staff are unavailable (Security Services remain on site).

## Semester 1

Dates	
University Closed	25 September 2023
University Closed	23 December 2023 – 03 January 2024 (inclusive)

## Semester 2 (*Semester 1 for PGT January starts*)

Dates	
University closed	29 March 2024 and 1 April 2024
University Closed	06 May 2024

## Summer

Dates	
University Closed	27 May 2023
University Closed	12 July 2024 and 15 July 2024

Academic Teaching (date commencing) and equivalent Timetabling System weeks are at:

[University Academic Weeks Calendar 2023-24](#)

# Student Support Services

There is a wide range of support and information services around the University. Details are available from the central 'Strathlife' student webpages at <http://www.strath.ac.uk/studywithus/strathlife/>.

Information and various Student Business forms are also available on the main Student Lifecycle website at: <https://www.strath.ac.uk/professionalservices/studentlifecycle/>.

There is also the Students' Association - see <https://www.strathunion.com/>.

In this section of the Handbook, we outline where you can find support within the Department of MAE.

## Academic Programme Advisers

There is an Adviser of Studies for each programme. The aim of the Adviser is to assist with counselling you on various aspects of your studies (in particular for academic queries/issues and to help in choosing any optional subjects to study), as well as providing support on personal matters.

There is also a Programmes Leader, who is responsible for the management of applicable programmes.

MSc Advanced Materials Engineering	Dr Reda Felfel	<a href="mailto:Mae-MATENG-adviser@strath.ac.uk">Mae-MATENG-adviser@strath.ac.uk</a>
MSc Advanced Mechanical Engineering (including with Aerospace, Energy Systems, Materials & Powerplant Technologies)	Dr Marcello Lappa	<a href="mailto:Mae-AME-adviser@strath.ac.uk">Mae-AME-adviser@strath.ac.uk</a>
MSc Advanced Mechanical Engineering with Industrial Placement		
MSc Advanced Mechanical Engineering – Online Learning	Mr Chris Cameron	<a href="mailto:Mae-DL-adviser@strath.ac.uk">Mae-DL-adviser@strath.ac.uk</a>
MSc Sustainable Engineering: Renewable Energy Systems and the Environment	Dr Paul Tuohy	<a href="mailto:Mae-RESE-adviser@strath.ac.uk">Mae-RESE-adviser@strath.ac.uk</a>
MSc Satellite Data for Sustainable Development	Dr Annalisa Riccardi	<a href="mailto:Mae-SATDATA-adviser@strath.ac.uk">Mae-SATDATA-adviser@strath.ac.uk</a>

PGT Programmes Leader	Dr Olga Ganilova
Director of Education	Dr Emma Henderson

*The above is subject to change; refer to your Pegasus record for up-to-date information.*



## People in the Department

Departmental academic staff are primarily based on Level 8 of the James Weir Building. All students must report to **MAE Reception room JW804** on arrival prior to meeting with staff.

**Staff sometimes work from home - initial contact and meeting arrangements must be made via email.**

PLEASE REFER TO THE UNIVERSITY'S [STAFF TELEPHONE DIRECTORY](#)

or [MAE STAFF SEARCH](#) WEBPAGE

FOR ALL DEPARTMENT STAFF NAMES AND CONTACT DETAILS.

Head of Department	Prof Bradley Wynne
Director of Education	Dr Emma Henderson
Departmental Safety Convener	Dr Fiona Sillars
Departmental Operations Manager	Mrs Marie Gray
PGT Contact	<a href="mailto:mae-pg@strath.ac.uk">mae-pg@strath.ac.uk</a>

## Disability

A disability is generally defined as a physical or mental impairment which has a substantial and long-term adverse effect on a person's ability to carry out normal day-to-day activities. It covers physical disability, some medical conditions and mental illness.

If you have or think you have a disability, you should disclose it as soon as possible to enable you to access any additional support that you may need. Information provided is treated as confidential and will not be shared without your consent. The University has a dedicated Disability and Wellbeing Team offering advice and assistance (refer to the 'Strathlife' webpage for details). If you believe you qualify for special assessment arrangements, you must visit the team without delay. **Requirements must be prepared several weeks prior to exams starting.**

Prof Cartmell ([matthew.cartmell@strath.ac.uk](mailto:matthew.cartmell@strath.ac.uk)) is the MAE Departmental Disability Coordinator.

**Further details and additional contacts can be obtained from the Disability & Wellbeing Service webpages at <https://www.strath.ac.uk/professionalservices/disabilityandwellbeing/>.**

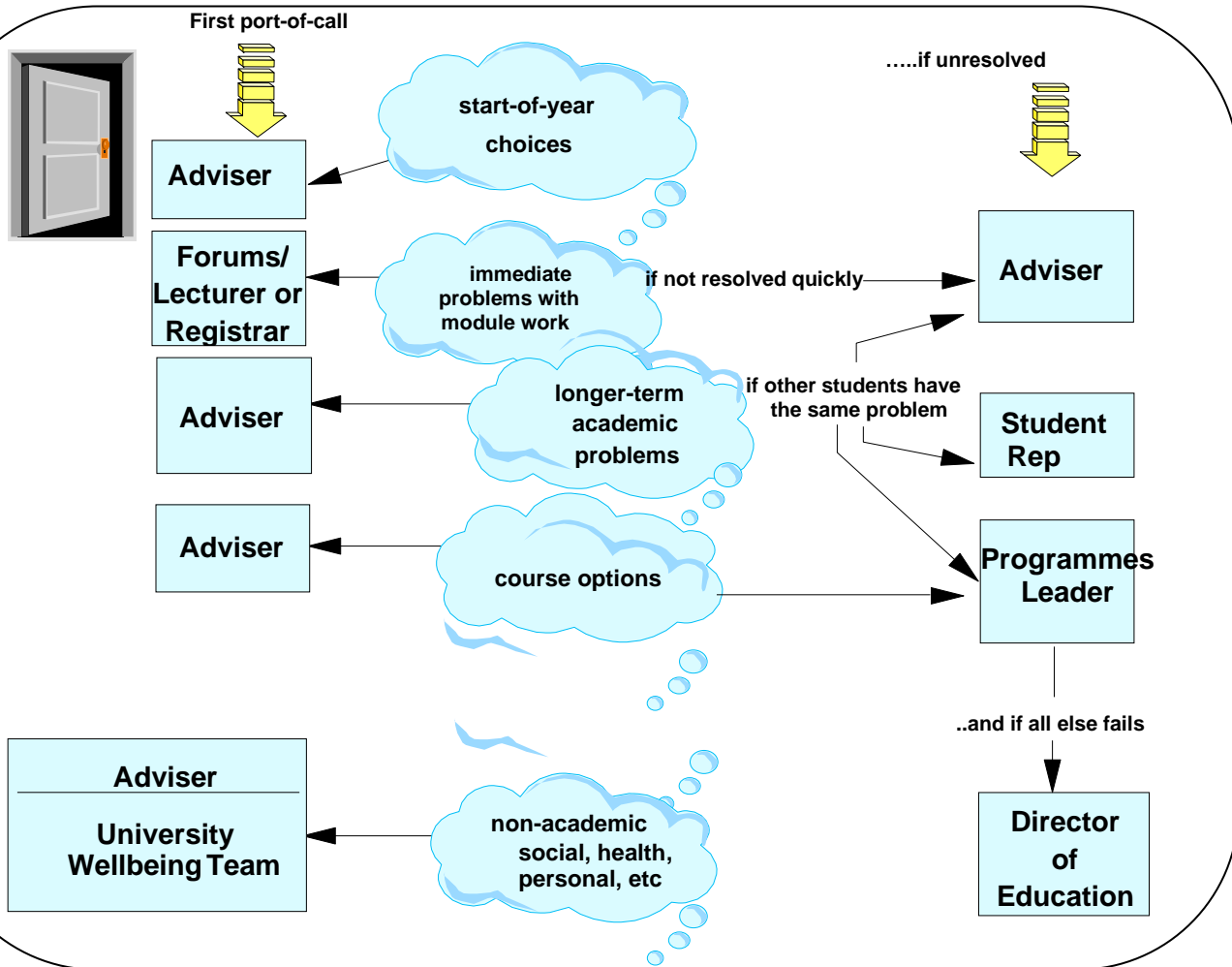
## Staff-Student Liaison Committee (SSLC)

A Staff-Student Liaison Committee, which normally meets at least once per semester, provides a forum where academic problems may be raised by representatives. Students are encouraged to consider the benefits of becoming a 'Student Rep', further information on which can be found on the [Student Representation](#) webpage and from the USSA at <https://www.strathunion.com/voice/studentreps/>.

Departmental Student Reps are encouraged to run the SSLC, which normally comprises two Reps from each programme, the Programmes Leader, Advisers of Studies and senior members of staff or others as appropriate.

When selected, the names of Reps are notified to all students. If there is an issue which is important to a large number of students and you believe it should be discussed by this Committee, you must inform the Student Rep so that it can be placed on the agenda for the next meeting. However, before the issue is brought to the meeting, it is ESSENTIAL that it has first gone through the proper 'Problems' channels which follow. Only if there has been no satisfactory resolution, should a problem be raised at SSLC.

## Problems? – Where to go



# Useful Administrative & Other Information

## MAE Reception (Central Services)

General student enquiries should be directed in the first instance to [mae-pg@strath.ac.uk](mailto:mae-pg@strath.ac.uk) (academic queries must be sent to the relevant Adviser email address).

If necessary, students can drop into our departmental Central Services Reception, on Level 8 of the James Weir Building, room JW804. Opening hours for students, which are subject to change, are:

**Monday – Friday: 1000-1230hrs and 1330-1600hrs**

## Access to Buildings

If you wish to access University premises out-with normal hours (generally 0800–1800hrs) it is important that you read Appendix 2 of this Handbook.

All queries or campus issues can be directed to the Security Services team, who are part of the University's Safety, Health and Wellbeing Directorate – see Security section at <https://www.strath.ac.uk/studywithus/ourcampus/whatsoncampus/> (building codes are listed at <https://www.strath.ac.uk/professionalservices/estates/roombooking/buildingcodes/>).

If you experience an issue with physical access getting around on campus, please email: [physicalaccess@strath.ac.uk](mailto:physicalaccess@strath.ac.uk) where a member of Estates staff will be able to assist.

## Change of Address / Personal Details

Students are required to notify the University of **any change in term-time or permanent home addresses** without delay. Letters are sometimes posted to students, therefore it is vital that your current addresses on file are accurate and up-to-date. All relevant details must be updated via Pegasus – see <https://www.strath.ac.uk/professionalservices/studentlifecycle/personaldetails/>.

## Email Accounts

You must check your '@uni.strath' email account on a regular basis, to ensure that you do not miss announcements or updates. Email accounts must always be used to send communications and should also be cleared regularly, as notifications cannot be received when an account has reached capacity.

**Failure to read emails could impact on your studies if you miss an important message** (online forums are not the sole means used by the University for issuing communications).

## Graduation

Award Ceremonies, known as Congregations, are normally held in June/July and October/November. All students hoping to graduate or be presented must complete enrolment well in advance and pay the appropriate fee. Details of ceremonies and enrolment forms are usually available in March each year - see <http://www.strath.ac.uk/studywithus/graduation/>.

**Note:** Enrolment for graduation and fee payment does not constitute an explicit intention/request to exit a programme early. **The Department, via your Adviser of Studies, must also be informed.**

## Jury Duty Exemption

Where required, a Jury Duty excusal letter can be requested by email to [mae-pg@strath.ac.uk](mailto:mae-pg@strath.ac.uk). The Citation Number and relevant Personal ID Number (as stated on documentation received from the Court) should be provided when emailing.

## Myplace

The University's virtual learning environment (VLE) is called Myplace. All modules for which you are officially registered will automatically appear on Myplace. In addition, MAE students will see dedicated programme pages and a General MAE PGT page with some generic information.

Login using your Strathclyde student DS username and password. Details can be found at <https://www.strath.ac.uk/studywithus/strathlife/whatitslikestudyingatuniversity/myplace/>. You will find hints and tips as well as support via the link to the 'Student Support Section' - including how to submit an assignment electronically and an explanation of Turnitin.

Myplace delivers online resources and activities designed to enhance learning. The pages generally include assessments, online discussion, learning materials (e.g. lecture slides) and class news.

Please note that it will take a few days after registration for your classes to update through the University's systems, so that everything appears in Myplace. If you are not registered for a class and think that you should be, you should contact your Adviser of Studies urgently.

## References

When companies ask for referees who can comment on academic progress as well as your general conduct, students should contact their individual Project Supervisor in the first instance, where applicable or can ask their Adviser of Studies. It is department practice to provide a reference directly to the employer and not to the student.

Under the General Data Protection Regulation (GDPR), staff are not permitted to provide references without student consent. Reference requests will therefore be declined where students have not contacted and agreed this with the relevant member of staff prior to the request being received.

## Student Complaints

Please refer to the below University website for the official complaints procedure (note: major issues should always be directed to your Adviser of Studies in the first instance).

<https://www.strath.ac.uk/contactus/complaintsprocedure/>

## Student Lifecycle (Student Business / Graduations / Transcripts)

Student Lifecycle is part of Student Experience & Enhancement, with a Helpdesk located on Level 4 of the Learning and Teaching building (hours of opening normally Monday-Friday 1000 to 1600 hours).

Out-with these times, much of the information and forms you may require should be available from the Student Lifecycle webpages at <https://www.strath.ac.uk/professionalservices/studentlifecycle/>. For contact details, please refer to the 'Contact Us' link.

Changes to curriculum modules or programmes must be notified to Student Business by the Department through the academic Adviser of Studies (see earlier section of this Handbook for details).

## Student Visas

Students granted a Student Visa have the responsibility to abide by its conditions. Engaging with your studies prevents any problems and protects your visa status. Students who hold a visa who are absent or need to briefly leave the Glasgow area at any time during their studies, **must first request permission from the Department before making any arrangements.**

UK Immigration Rules are very strict and the consequences of not adhering to these can include being suspended from your studies and/or reported to the Home Office.

**Visa queries must be directed to the International Student Support Team – refer to their webpage <https://www.strath.ac.uk/studywithus/internationalstudents/whileyourehere/internationalstudentsupportteam>**

## Use of Computing Facilities and Resources

The University will not permit the use of its computer facilities and resources for access to, or transmission of, information which is considered by the University to be unacceptable; illegal; in breach of university policies, such as those on Equal Opportunities and Harassment; wasteful of resources or not commensurate with the provision of facilities for legitimate educational purposes.

Examples of such unacceptable use may include:

accessing/displaying pornographic material; stating defamatory opinions/views concerning individuals or organisations; accessing/displaying discriminatory material or material which encourages discrimination; engaging in games or chain e-mail; publishing information which is intended to misinform and thereby causes anxiety or inconvenience to another; unauthorised use of University logos, titles etc; spamming; corrupting or destroying another user's data; violating the privacy of other users; disrupting the work of others; using JANET (Joint Academic NETwork) in a way that denies service to others; misuse of networked resources such as the introduction of viruses.

The University actively monitors usage of the University computer facilities and resources which includes monitoring the access to, publication or receipt of, any Internet materials by any user.

IT details can be found via Information Services at <https://www.strath.ac.uk/professionalservices/is/>.

## Copyright

Under UK Copyright laws, original works such as books, journal articles, images, music or films are protected by copyright. This means that they cannot be reproduced (copied), on paper or electronically, unless: covered by a licence, permitted by statutory exceptions or legal defences or where permission is given by the copyright holder. Remember that materials found on the Internet are equally protected by copyright even if there is no fee or password required to access them.

The University has a range of licences in place which permit students to make copies of extracts, for example one chapter or one article, from copyright works for the purpose of their studies and in other cases the law will often provide a defence. If you are unsure whether you can copy material, always check if there are Terms & Conditions or similar and follow them. With web-based materials, if in doubt, provide a link (URL) rather than copying the material. Never link to sites that you know contain 'pirated', infringing (or otherwise illegal) material. Further guidance is available (see link below).

It is important that students observe the terms and limits of licences and exceptions. Failure to do so may make you personally liable for copyright infringement, as well as cause; loss of access to materials such as eBooks, eJournals or databases, by your fellow students and the whole University. Dealing with copyright material inappropriately can be a disciplinary offence and a breach of University regulations.

It is important when copying other people's work, in print or on the internet, to do this fairly. This means that whilst copying for your research or your assignments is generally permissible, republishing copies on social media or the public web is likely to cause problems. You should only copy as much as you need for your work and should not reuse other people's work in a commercial context without checking if you need permission. Finally, always acknowledge your use of other people's work and cite them accordingly. This will help you stay legal as well as avoiding plagiarism.

The good news is that normally, you own copyright in material you produce such as a dissertation or project report and this too is protected by copyright.

If you have any questions or concerns, please visit the Information Governance and Compliance webpage <https://www.strath.ac.uk/professionalservices/is/compliance/>.

# Academic Information

General Regulations for all courses are published on the University's website at <https://www.strath.ac.uk/studywithus/academicregulations/>.

Policies and Procedures for students are published on the Student Experience and Enhancement Services (SEES) website <https://www.strath.ac.uk/sees/studentpolicies/>. These include:

Absence and Voluntary Suspension	Personal Circumstances	Student Discipline
Academic Appeals	Academic Dishonesty	Assessment and Feedback
Compensation Scheme and Progress	Motivational Merit & Distinction	Honours Classification & Other Awards Rankings
Extensions to Coursework Submission	Late Submission of Coursework	Dignity & Respect (inc Equality & Diversity)
Student Guidance on the Use of Social Media and VLEs	Charging for Course Material	Student Representation

**All students must refer to relevant policies for full information, to be familiar with, remain aware of and consult each where required during their studies. Outlined below are some key points.**

## Academic Appeals

Appeals can only be made after you have been officially informed of a Board of Examiner outcome/decision and associated results via Pegasus. Included will be a link to indicate when and how to make an appeal and the final deadline. Appeals are assessed by a Faculty panel, although departments are asked for their response for consideration alongside the student submission. Any appeal must have significant grounds (for example, instead of an opinion that a mark should be higher). Discussion with your Adviser of Studies before making a formal appeal is advisable. Please refer to the University's Appeals policy before submitting an appeal directly to the Faculty Office – Engineering.

## Academic Dishonesty

The University regards academic dishonesty as a serious offence. Allegations of academic dishonesty will be fairly assessed and appropriate action 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. Promoting a general climate of academic integrity within the student body is important.

### **Plagiarism and Collusion**

Plagiarism is taking the work of others and presenting it as your own. Collusion is using the work of a fellow student, with his or her knowledge, and presenting it as your own.

You could be accused of plagiarism if you:

- hand in (as your own) work that was written by someone else
- copy out someone else's work and hand it in
- copy out sections of someone else's work and include it in your own submitted work without acknowledging it
- use someone else's work in any of the above ways with a few words changed

"Someone else" might be the writer of a journal article, textbook or website. It could be a fellow student, though you might then be accused of collusion. The "work" could be a full essay, paragraph or sentence i.e. copying (or altering in a minor way) a complete paragraph or sentence constitutes plagiarism.

You could be accused of collusion if:

- you and another student submit identical or almost identical work

Any work submitted for assessment, e.g. essays, laboratory reports, homework and tutorial assignments, must be solely the work of the individual student or group (if a group assignment is set).

If there is evidence of plagiarism or collusion, penalties will be imposed ranging from a reduction in marks, to resubmission of work, to University disciplinary action. Each case of plagiarism/collusion will be discussed by an adjudication panel who will recommend an appropriate course of action. Please see [https://www.strath.ac.uk/media/ps/cs/gmap/plagiarism/plagiarism\\_student\\_booklet.pdf](https://www.strath.ac.uk/media/ps/cs/gmap/plagiarism/plagiarism_student_booklet.pdf) for the University's guidance on plagiarism. For any doubts as to what constitutes plagiarism, please read this document.

## Assessment and Feedback

The Department fully subscribes to the approach to Assessment and Feedback outlined by the University at <http://www.strath.ac.uk/learn/learn/informationforstudents/students/assessfeedback/> and elucidated in the 'Assessment and Feedback Cycle'. The document 'Making the most of your Assessment and Feedback at Strathclyde' is also available from this webpage.

Accordingly, assessment and feedback methods used by each module are explicitly stated in the associated Module Descriptor Form (MDF). Current MDFs can be found on the MAE student information webpage (see below 'Class Details - Modules and Timetables' section for link).

The Department also recognises that, in addition to constituting a formal response to assessment, feedback also incorporates informal communication between staff and students (either individually or collectively) that provides information on progress and performance. This implies a more bilateral process in which students are encouraged to seek feedback by actively engaging with staff as appropriate.

## Compensation

Compensation is a mechanism by which the Board of Examiners' can award credits for a module which has been narrowly failed i.e. even though a pass mark has not been achieved, a resit is not required.

The Policy on the compensation scheme can be found [here](#)

In exam boards, compensation will be applied to modules as soon as modules are eligible.

## Attendance / Absence and Personal Circumstances

**Poor attendance makes a course more difficult and is often associated with poor performance.**

All students are expected to be in attendance for activities during all Terms (as listed on the University's Key Dates webpage). This includes Welcome & Development Week, Consolidation & Development Week and all formal examination periods/diets.

The following procedures and regulations relating to absence through illness should be noted:-

- Students must sit all assessments/examinations unless prevented by illness, in which case a medical certificate must be produced as documentary evidence. Personal Circumstances must be notified to Student Business Engineering **within five working days** of the latest affected examination or date of submission of affected assessment - this includes scheduled assessments during the semester, such as presentations. Self-certification is not sufficient.
- Failure to attend due to being "unaware of the dates or times or submission deadlines" of assessments and missing an examination due to "misreading the timetable or oversleeping" are not valid reasons for non-attendance. An 'Absent' will be recorded in such situations (refer to the Personal Circumstances policy), which will impact on a student's degree classification.
- Students whose performance has been, or will be, affected by circumstances that are severe and outside their control must **inform the University as soon as they are aware of these circumstances** by recording them on Pegasus under 'Personal Circumstances' (clearly state the extent, duration and nature, plus how they impact on performance/attendance) and also by **submitting supporting documentary evidence to Student Business Engineering**. In addition, students must contact their Adviser of Studies as soon as possible to discuss adverse circumstances.



## **CIRCUMSTANCES THAT WILL NOT BE CONSIDERED**

Personal Circumstances Boards (PCBs) meet prior to each Board of Examiners to consider whether intervention is required, based on the personal circumstances submitted. PCBs will disregard circumstances which a student could reasonably have avoided, where measures should have been taken to reduce their impact or where circumstances are no different from those facing a significant number of other students (which you are expected to cope with as part of a properly managed workload). Computer problems, failure of a single data source or lack of back-up are not valid mitigating circumstances and not acceptable grounds for discounting attempts or appealing.

Students who do not submit formal Personal Circumstances via Pegasus will not be considered by the PCB or subsequent Exam Board. **NO** notifications of circumstances will be accepted after the PCB has met and students cannot appeal where they fail to report their circumstances prior to Exam Boards.

## **Class Details - Modules and Timetables**

Module Description Forms (MDFs) for all MAE classes can be found on the MAE Student Information webpage <http://www.strath.ac.uk/engineering/mechanicalaerospaceengineering/student-information/>. These contain the most up-to-date details for all syllabuses/assessments. General class enquiries should be directed to Module Registrars. Past exams papers can be found using the University's Library pages.

Timetables can be found via the University Timetabling page <http://www.strath.ac.uk/timetables>. Information on personalised student timetables can also be found via this webpage.

**Note: Personalised timetables cannot always fully reflect all information. Students should also consult relevant module pages on Myplace for certain individual slot schedules.**

## **Coursework**

It is the responsibility of students to keep up to date with coursework and **ensure that all assignments are submitted prior to relevant deadlines**. If you miss a deadline without satisfactory reasons, you may find that your assessment for that module is heavily compromised. Only you can judge if losing marks might affect either your progress or final assessment.

### ***Policy and Procedure on Extensions to Coursework***

The University's Extensions policy is in place to support students and to help staff to monitor students' use of extensions for identifying those who may require extra support. Where circumstances negatively impact on studies, students can request an extension to a coursework deadline. **Extension requests should be made in advance of a submission date, via the Myplace online request facility.**

For the University's extensions policy, which provides guidance on requirements, see [here](#).

### ***Policy and Procedure on Late Submission of Coursework***

It should be noted that penalties will be incurred for late submissions. Coursework is deemed to be late when submitted after the published deadline without an agreed extension and in the absence of personal circumstances. Students should ensure that they are familiar with this policy, available [here](#).

For more detailed information on both Extensions to Coursework and Late Submissions, all students must read over the relevant links which can be found on the MAE Student Information webpage (link within preceding section above).

**If you think you are unlikely to meet a coursework deadline due to medical issues or personal circumstances, you must apply for an extension without delay.**

**NOTE: Extensions and Late Submissions are NOT applicable to Projects.**



## Examinations

It is important to note that:

- students **MUST** remain available for exams during ALL exam diets and should therefore not arrange holidays within such periods. Published exam dates may change and therefore **you must not make arrangements to leave the area prior to the official end of 'Term', which includes examination periods.** No special arrangements will be made in such cases.
- students will normally have two attempts to pass classes during the course of the academic year. Those who fail to complete a class at the first attempt will be given one additional assessment opportunity before the next Board of Examiners. This will either be by coursework or examination, as outlined in the class Module Descriptor Form.
- those who are permitted to carry classes to subsequent years will be given the opportunity to resit during the following academic year. Students should note that failure to pass any compulsory class after four attempts maximum (where permitted) will result in withdrawal from the degree. For level 4 and 5 modules, only **ONE** resit is allowed (i.e. two attempts in total).

For further information, please check the University SEES Student Lifecycle webpage at <https://www.strath.ac.uk/professionalservices/exams/>.

**NOTE: during the semester 2 exam period, level 4 and 5 modules are normally scheduled to take place early in the diet (though students must always be available throughout the full duration of all formal examination diets).**

Exam Co-ordinators' details for all departments (inc MAE for module codes beginning "16" and "ME") are listed at <https://www.strath.ac.uk/professionalservices/disabilityandwellbeing/disabilitysupport/ddc/>.

### ***Use of Calculators***

It is recommended that students have a basic SCIENTIFIC calculator for use in examinations as, although calculators may normally be taken into an exam, they must not be used to store text /formulae nor be capable of communication (see 'Use of Electronic Devices' below). Invigilators may require calculators to be reset. Candidates are not permitted to share the use of calculators.

### ***Use of Dictionaries***

Regulations state that students whose native language is not English are permitted to use paper-based English/native language dictionaries in University examinations. These dictionaries will be subject to scrutiny by the Invigilator in charge of each examination. Electronic dictionaries are not permitted in University examinations. Regulations state that, unless instructions have been issued to the contrary, dictionaries shall not be used in language examinations.

### ***Use of Electronic Devices***

Electronic devices are not permitted during examinations (unless with prior written permission of the Department/School). Electronic devices include, but are not limited to: mobile phones, music players, tablets and smart watches. Candidates are not permitted to bring earphones into the examination room. **DEVICES CANNOT BE USED AS CALCULATORS DURING EXAMS.**

### ***Pass mark***

Normally the pass mark for each individual class is 50% for academic level 5 modules and 40% for all others, unless otherwise notified. It is important to note that students on Honours and Masters courses are expected to perform at a substantially higher level.

There are a number of reasons to set your sights higher than the above pass marks, not least the fact that marks appear on Academic Transcripts, copies of which are often sought by prospective employers.

In addition, results contribute to the grading of final award classifications, so it is important to secure the highest possible. In line with recommendations of accrediting institutions, the mechanism for calculating final marks is **based on first attempts**, so continued high performance will be rewarded.

### ***Resit Attempts***

If a student does not pass a particular examination then it is essential to resit at the next examination diet or available opportunity (to complete supplementary work to a satisfactory standard), so that the total credits required for the final degree can be accumulated. **All students must be available to attend examinations during exams diets on campus as necessary.**

Note: although Examination Boards normally allow two attempts (first attempt and one resit attempt) to gain credits for a specific module, such attempts must be at two consecutive offerings of the assessment. **For the purpose of determining final award classifications, marks obtained at the first attempt are used.**

### ***Requests to sit exams off campus***

All students must attend for examination at the University of Strathclyde on the dates and times scheduled, including mid-semester assessments (for example, class tests, presentations, etc).

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 University's elite athlete Sports Scholars programme.

The following specific cases will **NOT** be considered by the Department:

- where 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 should not be made until you know that you have passed all classes for the current academic year.**

Students who decide to make travel arrangements (such as purchasing non-flexible/changeable tickets) prior to receiving official results at the end of the academic year, **must return to the University campus in Glasgow for the resit diet to attend examinations in person for any failed classes.**

Where critical and provisionally agreed in principle by the Exam Co-ordinator, requests to take an examination at a bona fide institution other than this University (normally a suitable overseas exchange institution or a British Council Office) should be formally made in writing to the relevant Exam Co-ordinator. Only *EXCEPTIONALLY* will permission be given to sit an examination out-with the University.

Such a request must be made **no later than six weeks** prior to the start of an examination diet. If permission in principle is granted, you must thereafter arrange for written communication to be sent by an authorised person at the proposed off-campus site confirming that the institute agrees to act for the University of Strathclyde in this matter and giving a contact name, telephone number, e-mail and full postal address (post box addresses are not suitable). This formal written communication must reach the Department **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 to the University's Director of Professional Services, from whom formal approval must be obtained. Examination papers **cannot** be issued to an alternative bona fide institution unless the above procedure has been followed.

Students will be liable for all expenses incurred and any fees charged by an overseas institution/site.

## **Section 2**

# **PGT Programmes, Educational Aims & Regulations**

---

## PGT Programme Information

### **Advanced Materials Engineering**

Materials engineering is the field of engineering where materials have been developed, processed, and tested to be used in a variety of applications, from computer chips and aircraft wings to wind turbines and biomedical devices.

The Advanced Materials Engineering programme through a variety of modules leads to awards in Postgraduate Certificate (requires 60 credits), Postgraduate Diploma (requires 120 credits) and MSc levels (requires 180 credits).

The programme includes a total of 5 compulsory teaching modules in the field of materials (e.g. metal and alloys, composites, processing and fabrication of materials) and a wide range of optional modules from which the student can choose. For students interested in pursuing an MSc qualification, an individual research project will be completed, generally working alongside industrial partners and research colleagues. Individual staff-supported projects provide students with the opportunity to apply the skills and knowledge acquired during their studies to a specific problem or project.

The Advanced Materials Engineering programme attracts graduates from a range of backgrounds in engineering, physics and materials science. This programme is designed to build a comprehensive understanding of basic materials engineering, including industrial metallurgy, composites, and advanced materials. Students will gain a broad knowledge base on advanced manufacturing processes and the importance of materials sciences. In addition, students will benefit from industry exposure through funded research projects, site visits and visitor lectures and other employability initiatives with the National Manufacturing Institute of Scotland and the Advanced Forming Research Centre.

### **Advanced Mechanical Engineering- on campus**

The Advanced Mechanical Engineering programme offers flexible postgraduate training opportunities and leads to awards at Postgraduate Diploma and MSc levels. The course includes technical/specialist and generic taught modules, and industry-relevant projects for those progressing to the MSc. Teaching methods include lectures, practical exercises and site visits. The MSc requires 180 credits and the PgDip 120 credits.

This programme has been specifically conceived to attract graduates from different branches of engineering, physics or mathematics interested in developing a successful mechanical engineering career in industry, public institutions or academic research. It has therefore been designed as a broad-based programme covering a wide portfolio of mechanical engineering modules.

Inherently multidisciplinary, this programme stands at the intersection of different specialisms, which include (but are not limited to) aerospace disciplines, materials science, energy systems and powerplant technologies. Students can develop relevant knowledge and skills in any of these four specific sectors (AME with specialism) or build a more general curriculum (general AME) involving a balanced combination of theoretical, analytical, computational and experimental techniques and methods. This flexibility allows our course to branch out and put students in a condition to tackle a variety of industrially relevant problems. Teaching is delivered by qualified and long experienced academics, who are at the forefront of their respective fields. Individual projects in semester 3 are student led with staff support, allowing students to put in practice the theoretical knowledge and skills they have been provided with.

This programme 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

## **Advanced Mechanical Engineering- Online Learning**

The Advanced Mechanical Engineering Online learning programme has been developed to provide high calibre mechanical engineering graduates with an in-depth technical understanding of advanced mechanical engineering topics, working flexibly on their studies part time, while in other employment or circumstances.

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.

The Advanced Mechanical Engineering (Online Learning) course offers flexible, part time postgraduate training opportunities, and leads to awards at Postgraduate Certificate, Postgraduate Diploma and MSc levels. The PgCert requires 60 credits, the PgDip 120 credits, and the MSc 180 credits. The MSc project carries 60 credits.

## **Renewable Energy Systems and the Environment (RESE)**

Engineering involves the creative process of turning knowledge of science and technology into products, services, and infrastructure that benefit society. 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.

The RESE course attracts graduates from a range of backgrounds and exemplifies the multidisciplinary nature of engineering required to meet the challenges of a “just transition” to sustainable renewable energy systems that benefit local and wider environments.

The RESE course is structured to deliver knowledge and skills plus experience of real-world application. The 5 compulsory taught classes in semester 1 establish the knowledge base for application in group and individual projects in semesters 2 and 3. Group projects tackle industry and societal challenges, employing a range of software tools, with students presenting their outcomes to peers and at a final ‘industry day’ forum. During semester 2 site visits to renewable energy sites are arranged to gain practical insights from practitioners. Students select an additional 3 elective taught classes in semesters 1 and 2. Individual projects in semester 3 are student led with staff support, allowing students to explore fields relevant to their individual career path.

## **Satellite Data for Sustainable Development**

The MSc in Satellite Data for Sustainable Development has been developed to provide high calibre graduates with an in-depth technical understanding of how satellite data can be used to address global challenges particularly in sustainable development. It offers a cross-disciplinary approach to the teaching of geospatial data, data analysis and sustainability. The applied learning activities of the MSc programme are strategically aligned with the goals and interests of the University of Strathclyde’s Centre for Sustainable Development at Strathclyde, to give students a wider exposure to the global movement that surrounds the 17 UN SDGs.

The programme will focus on the practical use of satellite data in direct applications to SDGs through the analysis of case studies, invited lecture talks and engagement, through student projects with start-ups and NGOs actively working in the field. Students will gain an insight in to the broad use of satellite data across various industries and will be equipped with a host of technical skills and knowledge relating to space system design, remote sensing and data analytics.

Students joining the course will take 4 compulsory modules and have the opportunity to select among a wide range of optional classes in the area of Entrepreneurship, Business and Management, Machine Learning and Data Analysis, Urban Design, Civil and Environmental Engineering, Space Systems and Energy Systems.

The Satellite Data for Sustainable Development course offers flexible postgraduate training opportunities and leads to awards at Postgraduate Diploma and MSc levels. The course includes specialist and generic taught modules, and an individual project for those progressing to the MSc. Teaching methods include lectures, practical laboratories, invited lectures and a final individual project. This course is suitable for graduates with a broad range of backgrounds: Engineering, Physical Sciences, Applied Sciences, Public Policy, Law, and Business. Other qualifications may also be considered provided there is evidence of capacity for postgraduate study and an attitude to data analytics.

**Individual Project:**

Alongside completion of 120 credits of taught modules, students completing the MSc route undertake an industry-relevant 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 suggested by industrial contacts or aligned to one of the many areas of research strengths within the Department.

## EF900: Individual Project/Dissertation

MSc students from all programmes will undertake the class EF900, the Individual Project. This usually occurs after a taught part of the course. Students are expected to undertake supervised, individual project work, with the award of MSc being made on the basis of an acceptable electronic thesis submission pdf file, as directed by their Project Supervisor. This component is valued at 60 PG credits.

Students are encouraged to self-generate a project topic based on their experiences of the course and aligned with their future career aspirations. More specific details on this process will be detailed at the beginning of semester 2, while general guidance can be found in this Handbook's Appendix. It is the students' responsibility to identify, in the first instance, suitable project supervisors in the MAE department based on research and other interests.

Students who do not wish to self-generate a project, will be able to suggest a topic/area of interest using a selection form and will be asked to select multiple research areas of interest. Supervisor allocation will then be managed centrally by the department and students will be notified of their allocated supervisors. The allocation committee will do their best to match one of the areas of interest indicated with the supervisor specialising in the area. However it cannot be guaranteed (see Appendix for details).

The Project Coordinator will hold an introductory project meeting at the beginning of semester 2 for all students undertaking projects in the summer and following academic year. The current Coordinator is Dr Ganilova ([olga.ganilova@strath.ac.uk](mailto:olga.ganilova@strath.ac.uk)), to whom all project queries should be directed.

In order to graduate at the ceremony in November, the final version of the student's dissertation must be submitted online via Myplace **by the published deadline** (a first draft should be submitted to the project supervisor 2 weeks prior to the final submission deadline which will provide time for feedback).

RESE Theses from recent years may be found on the web at:

<https://www.strath.ac.uk/research/energysystemsresearchunit/courses/individualprojects/>

### Part-time Students

Normal duration for part-time (PT) study on MSc programmes is 36 months, meaning 60 credits should be completed per year. PT students can choose to start the project in the summer of their second year of study, in line with the full-time cohort, or in the new academic session starting in September.

### PG Diploma Students

Students enrolled in the PG Diploma course, who wish to be moved to the MSc and meet the requirements, can request that a transfer be considered at the June Board of Examiners. They can still choose a project, however this will be 'at risk' and will not be confirmed until after the Board. Students should inform their Programme Adviser and [mae-pg@strath.ac.uk](mailto:mae-pg@strath.ac.uk) of the option they wish to choose:

- Students can wait until Board results are released before commencing their project, which means starting early June, submit mid-September, then graduate in June the following year.
- Students can commence their project 'at risk' in May and if the Board of examiners agree on the MSc transfer, they can continue and graduate in November. The 'at risk' process must be discussed with the relevant Programme Adviser.

**PLEASE NOTE:** the undertaking of the project of 60 credits, to qualify for the award of MSc, requires approximately 600 hours of study. Therefore, it is important that students are fully committed to their project during this period. Any request for an extension will only be granted by the Personal Circumstances Board for recognised extenuating circumstances.

**IMPORTANT:** Extensions and Late Submissions are **NOT APPLICABLE** to projects.

**For example, other work commitments are not considered an adequate reason. Delays due to unavailability of software or hardware required for project delivery will not result in an extension (potential mitigation strategies will be discussed and agreed directly with the Project Supervisor).**

## Boards of Examiners for PGT Courses

There are usually three meetings of the Board of Examiners per year. June, August and September.

- The June Board will normally consider the transfer of candidates between PgCert, PgDip and MSc and progression to the MSc project/dissertation. This Board will also consider any outstanding candidates from the previous academic year.
- The August Board will consider PgCert, PgDip and MSc students with resit examinations which are preventing them from progressing to the next stage of their programme.
- The September Board of Examiners is the main Examination Board for PGT Courses. This Board considers the award of MSc, PgDip and PgCert, and the transfer of students between MSc, PgDip and PgCert. Outstanding issues from the earlier Examination Board will also be considered.
  - Note, the Boards of Examiners may allow a thesis/dissertation to be re-submitted only if the original mark is at least 45%, in which case the re-submission must be made before the end of November (in the same calendar year).

Full details on Board of Examiners can be found at: <https://www.strath.ac.uk/exams/examboardsandresultsfaq/>

## Library

We expect students to use the library independently as part of their daily study routine. Independent study using books and journal articles will augment class notes and facilitate a deeper understanding. Distance learning students can access the University library online services, whilst on campus students can also access our hard copy media too. All students can borrow online books and download academic papers and journals.

The library also offers a postal service for distance learning students.

The University of Strathclyde uses an integrated search service called SUPrimo. This service allows students to access online journals, reports, articles, books, exam papers and other relevant materials. Additionally, students have access to a wide selection of databases subscribed to by The University of Strathclyde.

A guide on how to use the library is here: <https://www.strath.ac.uk/professionalservices/library/>

## Student Self-Development

The University provides a range of information that guide you through some common tasks at university. For example, reading and writing tips, grammar and language help, time management, avoiding plagiarism, making presentations and critical thinking.

These can be accessed [here](#)

The University also provides online IT training for common software packages including Microsoft Office (Word, Excel, Powerpoint) and for University systems (Pegasus, Nemo, webdrives, MyPlace etc).

Staff will assume that all students are familiar with Microsoft Office to a basic level, and can engage with all University systems.

---



**The following sections detail specific information relating to curriculum and the requirements to complete your programme.**

**Please read this section in detail prior to selecting modules and contacting your Programme Adviser regarding curriculum.**

## **PGT Curriculum**

As soon as registration is complete, students should give consideration to their curriculum, and the modules they wish to undertake to obtain the requisite credits for their level of registration.

### **Specialist Instructional Modules**

Specialist instructional modules focus on different technical aspects allowing multidisciplinary tailored learning to suit individual needs. When choosing technical modules, individuals will discuss the options with their programme adviser.

### **Generic and Optional Instructional Modules**

Students can select from a range of generic modules which are available to provide other skills which are considered necessary for professional engineers. Those on offer include the areas of Design Management, Project Management, Environmental Impact Sustainability, Information Management, Financial Engineering, Risk Management, and Knowledge Engineering and Management for Engineers. It is also possible for students to select alternative 'elective' masters level modules with approval of the Programme Adviser.

### **Important:**

1. All curriculum choices are subject to approval by your Programme Adviser.
2. It is possible to take up to 20 credits from modules out with those listed above with the approval of the Programme Adviser and of the related Module Registrar
  - It is a student's responsibility to contact the Module Registrar to ask permission before completing the curriculum form and to forward the corresponding email to your Programme Adviser.
3. Students are expected to finalise their curriculum as soon as possible at the start of semester, changes beyond the end of week 2 are not possible.
4. It is the student's responsibility to check that the timetables of your selected classes do not clash.
5. Normally the balance of credits between semester 1 / semester 2 should be either 60 / 60 or 50 / 70. For those in part time study, the balance of credits between semester 1/ semester 2 should be 30/30, or 25/35.
6. Certain classes require specific pre-requisites. It is the students' responsibility to check that you satisfy ALL pre-requisites (listed at the beginning of the class MDF). If in doubt, contact the module Registrar.

# MSc Advanced Materials Engineering Curriculum

All students shall undertake an approved curriculum as follows:

- for the Postgraduate Certificate no fewer than 60 credits
- for the Postgraduate Diploma no fewer than 120 credits
- for the degree of MSc no fewer than 180 credits including the project

## **Compulsory Modules**

ME962 Degradation of Metals and Alloys (SEM1)

ME966 Fundamentals of Materials Science (SEM1)

ME978 Advanced Materials Processing & Manufacturing (SEM1)

16565 Engineering Composites (SEM2)

ME931 Industrial Metallurgy (SEM2)

## **Students for the degree of MSc only:**

EF900 Project

## **Optional Modules**

Students must choose 70 credits of optional credits which must include a minimum of 30 credits from List A and a minimum of 30 credits from List B.

### **List A (minimum of 30 credits)**

EF927 Design Management

EF931 Project Management

EF932 Risk Management

EF929 Financial Engineering

AB975 Sustainability

EV939 Environmental Impact Assessment

### **List B (minimum of 30 credits)**

BE900 Tissue Mechanics

BE906 Biomaterials and Biocompatibility

CL996 Materials and Microstructures

CL976 Pre-stressed concrete, composite materials and structural stability

CP535 Molecular and Interfacial Science, **OR** CP970\*\* Molecular and Interfacial Science (online)

DM946 Micro and Nano Manufacturing

DM947 Advanced Forming Technology and Systems

DM948 Advanced Materials and Production Technology

16598 Aerodynamic Performance

ME926\*\* Nuclear Power Systems

ME927 Energy Resources and Policy

ME928 Energy Systems Analysis

ME929 Electrical Power Systems

ME930 Energy Modelling and Monitoring

ME945\*\* Introduction to Open Source Computational Fluid Dynamics

ME948\*\* Hydraulics

ME950\*\* Boiler Thermal Hydraulics

ME953 Engineering Artificial Environments

ME963\*\* Structural Integrity

ME965\*\* FEA in Mechanical Engineering Design

\*\*denotes those modules delivered by online learning. A maximum of 30 credits spread over the programme by distance learning may be selected.

**Not all optional modules on this list will be available in each academic year.**

**Exceptionally, such other Level 5 modules as may be approved by the Programme Adviser.**

# MSc Advanced Mechanical Engineering - All on campus streams

## September & January START Curriculum

All students shall undertake an approved curriculum as outlined below.

The number of credits is dependent on the programme:

- PGCert (full time)- 60 credits taught classes (1 semester)
- PGDip (full time)- 120 credits taught classes (2 semesters)
- MSc (full time)- 120 credits taught classes PLUS 60 credit Project (2 semesters plus summer)
- Part time students select half the classes per semester.

To accumulate these credits modules must be selected following the requirements:

- 3 or 4 Generic modules (30-40 credits) must be from List A
- 9 or 8 Specialist modules (90-80 credits) must be from List B to provide other skills necessary for professional engineers (CEng).
  - This will include 3 compulsory modules if you are enrolled with a specialism, eg. 'with Aerospace'.
- Modules selected from other departments must not exceed 20 credits, must be relevant to your programme and must be approved by the class registrar and the MSc programme adviser in advance of adding to the curriculum on Pegasus.
- A maximum of 30 credits of online modules are permitted and should be spread between semesters.
- Curriculum must be split evenly:
  - Full time students modules are split as 60:60 or 50:70 credits, which usually means 5 or 6 modules in SEM1 (Sept-Dec) and 7 or 6 modules in SEM2 (Jan-May),
  - Part time students' modules must be split 30:30 or 25:35 credits.
- It is students responsibility to make sure there are no clashes in the timetable. The Programme Adviser will verify your choice of curriculum but cannot check timetabling.
- Students have until the **end of week 2** from the start of the semester (SEM1 or SEM2) to change module choices. If the choice needs amendment before the end of week 2, the student **must** amend the curriculum as required on Pegasus and inform the programme adviser by email, otherwise the student must continue with this class.

### Additional restrictions in curriculum choices:

- ME526 and ME963 cannot be taken together
- ME931 and ME960 cannot be taken together
- Modules substantially similar to the ones in the student's previous study cannot be selected.

List A Module Descriptors 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.**

## **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:**

16565	Engineering Composites	(SEM2)
16587	Pressurised Systems	(SEM1)
ME507	Machinery Diagnosis and Condition Monitoring	(SEM 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)
ME953	Engineering Artificial Environments	(SEM2)
ME966	Fundamentals of Materials Science	(SEM 1 - online)
ME926	Nuclear Power Systems	(SEM 2 - online)
ME928	Energy Systems Analysis	(SEM1)
ME929	Electrical Power Systems	(SEM1)
ME948	Hydraulics	(SEM1 -online)
ME960	Applied Metallurgy	(SEM2 - online)
ME962	Degradation of Metals and Alloys	(SEM 1-online)
ME965	FEA in Mechanical Engineering Design	(SEM1 - online)
ME963	Structural Integrity	(SEM 2 - online)
ME975	Satellite Data Assimilation and Analysis	(SEM2)
ME976	Satellite Applications for Sustainable Development	(SEM2)

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

ME979	Fundamentals of Aeronautical Engineering	(SEM2 - online)
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)
ME978	Advanced Materials Processing and Manufacturing	(SEM1)
ME931	Industrial Metallurgy	(SEM2)

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

ME923	Gas and Steam Turbines	(SEM 2-online)
ME929	Electrical Power Systems	(SEM 1)
ME950	Boiler Thermal Hydraulics	(SEM 2-online)

**Please note the following when selecting curriculum:**

**No more than 3 online modules can be selected over the programme.**

**Students may select up to 20 credits relevant to their programme, 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  
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):**

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 Adviser of Studies, whom the student should contact prior to selection.***

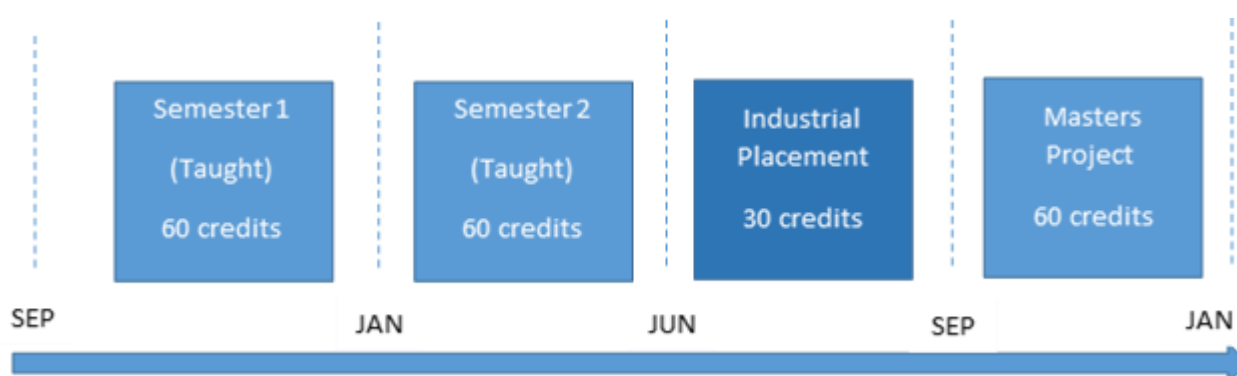
# MSc Advanced Mechanical Engineering with Industrial Placement

## Programme Structure

### Taught Classes (120 credits)

The criteria for the selection of the 120 credits related to the taught classes are identical to those already illustrated for the MSc in Advanced Mechanical Engineering (no fewer than 30 modules from List A and no fewer than 80 from List B).

The course structure is illustrated in the following figure:



### 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.

**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.**

## 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 workplace 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 placement applications;
- prepare for employer networking and other events by researching the employers you plan to approach and preparing questions in advance to ensure 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 adviser 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.



# MSc Advanced Mechanical Engineering – Online Learning Curriculum

All students shall undertake an approved curriculum as follows:

- for the Postgraduate Certificate – no fewer than 60 credits
- for the Postgraduate Diploma – no fewer than 120 credits
- for the degree of MSc – no fewer than 180 credits including the Project

MAE Level 5 and Postgraduate Module descriptors are available to view at:

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

## **Available Modules (for Sep 2022)\***

### **Core Technical Classes:**

ME919 Electrical Power Systems	10 credits	(SEM 1)
ME962 Degradation of Metals and Alloys	10 credits	(SEM 1)
ME965 FEA in Mechanical Engineering Design	10 credits	(SEM 1)
ME966 Fundamentals of Materials Science	10 credits	(SEM 1)
ME946 Pressurised Systems	10 credits	(SEM 1)
ME948 Hydraulics	10 credits	(SEM 1)
ME945 Introduction to Open-Source CFD	10 credits	(SEMS 2)
ME926 Nuclear Power Systems	10 credits	(SEM 2)
ME950 Boiler Thermal Hydraulics	10 credits	(SEM 2)
ME960 Applied Metallurgy	10 credits	(SEM 2)
ME963 Structural Integrity	10 credits	(SEM 2)
ME979 Fundamentals of Aeronautical Engineering	10 credits	(SEM2)
ME923 Gas and Steam Turbines	10 credits	(SEM 2)

### **Students may select up to four from the following generic classes**

***(Note, these classes will run subject to minimum number of registrants):***

DM810 People, Organisation and Leadership	10 credits	(SEM 1)
DM811 Project Management	10 credits	(SEM 1)
DM814 Technology and Innovation Management	10 credits	(SEM 1)
DM808 Introduction to Systems Thinking, Modelling and Optimisation	10 credits	(SEM 2)
DM805 Engineering Risk and management 2	10 credits	(SEM 2)

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

**Department of Biomedical Engineering:**

94 928 Introduction to Biomechanics 20 credits (SEMS 1&2)

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

## Communication

Students are required to communicate with the Department through e-mail and module forums, and are also encouraged, unless advised otherwise, to submit coursework electronically. Students are, therefore, expected to purchase or have access to a suitable computer (with internet access) and printer. This should also prove useful at a later stage for project work.

**Students MUST access their University emails on a regular basis** so that all communications are received and responded to in a timely fashion.

Important updates will be given through Myplace and students will receive an email through their Strathclyde email addresses to let them know, for example, of a marked assignment or a posting on a class forum. Students are encouraged to use their Strathclyde email address so that they receive these notifications.

If you think that you may have issues meeting the computing requirements of the course or will not have access to a reliable internet connection, you should contact the programme adviser before the start of the course. Students who are not able to access a suitable personal computer may be advised to delay or cancel starting the course as inability to access a suitable computer or internet connection may make it difficult or impossible to complete the course.

Please note that while we will try to be reasonable and help wherever we can, computing issues such as erratic or slow internet connections, inability to access VPNs, install software or upload/download files due to country or company restrictions, issues relating to non 'IBM PC type' computers and outdated software/operating systems cannot be considered reasons for non-completion or submission of coursework.

If in any doubt about this, you should contact the programme adviser prior to beginning the course.

# MSc Sustainable Engineering: Renewable Energy Systems and the Environment

Now in its twenty-fourth year, the course is part of the Sustainable Engineering postgraduate training provision. In today's society, there is a growing awareness that the quality of life must be balanced by the need for conservation of world resources, especially energy, and the protection of the environment. Society therefore needs professionals who understand this balance and seek to harness energy resources in an environmentally friendly manner.

On the course you will learn about the different energy resources: renewable, fossil and nuclear, and the systems employed to harness and make use of these resources such as geothermal, wind, hydro and photovoltaic systems, combined heat and power schemes, heat pumps, solar thermal capture devices, high efficiency plant, advanced materials, advanced buildings, storage systems, adaptive control systems, the importance of end users and controls. You will also learn about the impact energy has on the environment and the ways in which this impact can be reduced. In particular, you will come to understand the technical relationships between Renewable Energy Systems and the Environment and feel confident about using modern computer-based methods to address the complexities that underpin these relationships.

The programme consists of instructional classes covering key energy themes (normally first semester); group projects tackling topical and demanding issues, site visits to see renewable and sustainable energy systems in practice (second semester), followed by an individual project, possibly with industrial attachment, leading to the submission of a dissertation. Teaching methods include: lectures, discussions, group working, informal crits, site visits, debating, and computer-aided learning.

The course leads, at its final level, to an MSc degree by instruction while offering Diploma and Certificate qualifications for students completing selected parts, either on a full- or part-time basis. There are three course parts, progressive in their rigour, corresponding to these three possible qualifications. The course has been accredited by the Energy Institute, the Institution of Mechanical Engineers and the Royal Aeronautical Society and deemed to satisfy further learning requirements for progressing to Chartered Engineer status.

## **Part A: Instructional Classes**

All 5 specialist modules and several generic modules are offered in the first semester, with other generic modules offered in the second semester. The specialist classes address the principles, concepts and issues which underpin all Renewable Energy Systems. The objective is to inform students about the different generation, supply and utilisation technologies and to prepare those who will progress to Part B. Details of specialist classes can be found in Part A of this document, while details of generic classes can be found in the separate Sustainable Engineering Course handbook. Students can select elective instructional modules in place of generic classes with the approval of the programme adviser and the module registrar. Successful completion of six instructional modules (with a correct mix of classes, see later) will lead to the award of a Postgraduate Certificate.

## **Part B: Group Project**

In the second semester students undertake a design project (valued at 40 credits) in addition to completing the remaining credits from part A taught modules. While the approved projects will change over time, they will typically involve the evolution of an energy system from inception to completion, including an assessment of its cost effectiveness and environmental impact. For example, this might involve the evaluation of a renewable energy design, the quantification of the impact of advanced facades with generation, insulation, shading properties and smart controls on an energy efficient building, or the analysis of field data from an energy installation to form and validate a model. Industry attachment is encouraged, often the project will be undertaken within a real industrial context. On successful completion of Part B (the 40-credit group project plus a total of 80 credits from taught modules), students can either graduate with a Postgraduate Diploma or continue down the MSc route.

## **Part C: Dissertation**

In this part of the course, students undertake supervised, individual project work which typically entails an in-depth study of an issue (or set of issues) possibly identified from the Part B activities.

## Curriculum

### Part A - Module Descriptors

All students shall undertake an approved curriculum as follows:

- For the Postgraduate Certificate - no fewer than 60 credits including the 10 credit compulsory class and 20 credits of Faculty-wide or Approved Elective Optional Classes and 30 credits of classes chosen from the appropriate individual pathway.
- For the Postgraduate Diploma - no fewer than 120 credits including the 10 credit compulsory class, a 40 credit group project and at least 20 credits of Faculty-wide or Approved Elective Optional classes and at least 30 credits of classes from the appropriate individual pathway
- For the degree of MSc only - no fewer than 180 credits including Individual Project (60 credits)

#### **Individual pathway Compulsory Classes:**

ME 927 (SEM1)	Energy Resources and Policy
ME 928 (SEM1)	Energy Systems Analysis
ME 929 (SEM1)	Electrical Power Systems
ME 930 (SEM1)	Energy Modelling and Monitoring

Information on the following Generic Modules are available in the Sustainable Engineering handbook or by browsing the [University class catalogue](#):

#### **Compulsory Class:**

AB 975 (SEM 1)	Sustainability
----------------	----------------

#### **Faculty-wide Optional Classes:**

EV 939 (SEM2)	Environmental Impact Assessment
EF 927 (SEM1)	Design Management
EF 929 (SEM2)	Financial Engineering
EF 931 (SEM1)	Project Management
EF 932 (SEM2)	Risk Management
ME 527 (SEM2)	Engineering Optimisation
ME953 (SEM2)	Engineering Artificial Environments

MAE Level 5 and Postgraduate Module descriptors are available to view at:

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

**Please refer to Undergraduate MDFs for Level 5 classes**

## Part B: Group Project

Part B commences on **Monday 15 January 2024 at 1500 hours** (venue to be confirmed). In this part of the course, projects are constructed in a student led process for groups of typically four to six individuals. Each project involves the critical evaluation and/or evolution of an energy/environmental system, including a technical appraisal and, where appropriate, an assessment of its cost effectiveness and environmental impact.

For full details of examples of Group Projects, please visit:

<https://www.strath.ac.uk/research/energysystemsresearchunit/courses/projectwebsites/>

The expectation is that each group will:

- progress the project independently facilitated by the course tutors and in collaboration with an associated industrialist or focussed on a current industry challenge.
- present themselves for project kick-off on Monday of week 1 semester 2 and project crits on Thursdays between **2.00pm and 5.00pm** (venue to be confirmed).
  - submit a web-based final project report which includes a succinct statement on the main technical, economic and environmental findings and the learning and technical outcomes.
  - Make a final presentation of the project during the University's Knowledge Exchange week, to an audience of industrialists and tutors.

**Date to be confirmed in Semester 2.**

As a complement to the Part B projects, field trips will be undertaken. Visits usually take place on Wednesdays. Participation is compulsory. **Dates and venues to be confirmed at start of semester 2.**

<b>SITE VISITS</b>		
<b>[these locations and dates are provisional]</b>		
<b>Date</b>	<b>Visit</b>	<b>Comment</b>
TBC	New Lanark and SSE Hydro	Hydro, micro-hydro, water source heat pumps
TBC	GSK Irvine	GSK biomass, wind, storage and chip
TBC	Fintry+AD	Eco-village, PV, Solar HW, Biomass, Air Source Heat Pump, Elec Vehicles, building upgrades, AD CHP Plant, biomass DH.
TBC	West Whitlawburn Housing and Whitelees Wind Farm	Biomass district heating and large scale windfarm, domestic energy efficiency.
TBC	Hydrogen Office and Offshore Wind Catapult	Large scale Offshore Wind, Small scale Wind/PV, Hydrogen Electrolysis, Hydrogen Storage, H <sub>2</sub> Vehicles, Fuel Cell, Heat Pump.

Projects must have a high technical content and include a significant amount of quantitative analysis, simulation or experimental work

The following provide examples of project templates which help illustrate the group project activity:

## Example Project One: Clean Fuel Technologies

---

**Objectives:** Acting as a small consultancy/development partnership the group will prepare a brief for a large public transport company to consider alternative fuels to replace diesel.

**Outline:** This subject emulates the project carried out in Reading for the Council bus company and takes into account previous experience in Italy. The subjects to be considered by members of the team working in partnership include:

- Experience using biofuels in Italy (e.g. esters of rape seed oil)
- European Commission policy on alternative fuels
- Relationship to "set aside" land policy for agriculture
- Technical aspects of the fuels and their use
- Pollution aspects and their costs
- Costs, including taxes
- UK Government policy
- Relationship with developing countries

**Procedure:** The team would make two presentations to a transport company. The final report would be circulated to one or more companies. The team would include members able to cover details of engineering, environmental impact, transport and marketing. The work would be structured under a team leader for individual responsibilities within the group.

**Programme:** A possible activity plan:

Week	Tasks
1 - 2	Formulation of the project and allocation of responsibilities and tasks. Initial site visits.
3 - 5	Initial reports and in-house discussion. More details on site.
6	First presentation to the associated company.
7 - 10	In-depth investigation and individual report presentation.
11	Assembly of final report.
12	Final project presentation.

**Outcome:** Feasibility report for the bus company and two presentations to the company.

## Example Project Two: Commercial Viability of Landfill Gas (LFG)

---

**Objectives:** To examine the various factors that determine the economic and resource viability of landfill gas (LFG) and to scope the potential multi-purpose use as a source of energy in Scotland.

**Outline:** Organic wastes decay in landfills under anaerobic conditions, producing a mixture of primarily methane and carbon dioxide. Methane is a potent "Greenhouse Gas" and emissions from landfills can also be a significant environmental risk. However, once the environmental impacts of LFG are controlled, its methane content makes it a useful source of renewable energy. Using the gas offers significant environmental benefits over flaring it off or simply venting it to the atmosphere. Strengthening environmental protection legislation is mandating effective gas control measures at most landfills. Energy recovery, if perceived as an economically viable prospect, can complement the prime objective of gas control.

**Procedure:** The team will:

- establish a database of Scottish landfill sites.
- assess the potential landfill gas resource in Scotland.
- consider the impact of current and future environmental legislation.
- consider sustainable development strategy and LFG utilisation, particularly in rural areas.
- examine the potential applications, markets and economic potential of LFG.
- investigate the economics, investment and infrastructure requirements of various utilisation scenarios.
- identify those areas which are more suitable for the deployment of particular utilisation scenarios.
- investigate the perceived constraints or barriers to investment and commercialisation of LFG as an energy source.

**Programme:** A possible activity plan:

Week	Tasks
1 - 2	Establish sites data base.
3 - 5	Resource assessment aspects.
6	First presentation to collaborators.
7 - 8	Utilisation options, applications and potential markets.
9 - 10	Sustainable development and implementation issues.
11	Draft final report, second presentation.
12	Final project presentation.

**Outcome:** A report to illuminate and clarify the commercialisation issues and the interactions of the various participants (waste operators, developers and potential customers). In this manner, the study will develop a method for matching potential market applications with the most suitable sites and their chances for a successful development.

## Example Project Three: Renewable Energy, Bottom-Up

---

**Objective:** To evaluate national energy policy, but from the experience of individual installations and programmes.

**Outline:** It is well known that the major difficulties facing a company developing renewable energy, relate to institutional and local factors, and not to grand policy. For instance raising finance is a very immediate difficulty; obtaining planning permission is a local problem that varies from area to area; installation and maintenance of equipment require the skills of local companies whose abilities vary greatly; many practical matters are not foreseen at national level, but only come to light with working experience.

**Procedure:** The team will:

- consider UK policy and experience of renewables from a governmental point of view.
- plan which renewables schemes to consider in detail, e.g. some of those developed in Scotland and Northern England that can be visited.
- divide the work for detailed investigation of named projects, subject to cooperation from the operators and owners.
- make site visits and individual cooperation with the operators.
- report on particular schemes.
- analyse common and special factors.
- identify relationship to national policies.
- conclude and recommend.

**Programme:** A possible activity plan:

Week	Tasks
1 - 2	Specification of the task; literature review.
3 - 5	Detailed plan and trial visits.
6	First presentation to collaborators.
7 - 10	Detailed site/company reports.
11	Draft final report; second presentation to collaborators.
12	Final report.

**Outcome:** The aim is to publish the results as a web-based information resource.



## Example Project Four: Energy Conscious Building Design

---

**Objectives:** To impart an understanding of the principles underlying the design and operation of energy efficient buildings and to encourage the development of skills in the application of advanced simulation within a design context.

**Outline:** This project will entail a review of best practice in terms of each building design parameter (construction, layout, etc.), the utilisation of available energy (passive solar, group heating, etc.) and system control. Sources consulted will include the Energy Efficiency Office, the Energy Design Advisory Service, the Building Research Establishment and the Energy Technology Support Unit in the UK; and the programmes of the Commission of the European Community, especially DGXII and DGXVII.

**Procedure:** The various options available for energy saving will be identified and placed within a suitable 'taxonomy'. Dynamic energy modelling techniques will then be used to assess the energy savings and environmental impact of the different design options and environmental control regimes. In particular the project will focus on advanced energy saving technologies such as adaptive envelopes, 'smart' controllers, simulation based energy management systems, passive solar features and energy use metering. The feasibility of the integration of photovoltaic panels into the building fabric could also form a component of the project.

**Programme:** A possible activity plan:

Week	Tasks
1	Team formation, development of project brief, preliminary task assignment.
2 - 3	Best practice review and industrial visits.
4	Technical planning, detailed task assignment.
5 – 10	Energy/environmental appraisal by computer simulation.
11	Economic evaluation.
12	Submission of group report and poster.

**Outcome:** The elaboration of a methodological approach to energy conscious building design based on simulation. The methodology will offer a procedure whereby designers can differentiate between available options and select near optimum combinations. A particular building design will be evolved to demonstrate the methodology in use.

## Example Project Five: Transmission of Renewable Energy

---

**Objectives:** To identify where the "best" sources of renewable energies may be found. To examine technically the feasible solutions which would enable the energy gained to be transmitted to the users.

**Outline:** In general the sources of renewable energy are far away from the high concentration of users, e.g. areas of high winds or waves are not normally near densely populated cities. As a result, the cost of transmitting the acquired energy becomes uneconomic unless attractive solutions are available. The study will explore the usable potential of renewable energy and consider ways in which it might be maximised in the future.

**Procedure:** The project begins by identifying locations of renewable energy sources in Europe with a view to assessing the spare capacity available on existing transmission systems. Case studies will be used to examine the range of options and the economic/environmental issues.

**Programme:** A possible activity plan:

Week	Tasks
1 - 2	Preparation for project work. Definition of objectives and preparation of work schedule.
3 - 4	Literature review and selection of case studies.
5 - 8	Data collection and analysis, review of technologies for energy transmission and storage.
9 - 10	General conclusions extracted from case studies with projections for the future.
11	Assembly of final report.
12	Final report and presentation preparation.

**Outcome:** At the micro level: a practical assessment of the limitations on exploitation of Renewable Energy Systems in the short to medium term, in a form appropriate for use by regional planning authorities.

At the macro level: an assessment of existing systems to determine spare capacity and availability, and an identification of the best option for future European development.

## Example Project Six: Energy from Waste

---

**Objectives:** To examine and evaluate EfW systems, principally multi-fuel/MSW incineration technology, as representative of the BPEO in the context of an integrated and sustainable waste management strategy, encompassing waste minimisation, recycling, energy recovery and landfill.

**Outline:** The Government's policy on sustainable waste management is clearly intended to increase the proportion of waste managed by the disposal options towards the top of the 'Waste Hierarchy'. Further, > 85% of MSW is currently being landfilled, despite the fact that under NFFO tranches 1 and 2 municipal waste to energy represented 82% of contract awards. However, to date the vast majority of these projects have never been implemented.

**Procedure:** The team will: Review UK waste management strategy and policy developments relating to EfW. Investigate recent EfW case histories. Detail an EfW integrated scheme in terms of the various design, control and technology aspects found in a typical MSW incineration plant with energy recovery facilities. Explore the environmental issues, advantages and impacts likely resultant from an EfW scheme, i.e. air pollution, principally dioxins, and ash residue treatment and disposal. Particularly in the light of pollution control and new UK emission limits. Further, consider human health and safety aspects of surrounding population. Consider the role and influence of the planning authority. Consider the economics, investment and infrastructure requirements along with any Government 'Level playing field' policy, i.e. the tax treatment of incinerator residues, etc., likely to act as a barrier or affect implementation. Assess the local issues and factors likely to be responsible for the 'critical mass' necessary for or influencing the implementation of any EfW facility.

**Programme:** A possible activity plan:

Week	Tasks
1 - 2	Literature review of EfW technology
3 - 5	Investigate case histories
6	First presentation to collaborators
7 - 8	Environmental impact/pollution issues
9 - 10	Implementation issues
11	Draft final report, second presentation
12	Project presentation and report/poster submission.

**Outcome:** An informed report on EfW technology, environmental impact, implementation factors and the likely future role in a sustainable waste management strategy.

# Example Project Seven: Disposing of Decommissioned Offshore Oil Platforms in the North Sea

**Objectives:** To examine decommissioning and disposal procedures currently adopted by the oil industry and determine the associated environmental impacts resulting from these methods.

**Outline:** This project aims to:

- identify a small number of feasible methods which could be used in disposing of decommissioned offshore oil platforms in an environmentally friendly way.
- technologically examine one key issue or problem which has to be overcome or solved if the group's preferred method is to become a feasible solution.
- outline a procedure for the implementation of the chosen method for a given concept which has been adopted in platform design.

**Procedure:** It is recommended that some of the following steps should be taken:

- Acquire an understanding of the problems involved.
- Examine the various options on offer.
- Critically review these options.
- Select a preferred option and give the reason for your choice.
- Consider the key issues relating to the options and identify one technological problem requiring attention.
- Investigate the problem.
- Make visits, discuss the problem, think out solutions, evaluate them etc.
- Prepare a contents list for the report.
- Write the report using the contents list as a guide.

**Programme:** The following twelve week programme is suggested:

Week	Tasks
1	Project specification and literature review.
2 - 3	Identification of options with advantages and disadvantages.
4 - 6	Analysis of key issues for preferred option.
7	Review, presentation of initial ideas and evaluation
8 - 10	Refine analysis.
11 - 12	Reporting and final presentation.

**Outcome:** An informed report on platform decommissioning procedures and the resulting environmental impacts from these methods, concluding with a report on future decommissioning procedures that minimise environmental damage.

## Example Project Eight: Decentralised Integration of Wind Energy with Desalination Plant

**Objectives:** To study the architectural and control options which exist when designing an integrated wind driven desalination plant and to identify the optimum solutions.

**Outline:** In many parts of the world fresh water is scarce and reliance is placed on desalinated brackish or sea water. Desalination is energy intensive, and creation of new water plants inevitably means parallel creation of new energy supplies. Given recent environmental awareness, renewable energies such as wind are often considered in this context. For new water plant remote from a strong grid, local, decentralised energy production is an alternative to grid creation or reinforcement. This gives rise to a major problem - desalination processes tend to be designed to give constant power demand whereas wind can only supply power in a random manner. Special approaches must be taken in designing architecture and control strategies to overcome this mismatch. Three desalination techniques are suited to wind energy: reverse osmosis (mechanical), electrodialysis (electrical/mechanical) and vapour compression (thermal/ mechanical). It is not clear which combination offers best overall advantage.

**Procedure:** The project team will:

- identify the operational characteristics of different desalination plant (for a team of four it is suggested that one member specialises in electrodialysis, one in vapour compression and two in reverse osmosis)
- identify the scope for varying the gross power demand of the plant either by modularisation or 'acceleration/deceleration'
- define performance indices for a combined wind-desalination system (e.g. water quality, overall efficiency, cost etc.) against which assessments can be made
- define a specification for a target plant in terms of required water production profile and quality limits
- model and refine different architecture and control strategies to obtain the 'best' systems based on each of the three desalination processes, this being done by time domain modelling using a year's worth of one hourly wind speeds as the basic input.

**Programme:** The following twelve week programme is suggested:

Week	Tasks
1	Project planning and task allocation, definition of target specification.
2 - 3	Definition of operational constraints/characteristics of desalination plant.
4	Planning of computer programming strategy.
5 - 7	Testing of models.
8 - 10	Ongoing refinement and assessment of systems.
11 - 12	Reporting and final presentation.

**Outcome:** The outcome will be a report highlighting the key technical, economic and operational considerations which must be taken into account when designing a decentralised, integrated wind driven desalination plant.

# MSc Satellite Data for Sustainable Development (January start)

The programme consists of four compulsory modules (for a total of 50 credits) and up to seven optional modules (for a total of 70 credits) over the full calendar year run alongside an individual project. The wider choice of optional modules allows students to deepen their knowledge in specific fields of interest. A descriptive table of how the study load can be distributed across two semesters is provided below.

FULL TIME STUDENTS		
January Semester	Summer Semester	September Semester
Core module Satellite Applications for Sustainable Development Goals (20 credits)	MSc Individual Project (60 credits)	Core module Geographical Information Systems (10 credits)
Core module Satellite Data Assimilation and Analysis (10 credits)		Optional Module (10 credits)
Core module Machine Learning for Satellite Data (10 credits)		Optional Module (10 credits)
Optional Module (10 credits)		Optional Module (10 credits)
Optional Module (10 credits)		Optional Module (10 credits)
		Optional Module (10 credits)

## Curriculum

As soon as registration is complete, students should give consideration to their curriculum, and the modules they wish to undertake to obtain the requisite credits for their level of registration. All students shall undertake an approved curriculum as follows:

### 50 credits of core compulsory classes

- ME975 Satellite Data Assimilation and Analysis (10 credits, Sem 2)
  - for students to develop a knowledge on available satellite datasets, how they can be assimilated, and which tools exist to analyse them
- ME977 Machine Learning for Satellite Data (10 credits, Sem 2/April block)
  - for students to develop an understanding of the use of machine learning techniques in the processing of satellite data, inclusive of cloud-based GPU computing and ethical use of spaceborne and ground data.
- ME976 Satellite Applications for Sustainable Development Goals (20 credits, Sem 2)
  - for students to develop an understanding of the capability of the use of satellite data to address UN SDGs. Introductory lecture on the sustainability of satellite data provision. The course SF105 is planned to be used as propraedeutic for this class and introduction to SDGs.
- CL961 Geographical Information Systems (10 credits Sem 1/September)
  - for students to provides a thorough introduction to the field of Geographical Information Systems and spatial analysis

A minimum of 20 credits from the following optional classes

- EF931 Project Management
- AB975 Sustainability
- CL994 Circular Economy and Transformations Towards Sustainability
- EF932 Risk Management
- CS978 Legal, Ethical and Professional issues for the Information Society
- EV939 Environmental Impact Assessment

Classes, bringing taught credit total to 120 credits, to be chosen from

- AB931 Design Studio
- AB935 Urban Landscape Design
- CS952 Database & Web Systems Development
- CS985 Machine Learning for Data Analytics
- CS988 Big Data Tools and Techniques
- CS989 Big Data Fundamentals
- CS990 Database Fundamentals
- ME512 Spaceflight Mechanics
- ME517 Spaceflight Systems
- ME927 Energy Resources and Policy
- ME928 Energy Systems and Analysis
- ME930 Energy Modelling and Monitoring
- NM833 Marine Renewable Energy Systems
- Z1931 Entrepreneurship, Innovation and Commercialisation
- Z1986 New Venture Planning
- Exceptionally, such other Level 5 classes, totalling no more than 20 credits, as approved by the Programme Adviser.

Students for the degree of MSc only

- EF900 Individual Project

**Important:**

1. Students have until the **end of week 2** from the start of the semester to change module choices. If the choice needs amendment before the end of week 2, the student **must** amend the curriculum as required on Pegasus and inform the programme adviser by email, otherwise the student must continue with this class.
2. Other modules out with the above selection will be at the discretion of the Programme Adviser of Studies whom the student should contact prior to selection.

# Appendix 1

## Departmental Occupational Health and Safety Arrangements

Emergency telephone numbers (internal) - Extension 2222 or 3333

### 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 [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](#) and [COSHH](#) form 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 6<sup>th</sup> April 2006 (with the exception of the music and entertainment sectors where the Regulations come into force on 6<sup>th</sup> 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](mailto: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.

## 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         | (as stated in Regulation 3.5 of the University Calendar)                                   |
| Andersonian Library   | 0800-2200  |
| Computer Centre       | 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.

### **Laboratory Access Out of Hours**

- 6.7.10 Students should apply for access to the laboratories through [Sharepoint](#) and select either Drew Irvine (MAE Laboratory Manager) or Fiona Sillars (DSC) as the approver. You will then need to collect a Red Card B from Drew Irvine.

### **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.