MSc and Postgraduate Diploma Courses

in Prosthetics and Orthotics

Student Handbook

Session 2019 – 2020
Dear All

On behalf of all members of staff, I welcome you to the Department of Biomedical Engineering. We hope you will have an enjoyable and successful time with us.

The Course is divided into two Semesters of instructional classes followed by a full-time research project. Those intending to obtain an MSc will have a four-month research project; those intending to obtain a Postgraduate Diploma have the option of a two-month research project.

This handbook explains the organisation and regulations affecting the MSc and PgDip Courses.

**StrathLife – The Student Journey**
This handbook should be read in conjunction with ‘everything you need to know about student life’ which can be found here:

[www.strath.ac.uk/studywithus/strathlife/](http://www.strath.ac.uk/studywithus/strathlife/)

This provides information on the range of support and information services within the University.

Dr Anthony McGarry (Room 896, Graham Hills Building, extension 5868, 0141 548 5868, anthony.mcgarry@strath.ac.uk), as Course Director, will be your main point of contact and will help with any academic issues you may have.

*Please note that the Course begins on Monday 16th September at 9.30 in the BME Teaching Room 863, Level 8, Graham Hills building.*

Professor Terry Gourlay
Head of Department
Department of Biomedical Engineering
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The Department of Biomedical Engineering, in the Faculty of Engineering, was formed in 2012 following the merger of the Bioengineering Unit and the National Centre for Prosthetics and Orthotics. The merger reconnects two complementary and key areas of health technology teaching and research within the University. The single department offers students unrivalled undergraduate and postgraduate opportunities for learning and knowledge exchange in prosthetics and orthotics and postgraduate study in a broad range of biomedical engineering disciplines.

The Department was rated number 1 in the UK, in the 2017 Complete University Guide for Medical Technology. It is highly research intensive and was ranked in the UK top 5 and first in Scotland in the 2014 Research Excellence Framework.

The National Centre for Prosthetics and Orthotics was established in 1972, emerging from the Bioengineering Unit at Strathclyde, which was established more than 50 years ago. Both are internationally-recognised centres of excellence for education and research at the interface of engineering and the medical science, with particular emphasis on clinically-related teaching and research.

The MSc/PgDip in prosthetics and orthotics is taught in the Department of Biomedical Engineering. The following Biomedical Engineering staff, with their contact details, have a significant role on the course. Other staff, including those from other departments, may also contribute to the course in a minor capacity, and their contact details will be given by them in due course.

<table>
<thead>
<tr>
<th>HEAD OF DEPARTMENT</th>
<th>E-mail</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof Terry Gourlay</td>
<td><a href="mailto:terence.gourlay@strath.ac.uk">terence.gourlay@strath.ac.uk</a></td>
<td>2005</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>COURSE DIRECTOR</th>
<th>E-mail</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Chris McCormick BME</td>
<td><a href="mailto:christopher.mccormick@strath.ac.uk">christopher.mccormick@strath.ac.uk</a></td>
<td>3438</td>
</tr>
<tr>
<td>Dr Tony McGarry PO</td>
<td><a href="mailto:anthony.mcgarry@strath.ac.uk">anthony.mcgarry@strath.ac.uk</a></td>
<td>5868</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>COURSE ADMINISTRATOR</th>
<th>E-mail</th>
<th>Extension</th>
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</thead>
<tbody>
<tr>
<td>Ms Maureen Leonard</td>
<td><a href="mailto:m.b.leonard@strath.ac.uk">m.b.leonard@strath.ac.uk</a></td>
<td>5920</td>
</tr>
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<tr>
<th>COURSE TEACHING STAFF</th>
<th>E-mail</th>
<th>Extension</th>
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<tbody>
<tr>
<td>Dr Richard Black</td>
<td><a href="mailto:richard.b.lack@strath.ac.uk">richard.b.lack@strath.ac.uk</a></td>
<td>4568</td>
</tr>
<tr>
<td>Mr Roy Bowers</td>
<td><a href="mailto:r.j.bowers@strath.ac.uk">r.j.bowers@strath.ac.uk</a></td>
<td>4699</td>
</tr>
<tr>
<td>Dr Arjan Buis</td>
<td><a href="mailto:arjan.buis@strath.ac.uk">arjan.buis@strath.ac.uk</a></td>
<td>4716</td>
</tr>
<tr>
<td>Dr Craig Childs</td>
<td><a href="mailto:craig.childs@strath.ac.uk">craig.childs@strath.ac.uk</a></td>
<td>2228</td>
</tr>
<tr>
<td>Mr Christopher Cox</td>
<td><a href="mailto:c.cox@strath.ac.uk">c.cox@strath.ac.uk</a></td>
<td>5952</td>
</tr>
<tr>
<td>Ms Sarah Day</td>
<td><a href="mailto:sarah.day@strath.ac.uk">sarah.day@strath.ac.uk</a></td>
<td>4034</td>
</tr>
<tr>
<td>Ms Suzanne Faulkner</td>
<td><a href="mailto:suzanne.faulkner@strath.ac.uk">suzanne.faulkner@strath.ac.uk</a></td>
<td>4358</td>
</tr>
<tr>
<td>Dr Mario Giardini</td>
<td><a href="mailto:mario.giardini@strath.ac.uk">mario.giardini@strath.ac.uk</a></td>
<td>3042</td>
</tr>
<tr>
<td>Mrs Laura Murray</td>
<td><a href="mailto:laura.murray.100@strath.ac.uk">laura.murray.100@strath.ac.uk</a></td>
<td>3929</td>
</tr>
<tr>
<td>Prof Terry Gourlay</td>
<td><a href="mailto:terence.gourlay@strath.ac.uk">terence.gourlay@strath.ac.uk</a></td>
<td>2005</td>
</tr>
<tr>
<td>Dr Daniel Kahani</td>
<td><a href="mailto:daniel.kahani@strath.ac.uk">daniel.kahani@strath.ac.uk</a></td>
<td></td>
</tr>
<tr>
<td>Dr Asimina Kazakidi</td>
<td><a href="mailto:asimina.kazakidi@strath.ac.uk">asimina.kazakidi@strath.ac.uk</a></td>
<td>3294</td>
</tr>
<tr>
<td>Dr Andy Kerr</td>
<td><a href="mailto:a.kerr@strath.ac.uk">a.kerr@strath.ac.uk</a></td>
<td>2855</td>
</tr>
<tr>
<td>Dr Michelle MacLean</td>
<td><a href="mailto:michelle.maclean@strath.ac.uk">michelle.maclean@strath.ac.uk</a></td>
<td>2891</td>
</tr>
<tr>
<td>Ms Christine McMonagle</td>
<td><a href="mailto:christine.mcmongal@strath.ac.uk">christine.mcmongal@strath.ac.uk</a></td>
<td>3525</td>
</tr>
<tr>
<td>Dr Philip Riches</td>
<td><a href="mailto:philip.riches@strath.ac.uk">philip.riches@strath.ac.uk</a></td>
<td>5703</td>
</tr>
<tr>
<td>Ms Karyn Ross</td>
<td><a href="mailto:k.ross@strath.ac.uk">k.ross@strath.ac.uk</a></td>
<td>3525/5952</td>
</tr>
<tr>
<td>Prof Philip Rowe</td>
<td><a href="mailto:philip.rowe@strath.ac.uk">philip.rowe@strath.ac.uk</a></td>
<td>3032</td>
</tr>
<tr>
<td>Mr Stephanos Solomonidis</td>
<td><a href="mailto:s.e.solomonidis@strath.ac.uk">s.e.solomonidis@strath.ac.uk</a></td>
<td>3778</td>
</tr>
<tr>
<td>Dr Wei Yao</td>
<td><a href="mailto:w.yao@strath.ac.uk">w.yao@strath.ac.uk</a></td>
<td>3030</td>
</tr>
</tbody>
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<table>
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<tr>
<th>COURSE COUNSELLORS</th>
<th>E-mail</th>
<th>Extension</th>
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<tbody>
<tr>
<td>Dr Tony McGarry</td>
<td><a href="mailto:anthony.mcgarry@strath.ac.uk">anthony.mcgarry@strath.ac.uk</a></td>
<td>5868</td>
</tr>
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<td>4699</td>
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<tr>
<th>DEPARTMENT DISABILITY CONTACT</th>
<th>E-mail</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Craig Robertson</td>
<td><a href="mailto:craig.a.robertson@strath.ac.uk">craig.a.robertson@strath.ac.uk</a></td>
<td>3030</td>
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OVERVIEW OF THE MSC/PGDIP in Prosthetics and Orthotics

MSc and PgDip students are required to undertake instructional classes and complete a research project. For the MSc degree, students must attain 120 credits from the instructional classes and obtain a further 60 credits on satisfactory completion of a thesis on a research project. PgDip students require to attain 120 credits in total, either in totality from the instructional classes, or including a further 20 credits on satisfactory completion of a dissertation.

In the 1st week of the course, you will be interviewed by a member of senior staff who will advise you on the classes you should attend. The list of classes is given on page 6. The selection of classes in Block 1 will reflect your previous education. For example, physical science students will normally take the Medical Science conversion module, while life science students will normally take the Engineering Science conversion module.

Midway through Semester 1, a list of available research projects will be published. You should speak with project supervisors about the projects that you are interested in and submit a form indicating your 1st, 2nd and 3rd projects will be allocated before the winter break in December.

Towards the end of Semester 1, you may have a second interview with a member of senior staff. The purposes of this interview are to confirm and discuss your optional class choices.

There are two examination weeks before the Winter break. Semester 2 starts mid-January after a consolidation week. There are two weeks of vacation in Spring, and examinations are held after this break.

Prior to week 11 of Semester 2 you are required to submit an abstract of your MSc project, you will be required to make an oral presentation of your MSc project, outlining the programme of research you have undertaken and your key findings. Your project supervisor will advise you on the preparation of the abstract and oral presentation.

Second semester classes will be examined in April-May and following this, a meeting of the Board of Examiners will be held at which the performance of each student during Semesters 1 and 2 will be reviewed and progress recommendations based on the student's examination results made.

MSc students who attain at least 120 credits will be allowed to proceed as normal. Those who do not attain 120 credits may on the basis of their performance be: (i) instructed to undertake resit examinations, (ii) advised to transfer to the Diploma course or (iii) required to terminate study (please see the following section on compensation schemes and resit examinations for detail).

Resit examinations will be held in August. The format of the resit will be as stated in the individual module descriptors or as communicated by the module coordinator.

Following the completion of project work, PgDip students submit a dissertation (typically a review of the literature), while MSc students are required to submit a thesis. The submission date for MSc students will be in early August. MSc students will be required to attend an oral examination of their thesis in mid-late August, and present their research as a Poster to the examiners. PgDip students will be required to submit their dissertation in mid-July.

Whilst every effort has been made to make this handbook correct at the time of printing, please be aware that some information may be subject to revision.
## CLASSES IN THE MSc/PgDip Prosthetics and Orthotics

<table>
<thead>
<tr>
<th>Code</th>
<th>Class Name</th>
<th>Semester</th>
<th>Credits</th>
<th>Organiser</th>
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<tbody>
<tr>
<td>BE915</td>
<td>Medical Science for Engineering</td>
<td>1</td>
<td>20</td>
<td>Dr Damion Corrigan</td>
</tr>
<tr>
<td>or BE911</td>
<td>Engineering Science</td>
<td>1</td>
<td>20</td>
<td>Dr Chris McCormick</td>
</tr>
<tr>
<td></td>
<td>Compulsory (for MSc) Classes:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BE918</td>
<td>Professional studies in Biomedical Engineering</td>
<td>1</td>
<td>10</td>
<td>Dr Richard Black</td>
</tr>
<tr>
<td>BE919</td>
<td>Research Methodology</td>
<td>1</td>
<td>10</td>
<td>Dr Chris McCormick</td>
</tr>
<tr>
<td>BE921</td>
<td>Disability and Societal Effects</td>
<td>1 &amp; 2</td>
<td>20</td>
<td>Dr Tony McGarry</td>
</tr>
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<td></td>
<td>Optional list A Classes</td>
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<tr>
<td>(No fewer than 40 credits)</td>
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<td></td>
<td></td>
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<tr>
<td>BE929</td>
<td>Orthotic Management of Neurological Condition B</td>
<td>2</td>
<td>20</td>
<td>Roy Bowers</td>
</tr>
<tr>
<td>BE930</td>
<td>Orthotic Management of Diabetic Foot B</td>
<td>2</td>
<td>20</td>
<td>Suzanne Faulkner</td>
</tr>
<tr>
<td>BE931</td>
<td>Hip, Knee and Ankle Disarticulation B</td>
<td>2</td>
<td>20</td>
<td>Dr Tony McGarry</td>
</tr>
<tr>
<td>BE932</td>
<td>Clinical Governance B</td>
<td>2</td>
<td>20</td>
<td>Laura Murray</td>
</tr>
<tr>
<td>BE507</td>
<td>Orthotic Management of Spinal Deformity B</td>
<td>2</td>
<td>20</td>
<td>Karyn Ross</td>
</tr>
<tr>
<td>BE934</td>
<td>Clinical Gait Analysis B</td>
<td>2</td>
<td>20</td>
<td></td>
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<tr>
<td>BE935</td>
<td>Upper Limb Prosthetics B</td>
<td>2</td>
<td>20</td>
<td>Sarah Day</td>
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<tr>
<td>BE936</td>
<td>Lower Limb Prosthetic Design B</td>
<td>2</td>
<td>20</td>
<td>Dr Tony McGarry</td>
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<tr>
<td>BE937</td>
<td>Paediatric Lower Limb Prosthetics B</td>
<td>2</td>
<td>20</td>
<td>Laura Murray</td>
</tr>
<tr>
<td>Note: students transferring from the BSc in prosthetics and orthotics, University of Strathclyde may not select previously completed modules.</td>
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<tr>
<td>Optional list B Classes (No fewer than 20 credits)</td>
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<tr>
<td>BE916</td>
<td>Introduction to Biomechanics</td>
<td>1</td>
<td>10</td>
<td>Prof Phil Rowe</td>
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<tr>
<td>BE901</td>
<td>Regenerative Medicine and Tissue Engineering</td>
<td>2</td>
<td>10</td>
<td>Dr Chris McCormick</td>
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<tr>
<td>BE900</td>
<td>Tissue Mechanics</td>
<td>2</td>
<td>10</td>
<td>Dr Phil Riches</td>
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<tr>
<td>BE904</td>
<td>Clinical and Sports Biomechanics</td>
<td>2</td>
<td>10</td>
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<tr>
<td>BE906</td>
<td>Biomaterials and Biocompatibility</td>
<td>2</td>
<td>10</td>
<td>Dr Richard Black</td>
</tr>
<tr>
<td>BE903</td>
<td>Cardiovascular Devices</td>
<td>2</td>
<td>10</td>
<td>Prof Terry Gourlay</td>
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<tr>
<td>Note: students transferring from the BSc in prosthetics and orthotics, University of Strathclyde may not select previously completed modules.</td>
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<td>Independent Research Classes:</td>
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<tr>
<td>94500</td>
<td>MSc Project</td>
<td>1, 2 and 3</td>
<td>60</td>
<td>Dr Tony McGarry</td>
</tr>
<tr>
<td>or BE922</td>
<td>PgDip Prosthetics and Orthotics Dissertat</td>
<td>3</td>
<td>20</td>
<td>Dr Tony McGarry</td>
</tr>
<tr>
<td>A detailed description of each class is provided in the section on Module descriptors.</td>
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GENERAL NOTES

Building Access

The normal hours of access to Graham Hills or Curran Building are:

Monday to Friday 0800 to 1800 hours

Every other time is considered out-with normal working hours. Saturdays, Sundays and public holidays are considered to be out-with normal hours of access. Out of hours IT provision is available in the library.

You are not allowed in the building at any other time, except with a valid out of hours access card. An out of hours access card (RED), issued by the Department Administrator, allows access to low hazard areas only. It must be signed by the Head of Department, or their deputy and the person being granted access. These RED cards are not normally provided to MSc/PgDip students.

Under no circumstances are you to invite friends or family into the building without the prior approval of the Head of Department.

Health & Safety

University Health and Safety information may be found here:
http://www.strath.ac.uk/wellbeing/

Essential departmental Health and Safety policy is:

Emergency evacuation of buildings
If you discover a fire:
1. raise the alarm by operating the nearest fire alarm ‘break-glass’ call point.
2. leave the building by the nearest escape route

When you hear the fire alarm:
1. Evacuate the building immediately using the nearest escape route
2. Do not delay your departure by collecting personal belongings
3. Where possible, close all doors through which you pass
4. Once outside, proceed to the designated assembly point
5. Do not use lifts during a fire alert
6. Do not re-enter the building until advised by University Security Staff or Safety Services staff

Familiarising yourself with the emergency routes from the building and the location of fire alarm call points and fire-fighting equipment in advance of any fire alert will improve your response in the event of an emergency.

Procedure for summoning first aid assistance
In the event of an accident:
- All University Security staff are qualified to administer first aid. To summon assistance, telephone Security Control on emergency number 2222. If phoning from a mobile – 0141 548 2222.
- State your name, department and the telephone extension from which you are calling.
- Give your location and brief details of the casualty’s injuries.
- If you consider the injuries are sufficiently serious to warrant hospital treatment, inform Security Control that an ambulance is required.
- Remain with the casualty until the arrival of the first aider who will take charge of the situation.

Ring x3333 for advice and non-emergency assistance. In a student residence, ring 8888 for assistance. Security Control can be found on the ground floor of the Livingstone Tower and is staffed 24 hours a day, 7 days a week.

Before participating in laboratory sessions, each student should have read and become familiar with the Departmental Safety Regulations. A copy of these regulations will be provided. Before research projects commence, all students must attend a Safety Talk organised by the Department and complete all necessary safety documentation, including completion of a training record.

The Departmental Safety Officer is Mr Brian Cartlidge, extension 3283 or 0141 548 3283.
Communication
Students must notify the Department and University of any change in their in-term or out-of-term addresses. The University may use these addresses for official communications and cannot be held responsible for non-delivery where a change of address is not notified.

The Department of Biomedical Engineering and the University will predominantly communicate with students using their Strathclyde email account. It is students’ responsibility to check this email account daily for new Departmental and University messages.

The noticeboard in the student area on level 9 of the Graham Hills Building will also be used for Departmental communication purposes.

Individual class lecturers and tutors may use the University’s virtual learning environment (MyPlace) to communicate class matters to students (http://classes.myplace.strath.ac.uk/). It is the students’ responsibility to ensure that they are able to engage with this environment as expected by individual tutors. Online training packages are available. Class tutors will require assignments to be uploaded to MyPlace for assessment purposes, with Turnitin, a plagiarism detection software being used where appropriate.

Smoking
The University has a policy on smoking. This is available from:

http://www.strath.ac.uk/wellbeing/lifestyle/smoking/

Smoking is prohibited within all University buildings and within 15 feet (4.6m) of any University building entrance, doorway, stairway or covered area.

You are also asked to take a responsible attitude to ensure that areas are kept litter free and that you do not stand in close proximity to open windows.

Eating and Drinking Areas
Eating and drinking are permitted in the foyer, office areas and the tea area only. Eating and drinking are not permitted in any labs, prosthetic or mechanical/electronic workshops.

Use of Computing Facilities
Your attention is drawn to the University Regulations regarding the use of computing facilities, which can be found at:

Equality and Diversity
The University of Strathclyde is committed to achieving and promoting equality of opportunity in the learning, teaching, research and working environments.

We value the diversity of our students and support the development of mutual respect and positive relations between people.

The University has in place Equality Outcomes which meet the requirements the Equality Act 2010. You are advised to familiarise yourself with the University approach on equality and diversity and relevant developments and information by visiting the website:

If you have any queries, please bring these to the attention of staff or the University’s Equality and Diversity office. Email: equalopportunities@strath.ac.uk Telephone: 0141 548 2811

http://www.strath.ac.uk/equalitydiversity/

Athena SWAN
The University currently holds a Bronze Athena Swan award, recognising our commitment to advancing women’s’ careers in science, technology, engineering, maths and medicine (STEMM) employment in academia.

The Athena SWAN Charter has been developed by the Equality Challenge Unit to encourage and recognise commitment to combating the under-representation of women in STEMM research and academia.

If you would like any additional information, please contact the Equality and Diversity office.
Disability and Wellbeing
The University is committed to providing an inclusive learning and working environment for disabled people.

If you have, or think you have, a disability we encourage you to disclose it as soon as possible. Declaring your disability will enable you to access any additional support that you may need and help to ensure you become a successful student. The information you provide will be treated as confidential and will not be shared with other staff without your consent.

The University has a dedicated Disability Service that offers specific advice, information and assistance to disabled students, including information on the Disabled Students Allowance (DSA). Further information is available from the website:

www.strath.ac.uk/professionalservices/disabilityandwellbeing/

In addition, each academic Department/ School (for HaSS) has at least one Departmental Disability Contact (DDC), who act as a first point of contact for disabled students. The Departmental Disability Contact list is available on the website at:

www.strath.ac.uk/professionalservices/disabilityandwellbeing/contact/

Please inform your course director, the DDC (Dr Craig Robertson, craig.a.robertons@strath.ac.uk) and a member of the Disability Service of your needs as soon as possible. The Disability Service will then formally communicate your needs to your Department/School.

Email: disability-wellbeing@strath.ac.uk Tel: 0141 548 3402

Issues with Physical Access on campus
If you experience an issue with physical access anywhere on campus, please email: physicalaccess@strath.ac.uk where a member of Estates staff will be able to help.

Classroom Protocol
At the University we are committed to providing a safe learning environment where dignity is respected and discrimination or harassment, including cyber bullying does not occur on the basis of age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation and socio-economic background. No student should intentionally be made to feel threatened or excluded from class participation.

You are reminded of your responsibility for the duration of your studies by showing respect to fellow classmates and staff by remembering the following protocol:

www.strath.ac.uk/studywithus/strathlife/whatitslikestudyingatuniversity/

www.strath.ac.uk/media/ps/strategyandpolicy/FINAL_GuideForStudents.pdf

Departmental Disability Contact (DDC)
The designated DDC in the Biomedical Department is Dr Craig Robertson (Room GH60, extension 3030, 0141 548 3030)

The role of the DDC is to discuss with students with a disability, any aspect of the courses and classes offered by the Department that might relate to their special needs with a view to ensuring, as far as possible, that any necessary adjustments are identified or sought. It is important that if you feel you require any adjustments that you discuss your needs with the DDC at the earliest opportunity.

The DDC acts as a two-way channel for communication between the University's Disability Service and academic and other staff of the agreed and disclosed needs of disabled students, with due regard to the students' rights to confidentiality.

Students with disabilities are also advised to contact the University Disability Service.
COURSE INFORMATION

Class Requirements
At the start of each class, the organiser will specify the level of skills necessary (e.g. in mathematics). Voluntary maths tuition is offered in week 1, however further mathematical work may be required in particular classes.

Attendance at Classes
Attendance at lectures and laboratory classes is a mandatory part of the MSc course. The attendance requirements for the MSc course are 75% of lectures, and 90% of laboratory classes, unless there is a valid reason for non-attendance. Reasons for absence from classes must be explained to the class teacher, and if appropriate entered on Pegasus as personal circumstances, otherwise the student will be marked as absent. A student who does not satisfy the requirements as to attendance and performance will not be entitled to take the examinations in the class concerned. Please refer to University Regulations for PGT courses, Attendance and Performance, Section 18.1.15.

Examination Procedure
Class examination will usually be by written examination or assignments. Some classes require the submission of laboratory reports for assessment. The class organiser will give details of the examination procedure and dates for completion of assignments at the start of each class.

External Examiners
The external examiner for the MSc/PgDip courses in prosthetics and orthotics is Donna Fisher.

Assessment and Award of Credits
Every class will be marked on a percentage scale, with the pass mark for each class set at 50%. On achieving a mark of 50% or more for a class, the student is awarded the class credits. The taught curriculum consists of 120 credits with the project adding a further 60 credits.

Compensation Mechanism and Resit Examinations
To proceed to the MSc project/dissertation a candidate will normally have accumulated 120 credits on the taught component of the course at the first attempt. With respect to students who have not passed all their credits at the first attempt the Board of Examiners will apply the Faculty Compensation Scheme, if applicable, as outlined below. If this can be done and the student thereby gains sufficient credits, then the student may proceed to the project.

The Faculty operates a compensation scheme that is designed to assist Boards of Examiners to take decisions about student progress to the MSc project/dissertation. The scheme can be applied only to the student's first attempts and, therefore, is normally used only at the May/June meetings of the Boards of Examiners.

MSc, PgDip and PgCert Awards
Where a candidate has accumulated 120 credits of taught classes from the curriculum, together with 60 credits for the project, they will be awarded an MSc in prosthetics and orthotics

Where a candidate has accumulated 120 credits of taught classes from the curriculum (including the PgDip dissertation), but has not obtained 60 credits for the project/dissertation, he/she will be awarded a PgDip.

Where a candidate has not accumulated 120 credits of taught classes after 2 attempts, he/she may be considered for a PgCert. The PgCert can be awarded if the candidate has accumulated at least 60 credits of taught classes from the curriculum.

A candidate who has accumulated less than 60 credits of taught material after two attempts will be deemed to have failed, and no award will be made.

Awards may be made "with Merit" or "with Distinction" according to the following framework.

<table>
<thead>
<tr>
<th>Degree Classification</th>
<th>CWA (including project)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distinction</td>
<td>70% – 100%</td>
</tr>
<tr>
<td>Merit</td>
<td>60% - 69%</td>
</tr>
<tr>
<td>Award</td>
<td>50% - 59%</td>
</tr>
</tbody>
</table>

A compensated pass is acceptable for Distinction/Merit awards, provided the overall mean score is in the Merit/Distinction category.
Late Submissions and Extensions

Extensions
Before requesting an extension, it is advised that students read this section fully. The extension request requirements vary depending on the length of extension requested and the method by which the request is submitted. There is also some guidance on what might constitute grounds for an extension request to be granted.

Students requesting an extension to the deadline for a piece of coursework must apply via the extensions tool in Myplace. Further guidance about using this tool is contained under the heading 'Myplace Extension Request' below.

Please pay attention to the examples found under the Section 3 heading 'Grounds for Extending the Deadline for Coursework Submission' below. These are taken from the Policy and Procedure on Extensions to Coursework Submission. The policy intends to be supportive of students, and staff will monitor students' use of extensions in order to identify students who may require support. The policy provides examples of what might be grounds for granting an extension and what is unlikely to be grounds for the granting of an extension. The list does not try to cover every possible scenario so students should discuss with staff any circumstances that are negatively impacting their studies.

Extension requests will normally be made in advance of a coursework submission deadline. In exceptional cases, students may apply for an extension retrospectively.

Extension of less than seven calendar days
Requests for an extension of less than seven calendar days do not require formal supporting evidence (e.g., a doctor’s letter). However, students are encouraged to communicate to staff any circumstances that are negatively impacting their studies as early as possible, especially where other assessments or aspects of their studies are also impacted. This can be done by submitting a Self-Certificate form on Pegasus.

Extension of longer than seven days
For extensions that are longer than seven days, it is essential that students complete a ‘Personal Circumstances Form’ and submit it directly to Student Business for their Faculty at: studentbusiness-engineering@strath.ac.uk within five working days of the agreed extension date. There is information about the Personal Circumstances Procedure on the website.

Failure to submit evidence of medical or personal circumstances for extension requests of seven days or more could result in the extension request being rejected or revoked and/or any subsequent academic appeal being regarded as inadmissible.

Students should note that certified cases of medical and/or personal circumstances will be considered sympathetically and the rules will be applied in a caring manner. Where there are sensitivities or difficulties in obtaining evidence (for example, a death certificate), a compassionate approach will be taken. The rules are designed to be as clear as possible, to help students plan their work sensibly and ensure parity in the service provided to all students.

Grounds for Extending the Deadline for Coursework Submission
The list below does not try to cover every possible scenario but provides examples of what might be grounds for granting an extension and what is unlikely to be grounds for the granting of an extension. Students should not be discouraged from submitting a request if they do not see their situation described below.

Examples of Medical Circumstances
Medical conditions or illness, including physical and/or mental health problems that negatively impact a student’s preparation for an assessment.
Examples of Personal Circumstances
- serious illness or death of a person close to the student
- family break-up
- being a victim of crime
- being in a serious car accident
- jury service
- significant relationship breakdown
- unexpected caring commitments
- homelessness
- Home Office requirements
- Fire
- flood
- adverse weather conditions
- exceptional travel circumstances out with a student’s control which prevented them from meeting the published submission date
- other exceptional circumstances that can be reasonably considered to negatively impact a student’s ability to submit coursework on time

Examples of Insufficient Grounds for an Extension
The following circumstances would not be acceptable grounds for granting an extension:
- poor planning and time management
- error made in understanding the published dates of assessment submissions
- having another assessment due on or around the same date
- minor IT issues such as computer failure
- failure of third parties to deliver the assessment
- holidays, social events, moving house, or any event planned in advance of the submission deadline
- failure to make alternative travel plans when disruptions were advised in advance

Myplace Extension Request Process
Instructions for the submission of an extension request via Myplace are below. A version of these instructions with images of the screen to support the explanation is also available.

1. Go to the Myplace site for the class in which you wish to request an extension to the deadline of a piece of coursework
2. Click on the assignment link for the piece of coursework. This will open a page containing information about the assignment, the status of your submission and the deadline
3. Click on the Extensions section and select ‘Request Extension’
4. You will be required to fill in three parts of a form:
   i. Select a reason from the dropdown list
   ii. Propose a new deadline (date and time)
   iii. Describe in more detail your reason for requesting an extension
5. Submit your extension request

You will receive a Myplace notice and an email to confirm that your request has been submitted. If you have downloaded the University’s Mobile App and have logged in using your DS username, you will also receive a push notification on your device.

Your request will be considered, resulting in one of the following two outcomes:

1. Your extension request will be granted – either based on the date and time you proposed or based on an alternative date and time specified by the appropriate member of staff
2. Your extension request will not be granted*

The outcome of your extension request will be communicated to you via a Myplace notice and an email. If you have downloaded the University’s Mobile App and have logged in using your DS username, you will also receive a push notification on your device.
If you submit an extension request and decide that you no longer require it, you can cancel the request up until the point at which it is approved. After it has been approved, you cannot cancel the request but you can, of course, submit the work in time for the original deadline.

*If your extension request is not granted and you would like to access support please contact your Advisor of Studies. For details of central University support services, please see the ‘Support’ section below.

Support
Disability and Wellbeing Service (including Student Counselling Service and Student Health)
Phone: 0141 548 3402
Email: disability-wellbeing@strath.ac.uk
Disability & Wellbeing Service
Room 4.36, Level 4,
Graham Hills Building
50 George Street
Glasgow G1 1QE
For more information visit the Disability and Wellbeing Service webpage.

Study Skills Service
Phone: 0141 548 4064/4062
Email: studyskills@strath.ac.uk
Level 6
Livingstone Tower
26 Richmond Street
Glasgow G1 1XH
For more information visit the Study Skills Service webpage.

Maths Skills Support Centre
Phone: 0141 548 3343
Room LT308
Livingstone Tower
26 Richmond Street
Glasgow G1 1XH
For more information visit the Maths Skills Support Centre webpage.

International Student Support
Phone: 0141 548 4273
Email: infoandadvice@strath.ac.uk
For more information visit the International Student Support webpage.

Strathclyde Students' Union’s The Advice Hub
Phone: 0141 567 5040
Email: strathunion.advice@strath.ac.uk
For location see Strath Union’s Advice Hub webpage.

Penalties for the Late Submission of Coursework
Coursework is deemed to be late when it is submitted after the published deadline without an agreed extension, and in the absence of personal circumstances.

The Policy and Procedure on Late Submission of Coursework provides a detailed account of the policy and procedures for the late submission of coursework. You should read this document carefully, noting that there may be exceptions to the policy outlined for specific types of coursework, such as (but not limited to) group work or presentations. Staff will communicate any such instances to students. However, in all instances, the range and timing of penalties will be applied according to a commitment to fairness and supporting all students in their studies alongside agreed procedures. Staff will monitor the late submission of assessments in order to identify any students who may require support. For regular coursework, the Policy and Procedure on Late Submission of Coursework outlines the penalties to be applied, and these are summarised below.
Penalties for Late Submission

Coursework that is submitted late, but within seven calendar days of the published deadline date and time, will be subject to penalties, as shown in the table below. The table demonstrates the application of a sliding scale of penalties, where a late submission within 24 hours of the deadline will incur a penalty of 10% applied to the original mark, and for each subsequent 24 hour period, an additional 5% penalty will be applied to the original mark. The table also shows that the application of penalties will be capped for coursework that is of a Pass standard. Coursework submitted after seven calendar days of the published deadline date and time will receive a mark of zero. Students who can demonstrate that they faced exceptional circumstances on the deadline day, and who submit their coursework within 4 hours of the published date and time, will not have their coursework subject to penalties. This 4 hour period is called the 'grace period' – see below the table for further information.

<table>
<thead>
<tr>
<th>Example</th>
<th>Day of submission</th>
<th>Penalties applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Coursework submitted after the deadline, student has an approved extension and submits within the approved extension period.</td>
<td>No penalty to be applied.</td>
</tr>
<tr>
<td>2.</td>
<td>Late submission on the day of the deadline (or approved extended deadline), student has communicated exceptional circumstances and is granted a grace period of up until four hours after the deadline.</td>
<td>No penalty to be applied.</td>
</tr>
<tr>
<td>3.</td>
<td>Late submission within one calendar day (less than 24 hours) of the deadline, student has no approved extension.</td>
<td>10 percentage point penalty applied to original mark, unless the penalty reduces the student’s mark to below 40% (UG) or 50% (PG), in which case the mark is capped at 40% (UG) and 50% (PG).</td>
</tr>
<tr>
<td>4.</td>
<td>Late submission more than one calendar day (more than 24 hours) after the deadline but less than two full calendar days (less than 48 hours) after the deadline has expired, student has no approved extension.</td>
<td>15 percentage point penalty (10 points for first day, 5 points for second day or part day), unless the penalty reduces the student's mark to below 40% (UG) or 50% (PG), in which case the mark is capped at 40% (UG) and 50% (PG).</td>
</tr>
<tr>
<td>6.</td>
<td>Late submission more than two full calendar days (longer than 48 hours) after the deadline but less than three calendar days (72 hours), student has no approved extension.</td>
<td>20 percentage point penalty (10 for first day, 5 for second day, 5 for third day or part day), applied to original mark, unless the penalty reduces the student's mark to below 40% (UG) or 50% (PG), in which case the mark is capped at 40% (UG) and 50% (PG).</td>
</tr>
<tr>
<td>7.</td>
<td>Late submission more than three full calendar days (longer than 72 hours) after the deadline but less than four full calendar days (less than 96 hours), student has no approved extension.</td>
<td>25 percentage point penalty (10 for first day, 5 for second day, 5 for third day, 5 for fourth day or part day), applied to original mark, unless the penalty reduces the student’s mark to below 40% (UG) or 50% (PG), in which case the mark is capped at 40% (UG) and 50% (PG).</td>
</tr>
</tbody>
</table>
8. Late submission more than four full calendar days (more than 96 hours) after the deadline but less than five full calendar days (less than 120 hours), student has no approved extension.  
   30 percentage point penalty (10 for first day, 5 for second day, 5 for third day, 5 for fourth day, 5 for fifth day or part day), applied to original mark, unless the penalty reduces the student’s mark to below 40% (UG) or 50% (PG), in which case the mark is capped at 40% (UG) and 50% (PG).

9. Late submission more than five full calendar days (more than 120 hours) after the deadline but less than six full calendar days (less than 144 hours), student has no approved extension.  
   35 percentage point penalty (10 for first day, 5 for second day, 5 for third day, 5 for fourth day, 5 for fifth day, and 5 for sixth day or part day), applied to original mark, unless the penalty reduces the student’s mark to below 40% (UG) or 50% (PG), in which case the mark is capped at 40% (UG) and 50% (PG).

10. Late submission more than six full calendar days (more than 144 hours) after the deadline but less than seven full calendar days (less than 168 hours), student has no approved extension.  
   40 percentage point penalty (10 for first day, 5 for second day, 5 for third day, 5 for fourth day, 5 for fifth day, 5 for 6th day and 5 for the 7th part day), applied to original mark, unless the penalty reduces the student’s mark to below 40% (UG) or 50% (PG), in which case the mark is capped at 40% (UG) and 50% (PG).

11. Late submission more than seven full calendar days after the deadline. For example, a deadline was set for Midday on a Wednesday and a student submits an assessment after midday the following Wednesday  
   A mark of zero will be applied to the work.

**Requesting the application of the grace period**
If you experience unexpected circumstances before the time set on the day of the deadline and it results in a delay to your submission of less than four hours, you can request that the grace period is applied to your coursework submission via the late submissions tool in Myplace. If the reason provided is acceptable for use of the grace period, this will mean that a penalty is not applied to your mark. **Requests for the grace period to be applied must be submitted within 4 hours of the published date and time and no longer** – we strongly suggest that you submit your request as soon as you have submitted your coursework. To request that the grace period is applied:

1. Submit your coursework
2. In the assignment page containing information about the status of your submission and the deadline, click on the Late Submissions section to expand it
3. From the ‘Reason for grace period’ dropdown list, select the reason that best describes why you are requesting the grace period
4. Submit your request
The grace period will be automatically applied to your submission. However, if it becomes apparent that the grace period has been misused, a member of staff may revoke it and apply the appropriate late penalty. *Instructions with images of the screen to support this explanation is also available.*

Where a penalty is applied in Myplace, you can view the grade awarded to your work, the late penalty deducted and the final grade received after the deduction of the penalty. You can do this by expanding the 'late submissions' section on the assignment page, once the grades have been released. *Instructions with images of the screen to support this explanation is also available.*

<table>
<thead>
<tr>
<th>Penalty for late submission</th>
<th>The penalty applied as a percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performant grade</td>
<td>The mark you would have received if there was no penalty</td>
</tr>
<tr>
<td>Pass mark</td>
<td>The mark required to pass the assignment</td>
</tr>
<tr>
<td>Marks deducted</td>
<td>The number of marks deducted (not the percentage deducted)</td>
</tr>
<tr>
<td>Effective percentage point penalty</td>
<td>How many percentage points were deducted</td>
</tr>
<tr>
<td>Grade</td>
<td>The mark returned to you shows you your Performant Grade minus the Marks Deducted</td>
</tr>
</tbody>
</table>

In the case of coursework to be submitted through Myplace, issues with Myplace which prevent students from submitting their coursework before the deadline will not result in late penalties. In this situation, staff will amend the deadline to allow enough time for students to successfully upload and submit their coursework after the issue has been resolved.

If you think you are unlikely to meet a coursework deadline due to medical issues or personal circumstances, please [apply for an extension](#) as early as possible.
Submission of the MSc Project
The MSc project thesis should be submitted to the Departmental Office and electronically via MyPlace. The submission date will be in early August.

The normal period of study is 12 months and the maximum period of study will only be allowed in exceptional circumstances. An extension of the MSc submission date will not normally be granted unless there are personal circumstances that can be evidenced.

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

That "someone else" might be the writer of a journal article, a textbook or an internet site. It could be a fellow student, though you might then be accused of collusion. The "work" could be a whole essay, paragraph or even 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 may be imposed ranging from a reduction in marks, to resubmission of work or, if particularly severe, to disciplinary action. Each case of plagiarism/collusion will be discussed by an adjudication panel who will recommend an appropriate course of action. The University's guidance on plagiarism can be found using the url below. If you are in any doubt as to what constitutes plagiarism, please read this document.

Absenteeism from Laboratory Sessions
Laboratory reports submitted by a student who was absent for the relevant session will normally result in a reduced mark. Consideration will be given if the student has a valid reason for being absent.

Absence & Mitigating Circumstances
For absences of seven days or less: Students who have been absent from the University for seven days or less should record a self-certification online via PEGASUS using the 'Personal Circumstances' link under the Services tab. You should also inform the Course Director.
For absences of more than seven days: Where sickness results in absence of more than seven days, the student is required to submit a medical certificate (signed by a medical practitioner who is not a member of the student's family) to Student Business. You should also inform the Course Director.
For absences from an examination: The self-certification convention does not apply and a student absent from an examination due to sickness must submit a formal medical certificate. All certificates that are submitted to Student Business are kept in the student's file, and details are recorded on computer. Student Business informs the relevant departments and Board of Examiners of certificates which are relevant to a diet of examinations or the corresponding period of study, including, where appropriate, the relevant details.

The University's policy on Mitigating Circumstances that have affected a student's performance in assessments leading to the final mark for a class can be found on the following webpage:
www.strath.ac.uk/media/ps/cs/gmap/academicaffairs/policies/Personal_Circumstances_Aug_17.pdf

Student feedback
Students also have the opportunity to feedback their comments to staff. At the start of the academic year, we will ask for course representatives (normally 2) to be chosen from amongst the student cohort. These representatives will sit on the student-staff liaison committee (SSLC), which will sit three times a year, and comments on the course will be formally minuted and action taken where necessary.
LEARNING RESOURCES

MyPlace
The University’s virtual learning environment (VLE) is called MyPlace. It is accessed using your DS credentials via the Strathclyde homepage, or directly from: http://classes.myplace.strath.ac.uk/

Many class resources will be available from MyPlace; however individual class tutors will inform you regarding the level of class engagement with the VLE.

Student Self-Development
The University provides a range of handouts 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: http://www.strath.ac.uk/studyskills/

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). The online tutorials can be accessed, using your DS username and password here: https://moss.strath.ac.uk/developmentandtraining/resourcecentre/Pages/Home.aspx

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

Printing and Photocopying
The University library offers a good printing and photocopying service. Please contact: www.strath.ac.uk/is/studentprinting/ for information.

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. A guide on how to use the library is here:
www.strath.ac.uk/professionalservices/library/
COURSE REGULATIONS

PROSTHETICS AND ORTHOTICS

MSc in Prosthetics and Orthotics
Postgraduate Diploma in Prosthetics and Orthotics
Postgraduate Certificate in Prosthetics and Orthotics

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

Admission
19.42.242 Regulations 19.1.1, 19.1.2 and 19.1.3 shall apply. The candidates should also have an International Category 1 degree award of equivalent in Prosthetics and Orthotics and be eligible for state registration as a prosthethist/orthotist.

Duration of Study
19.42.243 Regulations 19.1.5 and 19.1.6 shall apply.

Mode of Study
19.42.244 The courses are available by full-time and part-time study.

Curriculum
19.42.245 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 a project

As permitted by Regulation 19.1.4 and at the discretion of the Course Director, exemption from part of the course may be granted to students submitting evidence of appropriate academic attainment or accredited prior experiential learning.

Compulsory Classes

<table>
<thead>
<tr>
<th></th>
<th>Level</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Either</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BE 911</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>BE 915</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>BE 918</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>BE 919</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>BE 921</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>
Optional List A (No fewer than 40 credits chosen from)

- 94 509 Orthotic Management of Neurological Condition B 5 20
- 94 510 Orthotic Management of Diabetes Mellitus B 5 20
- BE 504 Hip, Knee and Ankle Disarticulation B 5 20
- BE 505 Clinical Governance B 5 20
- BE 506 Wheelchairs and Seating B 5 20
- BE 507 Orthotic Management of Spinal Deformity B 5 20
- BE 508 Clinical Gait Analysis 5 20
- BE 509 Upper Limb Prosthetics B 5 20
- BE 510 Lower Limb Prosthetic Design B 5 20
- BE 511 Paediatric Lower Limb Prosthetics B 5 20

Optional list B (No fewer than 20 credits chosen from)

- BE 916 Introduction to Biomechanics 5 10
- BE 901 Regenerative Medicine & Tissue Engineering 5 10
- BE 900 Tissue Mechanics 5 10
- BE 904 Clinical and Sports Biomechanics 5 10
- BE 905 Bio-signal Processing and Analysis 5 10
- BE 906 Biomaterials and Biocompatibility 5 10
- BE 903 Cardiovascular Devices 5 10
- BE 920 The Medical Device Regulatory Process 5 10
- BE 923 Haemodynamics for Engineers 5 10
- BE 924 Medical Robotics 5 10
- BE 925 Numerical Modelling in Biomedical Engineering 5 10

Students for the Postgraduate Diploma only in addition will have the optional class

- BE 922 PGDip Prosthetic and Orthotic Dissertation 5 20

Students for the degree of MSc only in addition will undertake

- 94 500 Prosthetic and Orthotic Masters Project 5 60

Examination, Progress and Final Assessment

19.42.246 Regulations 19.1.19, 19.1.20 and 19.1.27 shall apply.
19.42.247 The final assessment will be based on performance in the examinations, coursework, the Project where undertaken.

Award

19.42.248 Degree of MSc: In order to qualify for the award of the degree of MSc in Prosthetics and/or Orthotics, a candidate must have performed to the satisfaction of the Board of Examiners and must normally have accumulated no fewer than 180 credits including those for all the compulsory classes within the curriculum and the Project 94500.
19.42.249 Postgraduate Diploma: In order to qualify for the award of the Postgraduate Diploma in Prosthetics and/or Orthotics, a candidate must normally have accumulated no fewer than 120 credits.
19.42.250 Postgraduate Certificate: In order to qualify for the award of the Postgraduate Certificate in Prosthetics and Orthotics, a candidate must normally have...
accumulated no fewer than 60 credits from the taught classes of the course of which 40 must have been awarded from the list of compulsory and optional List A classes.

19.42.251 to
19.42.281 (numbers not used)

Course regulations can be found at:

www.strath.ac.uk/sees/educationenhancement/qualityassurance/universityregulations/
<table>
<thead>
<tr>
<th>Date</th>
<th>Week Commencing</th>
<th>University &amp; Timetabling System Weeks</th>
<th>University Holidays</th>
<th>Academic Calendar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon 05/08/2019</td>
<td>1</td>
<td></td>
<td>Resit Exams</td>
<td></td>
</tr>
<tr>
<td>Mon 12/08/2019</td>
<td>2</td>
<td></td>
<td>Resit Exams</td>
<td></td>
</tr>
<tr>
<td>Mon 19/08/2019</td>
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<tr>
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<td>Wk 2</td>
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<td>Wk 7</td>
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<td>Mon 09/03/2020</td>
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<td>Mon 16/03/2020</td>
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<td>Mon 23/03/2020</td>
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<td>Wk 10</td>
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<td>Mon 30/03/2020</td>
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<td>Mon 01/06/2020</td>
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<td>Mo 20/07/2020</td>
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<tr>
<td>Mon 27/07/2020</td>
<td>52</td>
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</table>
**TIMETABLE FOR WELCOME AND DEVELOPMENT WEEK**

There is a separate timetable for the first week of the first semester. It is important you attend on Monday morning at 09:30. This week contains revision mathematics classes which are open to all, however those from a Life Science background are particularly encouraged to attend. These classes are not examined, but should provide you with the minimum mathematical content required for the MSc.

<table>
<thead>
<tr>
<th>Welcome Week</th>
<th>9am</th>
<th>10am</th>
<th>11am</th>
<th>12pm</th>
<th>1pm</th>
<th>2pm</th>
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<tbody>
<tr>
<td><strong>Monday</strong></td>
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<tr>
<td></td>
<td>Welcome Talk (09.30-11.00) (Dr C McCormick)</td>
<td>Campus Tour</td>
<td>Sandwich Lunch</td>
<td>Tripodometry (Dr M Bangter)</td>
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<tr>
<td><strong>Tuesday</strong></td>
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<td></td>
<td>Exponentials &amp; Logs (Dr C McCormick)</td>
<td>Dept Research Overview (Dr C McCormick)</td>
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<tr>
<td><strong>Wednesday</strong></td>
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<td></td>
<td>Integration (Dr P Ritchie)</td>
<td>Module Choice Interview</td>
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<td><strong>Thursday</strong></td>
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<tr>
<td></td>
<td>Faculty Induction Session (09.30-11.45) (attend one of these)</td>
<td></td>
<td>Faculty Induction Session (11.30-13.45) (attend one of these)</td>
<td>Matrices (Dr A Kazakis)</td>
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<tr>
<td><strong>Friday</strong></td>
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<td></td>
<td>Module Choice Interview</td>
<td>Social Gathering</td>
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</table>

**Postgraduate Induction Week for Biomedical Engineering**

The timetable for all the modules in the course is to be found at: [www.strath.ac.uk/timetables/](http://www.strath.ac.uk/timetables/)

Use this link to access the timetable for your modules.

When not in lectures the department expects students to be engaged in private study and preparation of course assignments.

Please note that Monday 30 September is a public holiday.
The following pages detail the individual classes (modules that may be taken as part of the MSc/PgDip Prosthetics and Orthotics.

They are in order, according to their class code (beginning BE or 94)

<table>
<thead>
<tr>
<th>Code</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE900</td>
<td>Tissue Mechanics</td>
</tr>
<tr>
<td>BE901</td>
<td>Regenerative Medicine</td>
</tr>
<tr>
<td>BE903</td>
<td>Cardiovascular Devices</td>
</tr>
<tr>
<td>BE904</td>
<td>Clinical and Sports Biomechanics</td>
</tr>
<tr>
<td>BE906</td>
<td>Biomaterials and Biocompatibility</td>
</tr>
<tr>
<td>BE911</td>
<td>Engineering Science</td>
</tr>
<tr>
<td>BE915</td>
<td>Medical Science for Engineering</td>
</tr>
<tr>
<td>BE916</td>
<td>Introduction to biomechanics</td>
</tr>
<tr>
<td>BE918</td>
<td>Professional Studies in Biomedical Engineering</td>
</tr>
<tr>
<td>BE919</td>
<td>Research Methodology</td>
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<tr>
<td>BE921</td>
<td>Disability and Societal Effects</td>
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<tr>
<td>BE929</td>
<td>Orthotic Management of Neurological Condition B</td>
</tr>
<tr>
<td>BE931</td>
<td>Hip, Knee and Ankle Disarticulation B</td>
</tr>
<tr>
<td>BE932</td>
<td>Clinical Governance B</td>
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<tr>
<td>BE934</td>
<td>Orthotic Management of Spinal Deformity B</td>
</tr>
<tr>
<td>BE935</td>
<td>Clinical Gait Analysis B</td>
</tr>
<tr>
<td>BE936</td>
<td>Upper Limb Prosthetics B</td>
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<tr>
<td>BE937</td>
<td>Lower Limb Prosthetic Design B</td>
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<tr>
<td>BE938</td>
<td>Paediatric Lower Limb Prosthetics B</td>
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<tr>
<td>94500</td>
<td>MSc Project</td>
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<tr>
<td>BE930</td>
<td>Orthotic Management of the Diabetic Foot B</td>
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<tr>
<td>BE922</td>
<td>PgDip Prosthetics and Orthotics Dissertation</td>
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MODULE DESCRIPTION FORM

BE900 Tissue Mechanics

Module Registrar: Dr Philip Riches
Taught To: MSc/MRes Biomedical Engineering
EngD/MSc Medical Devices

Other Lecturers Involved: 
Credit Weighting: 10
Semester: 2

Compulsory/optional/elective class: None
Academic Level: 5

Prerequisites: 

<table>
<thead>
<tr>
<th>Module Format and Delivery (hours):</th>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
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<tbody>
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<td>12</td>
<td>12</td>
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Educational Aim

This module aims to provide an introduction to the mathematical theory of time-dependent mechanical properties of human tissue, i.e. viscoelasticity and poroelasticity. Finite Element modelling will be used to demonstrate tissue behaviour in a variety of loading scenarios. A group project of a specific tissue will enhance understanding of the application of the learned theory and demonstrate the state-of-the-art experimental techniques in the field.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Construct and discuss the relationship between the mechanical functioning and the microstructure of the main tissues of the body.
LO2 Understand two linear theories of time dependency in describing tissue behaviour and implement the two theories in a finite element analysis package to elucidate tissue behaviour.
LO3 Search, collate and digest current literature on the mechanical properties of tissue.
LO4 Critically appraise current experimental and modelling approaches to the above tissues.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The module will teach the following:
- Linear viscoelasticity theory as applied to biological tissue
- Linear biphasic (poroelasticity) theory as applied to biological tissue
- The implementation of these material behaviours in a finite element package
- Group project of the mechanical behaviour of a specified tissue

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

LO1 Describe the relationship between the mechanical functioning and the microstructure of the main tissues of the body.
C1 Describe the relationship between the mechanical functioning and the microstructure of compact and trabecular bone.
C2 Describe the relationship between the mechanical functioning and the microstructure of articular cartilage.
C3 Describe the relationship between the mechanical functioning and the microstructure of ligaments.

LO2 Understand two linear theories of time dependency in describing tissue behaviour and implement the two theories in a finite element analysis package to elucidate tissue behaviour.
C1 Devise and solve simple linear viscoelastic analogue models.
C2 Understand the derivation of poroelasticity and analyse its equilibrium behaviour.
C3 Be able to implement the material models in computer models and interpret their time dependent behaviour.

LO3 Search, collate and digest current literature on the mechanical properties of tissue.
C1 Be able to identify pertinent research literature regarding a specific question in this field.
C2 Understand and contextualise the literature within the development of understanding in this area.
LO4 Critically appraise current experimental and modelling approaches to the above tissues.

C1 Demonstrate a critical knowledge in a single tissue.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Policies of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/

Specific details relating to this class are as follows:

Please state briefly how these are incorporated in this module.

One exam, one piece of coursework (computer laboratory write up) and one presentation (research synthesis and critique) will be used for assessment purposes. The weighting of each assessment will be between 20% and 60% and chosen by each student, adding up to 100%. Thus the assessment will be completely individualised and shaped by each student.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th></th>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
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<tr>
<td>Weighting</td>
<td>LO1, LO2, LO4</td>
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</tbody>
</table>

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:

Lab report week 9. Presentation week 11 (semester 2)

Resit Examination Procedures:

Exam Only

PLEASE NOTE:

Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of exam and coursework.

Recommended Reading:


Some up to date research articles will be provided for class discussions and students will be expected to find many more.

Additional Student Feedback:

(Please specify details of when additional feedback will be provided)

Wednesday, Weeks 6 and 11 Semester 2.
MODULE DESCRIPTION FORM

BE901 Regenerative Medicine and Tissue Engineering

Module Registrar: Professor Helen Grant
Taught To: MSc/PgDip/PGCert Biomedical Engineering, EngD Medical Devices

Other Lecturers Involved: Dr R A Black plus invited guest lecturers
Credit Weighting: 10
Semester: 2

Compulsory/optional/elective class: Optional
Academic Level: SHE 5

Prerequisites: BE915 Medical Science or a Life Sciences Degree

Module Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
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<tbody>
<tr>
<td>24</td>
<td>4</td>
<td></td>
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<td>22</td>
<td>50</td>
<td>100</td>
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</table>

Educational Aim

To describe the development and advances in regenerative medicine/repair medicine in terms of:

- Source of cells
- Cell expansion/seeding and bioreactor technology
- Tissue scaffolds: design criteria, fabrication and characterisation
- Clinical status of replacement tissues and organs

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Appreciate the difficulties in sourcing a suitable supply of cells to produce artificial organs and tissues.
LO2 Understand the importance of mass transfer and membrane transport in relation to cell expansion and the design of bioreactors in general.
LO3 Know the characteristics required of materials used for scaffolds in tissue engineering, and how their physical properties can be measured.
LO4 Have discovered the most recent advances in regeneration and repair of cartilage; skin; pancreas; liver; neural tissue and retina.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The module will teach the following:

- Sources of cells for tissue replacement and repair – primary and immortalised cells and stem cells.
- Differentiation of stem cells into functional tissue cells in vitro and in vivo.
- Bioreactor technology and design, including principles of mass transfer, oxygenation and the supply of nutrients and removal of waste products; membrane transport.
- Scaffolds for 2-D and 3-D tissue engineering- effects of surface chemistry and physical properties on adhesion; porosity and its effect on cell distribution and vascularisation.
- Mechanical characterisation of engineered tissues.
- Advances in the replacement of organs and tissues including– cartilage; skin; pancreas; liver; neural tissues and retina.

Assessment of Learning Outcomes

Criteria
For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

LO1 Appreciate the difficulties in sourcing a suitable supply of cells to produce artificial organs and tissues.
C1 Know the different options for supply of cells and their advantages and limitations.
C2 Understand the sources for stem cells and their advantages and limitations.

LO2 Understand the importance of mass transfer, oxygen and nutrition supply, and membrane transport in the design of bioreactors.
C1 Understand the process of mass transfer and how it is affected by diffusion and convection.
C2 Be aware of how oxygen and nutrients are supplied to bioreactor environments.
C3 Understand basic membrane transport processes.

LO3 Know the characteristics required of materials used as scaffolds in tissue engineering, and how their physical properties can be measured.

C1 Appreciate how cell adhesion to materials can be influenced by chemical and physical properties of materials, and the conditions under which cells/materials are cultured in vitro.

C2 Know how the mechanical properties of engineered tissues can be measured, and manipulated.

C3 Understand the importance of porosity and interconnectivity in scaffolds.

LO4 Have discovered the most recent advances in replacement/repair of cartilage; skin; pancreas; liver; neural tissue and retina.

C1 Know the anatomy, physiology and function of the tissues which are being repaired.

C2 Learn about the source of cells to be used and the options for scaffolds available for each tissue/organ.

C3 Appreciate the stage of development of the engineered tissues aiming towards clinical therapy.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/

Specific details relating to this class are as follows:

The lecturers will interact, and actively discuss and debate topics, with the students. High quality feedback will be provided to encourage students to correct their work and develop their ideas. Students will be encouraged to take the time and put in the effort to learn about the field. Student feedback will be sought to improve content and style of the course.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
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<td>1</td>
<td>2 hours</td>
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</tbody>
</table>

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:

Coursework will be set in week 7 and submitted in week 10.

Resit Examination Procedures:

Failed coursework shall be submitted prior to a resit at the next available exam diet. Failed examinations will be attempted again at the August resit diet.

PLEASE NOTE:

Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of exam and coursework.

Recommended Reading:

Journal papers will be used to illustrate the most recent advances in regeneration and repair of tissues in animals and humans. The most recent literature review articles will be used to provide state-of-the-art information on the topics.

Additional Student Feedback:

(Please specify details of when additional feedback will be provided)

Feedback on assignment will be provided week 11, Semester 2.
MODULE DESCRIPTION FORM

BE903 Cardiovascular Devices

Module Registrar: Professor T Gourlay
Taught To: MSc/MRes Biomedical Engineering
MSc/EngD Medical Devices

Other Lecturers Involved:
Mrs Ida Torrance and Mr Mark Danton (Yorkhill Hospital),
Mr Nawar Al Attar (Golden Jubilee) Prof David Wheatley,
Dr Monica Rozeik, Dr Craig Robertson, Dr Chris
McCormick and Dr Wei Yao

Credit Weighting: 10
Semester: 2

Compulsory/optimal/elective class: Optional
Academic Level: SHE 5

Prerequisites:

Module Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
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<td>5</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>100</td>
</tr>
</tbody>
</table>

Educational Aim

This module aims to:
- Give students a broad overview of cardiovascular devices used in the clinical setting for the treatment of a range of clinical conditions.
- Demonstrate and develop an understanding of the clinical, design and regulatory challenges involved in developing devices for this clinical sector.
- Offer some insight into the pathologies underlying the need for cardiovascular device technologies.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Understand the important elements of cardiopulmonary bypass and support systems.
LO2 Recognise the challenges, in terms of biocompatibility, associated with implantable and extracorporeal cardiovascular devices.
LO3 Understand the different and emerging valve replacement options available to clinicians
LO4 Understand the different types and applications of VAD technologies.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The module will teach the following:
- The history and principals of Cardiopulmonary Bypass (CPB)
- The design, development and clinical applications of Extracorporeal Membrane Oxygenation (ECMO).
- The history and design of conventional artificial heart valves.
- The challenges and advantages of the percutaneous approach to heart valve replacement.
- The history, current status and clinical challenges associated with the use of ventricular assist devices (VADs)
- The regulatory process governing the clinical deployment of cardiovascular devices and materials.
- Aspects of safety related to the clinical use of cardiovascular devices.
- An individual project around the design of a safety enhanced system for extracorporeal life support.

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

LO1 Understand the important elements of cardiopulmonary bypass and support systems
C1 Describe the main components of a CPB system and the equations used to calculate heat and oxygen transfer in a counter-current device.
C2 Explain the difference between CPB and ECMO with reference to the technologies employed.
C3 Describe the devices and techniques employed to ensure safe use of CPB and ECMO technologies.
LO2 Recognise the challenges, in terms of biocompatibility, associated with implantable and extracorporeal cardiovascular devices.

C1 Explain the in terms of blood/tissue/biomaterial contact, the inflammatory response to cardiovascular devices.

C2 Describe the techniques employed to enhance biocompatibility of cardiovascular devices.

C3 Explain the major clinical effects of bio-incompatibility in patients undergoing ECMO procedures.

LO3 Understand the different valve replacement options available to clinicians.

C1 Describe the different types of conventional artificial heart valves.

C2 Describe the different types of percutaneous artificial heart valves.

C3 Describe the limitations, advantages and drivers associated with the development and deployment of percutaneous heart valves.

LO4 Understand the different types and applications of VAD technologies.

C1 Describe the different types of VAD devices.

C2 Explain the different techniques used to deploy VAD devices and how these effect patient mobility and the treatment cycle.

C3 For a given clinical condition, select the appropriate VAD device and mode of use.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

**Principles of Assessment and Feedback**

The University’s Assessment and Feedback Policy can be found at: [www.strath.ac.uk/staff/policies/academic/](http://www.strath.ac.uk/staff/policies/academic/)

Specific details relating to this class are as follows:

Student feedback will be obtained through interaction during tutorial sessions associated with the project work. Examination will be by closed book examination, but further assessment will be undertaken through assessment of assignments and individual project reports.

**Assessment Method(s) Including Percentage Breakdown and Duration of Exams**

<table>
<thead>
<tr>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
</tr>
<tr>
<td>1</td>
<td>2 hours</td>
<td>60%</td>
</tr>
</tbody>
</table>

**Indicate which learning outcomes (L01, L02 etc) are to be assessed by exam/coursework/project as required.**

**Coursework / Submissions deadlines:**

Three coursework assignments will be set in weeks 3, 7, 9 with submission in two weeks. A project will be set in week 5, with submission in week 11.

**Resit Examination Procedures:**

Examination only.

**PLEASE NOTE:**

Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. For details of this re-examination see above.

**Recommended Reading:**

Materials and Devices of the Cardiovascular System. (Gourlay and Black eds). Woodhead Publishing Ltd, Cambridge, UK

Minimized Cardiopulmonary Bypass: Technologies and Applications (Gourlay and Gunaydin eds). Woodhead Publishing Ltd, Cambridge, UK

**Additional Student Feedback:**

(Please specify details of when additional feedback will be provided)

Friday week 6 and 11.
MODULE DESCRIPTION FORM
BE904 Clinical and Sports Biomechanics

Module Registrar: Dr. Andy Kerr
Taught To: MSc/MRes Biomedical Engineering EngD/MSc Medical Devices

Other Lecturers Involved:
Professor Phil Rowe, Dr. Craig Childs and visiting lecturers
Credit Weighting: 10
Semester: 2

Compulsory/optional/elective class: Optional
Academic Level: SHE 5

Prerequisites: BE916 Introduction to Biomechanics

Credit Weighting: 10
Semester: 2

Module Format and Delivery (hours):

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<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
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<td>20</td>
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</tr>
</tbody>
</table>

Educational Aim

This module aims to provide the student with the ability to appraise the role of biomechanics and biomechanical measurement techniques in the physical rehabilitation of movement disorders and sports performance.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Employ biomechanical principles to assess qualitatively clinical and sports related performance.
LO2 To appraise different biomechanical measurement technologies and to compare their strengths and weaknesses in different measurement settings.
LO3 To evaluate the role of biomechanics in the rehabilitation of movement disorders and sports injuries.
LO4 Evaluate the role of biomechanics in understanding clinical and sports practice and judge its likely impact on the design of medical, rehabilitation, and sports technology and on the design, implementation and evaluation of rehabilitation technology services.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The module will teach the following:

Motor control
Principles of rehabilitation
Neurological control of movement
Nine things to measure in relation to movement
Measuring equipment deployed in biomechanics
Measurement properties
Measuring movement outside the lab
3D motion capture
3D biomechanics and surgery in cerebral palsy
Robotic rehabilitation
Sports performance and enhancement

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

LO1 Employ biomechanical principles to assess qualitatively clinical and sports related performance.
C1 Comprehend and apply the concepts of forces, moments, displacement, velocity & acceleration in both linear and angular contexts
C2 Create suitable qualitative analyses of clinical and sports related tasks.
C3 Construct suitable analytical solutions for these problems using words and pictures.

LO2 To appraise different biomechanical measurement technologies and to compare their strengths and weaknesses in different measurement settings.
C1 To comprehend the different types and complexities of biomechanical measurement technologies and what their record.
C2 To deploy suitable biomechanical measurement techniques in an efficient manner to relevant movement issues using judgement as to the best tool for the job.
C3 To evaluate the results of these measurement techniques and interpret their implications for human movement and health.

LO3 To evaluate the role of biomechanics in the rehabilitation of movement disorders and sports injuries.

C1 To comprehend the biomechanical consequences of loading on the musculo-skeletal system.

C2 To appraise the potential for biomechanics to enhance rehabilitation.

C3 To comment knowledgeably on the potential for technology to enhance rehabilitation.

LO4 Evaluate the role of biomechanics in understanding clinical and sports practice and judge its likely impact on the design of medical, rehabilitation, and sports technology and on the design, implementation and evaluation of rehabilitation technology services.

C1 To appraise the role biomechanics has played in the understanding of clinical practice and sport performance.

C2 To appraise the role biomechanics has played in advancing clinical practice and sports.

C3 To estimate its likely future impact on clinical practice and sports.

The standards set for each criterion per Module and Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/

Specific details relating to this class are as follows:

An e-learning myplace website will be used to facilitate learning, assessment and feedback. The website will include all teaching material, powerpoint copies of lectures, examples and solutions, a previous exam paper with answers and suggested links to other learning resources. The website will also include pre module revision information and suggestions for further reading. Assignments will be directly relevant to current material and a feedback sheet giving the marks will be used to return performance to students. Interaction between staff and students and dialogue relating to delivered material will be encouraged in lectures and laboratories and an online chat facility will be included in the web package. Clear instructions will be given to students regarding the assignments in both written and verbal format.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
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</tr>
<tr>
<td>1</td>
<td>50</td>
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</table>

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:

The class will be taught over 11 weeks of semester 2
Assignment (group activity) presented during week 6
Assignment 2 submitted during exam period

Resit Examination Procedures:

Coursework resubmission prior to August exam Diet.

PLEASE NOTE:
Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

Recommended Reading:

Functional human movement: measurement and analysis
Brian R Durward; Gillian D Baer; Philip J Rowe
Oxford; Boston, Mass: Butterworth-Heinemann 1999
Biomechanics and motor control of human movement

Additional Student Feedback:
(Please specify details of when additional feedback will be provided)

There will be an opportunity for students to gain feedback halfway through the module by presenting and receiving formative feedback on a group presentation

Session: Feedback on the final assessment will also be given electronically through the module myplace e-learning package following the relevant exam board.
MODULE DESCRIPTION FORM

BE906 Biomaterials and Biocompatibility

**Module Registrar:** Dr Richard Black

**Taught To:** MSc/MRes/PgDip/PgCert Biomedical Engineering and EngD/MSc Medical Devices

**Other Lecturers Involved:** Prof MH Grant, Dr Milovan Cardona (BME), Drs A McLaren and A Toumpis (Mechanical & Aerospace Engineering)

**Credit Weighting:** 10

**Semester:** 2

**Compulsory/optimal/elective class:** Optional

**Academic Level:** SHE 5

**Prerequisites:** None

**Module Format and Delivery (hours):**

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<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
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<tbody>
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<td></td>
<td></td>
<td>12</td>
<td>48</td>
<td>100</td>
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**Educational Aim**

This module aims to:

- Provide fundamental information on the properties of synthetic biomaterials, and how these are evaluated experimentally and from the literature
- Outline how material properties are influenced by methods of processing
- Explore with the aid of appropriate examples what is meant by biocompatibility; provide an overview of the host responses to and interactions with biomaterials, and how these interactions are assessed and influenced by surface properties
- Introduce the principles of toxicology, identify the major toxic interactions with foreign chemicals and the protective mechanisms which enable us to survive most toxic insults. Assessment of the safety of materials according to the International Standards will be discussed.

**Learning Outcomes**

On completion of the module the student is expected to be able to:

LO1 Understand the relationship between structure of metals & ceramics and their behaviour as a basis for materials selection in biomedical applications.

LO2 Have a good understanding of the concept of biocompatibility as it relates to materials for implantation into different systems of the body; and of the interactions of tissues and body fluids with materials.

LO3 Be able to identify appropriate methods to assess biocompatibility, and to understand the relevance and limitations of those assessment procedures to clinical outcomes.

LO4 Understand how to assess and quantify toxic responses to foreign chemicals.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

**Syllabus**

The approach to metal, ceramic, composite and polymer engineering will be to integrate the description of materials in terms of their basic behaviour (brittle, ductile, plastic, elastic, viscoelastic) applied to Biomedical Engineering applications. The basic understanding will be established through examples with back-up software which will cover materials science in an interactive programme.

Manufacture of artefacts will be described in terms of basic materials behaviour governing the methods of fabrication and the consequences for use of those processing routes. Links between the properties of the materials considered, their selection, and processing will be made with reference to examples and demonstrations taken from Biomedical Engineering applications.

The concept of biocompatibility will be introduced with reference to the historical uses of materials in medicine, and the many successes and failures in clinical practice. The view that biocompatibility is akin to inertness will be challenged by citing examples of materials that illicit specific responses that are appropriate for their intended application, and the specific requirements of materials for use in cardiovascular applications, Tissue Engineering and Regenerative Medicine.

Toxicology: Quantification of toxic responses; in vitro and in vivo testing for toxicity; safety evaluation of materials according to the International Standards; mechanisms of toxicity and protective mechanisms of the body; inflammation; carcinogenesis; effect of the tissues and body fluids on materials.

**Assessment of Learning Outcomes**

**Criteria**

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:
LO1  Understand the relationship between structure of metals & ceramics and their behaviour as a basis for materials selection in biomedical applications.
   C1  Identify the types of bonding present in metals and ceramics, and explain how material structure and processing influences those properties;
   C2  Ability to perform basic calculations of material strength, elastic modulus, etc., for each class of material.

LO2  Good understanding of the concept of biocompatibility as it relates to materials for implantation into different systems of the body; and of the interactions of tissues and body fluids with materials.
   C1  Ability to explain the nature of the interactions between tissues and body fluids (e.g. blood) on materials, both acute and chronic; and
   C2  The manner in which surfaces properties in particular influence protein-cell-biomaterial interactions at the tissue interface.

LO3  Identify appropriate methods to assess biocompatibility, and to understand the relevance and limitations of those assessment procedures to clinical outcomes.
   C1  Describe methods used to assess blood-biomaterial biocompatibility: in vitro, ex vivo, in vivo; and
   C2  Explain the relevance and limitations of these assessment procedures in predicting device performance.

LO4  Understand how to assess and quantify toxic responses to foreign chemicals.
   C1  Describe mechanisms of toxicity and protective mechanisms of the body.
   C2  Detail in vitro and in vivo testing for toxicity.
   C3  Cite the relevant International Standards that apply.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/
Specific details relating to this class are as follows:
The module comprises a combination of summative and formative assessments, making full use of the University’s Virtual Learning Environment ‘Mylace’; the software will be used also to promote interaction between individual students and their tutors, and to tailor feedback on performance to individual students. Likewise, student feedback will be sought to improve both content and delivery of the course.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
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</tr>
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</table>

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:
Coursework set in week 5 and submitted in week 11 (semester 2). The assignment will make use of the materials selection software package CES Edupack, available to students of the University on site licence.

Resit Examination Procedures:
Examination.

PLEASE NOTE:
Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of exam.

Recommended Reading:
Callister WD, Materials Science & Engineering (Wiley: New York)
Young RJ and Lovell PA, Introduction to Polymers (CRC Press, Boca Raton, FL, USA)
McCrum NG, Buckley CP, Bucknall CB, Principles of Polymer Engineering (Oxford University Press)
Park JB and Lakes RS, Biomaterials - An Introduction (Plenum Press, New York)
Pruitt LA and Chakravartula AM, Mechanics of Biomaterials: fundamental principles for implant design (Cambridge University Press), 2011 (electronic access)
Dee KC, Puleo DA, Bizios R ‘An introduction to tissue-biomaterial interactions’ (John Wiley & Sons)
JA Timbrell ‘Introduction to Toxicology’ (Taylor & Francis)

Additional Student Feedback:
(Please specify details of when additional feedback will be provided)

Via MyPlace
### Module Description Form

**BE911 Engineering Science**

**Module Registrar:** Dr Chris McCormick  
**Taught To:** MSc Biomedical Engineering

**Other Lecturers Involved:**  
Prof S Reid, Dr M Giardini and Mr S Solomonidis  
**Credit Weighting:** 20  
**Semester:** 1

**Compulsory/optional/elective class:** Compulsory for students without and Engineering background.  
**Academic Level:** 5

**Prerequisites:** None

**Module Format and Delivery (hours):**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
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<td>36</td>
<td></td>
<td></td>
<td>2</td>
<td>122</td>
<td>200</td>
</tr>
</tbody>
</table>

**Educational Aim**

This module aims to provide instruction in the areas of fundamental engineering (mechanics of rigid bodies, mechanics of deformable bodies, mechanics of fluids and electronics) for life scientists who have no formal education in the engineering sciences.

**Learning Outcomes**

On completion of the module the student is expected to be able to:

- **LO1** Demonstrate knowledge and understanding of rigid body mechanics.
- **LO2** Demonstrate knowledge and understanding of the mechanics of materials.
- **LO3** Demonstrate knowledge and understanding of fluid mechanics.
- **LO4** Demonstrate knowledge and understanding of electronics.

*(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)*

**Syllabus**

The module will teach the following:

**Section 1 Mechanics of Rigid Bodies**

- Basic concepts – Force, moment, equilibrium
- Free body diagrams, force components, acceleration
- Friction, 3-D moments
- Angular motion, centrifugal force, moment of inertia
- Momentum, impulse, work done
- Differentiation/integration. Work, energy, power
- Jump laboratory – demonstration/data collection. Analysis of jump forces and impulse

**Section 2 Mechanics of Deformable Bodies**

- Tension and Compression
- Stress, strain; stress-strain relationships; elastic and plastic deformations; Young's modulus.
- Shear loading and torsion
- Shear stress and strain; modulus of rigidity, shear strength.
- Torsion of circular bars, angle of twist; polar moment of area. Analysis of compound shafts.
- Bending of Beams
- Bending moment and shear force distribution in beams. Calculation of bending stresses and strains, centroids and second moment of areas. Deflection of beams.
- Design considerations

**Section 3 Mechanics of Fluids**

- Fluids and their properties
- Definitions, shear stress in a moving fluid, Newtonian and non-Newtonian fluids, viscosity.
- Fluid properties – density, temperature effect on viscosity, surface tension, contact angle.
- Fluid Statics
- Pressure – Pascal's law for pressure at a point; variation in pressure within a static fluid. Pressure and head. Pressure measurement techniques.
- Fluid Dynamics
- Basic concepts – uniform and steady flow, streamlines and stream tubes, laminar and turbulent flow, Reynolds number.
- Rheology of Blood
Section 4 Electronics
The Nature of Electricity
Resistors in series and parallel.
Types of voltage signal: the function generator and the Cathode Ray Oscilloscope.
Capacitors and Inductors
Capacitance. Capacitors in series and parallel. Time constant.
Electromagnetic induction. Inductance and inductors.
AC Circuits
Concept of average and RMS representation of electrical power.
AC across resistive, capacitative and inductive loads. Power supplies.
Semiconductors
Semiconductors materials. Diodes and transistors. Transistor as an amplifier and as a switch.
Digital circuits.
An introduction to OP amps

Assessment of Learning Outcomes

Criteria
For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

<table>
<thead>
<tr>
<th>LO</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>LO1</td>
<td>Demonstrate knowledge and understanding of rigid body mechanics.</td>
</tr>
<tr>
<td>C1</td>
<td>Describe the main principles (i.e. Newton’s laws) of rigid body mechanics.</td>
</tr>
<tr>
<td>C2</td>
<td>Apply the appropriate equations to solve Biomedical Engineering-oriented problems.</td>
</tr>
<tr>
<td>LO2</td>
<td>Demonstrate knowledge and understanding of the mechanics of materials.</td>
</tr>
<tr>
<td>C1</td>
<td>Describe the main principles of the mechanics of materials.</td>
</tr>
<tr>
<td>C2</td>
<td>Apply the appropriate equations to solve Biomedical Engineering-oriented problems.</td>
</tr>
<tr>
<td>LO3</td>
<td>Demonstrate knowledge and understanding of fluid mechanics.</td>
</tr>
<tr>
<td>C1</td>
<td>Describe the main principles of fluid mechanics.</td>
</tr>
<tr>
<td>C2</td>
<td>Apply the appropriate equations to solve Biomedical Engineering-oriented problems.</td>
</tr>
<tr>
<td>LO4</td>
<td>Demonstrate knowledge and understanding of electronics.</td>
</tr>
<tr>
<td>C1</td>
<td>Describe the main principles electronics.</td>
</tr>
<tr>
<td>C2</td>
<td>Apply the appropriate equations to solve Biomedical Engineering-oriented problems.</td>
</tr>
</tbody>
</table>

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/
Specific details relating to this class are as follows:
Regular tutorial sessions will deliver high quality feedback situations providing not only clear guidance on the expected level of performance but also good data about how students are progressing which will help shape future teaching.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>60%</td>
</tr>
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</table>

LOT-LO4 LOT-LO4

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:
Coursework / Submissions deadlines: 4 assessments will be conducted, one in each of rigid body mechanics, electronics, deformable bodies and fluid mechanics, during the delivery of the class. One exam will be conducted two-weeks after the class has finished, comprised of questions from all four sub-disciplines.

Resit Examination Procedures:
Resit Assessment Procedures: exam only in August.

PLEASE NOTE:
Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of exam.

Recommended Reading:

Additional Student Feedback:
(Please specify details of when additional feedback will be provided)
MODULE DESCRIPTION FORM

BE915 Medical Science for Engineering

Module Registrar: Dr Damion Corrigan
Taught To: MSc/MRes/PgDip/PgCert Biomedical Engineering, EngD/MSc Medical Devices

Other Lecturers Involved: Dr Michelle McLean; Dr Danial Kahani and Dr Craig Childs.
Credit Weighting: 20
Semester: 1

Compulsory/optional/elective class: Compulsory for students without a life science background.
Academic Level: SHE 5

Prerequisites: None

Module Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
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<tbody>
<tr>
<td>66</td>
<td>6</td>
<td></td>
<td></td>
<td>128</td>
<td></td>
<td>200</td>
</tr>
</tbody>
</table>

Educational Aim

To provide students of Biomedical Engineering with instruction in key areas of human anatomy, physiology and cell biology relevant to the advanced study of bio- and clinical engineering. We aim to provide understanding of normal biological function and control as derived from scientific and clinical evidence. The course will educate students to use knowledge of normal function to better understand pathology, disease diagnosis and treatment.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Have knowledge and understanding of cellular organization, function and metabolism.
LO2 Have knowledge and understanding of human anatomy in relation to each major body system and the structural composition of the human body.
LO3 Have knowledge and understanding of the main physiological systems and the control processes that underpin normal function.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The module will teach the following:

Main theme: Normal function supplemented with information of disease states and pathologies.

Cell Biology:
Lecture classes will examine the principal features of cellular organisation, differentiation, division, signalling and metabolism, the structure and functions of the extracellular matrix and basic molecular biology. Classes will also examine the constituents of blood, the process of blood cell formation and the body’s defence mechanisms.

Anatomy:
Anatomy classes will examine the structural organisation of the tissues of the human body with emphasis on the musculoskeletal system, the divisions of the nervous system and the major organ systems.

Physiology:
Instruction in integrative physiology will introduce students to the main physiological systems and teaching will be strongly linked to lessons in anatomy. With the emphasis on function the physiological component of the course will identify the major control mechanisms that operate to regulate body function. The course will examine physiological processes at multiple levels of organization ranging from the sub-cellular to the intact human. Modern concepts and theories on membrane biophysics, neural control, sensation and movement, the cardiovascular system, the respiratory system, fluid balance and digestion will be provided.
Where possible lectures will be supplemented with laboratory demonstrations

Assessment of Learning Outcomes

Criteria
For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

LO1 Have knowledge and understanding of cellular organization, function and metabolism.
LO2 Have knowledge and understanding of human anatomy in relation to each major body system and the structural composition of the human body.
C1 Describe the relationships that exist between biological structure and function and demonstrate knowledge of anatomical terminology, body and organ topography.

C2 Report on the variety of tissue types found in the human body.

C3 Describe at micro and macro levels the structures of the musculoskeletal system and their actions

C4 Provide descriptions of the organ systems their general organisation.

LO3 Have knowledge and understanding of the main physiological systems and the control processes than underpin normal function.

C1 Understand the concept of homeostasis and its importance in biological control systems.

C2 Describe the structure and biophysics of the cell membrane and the ionic basis of the electrical activity of excitable tissues (signal generation, propagation and communication)

C3 Detail the main sensory and motor pathways within the central nervous system and describe sensory and motor function in relation to voluntary and involuntary neuronal behaviour.

C4 Describe the physiology of muscle function.

C5 Describe the regulation and co-ordination of the cardiac cycle and the maintenance of the circulation.

C6 Understand the principles of gas exchange across tissues, CO2 and O2 transport in the blood and the regulation of ventilation.

C7 Understand the role of the kidney in fluid balance regulation.

C8 Describe the major functions of the liver and the gastrointestinal system.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/
Specific details relating to this class are as follows:
At each stage in the curriculum student engagement is encouraged through interaction with the course tutors and on discussions on key biological principles presented to students for the first time. Tutorials aim to support learning and instant feedback is provided on understanding and comprehension of course content.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Class Test</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
</tr>
<tr>
<td>3</td>
<td>120 min</td>
<td>100%</td>
</tr>
</tbody>
</table>

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:

No Coursework.

Resit Examination Procedures:

If first attempt average mark over all class tests is less than 50 student will re-sit failed individual component exams at the next exam diet.

PLEASE NOTE:

Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of exam.

Recommended Reading:


Additional Student Feedback:

(Please specify details of when additional feedback will be provided)

Tutorials will be arranged if required with individual student groups.
MODULE DESCRIPTION FORM

BE916 Introduction to Biomechanics

**Module Registrar:** Professor Philip Rowe

**Taught To:** MSc/MRes Biomedical Engineering
EngD/MSc Medical Devices

**Credit Weighting:** 10
**Semester:** 1

**Other Lecturers Involved:**

**Compulsory/optional/elective class:** Optional

**Academic Level:** SHE 5

**Educational Aim**

This module aims to provide the student with a tool set of analytical skills to enable them to undertake valid biomechanical analyses of human movement, including the science, engineering and mathematical skill to produce kinematic and kinetic analyses of human movement and the external and internal load actions experienced by humans during activity. The module will provided generic analysis skills but examples will focus primarily on human gait.

**Learning Outcomes**

On completion of the module the student is expected to be able to:

**LO1** Employ biomechanical principles and numerical methods to solve biomechanical problems.

**LO2** To formulate biomechanical analyses and to appraise the results of such analyses.

**LO3** To appraise current biomechanical technology and methodology and estimate future advances in such methods and technology.

**LO4** Evaluate the role of biomechanics in understanding human movement and judge its likely impact on the design of medical and rehabilitation devices and the implementation and evaluation of rehabilitation technologies.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

**Syllabus**

The module will teach the following:

- Newton's laws
- Body segment parameters
- Force and motion analysis
- Kinematics and Kinetics
- Numerical analysis of displacement data
- Use of load transducers
- Gait and intersegmental moments
- Gait demonstration/data collection
- Hip force analysis
- Knee force analysis
- Analysis of 3-D geometry
- 3-D motion analysis
- 3-D matrix mathematics
- 3-D definition of human joints

**Assessment of Learning Outcomes**

**Criteria**

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

**LO1** Employ biomechanical principles and numerical methods to solve biomechanical problems.

**C1** Comprehend and apply the concepts of forces, moments, displacement, velocity & acceleration in both linear and angular contexts and how they are related by Newton's laws.

**C2** Create suitable free body diagrams of forces and moments of typical biomechanical problems.

**C3** Construct suitable mathematical solutions for these diagrams.

**LO2** To formulate biomechanical analyses and to appraise the results of such analyses.

**C1** To design suitable strategies for the solution of these problems.
C2 To deploy the learnt mathematical techniques to solve these problems.

C3 To evaluate the results of these solutions and interpret there implications for human movement and health.

LO3 To appraise current biomechanical technology and methodology and estimate future advances in such methods and technology.

C1 To distinguish different types of biomechanical technology and methodology.

C2 To compare and contrast such technology and methodology.

C3 To assess its current and future abilities and potential.

LO4 Evaluate the role of biomechanics in understanding human movement and judge its likely impact on the design of medical and rehabilitation devices and the implementation and evaluation of rehabilitation technologies.

C1 To appraise the role biomechanics has played in the understanding of human movement.

C2 To appraise the role biomechanics has played in advancing healthcare.

C3 To estimate its likely future impact on healthcare.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

**Principles of Assessment and Feedback**

The University’s Assessment and Feedback Policy can be found at: [www.strath.ac.uk/staff/policies/academic/](http://www.strath.ac.uk/staff/policies/academic/)

Specific details relating to this class are as follows:

An e-learning Myplace website will be used to facilitate learning, assessment and feedback. The website will include all teaching material, powerpoint copies of lectures, tutorial examples and worked answers, a previous exam paper with answers and suggested links to other learning resources. The website will also include pre module revision information and suggestions for further reading. Assignments will be directly relevant to current material and a feedback sheet giving the marks will be used to return performance to students. Interaction between staff and students and dialogue relating to delivered material will be encouraged in lectures, tutorials and laboratories and an online chat facility will be included in the web package Clear instructions will be given to students regarding the assignments in both written and verbal format.

### Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Exam</th>
<th>Coursework</th>
</tr>
</thead>
<tbody>
<tr>
<td>LO1-LO4</td>
<td>LO1-LO4</td>
</tr>
<tr>
<td>Duration</td>
<td>Weighting</td>
</tr>
<tr>
<td>2 hours</td>
<td>70%</td>
</tr>
</tbody>
</table>

*Indicate which learning outcomes (L01, L02 etc) are to be assessed by exam/coursework/project as required.*

**Coursework / Submissions deadlines:**

To be announced.

**Resit Examination Procedures:**

Coursework resubmission prior to August Diet and resit exam in August diet.

**PLEASE NOTE:**

Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of resit exam and coursework resubmission.

**Recommended Reading:**

Research methods in biomechanics
D. Gordon E. Robertson 1950-
Champaign, IL : Human Kinetics c2004
Main Library 6 Week Loan (D 591.1852 RES )

Functional human movement : measurement and analysis
Brian R Durward; Gillian D Baer; Philip J Rowe
Oxford ; Boston, Mass : Butterworth-Heinemann 1999
Main Library 6 Week Loan (D 612.76 FUN )

Biomechanics of the musculo-skeletal system
Benno Maurus Nigg; W Herzog (Walter), 1955-
2nd ed. Chichester ; New York ; Wiley c1999
Available at ML Main Library 6 Week Loan (D 612.76 BIO )

Basic biomechanics of the musculoskeletal system
Margareta Nordin; Victor H Frankel (Victor Hirsch), 1925-
3rd ed. Philadelphia : Lippincott Williams & Wilkins c2001
Main Library 6 Week Loan (D 612.76 NOR )

Biomechanics and motor control of human movement
David A. Winter 1930-
ML Main Library 1 Week Loan (D 612.76 WIN )

Fundamentals of biomechanics : equilibrium, motion, and deformation
Nihat Ozkaya 1956- Margareta Nordin
Additional Student Feedback:
(Please specify details of when additional feedback will be provided)

Weeks 12

Feedback will also be given electronically through the module Myplace e-learning package following the relevant exam board.
MODULE DESCRIPTION FORM

BE918 Professional Studies in Biomedical Engineering

Module Registrar: Dr Richard Black
Taught To: MSc/MRes Biomedical Engineering EngD/MSc Medical Devices

Other Lecturers Involved: S Solomonidis (Hospital Visit)
Credit Weighting: 10
Semester: 1/2

Compulsory/optimal/elective class: Compulsory
Academic Level: SHE 5

Prerequisites: None

Module Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>6</td>
<td>12</td>
<td></td>
<td>70</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Educational Aim

This module aims to:
- Provide an introduction to the philosophy, ethics and methodology of research;
- Outline the role that the bioengineer plays in the solution of clinical problems;
- Provide training in the principles, assessment and application of safety procedures in areas relevant to medical physics and biomedical engineering; and
- Engender an awareness of the importance of regulatory issues in medical device design and manufacturing.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Appreciate the role that professional bodies play in society, and the various pathways that exist to becoming a professionally qualified engineer; have knowledge of the standards of competence and integrity to which professional engineers in the UK are held (UK-SPEC), and the role that biomedical engineers, in particular, play in finding solutions to clinical problems.

LO2 Recognise and understand hazards, relevant safety procedures and legislation in a broad range of activities encountered in medical physics and biomedical engineering.

LO3 Compare and contrast the quality management systems in place in industry with the requirements of medical device manufacture; and to provide an overview of the regulatory framework in which these companies operate.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The healthcare science workforce: overview of career pathways for healthcare scientists and engineers in Universities and the NHS
The research landscape: the scientific literature; good practice in research; research ethics: structure and conduct of clinical trials
Management of Health & Safety in the work-place:
  - Health & Safety Legislation
  - Fire safety
  - Chemical Safety: COSHH, hazards, storage, use & disposal
  - Electrical Safety: fault conditions, leakage currents, circuit protection, body response to electrical shock
  - Biological Safety: blood and other tissues, handling procedures, contamination and cross-contamination, cleaning; infection control
  - Ionising Radiation: sources, units, physical and biological effects, measurement and instrumentation, dose limits, protection, legislation
  - Non-ionising Radiation: UV, lasers, ultrasound, physical and biological effects, dose limits, legislation
Quality Management Systems: comparison of industry-based and clinical design management systems;
Manufacturing and quality control (ISO9001); good manufacturing practices
Regulatory issues in medical device manufacture: device classification; registration and listing; declaration of conformity (the CE mark)

Assessment of Learning Outcomes

Criteria
For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]
LO1 Appreciate the complexity of the research landscape, its constraints and challenges, and the role that bioengineers in particular play in finding solutions to clinical problems.
C1 Articulate the importance ethical issues in scientific and clinical research;
C2 Identify the type of projects that require ethical review by a University or NHS Research Ethics Committee;
C3 Ability to identify the procedures in order to obtain ethical approval for research involving human subjects in both university and NHS settings; and the roles of the chief investigator, sponsor, etc.
C4 Outline the career paths open to scientists and engineers in biomedical research.
LO2 Recognise and understand hazards, relevant safety procedures and legislation in a broad range of activities encountered in medical physics and biomedical engineering.
C1 Ability to identify and weigh the risks and hazards associated with laboratory- and clinical-based activities;
C2 Outline the assessment and reporting procedures to be followed to ensure a safe working environment; and
C3 The relevant health and safety legislation and the executive bodies involved in enforcing those regulations.
LO3 Compare and contrast the quality management systems in place in industry with the requirements of medical device manufacture; and to provide an overview of the regulatory framework in which these companies operate.
C1 Ability to identify principles of Medical Device Design;
C2 Identify the requirements specific to medical device design and manufacture;
C3 Identify the relevant quality management systems, standards and regulations that apply; and
C4 The relevant medical device legislation and the executive bodies involved in enforcing those regulations.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback
The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/
Specific details relating to this class are as follows:
The module is wholly formative, student outcomes being assessed using tools provided by the University’s Virtual Learning Environment ‘MyPlace’; the VLE will be used also to promote interaction between individual students and their tutors, and to tailor feedback on performance to individual students. Likewise student feedback will be sought to improve both content and delivery of the course.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Duration</td>
<td>Weighing</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

Indicate which learning outcomes (L01, L02 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:
An online MCQ test will be set in Week 11 of Semester 1.
A number of self-assessment exercises will be set in Week 6 with a deadline in Week 1 of Semester 2.

Resit Examination Procedures:
Resubmission of failed coursework as per 1st attempt.

PLEASE NOTE:
Students need to gain a summative mark of 50% in the class test and complete all formative assessments in order to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

Recommended Reading:
Electronic resources:
Links to appropriate on-line learning resources and exercises will be provided on MyPlace

Additional Student Feedback:
(Please specify details of when additional feedback will be provided)
Beginning of second semester (via MyPlace).
**MODULE DESCRIPTION FORM**

**BE919 Research Methodology**

<table>
<thead>
<tr>
<th>Module Registrar:</th>
<th>Taught To: MSc/MRes Biomedical Engineering EngD/MSc Medical Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Christopher McCormick</td>
<td>Dr Michelle MacLean and Dr Damion Corrigan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Lecturers Involved:</th>
<th>Credit Weighting: 10</th>
<th>Semester: 1</th>
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</thead>
<tbody>
<tr>
<td>Compulsory/optional/elective class: Compulsory</td>
<td>Academic Level: SHE 5</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites: None</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Module Format and Delivery (hours):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Educational Aim</th>
</tr>
</thead>
</table>

This module aims to equip the students with the knowledge and skills necessary for undertaking a research project. Students will gain an understanding of aspects including experimental design, research writing skills, and the use of mathematics and statistics tools including software for data visualisation and analysis, all of which are needed to progress in their research in Biomedical Engineering.

<table>
<thead>
<tr>
<th>Learning Outcomes</th>
</tr>
</thead>
</table>

On completion of the module the student is expected to be able to:

**LO1** Demonstrate knowledge and understanding of the various design possibilities for a research project, the different types of data that can be generated, and demonstrate knowledge of how to select a data sample.

**LO2** Demonstrate knowledge and understanding of the most common methods for visualising and analysing categorical and continuous data, including regression methods and probability.

**LO3** Demonstrate understanding of when particular estimation and inference methods are appropriate and how to interpret their results.

**LO4** Demonstrate the ability to appropriately utilise the various methods of data presentation and statistical analysis when writing scientific reports.

*(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)*

<table>
<thead>
<tr>
<th>Syllabus</th>
</tr>
</thead>
</table>

The module will teach the following:

**Section 1:** Exploratory Data Analysis
- subsection 1.1: Examining Distributions
- subsection 1.2: Examining Relationships

**Section 2:** Producing Data
- subsection 2.1: Sampling
- subsection 2.2: Designing Studies

**Section 3:** Probability
- subsection 3.1: Introduction (Probability)
- subsection 3.2: Random Variables
- subsection 3.3: Sampling Distributions

**Section 4:** Inference
- subsection 4.1: Introduction (Inference)
- subsection 4.2: Estimation
- subsection 4.3: Hypothesis Testing

**Section 5:** Scientific Writing
- subsection 5.1: Writing scientific abstracts and reports
- subsection 5.2: Presenting and reporting data and statistical analysis
Assessment of Learning Outcomes

Criteria
For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

<table>
<thead>
<tr>
<th>LO1</th>
<th>Demonstrate knowledge and understanding of the various design possibilities for a research project, the different types of data that can be generated, and demonstrate knowledge of how to select a data sample.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Identify a range of experimental design methods, and the level of measurement in different research studies.</td>
</tr>
<tr>
<td>C2</td>
<td>Recognise and compare important considerations for observational and randomised trials.</td>
</tr>
<tr>
<td>C3</td>
<td>Describe how to select a data sample and estimate the size of a sample required for a particular research study.</td>
</tr>
<tr>
<td>C4</td>
<td>Differentiate between different types of data generated in a particular research study.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LO2</th>
<th>Demonstrate knowledge and understanding of the most common methods for visualising and analysing categorical and continuous data, including regression methods and probability.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Describe the main principles of visualising and analysing data generated in research studies</td>
</tr>
<tr>
<td>C2</td>
<td>Apply the appropriate methods to visualise and analyse data generated in research studies</td>
</tr>
<tr>
<td>C3</td>
<td>Interpret and assess results after analysing data.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LO3</th>
<th>Demonstrate understanding of when particular estimation and inference methods are appropriate and how to interpret their results.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Construct a research hypotheses and identify a claim</td>
</tr>
<tr>
<td>C2</td>
<td>Apply appropriate inference methods to test a research study hypothesis</td>
</tr>
<tr>
<td>C3</td>
<td>Interpret results from hypothesis testing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LO4</th>
<th>Demonstrate the ability to appropriately utilise the various methods of data presentation and statistical analysis when writing scientific papers/reports.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Apply knowledge learnt to construct a scientific abstract and prepare a research paper/report</td>
</tr>
<tr>
<td>C2</td>
<td>Present, report and interpret data and statistical analysis within a research paper/report</td>
</tr>
</tbody>
</table>

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/

Specific details relating to this class are as follows:

- Clear instructions will be given to students about assessment requirements and expectation through lecture/tutorial sessions and written notes.
- Students will work on a regular basis on a series of tasks within tutorials and computer labs, where there are opportunities for interaction and dialogue around learning (with their peer group and teaching staff). Each of these tasks will be followed by feedback to encourage self-assessment and reflection on their learning progress. Informal communities of learning may emerge from these activities.
- Interaction and dialogue around learning will be encouraged during tutorials, laboratory sessions and at the end of each lecture.
- Students will be given a choice of topic to explore for their project assessment, thus enabling this aspect of assessment to be tailored to their interests and motivations.
- The opportunity to work through worked examples during lectures, together with conversations with students during tutorial/computer lab sessions, will provide information that will help that shape teaching in subsequent lectures. In particular, the revision lecture content will be shaped by such information.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Examination</th>
<th>Class Test</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
</tr>
<tr>
<td>1</td>
<td>2 hours</td>
<td>1</td>
</tr>
</tbody>
</table>

LO1-LO4 (resit only)       LO1-LO4       LO1-LO4

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:

Students will sit a class test in week 10 (based on class running from week 6-11). One project report to be submitted at the end of week 11 of semester 1. All submission deadlines will also be communicated in class.

Resit Examination Procedures:

Examination.

PLEASE NOTE:

Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of exam.
Recommended Reading:
Access to comprehensive lecture slides and notes will be provided during the class. Students wishing to carry out additional reading to supplement their learning may wish to consult some of the following texts, which provide a broad range of approaches to the study and application of statistics within a biomedical context.

R. Ennos, *Statistical and Data Handling Skills in Biology*, Pearson Education Ltd
D.G. Altman *Practical Statistics for Medical Research*, Chapman and Hall
J.M. Bland *An Introduction to Medical Statistics*, Oxford
B.R. Kirkwood and J.A. Sterne *Essential Medical Statistics*, Blackwell
Ryan, BF & Joiner, *MINITAB handbook*, Duxbury - Kent

Additional Student Feedback:
*(Please specify details of when additional feedback will be provided)*

Week 11, Semester 1.

Session: Further details on the feedback session will be announced via Myplace and in class, once these are known.
MODULE DESCRIPTION FORM

BE921 Disability and Societal Effects

Module Registrar: Dr Anthony McGarry  Taught To: MSc Prosthetics & Orthotics
Other Lecturers Involved: Mrs Sandra Sexton  Credit Weighting: 20  Semester: 1 & 2
Compulsory/optional/elective class:  Academic Level: 5

Prerequisites: None

Module Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>8</td>
<td></td>
<td></td>
<td>60</td>
<td>96</td>
<td>200</td>
</tr>
</tbody>
</table>

Educational Aim

This module aims to expand the learners understanding of disability and its impact on societies. The World Health Organisations Report on Disability and the United Nations Convention of Rights for People with Disability (UN CRPD) will be used as a basis to raise awareness and appreciation of disability and the effect on society, and future impact.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Critically discuss the concept of Disability as defined by the United Nations article 4, 20, 26 and 32.

LO2 Appreciate and evaluate the impact for people with physical disability of Societies acceptance from a global perspective.

LO3 Appraise the World Report on Disability and World Health Organisations /UN on-going work in this area.

LO4 Evaluate the role of NGOs in impacting societal effect to improve disability awareness and assess the long term effectiveness of this work.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

Throughout this module, students will be expected to investigate the current literature on global issues and rights surrounding disability. Students will critically evaluate and discuss how different societies consider the implementation of these rights. Students will appraise the effects International societies and different organisational impact such as NGOs on persons with disability, their effectiveness and longevity. Students will critically evaluate the effectiveness of long term change in each society considered. Students will appraise future research requirements to evidence disability and its impact on societies across the globe as a priority for fully embedded evidenced based change.

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning: [Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

LO1 Critically discuss the concept of Disability as defined by the United Nations article 4, 20, 25, 26 and 32. C1 show a clear evidence of this work in both written and oral form C2 be able to explain how these concepts should influence future research in society

LO2 Appreciate and evaluate the impact for people with physical disability of Societies acceptance from a global perspective. C1 Be able to argue future requirements to aid improved impact assessments of disability C2 be able to construct an argument and discuss different societies acceptance and accommodation of disability

LO3 Appraise the World Report on Disability and World Health Organisations /UN on-going work in this area. C1 reference appropriate evidence on disability and current literature C2 discuss and present current issues and developments on improving rights for persons with disability

LO4 Evaluate the role of NGOs in impacting societal effect to improve disability awareness and assess the long term effectiveness of this work C1 analysis of the current NGOs and charities, where they are working and their effectiveness and future goals C2 be able to discuss requirements for long term benefits.
The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

**Principles of Assessment and Feedback**

The University’s Assessment and Feedback Policy can be found at: [www.strath.ac.uk/staff/policies/academic/](http://www.strath.ac.uk/staff/policies/academic/)

Specific details relating to this class are as follows:

Peer assessment of an essay will aid students understanding of what a good essay looks like. Additionally, a double time frame will allow resubmission. This will ensure students can redraft following peer feedback prior to final submission for grading. This process will also provide an opportunity to close the gap between current and desired performance. It supports a learning community and the peer assessment will be discussed and agreed with the class. The feedback received from the peer assessment will allow changes to subsequent years’ teachings, and help monitor on-going changes globally in the area of disability.

For the final projects a choice will be given for the students to select the country they wish to focus on. The essays and presentations will both require students to reflect on their learning throughout the process.

**Assessment Method(s) Including Percentage Breakdown and Duration of Exams**

<table>
<thead>
<tr>
<th></th>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
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</thead>
<tbody>
<tr>
<td>Number</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Duration</td>
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<td>50%</td>
<td>LO1-LO4</td>
</tr>
<tr>
<td>Weighting</td>
<td></td>
<td>LO2, LO4</td>
<td></td>
</tr>
</tbody>
</table>

Indicate which learning outcomes (L01, L02 etc) are to be assessed by exam/coursework/project as required.

**Coursework / Submissions deadlines:**

First CW submission in week 1 of semester 1, peer assessed feedback week 3 semester 2, then final submission week 7 of semester 2, Project presentation date week 10 semester 2.

**Resit Examination Procedures:**

Resit Assessment Procedures: A student failing with a mark below 50% will be given a resit CW for submission at the August resit examination period.

**PLEASE NOTE:**

Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

**Recommended Reading:**

- World Report on Disability (WHO 2011)
- Joint Position paper on the provision of mobility devices in less resourced settings, (WHO and USAID 2010)
- Community-based rehabilitation (CBR) guidelines (WHO 2010)
- Disability prevention and rehabilitation in primary health care (WHO 1995)

**Additional Student Feedback:**

*(Please specify details of when additional feedback will be provided)*

Semester 2 – week 3.

Session: Peer assessment will be used as the method of assessing the essays, where the peer assessment will be worth a percentage of the essay mark, and this will be agreed at the beginning of the module with the class for their final grade for the CW.
### Module Description Form

**Module Registrar:** Roy Bowers  
**Module Title:** Orthotic Management of Neurological Conditions B

<table>
<thead>
<tr>
<th>Other Lecturers Involved:</th>
<th>Guest Lecturers</th>
<th>Credit Weighting:</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compulsory/optional/elective class:</td>
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<td>Semester:</td>
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</tr>
<tr>
<td>Academic Level:</td>
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</table>

### Prerequisites:

### Module Format and Delivery (hours):

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<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Assignments</th>
<th>Private Study</th>
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<tbody>
<tr>
<td>30</td>
<td>20</td>
<td>50</td>
<td>100</td>
<td>200</td>
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### Educational Aim

This module aims to:
1. present a multidisciplinary and patient-centred approach to the orthotic management of neurological conditions
2. enable students to synthesise knowledge of the role of lower limb orthoses in the management of neurological conditions
3. review the available evidence base for orthotic intervention in neurological conditions
4. develop a detailed knowledge of the biomechanics of pathological gait in neurological conditions, and the biomechanical effects of orthoses in addressing these
5. explore the interaction between biomechanics and neurology
6. develop an appreciation of the effects of shortened biarticular muscles and tone abnormalities on rehabilitation
7. present current best practice on the importance of tuning ankle-foot orthoses
8. develop an understanding of the roles of physiotherapy in the management of neurological conditions
9. develop an understanding of the role of pharmacology in the management of increased tone
10. encourage and develop problem-solving and the ability to evaluate outcomes of treatment in a clinical setting

### Learning Outcomes

On completion of the module the student is expected to be able to

| LO1 | Understand the presentation, clinical features and natural history of common neurological conditions, including stroke, cerebral palsy, multiple sclerosis, and traumatic brain injury |
| LO2 | Appreciate the role of lower limb orthoses in the management of common neurological conditions, and understand the indications for and limitations of different types of lower limb orthoses |
| LO3 | Appreciate the importance of correct casting positions for ankle-foot orthoses in order to accommodate muscle shortening and abnormalities of tone, and understand the importance of tuning ankle-foot orthoses to optimise knee and hip kinetics and kinematics |
| LO4 | Appreciate the value of and interdependence of the different forms of clinical intervention, for example orthotics, physiotherapy, surgery and pharmacology |

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

### Syllabus

The core curriculum will address the specific learning outcomes by means of:

- formal teaching
- self-directed learning
- multidisciplinary clinical sessions illustrating patient assessment, treatment planning, orthosis prescription and evaluation and assessment of outcome
- demonstration of the value of gait analysis in clinical setting

### Assessment of Learning Outcomes

#### Criteria
For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

| LO1 | C1 | demonstrate competence in assessment techniques for patients with neurological disorders |
| LO2 | C2 | demonstrate ability to describe clinical characteristics of common neurological conditions |
| LO3 | C3 | demonstrate ability to describe the natural history of various common neurological conditions |
LO2
C1 demonstrate understanding of the prescription criteria for different types of lower limb orthosis
C2 demonstrate understanding of the important design characteristics of different lower limb orthoses to ensure they are fit for purpose
C3 demonstrate understanding of the limitations of lower limb orthoses

LO3
C1 demonstrate ability to relate casting position to the findings of patient assessment
C2 demonstrate understanding of the biomechanical effects of pathology and orthotic intervention
C3 demonstrate ability to identify correct/incorrect alignment of orthosis

LO4
C1 demonstrate understanding of the role of surgery in the management of neurological conditions
C2 demonstrate understanding of the role of physiotherapy in the management of neurological conditions
C3 demonstrate understanding of the role of pharmacology in the management of neurological conditions

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/
Specific details relating to this class are as follows:
Assessment criteria will be made explicit and will be provided at the start of the module.
Interim formative feedback will be provided in a timely manner (before next deadline/examination).
'Action points' will be provided along with the normal feedback they receive – this would help students identify what they should do next time, what to prioritise, and ultimately how to improve their performance. This will also impact on their honours project work which is undertaken in semester 2.

Students will be encouraged in class to give each other feedback on presentations in relation to published criteria.
Class evaluations allow students to express concerns about assessment policy and practice to module registrar.

Students will be required to work together in small groups and small-group discussions will be a routine part of all sessions.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Coursework</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Weighting</td>
</tr>
<tr>
<td>2</td>
<td>67%</td>
</tr>
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</table>

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:
Report due on week 11. Presentation due on week 11.
Dates will be confirmed at the beginning of the module.

Resit Examination Procedures:
Resit assignment in the form of additional coursework will be given.

PLEASE NOTE:
Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

Recommended Reading:

Additional Student Feedback:
(Please specify details of when additional feedback will be provided)

Sessions: Access to tutors is available at all times during the semester, so interim formative feedback will be provided as requested.
MODULE DESCRIPTION FORM

BE931 Hip, Knee and Ankle Disarticulation Prosthetics B

<table>
<thead>
<tr>
<th>Module Registrar:</th>
<th>Dr Tony McGarry</th>
<th>Module Title:</th>
<th>Hip, Knee and Ankle Disarticulation Prosthetics B</th>
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<tbody>
<tr>
<td>Other Lecturers Involved:</td>
<td>Laura Murray</td>
<td>Credit Weighting:</td>
<td>20</td>
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<tr>
<td>Compulsory/optimal/elective class:</td>
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<td>Semester:</td>
<td>2</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>Entry to the MSc degree programme requires an undergraduate degree qualification in prosthetics and orthotics</td>
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Module Format and Delivery (hours):

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<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
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</tr>
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<tbody>
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<td>10</td>
<td>50</td>
<td>40</td>
<td>70</td>
<td>200</td>
</tr>
</tbody>
</table>

Educational Aim

The module builds on the introduction to ankle, knee and hip disarticulation prosthetics studied in PO science 1, 2 and 3. Students will gain knowledge of advanced clinical and technical aspects required to become a competent and professional practitioner. The module will build on the cross-curricular links with other relevant and complimentary modules, for example human biological sciences, professional skills for healthcare, principles of prosthetic and orthotic design, and health services research.

This module consists of appropriate clinical hours and will equip the student with knowledge skills and understanding in the areas of ankle, knee and hip disarticulation prosthetics. This will be supplemented by additional self-reflection activities to a total of 200 hours.

Learning Outcomes

The objective of this module is to provide the student with experience of management of patients requiring treatment at the hip, knee and ankle disarticulation levels, and to further develop the clinical, technical and professional knowledge and skills required of a prosthetist/orthotist. Learning objectives are as follows:

- **LO1** Through effective patient and colleague communication skills will be able to establish good patient rapport and empathy in a controlled clinical practice setting. Develop a knowledge of prescription criteria for hip, knee and ankle prostheses based on the needs of the patient.
- **LO2** Knowledge and understanding of hip, knee and ankle disarticulation prosthetic design.
- **LO3** Access, gather, review and appraise and present relevant and current literature in the field.
- **LO4** Expand their knowledge of prosthetic component design and develop a knowledge of a range of socket designs and their applications.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The module will teach the following:

- Causes and surgical management of hip, knee and ankle disarticulations.
- Prosthetic management of persons with hip, knee and ankle disarticulations.
- Physiotherapy and clinical assessment techniques.
- Contemporary prosthetic component systems.
- Gait and video analysis techniques.

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

- **LO1** Through effective patient and colleague communication skills will be able to establish good patient rapport and empathy in a controlled clinical practice setting. Develop a knowledge of prescription criteria for hip, knee and ankle prostheses based on the needs of the patient.

  - **C1** Demonstrate through competency in prosthetic clinics awareness of a range of assessment techniques and clinical conditions supported by a clinical supervisor.

- **LO2** Knowledge and understanding of a Hip, knee and ankle prosthetic design.

  - **C1** Demonstrate through clinical studies reports of patients assessed during clinical practice sessions a knowledge of the biomechanical principles of disarticulation socket design.

- **LO3** Access, gather, review and appraise relevant and current literature in the field.

  - **C1** Demonstrate competency in conducting a literature review on a relevant paediatric topic.
C2 Demonstrate a knowledge of the aetiology of disarticulation surgical techniques

LO4 Expand their knowledge of prosthetic component design and develop a knowledge of a range of socket designs and their applications.

C1 Demonstrate knowledge gained from clinical practice sessions and previous clinical placements in tutorial sessions.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

### Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: [www.strath.ac.uk/staff/policies/academic/](http://www.strath.ac.uk/staff/policies/academic/)

Specific details relating to this class are as follows:

- Several of the principles of assessment and feedback are incorporated into this module.
- Provision of better definitions of academic requirements before a learning task using carefully constructed criteria sheets and performance level definitions. Expectation will be clearly explained to the class; two assessments are provided; feedback from the first will be provided in advance of second assessment.
- Project deadlines are evenly dispersed in the semester to minimise burden on time commitments. A proforma is provided for the coursework so that required content is defined.
- Coursework formative and summative feedback will be provided in timely manner (before next deadline/examination). Students thereby will be made aware of their performance and standing before the next and final assessment.
- ‘Action points’ will be provided along with the normal feedback they receive-- this would help students identify what they should do next time, what to prioritise, and ultimately how to improve their performance. This will also impact on their honours project work which is undertaken in semester 2.
- Midterm and end-of-term class evaluations allow students to express concerns about assessment policy and practice to registrar.
- Small-group discussions are routine part of all sessions.
- The tasks and assessment are structured to become progressively challenging (with timely feedback). Initially relevant literature is provided to the students for critical appraisal, but thereafter students must source the relevant literature pertaining to a newly defined topic to support the case study which is presented.

### Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Presentation &amp; poster</th>
<th>Coursework</th>
</tr>
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<tbody>
<tr>
<td><strong>Presentation &amp; poster</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number</strong></td>
<td><strong>Duration</strong></td>
<td><strong>Weighting</strong></td>
</tr>
<tr>
<td>2</td>
<td>20 mins</td>
<td>50%</td>
</tr>
<tr>
<td>LO1</td>
<td></td>
<td>LO2, LO3</td>
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</table>

### Coursework / Submissions deadlines:

Coursework submission TBC

### Resit Assessment Procedures:

Where any student fails to complete the module assessment successfully a resit assignment of 5000 words will be set.

**PLEASE NOTE:**

Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

### Recommended Reading:

**Ankle Disarticulation**


Pinzur MS, Wolf B, Havey RM. Walking pattern of midfoot and ankle disarticulation amputees. Foot Ankle Int, 1997, 18, 635-638


**Knee Disarticulation**


Oberg K. Knee mechanisms for through-knee prostheses. Prosthet Orthot Int. 1983, 7, 107-112

Hip Disarticulation
Lehneis HR. Hip disarticulation and hemi-pelvectomy prosthetics design with hip-knee control system mechanism. Orthop Tech Q. 2005, IV, 1-4

Additional Student Feedback:
(Please specify details of when additional feedback will be provided)

Sessions: Access to tutors is available at all times during the semester, so interim formative feedback will be provided as requested.
### MODULE DESCRIPTION FORM

**BE932 Clinical Governance B**

<table>
<thead>
<tr>
<th>Module Registrar:</th>
<th>Laura Murray</th>
<th>Taught To:</th>
<th>MSc Rehabilitation Studies</th>
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<tbody>
<tr>
<td>Other Lecturers Involved:</td>
<td>Guest Lecturers</td>
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<td>Compulsory/optional/elective class:</td>
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<td>Semester:</td>
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<td>Academic Level:</td>
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<td>Prerequisites:</td>
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<td>Module Format and Delivery (hours):</td>
<td>Lecture</td>
<td>Tutorial</td>
<td>Laboratory</td>
</tr>
<tr>
<td></td>
<td>30</td>
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### Educational Aim

Clinical governance is "a system through which NHS organisations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish." (Scally and Donaldson 1998, p.61)

This module aims to inform participants about the ideas and principles behind the concept of clinical governance. This will include the standards of proficiency for Prosthetists and Orthotists and the wider medical profession.

- Introduction to information governance and data security awareness
- The importance of good clinical record keeping
- Clinical information systems
- eHealth the future direction
- Maintaining high standards of patient care
- Why patient safety is important

### Learning Outcomes

On completion of the module the student is expected to be able to:

**LO1** Understand the core principles of clinical governance, and be aware of the relevant references and documents in this area.

**LO2** Understand the practical and clinically relevant lessons on improving healthcare services from current national and international work.

**LO3** Appreciate the current literature and consider how to construct a clinical audit or produce clinical guidelines for a specific condition.

**LO4** Discuss the implications of clinical governance for prosthetic and/or orthotic services.

*(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)*

### Syllabus

The module will teach the following:

- Accountability and patient care.
- Openness and transparency of decision making in the health services.
- Effective management of performance.
- The function and role of the individual role practitioner.
- The function and role of the wider health organisation.
- The importance of engendering a learning environment as an integral part of health services.

**Clinical Governance**

- Clinical Governance and the National Health Service.
- Evidence based practice.
- Risk management.
- User involvement.
- Clinical effectiveness and clinical audit.
- Clinical performance indicators.
- The Bristol inquiry: illustrating a health service which failed its patients.

The core curriculum will address the specific learning outcomes by means of:

- Formal teaching
- Self-directed learning
- Peer assessment
Assessment of Learning Outcomes

Criteria
For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into 'teachable' elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

LO1 Understand the core principles of clinical governance, and be aware of the relevant references and documents in this area.
C1 Demonstrate an understanding of clinical governance through a literature review of a current topic within the field of Clinical Governance.
C2 Demonstrate ability to describe clinical governance and its relevance to clinical practice.

LO2 Understand the practical and clinically relevant lessons on improving healthcare services from current national and international work.
C1 Demonstrate ability to review literature in this area.
C2 Demonstrate ability to identify shortcomings in clinical treatment.

LO3 Appreciate the literature and consider how to construct a clinical audit or produce clinical guidelines for a specific condition.
C1 Demonstrate ability to review literature in this area.
C2 Present a guideline for care of a patient group with a particular condition that relates to prosthetic and/or orthotic care.

LO4 Discuss the implications of clinical governance for prosthetic and/or orthotic services.
C1 Specific literature search and appreciation of role of the Prosthetist/Orthotist in clinical governance
C3 Establish the importance of information governance.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback
The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/
Specific details relating to this class are as follows:
Assessment criteria will be made explicit and will be provided at the start of the module.
Interim formative feedback will be provided in a timely manner (before next deadline/examination).
Students will be required to work together in small groups and small-group working will be a routine part of the presentation element of the assessment.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
</tr>
</tbody>
</table>
| 1 | 20 mins | 25% | 2 | 25% each | 1 | 25%
| LO1-LO3 | LO1-LO4 | LO1-LO4 |

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:
- Literature review on clinical governance and referenced reflective essay
- Presentation of audit plan/ best practice guide and relevance to clinical governance
- Poster describing the importance of clinical governance in your field
Dates TBC

Resit Examination Procedures:
Where any student fails to complete the module assessment successfully, a resit assignment, of about 3000 words in length, will be set which specifically addresses the areas of weakness in the first submission.

PLEASE NOTE:
Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

Recommended Reading:
Clinical Governance literature through a literature search of NHS documents.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4223159/
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1113460/
Recommended Websites:
http://www.hpc-uk.org/assets/documents/10004EDFStandardsofconduct,performanceandethics.pdf
www.ehealth.nhs.scot
http://www.flyingstart.scot.nhs.uk/
http://www.cqc.org.uk
http://www.hqip.org.uk/

Additional Student Feedback:
(Please specify details of when additional feedback will be provided)

Session: Access to tutors is available at all times during the semester, so interim formative feedback will be provided as requested.
MODULE DESCRIPTION FORM

BE507 Orthotic Management of Spinal Deformity B

<table>
<thead>
<tr>
<th>Module Registrar:</th>
<th>Karyn Ross</th>
<th>Taught To: MSc Prosthetics and Orthotics</th>
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<tr>
<td>Other Lecturers Involved:</td>
<td>Roy Bowers and Guest Lecturers</td>
<td>Credit Weighting: 20</td>
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<td>Compulsory/optimal/elective class:</td>
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Prerequisites: Entry to the MSc degree programme requires an undergraduate degree qualification in prosthetics and orthotics.

Module Format and Delivery (hours):

<table>
<thead>
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<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
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<th>Assignments</th>
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Educational Aim

This module aims for the student to acquire the knowledge and understanding of the sciences which underpin the orthotic management of common spinal deformities. In addition, they will formulate and analyse treatment protocol for management of these patient groups.

Specifically, this module aims to:
1. present a multidisciplinary and patient-centred approach to the orthotic management of spinal deformity.
2. enable students to synthesise and analyse their knowledge of the role of spinal orthoses in the management of neuromuscular and idiopathic scoliosis and spinal injuries.
3. review the available evidence base for orthotic management of scoliosis.
4. present current best practice on the management of neuromuscular and idiopathic scoliosis.
5. develop an understanding of the roles of physiotherapy in the management of spinal deformity / injury.
6. develop an understanding of the role of pharmacology in the management of tone associated with spinal deformity / injury.
7. develop an understanding on the role of surgery in the management of spinal deformity / injury.
8. encourage and develop problem-solving and the ability to evaluate outcomes of treatment in a clinical setting.

Learning Outcomes

Material covered in Human Biological Science and Principles of Prosthetics and Orthotic Design relating to the spine will be referred to briefly, but it is assumed the student already has an adequate knowledge base and understanding of these subject areas:

Human Biological Science - anatomy and pathologies associated with spinal deformity
Principles of Prosthetics and Orthotic Design - biomechanics related to spinal deformity

On completion of the module the student is expected to be able to:

LO1 Recognise the presentation, clinical features and natural history of neuromuscular and idiopathic scoliosis and spinal injury and be adept at patient assessment techniques including the analysis of X-rays to identify deformity and blue print orthosis design.

LO2 Identify and appraise the principles of orthotic management and the role and design of spinal orthoses in the management of scoliosis and spinal injury.

LO3 Identify and appraise literature pertaining to the use of spinal orthoses for management of scoliosis and spinal injury.

LO4 Appraise the roles of orthotics, physiotherapy and surgery in the management of scoliosis and spinal injury and the value of and interdependence of the different forms of clinical intervention.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

- formal teaching, and self-directed learning
- attending a multidisciplinary clinical session (where practical)

The module will address the following:

- Identification and appraisal of the principles of orthotic management of spinal injury / deformity (including neuromuscular and idiopathic scoliosis).
- Evaluation of the use and design of spinal orthoses for spinal injury / deformity (including neuromuscular and idiopathic scoliosis).
- The undertaking of systematic patient assessment, resulting in the formulation of functional loss and objective setting.
- Formulation of a prescription based on orthotic design principles.
- Evaluation of spinal casting and rectification.
- Assessment of orthosis fit and function.
- Analysis of spinal X-rays to identify deformity and blue print orthosis design for idiopathic scoliosis management.
- Identification and appraisal of materials and manufacturing processes used in spinal orthotics.
- Appraisal of the role of adjunct management (e.g. physiotherapy, surgery) in the management of spinal injury / deformity (including neuromuscular and idiopathic scoliosis).
- Critical appraisal of literature pertaining to the use of orthoses in the management of spinal injury / deformity.

**Assessment of Learning Outcomes**

**Criteria**

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

*Note: Criteria break the LO down into 'teachable' elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.*

<table>
<thead>
<tr>
<th>LO1</th>
<th>Recognise the presentation, clinical features and natural history of neuromuscular and idiopathic scoliosis and spinal injury and be adept at patient assessment techniques including the analysis of X-rays to identify deformity and blue print orthosis design.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Demonstrate understanding of the clinical presentation of neuromuscular and idiopathic scoliosis and spinal injury.</td>
</tr>
<tr>
<td>C2</td>
<td>Demonstrate understanding of the assessment of neuromuscular and idiopathic scoliosis and spinal injury.</td>
</tr>
<tr>
<td>C3</td>
<td>Demonstrate knowledge and understanding of X-ray analysis to identify and quantify scoliosis and to blueprint the design of a Boston style scoliosis brace.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LO2</th>
<th>Identify and appraise the principles of orthotic management and the role and design of spinal orthoses in the management of scoliosis and spinal injury.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Demonstrate understanding of the principles of orthotic management of scoliosis and spinal injury.</td>
</tr>
<tr>
<td>C2</td>
<td>Demonstrate knowledge and understanding of prescription criteria for spinal orthoses used in the management of scoliosis and spinal injuries.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LO3</th>
<th>Identify and appraise literature pertaining to the use of spinal orthoses for management of scoliosis and spinal injury.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Demonstrate the ability to develop and perform a literature search.</td>
</tr>
<tr>
<td>C2</td>
<td>Demonstrate the ability to critically appraise literature.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LO4</th>
<th>Appraise the roles of orthotics, physiotherapy and surgery in the management of scoliosis and spinal injury and the value of and interdependence of the different forms of clinical intervention.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Demonstrate understanding of the principles of managing complex spinal deformity and injury which often involves multi-level clinical challenges.</td>
</tr>
<tr>
<td>C2</td>
<td>Demonstrate knowledge of adjunct treatment modalities in the management of complex multi-level clinical challenges.</td>
</tr>
<tr>
<td>C3</td>
<td>Demonstrate an understanding of the role of the multidisciplinary clinical team in the management of scoliosis and spinal injury.</td>
</tr>
</tbody>
</table>

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

**Principles of Assessment and Feedback**

The University’s Assessment and Feedback Policy can be found at: [www.strath.ac.uk/staff/policies/academic/](http://www.strath.ac.uk/staff/policies/academic/)

Specific details relating to this class are as follows:

Several of the principles of assessment and feedback are incorporated into this module.

Provision of better definitions of academic requirements before a learning task using carefully constructed criteria sheets and performance level definitions. Expectation will be clearly explained to the class; three assessments are provided; feedback from the first will be provided in advance of attempts on others.

Project deadlines are evenly dispersed in the semester to minimise burden on time commitments. A proforma is provided for the coursework so that required content is defined.

Coursework formative and summative feedback will be provided in timely manner (before next deadline/examination). Students thereby will be made aware of their performance and standing before the next and final assessment.

‘Action points’ will be provided along with the normal feedback they receive—this would help students identify what they should do next time, what to prioritise, and ultimately how to improve their performance.

Small-group discussions are routine part of all sessions.

The tasks and assessment are structured to become progressively challenging (with timely feedback). Initially relevant literature is provided to the students for critical appraisal, but thereafter students must source the relevant literature pertaining to a newly defined topic to support the case study which is presented.
### Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Number</th>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30 mins</td>
<td>CW1 30%</td>
<td>LO1-LO4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CW2 40%</td>
<td></td>
</tr>
</tbody>
</table>

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

### Coursework / Submissions deadlines:
- Case study: Patient case study presented on last day of module
- Coursework 1: Critical appraisal of literature submitted
- Coursework 2: Literature review

### Resit Examination Procedures:
**PLEASE NOTE:**
Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined with additional coursework.

### Recommended Reading:

WEBSITES:
- [http://www.srs.org](http://www.srs.org)
- [http://www.bostonbrace.com](http://www.bostonbrace.com)
- [http://srs.org](http://srs.org)

### Additional Reading:
- **Idiopathic Scoliosis**
  - Riseborough EJ, Herron JH: Scoliosis associated with Neuromuscular diseases, in Scoliosis and other deformities of the axial skeleton, 1975

- **Neuromuscular Scoliosis**

- **Kyphosis**

### Additional Student Feedback:
(Please specify details of when additional feedback will be provided)
Feedback for CW1 will be provided a minimum of 2 weeks before CW2.
## MODULE DESCRIPTION FORM

### BE934 Clinical Gait Analysis B

<table>
<thead>
<tr>
<th>Module Registrar</th>
<th>Module Title</th>
<th>Credit Weighting</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>tba</td>
<td>Clinical Gait Analysis</td>
<td>20</td>
<td>2</td>
</tr>
</tbody>
</table>

**Other Lecturers Involved:** Guest Lecturers

**Compulsory/optimal/elective class:** Optional

**Prerequisites:** Entry onto MSc programme (completion of undergraduate qualification (or equivalent) in Prosthetics and Orthotics

**Academic Level:** 5

### Module Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>5</td>
<td>5</td>
<td>60</td>
<td>90</td>
<td>200</td>
</tr>
</tbody>
</table>

### Educational Aim

1. To give candidates an appreciation of methods and levels of accuracy of currently available gait assessment techniques ranging from the simple to the sophisticated, or inexpensive to costly. The advantages and limitations of each will be explored.
2. To help students to develop an awareness and practical understanding of the interpretation of the data and its relevance to clinically observed conditions.

### Learning Outcomes

**LO1**

**Knowledge Based Objectives**

The course will facilitate development of knowledge and understanding of:

- kinematic analysis of gait
- kinetic analysis and force transducers
- analysis of muscle actions and joint forces
- how energy expenditure may be monitored
- 2-dimensional and 3-dimensional gait analysis laboratory systems
- outcome measures used in gait analysis

**LO2**

**Skills Based Objectives**

On completion of the course, you should be able to:

- identify appropriate methods of gait analysis
- structure analysis of information and data
- conduct a basic gait analysis exercise using 2-dimensional and 3-dimensional gait systems
- undertake critical reflection on a subject’s gait

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

### Syllabus

The module will cover the following:

**Section One**
Aims, objectives and methods of gait analysis

**Section Two**
Normal & pathological gait

**Section Three**
Kinematic Analysis
- Temporal parameters of gait
- Joint angular movements during gait
- Presentation of data
- Methods and equipment

**Section Four**
- Kinetic Analysis
- Pressure measurement
- Analysis of joint moments and forces

**Section Five**
Gait analysis applications in the rehabilitation of clinical populations
Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

LO1
Knowledge-based Objectives
A pass in all of the following is required to pass the module:
C1 3-D laboratory report
C2 Oral presentation based on 2-D laboratory
C3 Reflective essay of around 3000 words

LO2
Skills-based Objectives
Attendance at the following sessions is mandatory in order to pass the module:
C1 2-D and 3-D gait laboratory experiences
C2 Oral presentation of gait laboratory findings
C3 Rehabilitation service provider laboratory experience

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/
Specific details relating to this class are as follows:
• Assignment criteria issued at beginning of module.
• Negotiation and agreement with students on assignment submission deadlines.
• Summative feedback provided to students during early and mid stages of the module.
• Interaction and dialogue encouraged through the use of Myplace communication and online forums.
• Student self-assessment and reflection actively encouraged.
• Student-peer-teacher feedback opportunities provided throughout and on completion of module.
• Pastoral support and guidance provided by module registrar throughout module by email and meetings.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Coursework</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework 1</td>
<td>30%</td>
</tr>
<tr>
<td>Coursework 2</td>
<td>40%</td>
</tr>
<tr>
<td>Coursework 3</td>
<td>30%</td>
</tr>
</tbody>
</table>

LO1 and LO2

Coursework / Submissions deadlines:
March and April, Semester 2.

Resit Examination Procedures:
A resit assignment will be set to specifically address the areas of weakness in the first submission of the respective coursework failed.

PLEASE NOTE:
Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined prior to the Undergraduate Honours Board. This re-examination will consist entirely of coursework.

Recommended Reading:


Miller S. Enhancing Clinic Efficiency. Philadelphia.


Murphy A. 2D Motion Analysis. University of Strathclyde: Department of Biomedical Engineering; 2014.


Siliconcoach. Your guide to video analysis software. Siliconcoach.


Additional Student Feedback:
(Please specify details of when additional feedback will be provided)

Sessions: Access to tutors is available at all times during the semester, so interim formative feedback will be provided as requested.
**MODULE DESCRIPTION FORM**

**BE935 Upper Limb Prosthetics B**

<table>
<thead>
<tr>
<th>Module Registrar:</th>
<th>Taught To:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarah Day</td>
<td>MSc Prosthetics and Orthotics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Lecturers Involved:</th>
<th>Credit Weighting: 20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Semester:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compulsory/optional/elective class:</th>
<th>Academic Level: 5</th>
</tr>
</thead>
</table>

| Prerequisites: | Entry to the MSc degree programme requires an undergraduate degree qualification in prosthetics and orthotics. |

<table>
<thead>
<tr>
<th>Module Format and Delivery (hours):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>14</td>
</tr>
</tbody>
</table>

**Educational Aim**

This module aims to encourage a deeper level of critical analysis within upper limb prosthetics, building on the skills and knowledge gained in undergraduate Prosthetic programs.

Students will gain knowledge of advanced clinical and technical aspects required to become a competent and professional practitioner. The module will build on the cross-curricular links with other relevant and complimentary modules, for example human biological sciences, principles of prosthetic and orthotic design, and health services research. This module will consider socket design, component prescription and control strategies for proximal upper limb amputation levels, as well as emerging technologies and their clinical relevance to the field of upper limb prosthetics.

The module consists of lectures, tutorials and clinical sessions. Students will undertake further investigative reading in areas relevant to patient care and emerging technology.

**Learning Outcomes**

On completion of the module the student is expected to be able to:

**LO1** Understand the functional, technical and cosmetic properties of emerging technologies, and their use within upper limb prosthetics.

**LO2** Display competencies in the prescription and application of a variety of control systems and related technologies.

**LO3** Understand the different socket designs suitable for proximal amputation levels, including material choice and trimlines.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

**Syllabus**

The module will teach the following:

- Emerging technology and control systems, including multi-articulating prosthetic hands
- Cosmetic coverings
- Electric elbow joints
- Trans-humeral, shoulder disarticulation and forequarter socket design
- Socket design for congenital deformity

**Assessment of Learning Outcomes**

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

**LO1** Understand the functional, technical and cosmetic properties of emerging technologies and their use within upper limb prosthetics.

**C1** Describe the functional, technical and cosmetic properties of emerging technologies.

**C2** Make comparisons between emerging technologies and existing technology.

**C3** Consider the prescription criteria for new technologies.

**LO2** Display competencies in the prescription and application of a variety of control systems and related technologies.
C1 Describe the different control options available and their use.
C2 Design suitable prosthetic systems for patients with proximal upper limb absence.

LO3 Understand the different socket designs suitable for proximal amputation levels and congenital deformities, including material choice and trimlines.
C1 Conduct an investigative review of literature based on a specific clinical presentation.
C2 Describe the condition, functional loss and biomechanical considerations.
C3 Design suitable prosthetic systems for patients with proximal upper limb absence.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/
Specific details relating to this class are as follows:
Students will complete 2 summative assignments for which they will receive timely feedback. These activities will encourage student engagement and support their attainment of knowledge, understanding, and transferable skills. Students will participate in group activities to encourage peer support and dialogue and will be given choice in the topic to be assessed. The assessments will highlight any gaps in knowledge for both the student and tutor so that further teaching and learning can be conducted in this area.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
</tr>
<tr>
<td>1 Presentation</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>1 Essay</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>LO1, LO2, LO3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:
Assessment 1 – Week 7, Assessment 2 – Week 10

Resit Examination Procedures:
Additional coursework will be required.

PLEASE NOTE:
Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

Recommended Reading:


Additional Student Feedback:
(Please specify details of when additional feedback will be provided)

Session: Access to tutors is available at all times during the semester, so interim formative feedback will be provided as requested.
MODULE DESCRIPTION FORM

BE936 Lower Limb Prosthetic Design B

Module Registrar: Dr Tony McGarry
Taught To: BSc (Hons) Prosthetics and Orthotics

Other Lecturers Involved: Credit Weighting: 20
Compulsory/optimal/elective class: Optional Semester: 2
Academic Level: 5

Prerequisites: Entry to the MSc degree programme requires an undergraduate degree qualification in
prosthetics and orthotics.

Module Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>24</td>
<td>20</td>
<td>46</td>
<td>80</td>
<td>200</td>
</tr>
</tbody>
</table>

Educational Aim

The module builds on the introduction to prosthetics socket design, components and materials studied in
undergraduate PO science (or equivalent course). Students will gain knowledge of advanced clinical and technical
aspects required to become a competent and professional practitioner. The module will build on the cross-curricular
links with other relevant and complimentary modules, for example human biological sciences, professional skills
for healthcare, principles of prosthetic and orthotic design, and health services research. This module consists of appropriate clinical hours and will equip the student with knowledge skills and understanding in the areas lower limb prosthetics. This will be supplemented by additional self-reflection activities to a total of 200 hours.

Learning Outcomes

On completion of the module the student is expected to be able to

LO1 Ascertain and critically appraise relevant evidence for use in prosthetic prescription
LO2 Understand and organise factors that influence prosthetic prescription

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus
free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

Students will:
- demonstrate effective patient and colleague communication skills and be able to establish patient rapport
  and empathy in a controlled clinical setting
- develop a knowledge of prescription criteria for lower limb prostheses based on the needs of the patient
- develop clinical and technical problem solving skills
- access, gather, review and appraise relevant and current literature in the field
- demonstrate their ability to carry out patient assessment and document the findings
- develop a knowledge of socket design and their applications
- develop a knowledge of the biomechanical principles of prosthetic socket design
- Component testing techniques
- assess and recognise optimal prosthetic socket fit
- expand their knowledge of the prosthetic component design
- consider the influence of aesthetics and cosmesis on user acceptance

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student
learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention
of CAD package names, components etc.]

LO1 Ascertain and critically appraise relevant evidence for use in prosthetic prescription
   C1 Produce a report based on available evidence
   C2 Design appropriate prosthetic prescription pathways +/- matrices
   C3 Present and justify prescription choices in relation to lower limb prosthetic design
   C4 Revise and test pathways following assessment of lower limb prosthetic users

LO2 Understand and organise factors that influence prosthetic prescription
   C1 Produce a report based on available evidence
   C2 Design appropriate prosthetic prescription pathways +/- matrices
   C3 Present and Justify prescription choices in relation to lower limb prosthetic design
   C4 Revise and test pathways following assessment of lower limb prosthetic users
The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/

Specific details relating to this class are as follows:

Encourage interaction and dialogue around learning (peer and teacher-student).
All students are encouraged to interact and present their opinions in relation to prosthetic prescription.

Involve students in decision-making about assessment policy and practice
Assessment criteria are discussed and agreed in the introductory lecture. An average of students peer grading is used in the final presentation. This constitutes 10% of the final presentation mark.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Examination</th>
<th>Coursework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Duration</td>
</tr>
<tr>
<td>1</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

LO Presentation

Coursework / Submissions deadlines:
Practical work, oral presentation and submission of coursework dates will be given at the beginning of the module.

Resit Examination Procedures:
Resit assignment will be given for submission in August.

PLEASE NOTE:
Students need to gain a summative mark of 40% / 50% (BSc / MSc) to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

Recommended Reading:

Additional Student Feedback:
(Please specify details of when additional feedback will be provided)

Sessions: Access to tutors is available at all times during the semester, so interim formative feedback will be provided as requested.
MODULE DESCRIPTION FORM

BE937 Paediatric Lower Limb Prosthetics B

Module Registrar: Laura Murray Taught To: MSc Prosthetics and Orthotics
Other Lecturers Involved: Guest lecturers Credit Weighting: 20 Semester: 2
Compulsory/optional/elective class: Optional Academic Level: 5

Prerequisites: Entry to the MSc degree programme requires an undergraduate degree qualification in prosthetics and orthotics.

Module Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>20</td>
<td>10</td>
<td>50</td>
<td>40</td>
<td>70</td>
<td>200</td>
</tr>
</tbody>
</table>

Educational Aim

This module aims to:
The module builds on the introduction to prosthetics socket design, components and materials studied in PO science 1, 2 and 3. Students will gain knowledge of advanced clinical and technical aspects required to become a competent and professional practitioner. The module will build on the cross-curricular links with other relevant and complimentary modules, for example human biological sciences, professional skills for healthcare, principles of prosthetic and orthotic design, and health services research.

This module consists of appropriate clinical hours and will equip the student with knowledge, skills and understanding in the areas of upper and lower limb paediatric prosthetics. This will be supplemented by additional self-reflection activities to a total of 200 hours.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Through effective patient and colleague communication skills will be able to establish patient and parent rapport and empathy in a controlled clinical setting. Develop a knowledge of prescription criteria for upper and lower limb prostheses based on the needs of the patient.

LO2 Knowledge of a range of acquired and congenital deficiencies.

LO3 Access, gather, review and appraise relevant and current literature in the field.

LO4 Expand their knowledge of prosthetic component design and develop a knowledge of a range of socket designs and their applications.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The module will teach the following:

- Causes and surgical management of congenital deficiency and childhood amputations
- Psychology of disability in childhood
- Prosthetic management of the lower limb deficient child
- Prosthetic management of the upper limb deficient child
- Paediatric occupational therapy
- Growing up with a disability: A user’s perspective
- The parents perspective of disability

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

LO1 Through effective patient and colleague communication skills will be able to establish patient and parent rapport and empathy in a controlled clinical setting. Develop a knowledge of prescription criteria for upper and lower limb prostheses based on the needs of the patient.

C1 Demonstrate through attendance at a relevant paediatric prosthetic clinics awareness of a range of assessment techniques and clinical conditions supported by a clinical supervisor.

LO2 Knowledge of a range of acquired and congenital deficiencies.

C1 Demonstrate through clinical studies reports of patients seen and treated at relevant paediatric clinic
LO3 Access, gather, review and appraise relevant and current literature in the field.

C1 Competency in conducting a literature review on a relevant paediatric topic.

LO4 Expand their knowledge of prosthetic component design and develop a knowledge of a range of socket designs and their applications.

C1 Tutorials will be conducted to demonstrate student knowledge gained from clinical visits and previous clinical placements.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

**Principles of Assessment and Feedback**

The University’s Assessment and Feedback Policy can be found at: [www.strath.ac.uk/staff/policies/academic/](http://www.strath.ac.uk/staff/policies/academic/)

Specific details relating to this class are as follows:

Several of the principles of assessment and feedback are incorporated into this module.

Provision of better definitions of academic requirements before a learning task using carefully constructed criteria sheets and performance level definitions. Expectation will be clearly explained to the class; two assessments are provided; feedback from the first will be provided in advance of second assessment.

Project deadlines are evenly dispersed in the semester to minimise burden on time commitments. A proforma is provided for the coursework so that required content is defined.

Coursework formative and summative feedback will be provided in timely manner (before next deadline/examination). Students thereby will be made aware of their performance and standing before the next and final assessment.

‘Action points’ will be provided along with the normal feedback they receive - this would help students identify what they should do next time, what to prioritise, and ultimately how to improve their performance. This will also impact on their honours project work which is undertaken in semester 2.

Midterm and end-of-term class evaluations allow students to express concerns about assessment policy and practice to registrar.

Small-group discussions are routine part of all sessions.

The tasks and assessment are structured to become progressively challenging (with timely feedback). Initially relevant literature is provided to the students for critical appraisal, but thereafter students must source the relevant literature pertaining to a newly defined topic to support the case study which is presented.

### Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Number</th>
<th>Poster and Presentation</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
</tr>
<tr>
<td>1</td>
<td>30 minutes</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>50 minutes</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>LO1, LO3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.*

**Coursework / Submissions deadlines:**

Presentations: TBC

**Resit Examination Procedures:**

Where any student fails to complete the module assessment successfully a resit assignment of 5000 words will be set for submission in August.

**PLEASE NOTE:**

Students need to gain a summative mark of 40% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

**Recommended Reading:**


Additional Student Feedback:
(Please specify details of when additional feedback will be provided)

Sessions: Access to tutors is available at all times during the semester, so interim formative feedback will be provided as requested.
MODULE DESCRIPTION FORM

BE930 Orthotic Management of the Diabetic Foot B

<table>
<thead>
<tr>
<th>Module Registrar: Suzanne Faulkner</th>
<th>Module Title: Management of the Diabetic Foot In Prosthetics and Orthotics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Lecturers Involved: Guest Lecturers</td>
<td>Credit Weighting: 20 Semester: 2</td>
</tr>
<tr>
<td>Compulsory/optional/elective class: Optional</td>
<td>Academic Level: 5</td>
</tr>
</tbody>
</table>

Prerequisites: Entry to the MSc prosthetics and orthotics programme

Module Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>15</td>
<td>50</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

Educational Aim

This module is suitable for students who foresee their future in either prosthetics or orthotics. Diabetes is a pathology prevalent in both prosthetics and orthotic clinics. In this module students will gain enhanced in depth knowledge relating to this patient group.

This module aims to:
1. Provide practical experience of the management of diabetic patients in both prosthetics and orthotics.
2. Enhance the students understanding of the psychological aspects of living with diabetes through motivational interviewing and understanding the principles underpinning cognitive behavioural therapy.
3. Develop an understanding of the roles of key members of the multidisciplinary diabetic foot team with a focus on podiatry and diagnostic radiology.
4. Enhance knowledge of the biomechanics of the foot, foot amputation, the remaining foot, therapeutic amputation, limb amputation, prosthetics and the post-operative relieving orthoses.
5. Review the available literature on pressure relieving orthoses and the application of the varieties of total contact or wound healing casts.
6. Enhance the students’ ability to recognise and classify active foot ulceration. This will include identification of vascular insufficiency, neurological deficit, significant foot deformity, trauma, increased pressures, and the extent and degree of infection. Understand the importance of diagnosis of the acute Charcot foot.
7. Develop an understanding of the causes of painful diabetic peripheral neuropathy, the signs and symptoms of painful diabetic peripheral neuropathy and the typical progression of painful diabetic peripheral neuropathy.
8. Enhance the students’ knowledge of biomechanical risk factors relating to friction, shear and pressure risk resulting in the ability to alter prescription appropriately.
9. Develop the students’ understanding of prescription footwear, and footwear adaptations considering all risk factors utilising appropriate materials.
10. Enhance students’ problem solving skills using reflection and self-assessment to evaluate clinical outcomes.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Understand and describe the diagnosis, pathogenesis and clinical presentation of diabetes with particular focus on the feet.

LO2 Display in-depth knowledge of the range of interventions (orthotic and/or prosthetic) in the management of patients with diabetes. This includes proving evidence and rationale for treatment options prescribed.

LO3 Demonstrate an ability to understand the psychological problems associated with this patient group through the use of cognitive behavioural therapy, in addition to communicating effectively utilising motivational interviewing.

LO4 Demonstrate knowledge of the role of the multidisciplinary team in the management of patients with diabetes in a prosthetics and orthotic clinical setting.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The curriculum will convey the learning outcomes specified through:

- Blended learning
- Self-directed learning
- Attendance and participation at multidisciplinary clinical sessions

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:
LO1 Understand and describe the diagnosis, pathogenesis and clinical presentation of diabetes.
C1 Demonstrate knowledge of peripheral neuropathy, painful peripheral neuropathy.
C2 Demonstrate a working knowledge of HbA1c (glycated haemoglobin) levels and their importance in relation to developing diabetes-related complications.
C3 Demonstrate the ability to recognise and classify active foot ulceration, including identification of vascular insufficiency, neurological deficit, significant foot deformity, trauma, increased pressures, in addition to the extent and degree of infection.

LO2 Demonstrate knowledge and an appreciation of the range of interventions (orthotic and or prosthetic) in the management of patients with diabetes. This includes proving evidence and rationale for treatment options prescribed
C1 Demonstrate understanding of indications and contraindications with regards to appropriate shape capture techniques and prescription options.
C2 Demonstrating the ability to apply appropriate pressure relieving orthoses, including the application of the varieties of total contact or wound healing casts.
C3 Formulate a prescription for footwear and prosthesis where appropriate considering all risk factors, utilising appropriate materials.

LO3 Demonstrate an ability to understand the psychological problems associated with this patient group through the use of cognitive behavioural therapy, in addition to communicating effectively utilising motivational interviewing.
C1 Assess the individual’s understanding of the information that you have given them, and where necessary confirm the main areas that contribute to their risk of ulceration.
C2 Demonstrate through motivational interviewing the ability to assess the individuals understanding and reinforce the benefits of good glycaemic control, self-care and monitoring to prevent complications.
C3 Understand the theory behind cognitive behavioural therapy (CBT) and demonstrate an ability to incorporate this into clinical practice.

LO4 Demonstrate knowledge of the role of the multidisciplinary team in the management of patients with diabetes in a prosthetics and orthotic clinical setting.
C1 Attendance and participation in multidisciplinary diabetic foot and/or prosthetic clinics.
C2 Demonstrate knowledge of the biomechanics of foot amputation, limb amputation, prosthetics and the post-operative rehabilitation process including the importance of multidisciplinary team working.
C3 Demonstration of understanding different radiological and non-radiological methods of assessment resulting in the ability to interpret radiological reports.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback
The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/
Specific details relating to this class are as follows:
There will be an opportunity for students to choose the topic that their literature review will be based on, thus giving the students some control over their own learning, encouraging ownership and increase motivation.

The use of formative online tests will be utilised to identify areas that require clarification in tutorial sessions.

Students will be required to take part in peer assessment prior to submission of written work, students will receive formative feedback on this before summative assessment. This will provide an opportunity to students to ‘close the gap’ in their learning prior to summative assessment.

Students will be required to produce a reflective piece of work on their learning; this will be a useful task for students while at the same time providing indication of the students’ ability to critique their own work.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Method</th>
<th>Number</th>
<th>Duration</th>
<th>Weighting</th>
<th>Number</th>
<th>Weighting</th>
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<tbody>
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<td>LO1,2,3,4</td>
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<td></td>
<td></td>
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</tbody>
</table>

Coursework / Submissions deadlines:
Information relating to the self-selected topic for the literature review, the presentation and clinical sessions will be distributed at the start of the module.

Resit Examination Procedures:
A written piece of coursework will be given for submission in August.

PLEASE NOTE:
Students need to gain a summative mark of 40% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.
Additional Reading:


Additional Student Feedback:

(Please specify details of when additional feedback will be provided)

Sessions: Access to tutors is available at all times during the semester, so interim formative feedback will be provided as requested.
**Module Description Form**

**94500 Project**

**Module Registrar:** Dr Anthony McGarry  
**Taught To:** MSc Prosthetics and Orthotics

**Other Lecturers Involved:** All BME Academic, Research and Teaching staff

**Credit Weighting:** 60  
**Semester:** 3

**Compulsory/optional/elective class:** Compulsory  
**Academic Level:** SHE 5

**Prerequisites:** None

**Module Format and Delivery (hours):**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>600</td>
<td>600</td>
<td></td>
<td>600</td>
</tr>
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</table>

**Educational Aim**

This module aims to provide an opportunity for students to experience the challenges and rewards of sustained, independent study in a topic of their own choice in the general field of prosthetics and orthotics. It will involve students in a number of processes which include justification of the selected topic; selecting, devising and applying appropriate methods and techniques; anticipating and solving problems which arise; displaying knowledge of background literature; and evaluating and reporting the conclusions of the study. The project may take the form of an extended literature review or involve experimental work. This project work will have been supported by a compulsory research methods module and specialist knowledge classes throughout the year designed to assist with technical aspects of methodology and analysis.

**Learning Outcomes**

On completion of the module the student is expected to be able to:

- **LO1** Demonstrate a critical understanding of the principal theories, principles and concepts of their chosen topic field.
- **LO2** Show autonomy in planning and executing a significant project of research, investigation or development.
- **LO3** Apply critical analysis, evaluation and interpretation to their own experimental data and/or that of other published work.
- **LO4** Effectively communicate and discuss their research with non-specialists, peers, technically adept non-specialists and specialists in their chosen field.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

**Syllabus**

The module will teach the following:

There is no formal syllabus to this module. Supervisors will guide students through an appropriate research process.

**Assessment of Learning Outcomes**

**Criteria**

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

- **LO1** Demonstrate a critical understanding of the principal theories, principles and concepts of their chosen topic field.
  - C1 Describe the appropriate theoretical background for their project, including any underlying assumptions.
  - C2 Describe alternative theories/methodologies where appropriate and discuss the differences between approaches.
  - C3 Provide a fully-informed justifiable rationale for their research.

- **LO2** Show autonomy in planning and executing a significant project of research, investigation or development.
  - C1 Develop an appropriate methodology to examine the research question.
  - C2 Execute the developed methodology.
  - C3 Critically appraise the execution of the methodology.
LO3  **Apply critical analysis, evaluation and interpretation to their own experimental data and/or that of other published work.**

C1  Handle, present and discuss numerical data in an accurate and appropriate manner.

C2  Discuss their analysis in the light of the theoretical framework.

LO4  **Effectively communicate and discuss their research with non-specialists, peers, technically adept non-specialists and specialists in their chosen field.**

C1  Use a good standard of written and verbal technical English.

C2  Explain complex technological and scientific concepts with clarity of expression.

C3  Discuss and justify the written thesis.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

**Principles of Assessment and Feedback**

The University’s Assessment and Feedback Policy can be found at: [www.strath.ac.uk/staff/policies/academic/](http://www.strath.ac.uk/staff/policies/academic/)

Specific details relating to this class are as follows:

Regular student-supervisor meetings will deliver regular high quality feedback on progress providing ample opportunity for students to understand and to attain the expected level of achievement. Students will be working within a project area of their choice maintaining motivation and interest in their work. Whilst independent, a healthy research buzz within the Bioengineering Unit provides a motivational learning community with peer-peer encouragement and support in addition to that from the supervisor.

**Assessment Method(s) Including Percentage Breakdown and Duration of Exams**

<table>
<thead>
<tr>
<th></th>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
</tr>
<tr>
<td>Duration</td>
<td>Weighting</td>
<td>Weighting</td>
<td>Weighting</td>
</tr>
<tr>
<td>1</td>
<td>30%</td>
<td>1</td>
<td>70%</td>
</tr>
</tbody>
</table>

LO1-LO4  LO1-LO4

*Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam / coursework / project as required.*

**Coursework / Submissions deadlines:**

Thesis submission deadline is mid-August. An oral examination will take place in early September. The viva will start with a short poster presentation of the main research findings by the student to the examiners.

**Resit Examination Procedures:**

Students who fail to provide a satisfactory project at the first attempt will be asked to do corrections and to resubmit within an agreed timescale.

**PLEASE NOTE:**

Students need to gain a summative mark of 50% to pass the module.

**Recommended Reading:**

Individual supervisors will recommend initial reading. It is then up to the student to direct themselves in collating the appropriate literature.

**Additional Student Feedback:**

Feedback will be provided throughout the project with regular meetings scheduled with project supervisors.
MODULE DESCRIPTION FORM

BE922 PgDip Prosthetic and Orthotic Dissertation

Module Registrar: Dr Anthony McGarry
Taught To: PgDip Prosthetics and Orthotics

Other Lecturers Involved: All Biomedical Engineering Staff
Credit Weighting: 20
Semester: 3

Compulsory/optional/elective class: Optional
Academic Level: 5

Prerequisites:

Module Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
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<td></td>
<td></td>
<td>200</td>
<td></td>
<td></td>
<td>200</td>
</tr>
</tbody>
</table>

Educational Aim

This module aims to provide an opportunity for students to experience the challenges and rewards of sustained, independent study in a topic of their own choice in the general field of prosthetics and orthotics. It will involve students in a number of processes which may include justification of the selected topic; selecting, devising and applying appropriate methods and techniques; anticipating and solving problems which arise; displaying knowledge of background literature; and evaluating and reporting the conclusions of the study. The dissertation is likely to take the form of a literature review. This project work will have been supported by a compulsory research methods module and specialist knowledge classes throughout the year designed to assist with technical aspects of methodology and analysis.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Demonstrate a critical understanding of the principal theories, principles and concepts of their chosen topic field.

LO2 Show autonomy in planning and executing a significant review of the literature.

LO3 Apply critical analysis, evaluation and interpretation of published work.

LO4 Effectively communicate specialist knowledge in their chosen field to technically adept non-specialists.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The module will teach the following:

There is no formal syllabus to this module. Supervisors will guide students through an appropriate research process

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into 'teachable' elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

LO1 demonstrate a critical understanding of the principal theories, principles and concepts of their chosen topic field

C1 describe the appropriate theoretical background for their project, including any underlying assumptions

C2 describe alternative theories/methodologies where appropriate and discuss the differences between approaches

C3 provide a fully-informed justifiable rationale for their research

LO2 show autonomy in planning and executing a significant review of the literature

C1 collect relevant literature appropriate to the review

C3 demonstrate knowledge of the literature by reporting the salient issues

LO3 apply critical analysis, evaluation and interpretation of published work

C1 critically appraise the collated literature

C2 synthesise the literature and provide an original interpretation of the collected information

LO4 effectively communicate specialist knowledge in their chosen field to technically adept non-specialists.

C1 use a good standard of technical English

C2 explain complex concepts with clarity of expression

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.
Principles of Assessment and Feedback

The University’s Assessment and Feedback Policy can be found at: www.strath.ac.uk/staff/policies/academic/

Specific details relating to this class are as follows:

Regular student-supervisor meetings will deliver regular high quality feedback on progress providing ample opportunity for students to understand and to attain the expected level of achievement. Students work within a project area of their choice maintaining motivation and interest in their work. Whilst independent, a healthy research buzz within the Biomedical engineering department provides a motivational learning community with peer-peer encouragement and support in addition to that from the supervisor.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>Examination</th>
<th>Coursework</th>
<th>Project</th>
</tr>
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<tr>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
</tr>
<tr>
<td>1</td>
<td>100</td>
<td>LO, LO2, LO3, LO4</td>
</tr>
</tbody>
</table>

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:

Beginning of August.

Resit Examination Procedures:

Students who fail to provide a satisfactory project at the first attempt will be asked to do corrections and to resubmit within an agreed timescale.

PLEASE NOTE:

Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

Recommended Reading:

Individual supervisors will recommend initial reading. It is then up to the student to direct themselves in collating the appropriate literature. This will be done through searching the literature in a systematic manner, and using critical appraisal tools to assess the evidence/research documented.

Additional Student Feedback:

(Please specify details of when additional feedback will be provided)

Feedback will be provided by the module registrar and will be discussed individually at the start of the dissertation according to student requirements.
USE OF COMPUTING FACILITIES AND RESOURCES

1. **Scope**

This policy covers the use of all computing facilities and resources administered by the University of Strathclyde, including use by staff and students of the University and by any other person authorised to use these facilities, and use at the University's property and/or through any networked links to the University's computing facilities. Anyone using any kind of computer hardware or software, for any purpose, at the University, even if it is their own equipment and even if it is only connected to the institution through a network, is required to abide by the terms of this policy.

In this policy 'computing facilities and resources' includes central services such as those provided by Information Services through the Divisions of Information Systems and Networking and Computing Services, and through the Centre for Educational Systems and AV Media Services; the University Libraries; departmental computers; microcomputers and peripherals; personal computers, whether desktop or portable, when linked to facilities provided by the University; any associated software and data including data created by others, and the networking elements which link the facilities together.

2. **Introduction**

The University of Strathclyde provides a wide range of computing facilities and resources for use by staff and students in pursuit of teaching, learning, research and administration. Use of the facilities solely for the purposes of the University is encouraged as part of the University's strategy of ensuring that any use the University makes of information technologies will be for the improvement of our already high educational standards.

Use of computing facilities requires that individuals accept certain responsibilities as set out in this policy (see section 5 - Conditions for Use). The University recognises that new measures are required for managing information in electronic forms, much of which will represent the University as a first point of contact with the rest of the world. The underlying philosophy of this policy is that the University's computing facilities should be used in a manner which is ethical, legal, appropriate to the University's aims, and not to the detriment of others. The policy sets out the conditions for use of the University's network for the publication of all material and demands that the same sensitivity is applied to information in electronic format as is normally applied to the written work.

3. **Access to Facilities**

3.1 Computing facilities are provided by the Department of Information Services and others for the University as a whole, and by Faculties and Departments for their staff and students, solely for use by staff and students in connection with the aims and purposes of the University (see section 4 - Definitions). Computing facilities should not be used for personal or recreational purposes.

3.2 On special application being made, the University may authorise the use of its computing facilities for work outside the scope of normal University purposes, including consultancy and use by external users. Any charges for provision of such facilities will be determined by the Director of Information Services. Other use may be allowed, by agreement with the Director of Information Services, as a privilege not a right and if abused may be deemed to be a breach of this policy.

3.3 In order to use the computing facilities of the University of Strathclyde a person must first register with the Department of Information Services as an authorised user in the manner prescribed in this policy. Registration grants authorisation to use some or all of the facilities of the University. Access to facilities is normally arranged by allocation of a unique user ID (sometimes called a login or user name) and will require the production of a University ID card or other form of identification. On most computer systems a password is required to gain access. Users should choose a password that is secure and not easily guessed, and should keep it secure at all times.

3.4 If a user suspects that the security of their computing facilities has been breached or compromised it should be reported to Information Services Help Desk or departmental computing staff as soon as possible.

3.5 Bona fide visitors to the University such as the staff of institutions connected to JANET (Joint Academic Network) and visiting scholars from overseas can request access to the University's computing facilities. Appropriate arrangements will be made by the Department of Information Services to register them as an authorised user in the normal way.

3.6 The Director of Information Services may permit other legal entities to connect to the University network under the terms and conditions laid down in the United Kingdom Education and Research Networks Association (UKERNA) document “Sponsored and Proxy Connections to JANET Guidelines for Hosting Organisations”.

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4. Definitions

In this policy the following definitions apply:
Accessing means holding, storing, displaying, transmitting, or distributing information in electronic format, by whatever means, such that others may have access to it or use it; and such that the publisher or source of the information may be traced back the University of Strathclyde.

Authorised means a person who has been registered as a user by the Department of Information Services in accordance with the procedures set out in section 3 or a separate legal entity or bona fide visitor allowed connection under 3.5 and 3.6 above.

Computing Facilities includes:
All local computing facilities, multi-user systems, server systems, work stations, personal computers, micro computers and networks and or other electronic information and communication systems whether provided by the University or otherwise and which are intended wholly or partly for use by employees of, researchers at or students of the University or wholly or partly for use for other University related or academic purposes.

All remote facilities which are accessed through the computer, electronic information and communication facilities at or operated wholly or partly by the University and anything else deemed computing equipment by the University information includes words, pictures, data, graphics, visual images, video and sound clips and computer programs solely for University purposes means use by staff in connection with their normal University duties of employment and by students in connection with their approved University study or research unacceptable material includes material which, in the opinion of the University, is offensive, abusive, defamatory, discriminatory, obscene or otherwise illegal which brings or may bring the University into disrepute.

The provision by a University user of explicit or cryptic links to such material stored elsewhere on the Internet is also unacceptable unless agreed by the Director of Information Services personal information means any information which is not sanctioned by the University in accordance with section 7 of this policy.

5. Conditions for Use – Rights and Responsibilities

5.1 All users will be required to sign an agreement to become a registered user of the University's computing facilities and resources and by so doing have understood and agreed to abide by the terms of this policy and other appropriate University regulations. Users must also comply with the provisions of any current UK or Scots law (see section 6 - Legal Framework) and will be held responsible for any and all activity on computing facilities which is initiated by their user ID. It is every user's responsibility to act in a manner which will not cause damage to computing facilities or adversely affect the performance of any service available on these facilities. Users should not allow any other person access to their user ID or password; use another person's user ID or password; or modify or interfere with information belonging to another user without their permission.

5.2 The University of Strathclyde will not permit the use of its computer facilities and resources for the 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 or displaying pornographic material; stating defamatory opinions or views concerning individuals or organisations; accessing or displaying discriminatory material or material which encourages discrimination; engaging in games or chain E-mail; publishing information which is intended to misinform and thereby cause anxiety or inconvenience in another; unauthorised use of University logos, titles etc.; spamming; corrupting or destroying other users' data; violating the privacy of other users; disrupting the work of others; using JANET in a way that denies service to others; misuse of networked resources such as the introduction of viruses.

5.3 The University may actively monitor usage of University computer facilities and resources which includes monitoring the access to, publication or receipt of, any Internet materials by any user and reserves the right to remove or require the immediate removal from the University systems of any material which, in the opinion of the Vice-Principal or a depute to whom authority has been delegated is unacceptable (see section 4 - Definitions). It is University policy to provide information obtained by monitoring, when required to do so to the UKERNA CERT team or other relevant agency.

5.4 No user will by wilful or deliberate act jeopardise the integrity of the computing equipment, communications network, system programs or other stored information. No user will connect to the University network any piece of equipment which by its function could adversely affect the performance of the network without the prior agreement of the Director of Information Services. Any user connecting their own equipment to the University network agrees that by doing so the Director of Information Services has the right to audit the equipment and data stored on it at any time.
5.5 Users may only use JANET for the purposes which meet the conditions agreed by the Secretary of State for Education for the operation of the network, and as set out in the UKERNA document "JANET Acceptable Use Policy". Users must also comply with the provisions of the Code of Conduct for the Use of Software and Datasets at Higher Education and Research Council Establishments. This Code does not constitute a licence and, in all cases, users of software should acquaint themselves with the provisions of the relevant licence when they obtain a copy and before putting the same into use. Further information about JANET and the Code of Conduct is available from the Information Services Help Desk in the first instance.

5.6 At the request of the Director of Information Services, any user holding or transmitting encrypted data must provide corresponding decrypting tools to the Director of Information Services for investigation purposes. Any dispute arising over material of a commercial or militarily sensitive nature will be referred to the Vice-Principal for decision.

6. Legal Framework

Users should be aware of UK legislation which relates to computer use. Much of the electronic information in use by staff and students is likely to also be available world-wide and care should be taken that the laws of other countries are not infringed by this availability. Brief details of the relevant legislation is outlined below but those seeking further information should contact the Director of Information Services in the first instance. Users should note carefully that much of the legislation prescribes criminal penalties including fines and custodial sentences where an offence is committed.

6.1 Data Protection Act 1984
The Act prohibits the holding, processing or disclosure of personal data about others on computer, unless the user is properly registered under the terms of the Act and observes the principles of data protection. Use of such information is subject to the University's Data Protection Registration and information about this can be obtained from the University's Data Protection Officer on ext 2416 (JA). All users are responsible for ensuring that they comply with the terms of the Act.

6.2 Telecommunications Act 1984
The Internet makes use of the "public telecommunication system" as defined by the Act. Under the Act it is a criminal offence to send a message or other matter that is grossly offensive, indecent, obscene or menacing in character via the public telecommunication system or to send a false message for the purpose of causing annoyance, inconvenience or needless anxiety to another, and those found guilty could face a substantial fine or a term of imprisonment.

6.3 The Copyright, Designs and Patents Act 1988
The Act requires that the permission of the owner of the intellectual property must be sought before any use is made of it. It is therefore unlawful to use or copy any material without proper authorisation and this includes computer software. Penalties include unlimited fines and up to two years, imprisonment. It should be noted that the University titles and logos are the property of this University and may only be used for official University documents.

6.4 Computer Misuse Act 1990
The Act makes it a criminal offence to access, attempt to access or encourage others to access computer material without proper authority or to make unauthorised modification of computer material. This would include "hacking", the introduction of viruses and knowingly receiving or using material from an unauthorised user who has gained access to computer material. Penalties for conviction include up to five years, imprisonment and/or a fine.

6.5 Obscene Publications Act 1959
The publication, which includes transmission over a network, whether for gain or not, of material intended to be read, heard or looked at which is such as to tend to deprave and corrupt persons having access to it is a criminal offence under this Act. Penalties include up to three years in prison.

6.6 Criminal Justice and Public Order Act 1994
This legislation consolidates the protection of minors by making it a criminal offence to possess pornographic or obscene material of or involving minors, or material considered to be excessively violent. In the context of computer facilities, it applies to the transmission, receipt and storage of text, audio, graphic and manipulated images.
(Note: The Acts referred to in 6.5 and 6.6 above apply in England and Wales but not in Scotland where prosecutions for similar offences are mounted on the basis of common law as opposed to Statute).

6.7 Sex Discrimination Act 1975
The Act makes it unlawful to discriminate against others on the grounds of sex, gender and marital status and any information published or received via the Internet which discriminates or encourages discrimination is illegal.

6.8 Race Relations Act 1976
The Act makes it unlawful to discriminate against others on the grounds of race, colour, nationality, ethnic or national origin and any information published or received via the Internet which discriminates or encourages discrimination is illegal.
6.9  Laws of Defamation
Any publication of a statement, comment or innuendo about another individual or organisation which cannot be justified at law may render the author liable to an action for defamation.

6.10  International and EC Law
Users should be aware that material they produce and transmit may be available worldwide, and care should be taken to ensure that no international laws or treaties are contravened. Specific examples include importing specified materials from a country for which an embargo is in force, and exporting material legally obtained in the UK but which when accessed in another country may constitute an offence in that country. It also includes accessing material which though legally available in another country is illegal in the UK.

EC Law is constantly changing particularly in the areas of sex discrimination, harassment and unequal treatment. Increasingly EC Directives and regulations are being interpreted to afford protection to people who are discriminated against or harassed because of their sexuality. The information about the Sex Discrimination Act (see 6.7 above) should be read with this in mind.

6.11  Official Secrets Acts
Some work carried out under contract from the Government or its agencies may be subject to the provisions of this legislation. Any publication of material which contravenes obligations under this legislation is a criminal offence and punishable by imprisonment and/or a fine.

7.  Publishing Information in Electronic Format

7.1  The Department of Information Services gives permission to staff and students to publish information on the University of Strathclyde World Wide Web information server under Regulation 6.11.13 (see University calendar). This Regulation allows the University to impose more stringent conditions than those usually applying to the use of computing facilities and the University has chosen to do so in the form of this policy.

7.2  Heads of Department have responsibility for ensuring that any information published electronically on behalf of their Department adheres to this policy. Any person who provides information for the Department must have the authority to do so from the Head of Department.

7.3  Staff or students may apply to the Department of Information Services to publish information on behalf of a University club, society or association but such an application must first have the approval of the Head of Department or Dean as appropriate, and the approval of the club, society or association.

7.4  Those who publish general University information, such as maps, events, descriptive or historical information about the University must obtain permission from the Office of Marketing and Communications. Guidelines to publishing in electronic format are available from that department and via the home page on the University's website. They make clear that University logos and titles are only to be used in conjunction with information on official institutional web pages approved by the University for publication.

7.5  Individuals are responsible for all information published through their personal computer account such as via WWW personal home page or Email contributions to discussion lists or bulletin boards. All the requirements outlined in this policy apply equally to publications on the World Wide Web (see particularly sections 5 and 6).

7.6  Information published by individuals must be declared as such and must not appear to be published on behalf of the University. To that end there must be a clear separation between University information and personal information and the latter should contain the following disclaimer: "The views and opinions expressed herein are strictly those of the author. The contents have not been reviewed or approved by the University of Strathclyde. They do not represent or reflect the views of the University of Strathclyde or anyone else associated with the institution and the University retains no liability for the content or layout". Anyone who registers in an external index an address for an electronic information system, such as a departmental server or personal home page, must ensure that it does not appear that their address is the principal access point for all University of Strathclyde systems. The home page of any externally registered WWW server, run on University of Strathclyde systems MUST contain a pointer to the University of Strathclyde home page. Information on or links to or from the University's official web pages must be authorised by the Communications Office.

7.7  Nothing must be published which might in any way bring discredit or harm to the University or its members or bring the University into disrepute. Personal opinions must not be published in any way which might make them seem to be those of the University.

7.8  Appropriate care must be taken in the presentation, content and management of information being published electronically. This includes:

- care in writing, proofing and layout
- following appropriate University presentational guidelines eg display of University crest/logo etc.
- attribution of the source of the information - include author, contact name and address
- removal of out-of-date information
• restricting access to sensitive information
• editorial changes to documents in electronic format should only be made with the permission of the ‘owner’ of the document

7.9 The University’s computing facilities must not be used for the placing or distribution of commercial advertisements without the express written permission of the Vice-Principal. Any non-commercial advertisements which do appear must comply with the Code of Practice for Advertisers, issued by the Advertising Standards Authority, which requires that all advertisements should be ‘legal, decent, truthful and honest’.

8. **Misuse - Penalties and Sanctions**

8.1 Breaches of this policy by staff or students will be dealt with under the appropriate disciplinary procedures. Where this involves students it will normally be dealt with under the University regulations for Student Discipline (see Regulation 5 in the University Calendar). The University will accept no responsibility for the effect disciplinary action might have on a student's academic progress and achievement. Where members of staff are involved breaches will be dealt with under the appropriate disciplinary procedures. Where an offence may have occurred under criminal law it will be reported to the police or other appropriate authority.

8.2 Where appropriate, staff or students at the University of Strathclyde or other authorised users may have their use of the University’s computing facilities immediately suspended pending an investigation by an authorised person in the University.

8.3 In the event of loss being incurred by the University or members of the University as a result of a breach of these regulations by a user, that user may be held responsible for reimbursement of that loss.

9. **Monitoring and Review**

The effectiveness of this Policy will be monitored by the Department of Information Services and will be formally reviewed by the University Court within twelve months of its adoption.