Course Information

Department of Orthopaedic and Trauma Surgery
TORT Centre, Medical Education Institute
College of Medicine, Dentistry and Nursing, University of Dundee
Dear Candidate

Thank you for your interest in our Postgraduate Course in Motion Analysis by distance learning. The Distance Learning Section of the Department of Orthopaedic and Trauma Surgery at the University of Dundee was founded in 1990 and now provides distance learning programmes to over 150 students worldwide.

The Institute of Motion Analysis and Research (IMAR) was established in 2003 by combining the Foot Pressure Analysis Laboratory and the Dundee Gait Laboratory at the Orthopaedic and Trauma Surgery Department, University of Dundee. A new laboratory dedicated to Sports Biomechanics was completed in January 2007 to augment and support the current facilities of IMAR. IMAR’s main goal is to promote excellence in teaching and research and to provide a comprehensive clinical service in the field of motion analysis.

We hope that you will find this information booklet helpful in deciding whether to pursue this course of study with us. Application forms for the course are handled by the University Postgraduate Office and are submitted through UKPASS. You can find links to UKPASS electronic application system on our course web page at: www.dundee.ac.uk/postgraduate/courses/motion_analysis_msc.htm

If you require any further information please contact the Distance Learning Section at the address on the reverse of this booklet.

Yours faithfully

Dr Weijie Wang
PhD
Course Co-Director
Senior Lecturer

Professor Rami Abboud
BEng, MSc, PhD, ILTM, SMIEEE, Hon FRCS(Eng)
Course Co-Director
Head of Department
Director of Institute of Motion Analysis and Research
Orthopaedic and Trauma Surgery Department

The Department of Orthopaedic and Trauma Surgery, at the University of Dundee, was founded in 1967 when the University of Dundee split from St Andrews’ University and established an independent teaching medical school. The department is based in the Tayside Orthopaedic and Rehabilitation Technology (TORT) Centre. The current staff includes a professor, two clinical senior lecturers, two non-clinical senior lecturers, one clinical and one non-clinical lecturer, one research assistant, four clinical fellows, who are supported by various staff to make your stay with us as beneficial and enjoyable as possible.

The department has a tradition of teaching and research in the field of mechanisms of disease, treatment of disorders of the musculoskeletal system and biomedical and rehabilitation engineering. The founder, Professor Ian Smillie, gained a worldwide reputation in knee surgery and the role of the meniscus. His successor, Professor George Murdoch, founded and developed the Dundee Limb Fitting Centre and the Tayside Rehabilitation Engineering Services, which have acquired an international reputation for the treatment of the amputee and assessment of gait analysis. His successor, Professor David Rowley, sustained the department’s international reputation and innovation in the area of joints replacement complemented by a worldwide service in Clinical Audit Outcomes. The current Professor and Head of Department, Rami J Abboud, is a Biomedical and Rehabilitation Engineer with over 20 years of Biomechanics and Clinical Motion Analysis expertise. He is the founder and current Director of the Institute of Motion Analysis and Research (IMAR) and has developed a number of groundbreaking initiatives originating with the establishment of the Foot Pressure Analysis Clinic and Laboratory in 1993 and subsequently IMAR in 2003. Professor Abboud is also the Course Director of the widely acclaimed Master of Orthopaedic Surgery (MCh Orth) course, Chairman of the College Intercalated BMSc honours degree and Associate Director of the Medical Education Institute.

In 1990 the Distance Learning Section was established and now has over 150 students from all over the world studying its programmes. The Master of Orthopaedic Surgery Course (MCh Orth) and the Intercalated Honours Degree in applied Orthopaedic Technology have been added to complete a comprehensive portfolio of research and taught courses designed to meet the growing demand for education in the rapidly developing field of musculoskeletal medicine, biomechanics and surgery. The Clinical Audit Services coordinate several important clinical research and audit studies, in association with various companies and health boards. The department holds major UK and European grants concerned with motion analysis and clinical audit in a range of different orthopaedic and biomechanical related pathologies.
Orthopaedic and Trauma Surgery Department

The TORT Centre, which was opened on the 1st September 1999, encompasses a combination of surgeons, engineers, orthotists, prosthetists and various specialised professionals to support our clinical/research activities. The TORT Centre houses a diverse number of specialists under one roof who are supported with state of the art high-tech equipment and five laboratories as part of the Institute of Motion Analysis and Research (IMAR). It is going to be our job to pass on our knowledge and fields of expertise to you during your stay with us.

In 2007, the department received from the American Orthopaedic Society for Sports Medicine (AOSSM) the Society's highest honour, the ‘2007 AOSSM Hall of Fame’, presented posthumously to Professor Ian Smillie for his significant contributions to the specialty of Sports Medicine.

In 2008, to reflect the multi-disciplinary aspect of the research carried out at the Orthopaedic and Trauma Surgery Department, the respective staff were returned in the Research Assessment Exercise (RAE 2008) into Unit of Assessment 25 (General Engineering - Biomedical Engineering) and Unit of Assessment 8 (Primary Care and Other Community-based Clinical Subjects) where 90% and 85% of our quality research profile was deemed of international class respectively.

In 2012, Professor Rami Abboud, was elected an Honorary Fellow of the Royal College of Surgeons of England. Honorary Fellowship is given to a very limited number of individuals of outstanding academic merit, or other outstanding contributions to the profession. Those who receive this rare accolade are usually world recognised in that particular speciality. The number of living not-medically qualified Honorary Fellows at any one time shall not exceed thirty. This prestigious accolade that has been bestowed upon Professor Abboud by the College further ascertain our reputation as one of the leading institutes for teaching, research and training in Orthopaedic and Trauma Surgery and Biomechanics.

“It was a great learning experience. Coming here, my overall personality has changed. I have learnt the right way to write a thesis and also got to know the recent advancements in field of Orthopaedic surgery”

International Student Barometer, 2009
In 2003, the Institute of Motion Analysis and Research (IMAR) was established by Professor Rami Abboud to promote excellence in teaching and research and to provide a comprehensive service in the field of motion analysis. It incorporates the following:

- The Foot Pressure Analysis Laboratory provides a unique clinical service in Foot Pressure Analysis and is at the forefront of research in this area.
- The Gait Analysis Laboratory provides a clinical gait analysis service.
- The Disability Research and Assessment Laboratory provides state of the art technology for measuring all aspects of motion.
- The Materials Testing Laboratory provides cutting-edge technology for all aspects of orthopaedic evaluation.
- The Sports Biomechanics Laboratory was completed in 2007 and provides state of the art technology for measuring all aspects of motion and sports.

The Department contributes to the teaching of undergraduate medicine in the exciting new integrated Dundee Medical School curriculum. It also addresses postgraduate education and, besides training 14 specialist registrars, has a unique postgraduate course dedicated to postgraduate post-training orthopaedic surgeons:

- Master of Orthopaedic Surgery (MCh Orth) Course - accredited by the Royal College of Surgeons of England

The Department also contributes to the following postgraduate courses:

- MSc in Healthcare Law and Ethics
- MSc in Human Identification □
Distance Learning

Studying by distance learning means that you learn at a distance from your tutor and your fellow students. We aim to ensure that this distance is only physical, and encourage contact between you and your tutor, and other students. The distance learning mode of study therefore allows you to learn at your own pace, using specially designed learning materials and methods which are easily integrated into your daily routine. Our distance learning courses are particularly suitable for healthcare professionals and others who are unable to take time off work for full-time study.

What are the advantages of the distance learning approach?

- You start your study at any time
- You study at a pace that suits you
- You can set your own deadlines
- You take responsibility for directing your own learning
- You study where it suits you
- You study when it is convenient for you
- You can study without leaving your employment
- You can choose when to contact your tutor if you need support
Learning Materials and Tutor Support

Learning Materials
For each module, you receive learning materials consisting of a module guide and one or more study guides. The module guide provides information regarding the structure, the recommended reference materials and the tutor support system. Most modules consist of several individual units, each unit dealing with a different aspect of the module. For every unit there is a study guide which explains the objectives of the unit (what you will have learned by the end of the unit) and then leads you through the learning material, section by section, using text, illustrations, activities, exercises and references to the recommended reference materials. Some additional web-based materials may be made available on the University’s Virtual Learning Environment, which you will be able to access once you have completed the matriculation process. You monitor your own progress through the unit by completing self-assessment questions, which are placed at regular intervals throughout the text, and checking your answers against those provided in the study guide. At the end of each study guide there is a short exercise, which you need to complete and return to your tutor for marking.

You will also be supplied, at no extra cost, the text book ‘Locomotor System’ by Werner Platzer (pictured). This is yours to keep and will be sent out together with your first modules.

Tutor Support
When you need to discuss any aspects of your study, you may contact your tutor for support. You may contact your tutor by email, telephone, letter or fax, with email being the preferred method of communication. A telephone answering service is available after office hours.
Programme Structure and SCFQ Credit Points

Programme Structure
The programme consists of three exit levels at Postgraduate Certificate, Postgraduate Diploma and Master of Science in Motion Analysis. At Certificate level there are two distance learning modules; for the Diploma there are an additional two distance learning modules (made up from a number of specialised units). Students must complete the Diploma within 3 years part-time (2 years if undertaking the MSc). The MSc level has an additional approved research project. The MSc course must be completed within a period of 1 year full time or 3 years part-time.

Credit Points
The University has approved the award of SCQF level 11 (Postgraduate) credit points for the Programme. The accumulation of a minimum of 60 credit points is equivalent to a Postgraduate Certificate, a minimum of 120 is equivalent to a Postgraduate Diploma and a minimum of 180 is equivalent to a Masters.

To be awarded the credit points for a module, you must successfully complete the assignment and the examination of all its units. You may transfer your credit points to another institution subject to its credit rating procedures.
1. Foundation Module  30 SCQF credit points (Level 11)

The Foundation Module consists of the basic topics required for the understanding of the techniques used in motion measurement.

**Essential Anatomy**
The aim of this module is to develop your knowledge of basic regional and systematic anatomy and physiology with an emphasis placed upon the musculoskeletal system.

**Essential Mathematics**
The aim of this unit is to develop your understanding of the basic principles of mathematics, which are applied in the processes and calculations used in motion analysis.

**Essential Physics**
The aim of this unit is to develop your understanding of the basic principles of physics as applied to motion analysis. The topics covered will include mechanics, skeletal mechanics, kinematics, statics and kinetics.

**Vector Methods in Motion Analysis**
This unit introduces the mathematical methods of calculating the position and orientation of markers in 2D and 3D space.

**Research Methods**
In this unit, you will develop your literature searching skills, project design and report writing skills.
2. Motion Measurement 30 SCQF credit points (Level 11)

This module introduces the basic concepts of motion measurement techniques and describes the advantages of various systems.

Motion Measurement
In this unit the various types of motion measurement systems are introduced including electrogoniometry, accelerometry, photographic and optoelectronic techniques.

Load Measurement
In this unit, a number of different types of load (force and moment) measurement systems used in the field of motion analysis are described. For each type of system, several subtypes are also described and, where appropriate, the relative merits of the different subtypes are discussed.

Pressure Measurement
This unit provides the basic concepts of foot pressure measurement techniques and describes the advantages and disadvantages of various systems.

Physiological Measurement
In this unit, a number of different types of physiological measurement systems used in the field of motion analysis are described. For each type of system, several subtypes are also described and, where appropriate, the relative merits of each of the different subtypes are discussed.

Quality Assurance in Motion Analysis
This unit deals with many of the considerations which are required to produce data of a high quality e.g. data collection and processing, modelling and presentation of data.
3. Fundamentals in Motion Analysis  30 SCQF credit points (Level 11)

This module introduces the basic concepts of the fundamentals in motion analysis.

**Musculoskeletal System and Functional Motion**
This unit further develops your knowledge of anatomy and physiology in terms of how muscles function according to their attachments and their relationships with EMG and force.

**Data Acquisition and Processing**
This unit aims to introduce you to the techniques involved in the capture of motion analysis data. It deals with the issues of capture of markers in two and three-dimensional space, placement of cameras, recording external forces and signal processing methods used for the different types of data captured.

**Joints, Limbs and their Properties**
In this unit, consideration will be given to the definition of limb segments, their centre of mass, moments of inertia and the implications of these on motion and force.

**Kinematic Analysis**
This unit will introduce you to the methods of calculation of kinematic parameters including displacement, velocity, angular change and angular acceleration, reference frames and their application in motion analysis.

**Kinetic Analysis**
The aim of this unit is to introduce you to the methods of calculation of kinetic parameters and includes forces and moments, mechanical free-body analysis, calculation of work and power and their applications in motion analysis.
4. Advanced Motion Analysis 30 SCQF credit points (Level 11)

In this final module you have the option of choosing five units to accumulate a minimum of 30 SCQF to complete the requirements for the PG Diploma. Each unit is equivalent to 6 SCQF. Extra units can be chosen and paid for separately.

Statistics
This unit is compulsory and deals with basic statistical methods.

Modelling Techniques
This unit introduces the concepts of creating a computer model to deal with specific biomechanical problems and deals with the practical problems of marker placement and segment generation associated with this.

Energy Analysis
This unit introduces various aspects of energy expenditure, its measurement and analysis associated with motion.

Gait Analysis
This unit deals specifically with normal gait, its definition, the kinematic and kinetic characteristics of gait and the calculation of mechanical properties.

Computer Simulation
This unit introduces the basic concepts in computer programming, the general concepts of computer simulation and how to run such a simulation.

Inverse Dynamics
This unit introduces the field of inverse dynamics and specifically how to estimate muscle parameters for the musculoskeletal system during motion.

Forward Dynamics
This unit introduces the concept of forward dynamics, what data is required and the techniques required to undertake the process in terms of computer modelling.

Clinical Applications
Acquisition of motion analysis data is only the first step of the process. The process of the interpretation of such data will be discussed in this unit using clinical examples
5. Project (MSc only) 60 SCQF credit points (Level 11)

The project module is for MSc students only. The project will be in a relevant area of motion analysis. The project must be undertaken at a suitable centre approved by the University of Dundee.

You must find a suitably equipped location for your project, and arrange for a local supervisor that should be approved by the University of Dundee. You will be assigned an internal supervisor in Dundee. You are responsible for designing your own project and will be required to submit, for approval, details of your project, the centre and its facilities and also about your supervisor and the supervision you will receive.
Further Information

Assessment
Assessment for the diploma award is by a combination of coursework (assignments) and written examination.

Coursework
At the end of each unit you submit an assignment to your tutor for assessment, along with an assignment card containing a signed declaration that the work submitted is your own. A copy of the assignment is returned to you with your marks and the original is retained by the University. The assignments form the coursework element of the final assessment for both courses.

Examinations
Written examinations are held during March and September each year in Dundee. Under special circumstances exams can also be sat by arrangement at approved examination centres (for example, at British Council Offices) outside, and in the United Kingdom. If you sit an examination outside Dundee you will be responsible for paying any costs the examination centre may charge.

You must complete all the units in a module group, including the assignment, before you can sit the exam(s) for that particular group. You will only be able to progress to the diploma and subsequent MSc after successful completion of the respective examinations.

Dissertation (MSc only)
The MSc project is assessed by dissertation and viva (oral examination). Vivas are held in Dundee.

Registration
To register for the course, you must first complete and return the application form for the course to our Distance Learning Section. This will be processed and if, your application is approved by the University, you will be offered a place on the course. Should you accept the place, you will be forwarded for matriculation once payment of fees has been received. As soon as we receive payment of your course fees, you may then start the course.
Frequently Asked Questions

Q  Will I need to buy textbooks?
A  The Study Guides supplied for each module contain all the information you require, but for each module references and further reading are recommended. You can use these to reinforce what you have learned from the Study Guide, to clarify points in the module and for further reading.

Q  How many modules can I study at once?
A  You need to complete one module before you can start the next.

Q  Who will be my tutor?
A  You will be assigned a tutor for each module. He/she will be a University lecturer or practitioner or other expert with experience in the module topic. Details of your tutor’s name and address and how and when you may contact him/her are given in the Module Guide for each module.

Q  When does the course start?
A  Once you have accepted a place on the course, you return your payment and matriculation papers stating the date you wish to start your course.

Q  Do I need to come to Dundee at any time during the course?
A  Examinations are held in Dundee every March and September (when applicable), although examinations may also be held at suitable locations throughout the country, and overseas, by arrangement. MSc students are required to attend the University for an oral examination in connection with their project.

Q  If I start the Diploma course can I transfer to the MSc course later?
A  You must first register for the Diploma course and then transfer to the MSc course once you have successfully completed the Diploma course, subject to approval of your project proposal and your performance on the Diploma.

Q  When should I arrange my MSc project?
A  You will need to make arrangements for your project when you apply for a place on the MSc course.

Q  Are there any hidden costs?
A  Over and above the course fee you should also make allowance for the purchasing of books and study materials (e.g. a scientific calculator), and travel and accommodation costs when attending examinations in Dundee or for paying any charges levied by an external examination centre.
Entry to the distance learning programme is subject to the following requirements:

**Certificate/Diploma**
A degree in science, engineering, medicine, sports, physiotherapy, occupational therapy, orthotics, prosthetics, nursing or other related field. Or a medically related professional qualification of degree standard, with at least two years experience of working in the field of orthopaedics, rehabilitation and/or motion analysis.

**MSc**
Successful completion of Diploma course within 2 years. Your project must be approved by the Course Director before you may register for the MSc course.

**English Language**
We require all overseas students who are not native speakers of English to provide certification of their English language qualifications. For current information on all English language qualifications accepted by the University of Dundee, please consult the following webpage:

www.dundee.ac.uk/admissions/international/english_language_requirements.htm
Course Fees

Fees are set each year on 1st September. Course fees for 2014-15 are as follows:

<table>
<thead>
<tr>
<th>Course Fees</th>
<th>Distance Learning</th>
<th>MSc in-house (full-time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate Course</td>
<td>£2,825</td>
<td>-</td>
</tr>
<tr>
<td>Diploma Course</td>
<td>£2,825</td>
<td>-</td>
</tr>
<tr>
<td>MSc Course</td>
<td>£3,000</td>
<td>£10,000</td>
</tr>
</tbody>
</table>

**Distance Learning**

The Diploma fee may be paid either in full at the start of the Diploma course, or in two instalments prior to starting each entry level. The fee for the MSc project must be paid before the start of the project, once an offer of a place has been accepted. Once your fees have been paid, your first module will be forwarded to you. If you decide that you do not wish to proceed at this stage, and you return the module in good condition within ten working days from its date of postage, your fee will be refunded (after deduction of 10% administrative costs).

**In-house**

The fees should be paid in full upon matriculation. N.B. Candidates can opt to do their modules by distance learning and then attend Dundee for their project. The cost will then be £2140 + £2140 + £3800*

**Checklist**

When applying for the Motion Analysis Course please ensure that the following have been forwarded to the Distance Learning Section:

- A fully completed application form
- A current CV
- Names and contact details of two referees
- Copies of relevant qualification certificates
- Two passport photographs
Course Regulations

Diploma in Motion Analysis

1. Before entering a course of study leading to the Diploma in Motion Analysis a candidate must hold a degree or professional qualification, acceptable to the Head of the Division or Course Director, and satisfy them of his or her suitability to undertake the course.

2. A candidate must undertake a course of instruction approved by the College Board for not less than two years and not more than three years on a part-time basis or one year on a full-time basis. The period of study may be extended by the College Board of Medicine and Dentistry on sufficient cause being shown.

3. A candidate will not normally be required to attend the University of Dundee during his/her period of study, except as required by the Head of the Division or Course Director, but will be required to matriculate as a student of the University and to pay such fees as may be prescribed by the University Court.

4. A candidate will be required to satisfy the Head of Division or Course Director that any work submitted for the Diploma is the candidate’s own work.

5. Before being awarded the Diploma a candidate must have attained a minimum of 50% in the module overall assessment (end of unit assessments and written examinations).

6. On the recommendation of the examiners, the Certificate/Diploma may be awarded “With Distinction” □

MSc in Motion Analysis

The course of study leading to the MSc in Motion Analysis is governed by the regulations for the Diploma, listed above, and the regulations for the degree of MSc, copies of which are available upon matriculation for the MSc □
From its very beginning the University of Dundee was both inspirational and down to earth; traits that remain its fundamental watermark today. The Nobel Laureate, Seamus Heaney, described the University as an institution ‘with its Head in the clouds and its feet firmly on the ground’. Perhaps the most apt description of the University’s ethos comes from one of its founding fathers, Patrick Geddes, who advised that ‘By creating we think, by living we learn’.

The University’s origins date back over 100 years to the founding of University College Dundee in 1881. The driving force was a rising demand for the extension of liberal education and the advancement of technical instruction. Today the University of Dundee has a strong emphasis on the professions, educating more than 70% of its students into the non-business professions ~ medicine, dentistry, nursing, law and architecture ~ more than any other Scottish university. It also has thriving arts and science colleges.

With women accounting for over 60% of our student population, the University has long since fulfilled and surpassed the earlier vision of Mary Ann Baxter ‘promoting the education of persons of both sexes in the study of science, literature and the fine arts’. That quote translates today to excellence in teaching and research and contributing to the social, economic and cultural life of Scotland.
About the University of Dundee

The high quality of teaching and research at the University, together with the satisfaction ratings of our students, have contributed to a series of high rankings and accolades:

- The Guardian University Guide 2010 places Dundee Medical School in 4th place in UK.
- The University ranked 140 among the world’s top 200 universities in the Times Higher Education 2010-11 World University Rankings
- One of the world’s top seven ‘intelligent communities’ ~ US think-tank Intelligent Community Forum, 2010
- Dundee has been chosen as the site for the Victoria and Albert (V&A) museum development outside London, 2010
- Ranked 1st in the UK ‘for good teachers and learning support’ ~ International Student Barometer, 2009
- Second in Scotland for all-round student experience ~ Times Higher Education Student Experience Survey, January 2009
- Best scientific workplace in Europe ~ Poll of International Scientists, 2008 and 2009
- Ranked 1st in the UK for its Medical Course ~ Guardian Educational league table, 2008 and 2009
- Ranked 1st in the UK for Dentistry ~ Independent and Guardian, 2008
- One of the UK’s top 20 universities ~ The Guardian, 2008
- One of the UK’s top 20 for research ~ Research Fortnight, 2008
- Shortlisted as University of the Year ~ Times Higher Education Awards, 2008
- Ranked 3rd in the UK for scientific research impact ~ The Guardian and Thomson Scientific Index, 2008
- One of the world’s top 250 universities and the fastest rising Scottish university ~ Times Higher Education Awards, 2007
- Since the completion of the £21 million Sir James Black Centre for Interdisciplinary Research, the University has a larger medical research complex than the National Institute of Medical Research in London
- Dundee is among the UK’s highest generators of per capita research income, much of it focused on medical and biomedical research
Contact Information

Distance Learning Section
Department of Orthopaedic and Trauma Surgery
TORT Centre
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University of Dundee, DD1 9SY
Scotland, United Kingdom

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Email    dls@dundee.ac.uk
www.orthopaedics.dundee.ac.uk
www.facebook.com/ortho.dundee

The Department runs the following courses:

Postgraduate Taught Courses
Master of Orthopaedic Surgery (MCh Orth) - **RCS England Accredited**
Diploma/Master in Orthopaedic Science - **RCS England Accredited**
Diploma/MSc in Motion Analysis
Diploma/Master in Orthopaedic and Rehabilitation Technology
Diploma/MSc in Sports and Biomechanical Medicine
Postgraduate Certificate in Clinical Audit and Research for Healthcare Professionals

Postgraduate Research Courses
MSc/MPhil/PhD in the area of Motion Analysis
MSc/MPhil/PhD in Musculoskeletal Biomechanics
MSc/MPhil/PhD in Biomedical Engineering
Doctor of Medicine (MD)

Undergraduate Courses
BMSc in Applied Orthopaedic Technology

Continuing Professional Development Certificate Courses
Clinical Statistics
Orthopaedic Medical Technology
Plaster Technology

Produced by
Department of Orthopaedic and Trauma Surgery, University of Dundee
The information contained in this booklet is correct at the time of publication.
The University reserves the right to make changes. Should this occur every effort will be made to inform applicants or students at the earliest opportunity
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