

MEDICAL PHYSICS

- HANDBOOK -

2018-2019

1. Overview

Two programmes of study are offered jointly by the Department of Physics and Astronomy and the Medical Physics Group (Faculty of Medicine, Dentistry and Health), Department of Infection, Immunity and Cardiovascular Disease. The Physics with Medical Physics courses lead either to a BSc degree (3 years, code PHYU05), or to a MPhys (4 years, code PHYU10). The administration of both courses is handled by the Department of Physics and Astronomy, and so this guide should be read in conjunction with the Physics Department's "Guide for Undergraduate Students".

2. Points of contact

Department of Physics and Astronomy

Academic contact: Dr Ed Daw, room D28 (Hicks), internal telephone 24353, external 0114 2224353, email e.daw@sheffield.ac.uk

Physics office: F10 Hicks Building, Ms Sally Merrett, internal telephone 23706, external 0114 2223706, email s.merrett@sheffield.ac.uk

Medical Physics Group, Department of Infection, Immunity & Cardiovascular Disease (IICD)

Academic contact: Dr John Fenner, O-floor, Room OU142 (Hallamshire Hospital), x59526 from within the Hallamshire Hospital, 859526 from other parts of the University, and 0114 2159526 from outside, email j.w.fenner@sheffield.ac.uk

Medical Physics office contact: Ms Sue Clary, K-floor, Room K128, (Hallamshire Hospital), x59503, 859503 from other parts of the University, and 0114 2159503 from outside. As with the example above, internal Hallamshire Hospital numbers are prefixed by x = 8 from elsewhere in the University.

3. Modules in Medical Physics

The table below shows the medical physics modules with their co-ordinators, and the semester in which they are given (A = Autumn, S = Spring). Each module carries 10 credits unless otherwise indicated.

| Code | | Sem | Co-ord |
|----------------|---|----------------|----------------|
| Level 1 | | | |
| MPY101 | Physics of Living Systems | S | JWF/AJN |
| | | | |
| Level 2 | | | |
| MPY205 | Aspects of Medical Imaging and Technology | A | JWF |
| | | | |
| Level 3 | | | |
| MPY308 | Clinical Engineering and Computational Mechanics | A | AJN |
| MPY325 | Medical Physics Project (20 credits) | A&S | JWF/AJN |
| | | | |
| Level 4 | | | |
| MPY401 | Medical Physics Research Programme (40 credits) | A&S | JWF/AJN |
| MPY424 | Hospital or Industrial Placement (20 credits) | A | JWF |

Lecturers

JWF Dr John Fenner, Undergrad course director, RHH, O floor, OU142, Tel x 59526, j.w.fenner@sheffield.ac.uk

AJN Dr Andrew Narracott, Senior Lecturer, RHH O floor, OU142, Tel x59540, a.j.narracott@sheffield.ac.uk

DRH Prof Rod Hose, RHH, O floor, OU140, Tel x59533, d.r.hose@sheffield.ac.uk

PVL Prof Pat Lawford, Postgraduate Course Director, RHH, O floor, OU140, Tel x59535, p.lawford@sheffield.ac.uk

Questions or matters arising from Medical Physics modules should be directed to the module co-ordinator in the first instance. Complete descriptions of each module are available on request and module content is discussed in the introductory lecture of each module. Descriptions of all modules are available on the University Web site and may usefully help physics/medical physics students with module choices.

Assessment and Examination

The Assessment and Examination schedule of each module is indicated in the module documentation.

Students are requested to submit work for assessment identified only by their student number and not by name. Anonymous marking where possible is Departmental policy.

All continuous assessment work, including laboratory reports, tutorial assignments and essays, has a clearly-defined submission date. All such work must be submitted to the Physics Office (F10), where its receipt will be logged.

It is Medical Physics policy to double-mark any continuous assessment element that contributes more than 10% of the total mark for a module.

Essay Assignments

The continuous assessment process within a module might include an essay assignment. The purpose of this written work is:

- to develop your facility with methods of literature retrieval and study; you will gain credit for citing modern references from the scientific literature and for demonstrating an appreciation and an understanding of current ideas and developments - you must use more than the seed reference and avoid being over-reliant on Web references.

- to give you practice in writing clearly, concisely and coherently.

Unless you are notified of an alternative marking scheme for a particular assignment, the marks will be allocated according to the following schedule:

Content: Scope and adequacy of material, scientific accuracy, up-to-date references, discussion of new developments in the field. Is the material pitched at the right level for the target audience? **40%**

Presentation: How does it look? Layout of text, headings and paragraphs. Good, clear and appropriate diagrams or illustrations. **20%**

Structure: Clear introduction and conclusion. Consistent thread. What is the main theme? **20%**

Clarity: Are the sentences properly structured? Is the meaning clear? **20%**

Students are warned that the University takes issues of plagiarism extremely seriously. You should refer to the University website for guidance, but any member of staff can help you to understand more clearly how to learn from and present the work of others within your text without appearing to present it as your own. Checks for plagiarism are routinely carried out as part of the assessment process, using the Turnitin software tool.

Projects: Modules MPY325, MPY401

The Department supports projects at levels three and level four. At level three, students will normally work in small teams (2 or 3 persons per group). Projects are proposed by members of academic and NHS staff, and will reflect their current clinical or research interests. If you have a particular interest in a sub-discipline, you are encouraged to seek the support of a member of staff in the provision of an appropriate project - interest and enthusiasm go a long way! Allocation of students to projects takes place in the first week of the semester. A final list of projects is made available at the start of the semester during a session where students can discuss project content with supervisors and nominate their preference for project topic; where possible students are allocated to a project of their choice.

It is the responsibility of the student to maintain a project logbook and to arrange meetings with the supervisor at the necessary intervals. It is recommended that a *minimum of three formal meetings* should take place - one at the beginning of the project to define and agree goals, one after approximately four weeks to ensure that the project is running smoothly and one in week eight or nine to agree the content and format of the final report. It is suggested that informal progress meetings should take place at approximately two week intervals.

4. General Information

Academic or Personal Advice

The number of undergraduates taking medical physics is relatively small and the undergraduate course director, Dr John Fenner takes an interest in all students. Additionally, you are always welcome to discuss any issues of academic or personal concern with Dr Andrew Narracott, Prof Patricia Lawford or Prof Rodney Hose. Within the Physics and Astronomy Department, Dr Daw takes a particular interest in Medical Physics issues and students.

Staff Contact

All academic members of staff will be happy to make appointments to see students. If you want a meeting, you are encouraged to make an appointment directly with the staff concerned, perhaps immediately before or after a lecture, or by telephoning the secretary for Medical Physics (Sue Clary, RHH x59503, mpy-admin@sheffield.ac.uk). E-mail is an excellent alternative, and is guaranteed to reach us. This appointment facility is to help undergraduate students to plan visits to the hospital knowing that we will be here and available. It is, after all, ten minutes walk! This system is intended for your benefit, and is not intended to imply that we are unavailable at other times.

Absence

If you have a good reason for absence you must inform your home department. If you miss lectures, labs or tutorials because you are ill, or if illness affects examinations, you should obtain an official Medical Certificate from your Doctor or from the University Health Service. Only if this is done can allowance be made by the Examination Board for missed coursework or laboratory work. If you are ill for periods of up to seven days which do not include or affect an assessment, you can complete a Student Medical Self-Certificate. Blank self-certificates are available from the Student Services Information Desk (SSiD) located in the Union. We can do much less in your interest with Self-Certificates than signed Doctor's notes; Faculty in particular is little impressed by the former. All medical certificates should be returned to the Physics Office. It is in your interests to keep Dr Fenner, Dr Daw or the individual module co-ordinators informed of absence wherever possible. This will ensure that your module attendance records in medical physics reflect accurately your position and that appropriate evidence is presented to the Examination Board where performance has been affected by medical conditions.

Books

The course textbook is 'Medical Physics and Biomedical Engineering', ISBN 0 7503 0367 0 (Hardback) or ISBN 0 7503 0368 9 (Paperback), written by staff of the Department of Medical Physics and published by the Institute of Physics. This text contains bibliographies in each chapter, and most books referenced are available in at least one of the libraries. Supplementary material is supplied in the form of module books/packs by several lecturers.

Library Facilities

In addition to the Central Library facilities and those of your home department there is the Health Science Library, Royal Hallamshire Hospital (RHH) which can be accessed through the main entrance to the Medical School. This facility is a good source of material for project work and for detailed texts on anatomical or clinical aspects of the modules. There is a small number of medical physics textbooks in the lab on O-floor (OU137) for reference purposes. Please feel free to look at these, but *these must not be removed from the lab*.

Computer Facilities

Students are encouraged to make full use of central university or home department computer facilities. A small number of computers, attached to the University network, are available in the Medical Physics Group on O-floor of the RHH. These computers are intended primarily to support project work, and this usage has priority. They might also be used with a member of staff where specific assistance on taught-module work is required.

Health & Safety

When performing laboratory experiments students must follow the instructions in the laboratory manuals. A formal risk assessment is mandatory and is an important part of any project work. It is important that students familiarise themselves with the fire regulations and procedures applicable to the Royal Hallamshire hospital. No undergraduate student is permitted to work out of hours on hospital premises unless under the direct and continuous supervision of a member of staff.

See the web link below for further details relating to Health and Safety at Sheffield

- <https://www.sheffield.ac.uk/hs/riskass>

Ethics

Modules in Medical Physics may involve data collection from volunteers, or analysis of patient/volunteer data. It is important to emphasise that strict ethical guidelines govern collection/use of such data, designed for both the data provider and the data processor. Important concepts are:

- no coercion should be used to obtain or work with such data
- volunteers providing data should feel fully informed about its intended use and freely consent to providing it
- all personal data should be treated professionally and with respect, and must be anonymised/de-identified prior to its use
- Ethical review (ie. documented and approved ethical critique) must be undertaken for all activities in which ethical issues might be a factor

See the web link below for further details:

- <https://www.sheffield.ac.uk/rs/ethicsandintegrity/ethicspolicy/index>

Dress & Conduct

Whenever students come into the hospital environment they must respect the fact that the NHS Department is primarily concerned with providing a service to patients. Some patients are disturbed or intimidated by large groups of young people, and you are expected to dress and to behave in a professional manner. In particular it is helpful if you can come to laboratory classes equipped to do the lab and without excessive baggage.

Student Representative

Please note the existence of an active Staff/Student Committee. Each year group elects one representative to sit on this committee. The year representative is usually drawn from the Medical Physics cohort since these students attend most modules. Representatives are encouraged to attend the committee meetings. The cohort is encouraged to provide feedback to

the representative – positive or negative – who will make your views known. Both Departments are genuinely interested in maintaining and improving the quality of its undergraduate teaching, and have a track record of positive response to student initiatives.

Student Evaluation of Modules and Courses

The Department monitors the quality of teaching by a number of mechanisms. One of the most important is the feedback from students. You will be asked to co-operate in the completion of questionnaires evaluating many aspects of the teaching of the modules that you attend. The questionnaires are completed anonymously. Additional comments are invited and can be entered on the questionnaires. The information from them is collated and discussed by Teaching Committee, and raised with the staff concerned if necessary. You are encouraged to raise any issues of concern at the earliest opportunity, either through your Staff/Student Committee representative, directly with the module co-ordinator, Dr Fenner or Dr Daw.

Workloads

The Medical Physics Departmental Academic Policy Committee (APC) offers the following guidelines on the contact and personal study hours associated with a taught module. Generally the contact hours reduce and personal study time should increase as the student progresses from level one through to level three. In total a student should devote approximately six hours study per week to each ten credit half module. The Staff/Student Committee is just one vehicle by which students can voice concerns about workload. Such information helps to regulate workloads over Medical Physics as a whole so that they remain consistent with targets.

Careers Guidance and Advice

The Medical Physics group is happy to offer advice on careers in and around the Medical Physics discipline. It is particularly important for physics with medical physics candidates with an interest in clinical medical physics to understand clearly the relative merits of the three and four year programmes. The issues are complex and the choice is not an easy one. All students are encouraged to register initially for the four year programme and then to transfer to three at a later date if required. Literature from the IPEM, including careers information, is available online at www.ipem.ac.uk

Students due to graduate at the end of the academic year and who are interested in the professional training posts in clinical medical physics must fill in their application forms (see the Careers Service) soon after the Christmas vacation [<http://www.nshcs.hee.nhs.uk/join-programme/nhs-scientist-training-programme>]. Deadlines for applications are sometimes very tight, with forms released only a few weeks before submissions are required. It should be recognised that there is strong competition for these training posts.

IPEM (<http://www.ipem.ac.uk/>)

The professional body for medical physicists is the Institute of Physics and Engineering in Medicine. Those who might make a career in the discipline are encouraged to join this Institution as student members.

Research Seminars

The Medical Physics group is privileged to participate in a number of relevant research seminars throughout the year. These meetings typically occur during the lunch period and serve as a forum for the dissemination of information about the research activities of the medical physics team. It is possible to arrange, via Dr Fenner, for those with a particular interest in a topic to attend. Details of these seminars will be presented as part of the introductory information associated with the taught medical physics modules.

Timetable

Timetable information pertaining to Medical Physics modules for the period 2018-2019 is presented below.

Timetable for 2018-19

Semester 1

| | 9:00-9:50 | 10:00-10:50 | 11:00-11:50 | 12:00-12:50 | | 15:00-15:50 |
|-----------|----------------------------|--------------------------------|----------------------------|-------------|--|------------------------------|
| Monday | | | | | | <i>MPY205 Asp of Med</i> |
| Tuesday | <i>MPY308 Clin Eng</i> | | | | | |
| Wednesday | | | | | | |
| Thursday | | <i>MPY205 Asp of Med..</i> | <i>MPY308 Clin Eng</i> | \ | | |
| Friday | | | | | | |

Semester 2

| | 9:00-9:50 | 10:00-10:50 | 11:00-11:50 | 12:00-12:50 | | 15:00-15:50 |
|-----------|-----------|---------------------------|-------------------------------------|---------------------------|--|-------------|
| Monday | | | | | | |
| Tuesday | | | | | | |
| Wednesday | | <i>MPY101 Biomech</i> | | | | |
| Thursday | | | <i>Level 3 Med Phys Tut</i> | | | |
| Friday | | | | <i>MPY101 Biomech</i> | | |