



Ollscoil Chathair  
Bhaile Átha Cliath  
Dublin City University



## BSc Physics with Biomedical Sciences – INTRA Programme

### Physics driving progress in medicine and healthcare

Physics is the most fundamental of all the sciences and has fuelled most of the scientific and technological developments that we take for granted today. Since the discovery of X-rays by Roentgen in 1895, a number of the major discoveries of the 20th century have also played a fundamental role in advancing medicine and medical instruments. Think of magnetic resonance imaging (MRI) scanners, radiotherapy treatment or laser eye surgery, to realise how familiar we are with medical applications of physics! Today, the most recent scientific developments in information and communication technologies (ICT), nanotechnology, optics or biotechnology have also become key aspects in the field of medical physics.

### Overview

This course has been designed to provide both a solid background in physics and in the principles which underpin chemical, biological and life sciences, and a good understanding of the most recent developments such as nanosystem design or ultrafast molecular switching. It is ideally suited to the needs of students who intend to pursue a career in physics and technology related to medical research, clinical services or biomedical industries. St James's Hospital, Dublin, is a partner in both the development and the running of the Physics with Biomedical Sciences course. This four year course combines

lectures, tutorials and modern laboratory work with fundamental physics concepts and exciting, real life technological skills and applications in the biomedical area. This will develop analytical and problem-solving skills.

### Programme Outline

In Years One and Two, the students study the basic foundations of physics and the fundamentals of chemistry, cell biology, anatomy and physiology. In Years Three and Four, they study a selection of more advanced physics topics, such as Quantum Mechanics or Laser Physics, that underpin applications in the biomedical sciences. Application courses, at the interface between the physical and life sciences such as Biomechanics of Human Movement, will also be offered. In Year Four, medical physics subjects such as Medical Imaging or Medical Applications of Lasers, will be taught by expert academic staff. Throughout your course they work in a custom-designed physics building equipped with state-of-the-art undergraduate and research laboratories. Seminars by eminent DCU researchers and visits to internationally renowned biomedical research institutes will also be important parts of the course. In Year Three, INTRA is an important opportunity to work for an extended period (typically eight months) in a hospital or in private companies with business interests in medical/biological instrumentation, biotechnological applications or optical medical diagnostic applications.



## Work Areas

Physics with Biomedical Sciences is a gateway to a wide range of careers. Armed with highly marketable skills, students are a powerful addition to any workforce. Graduates will be well placed to take on a career in areas such as biomedical instrumentation, clinical and diagnostic services, medical imaging and image processing or lasers and medical optical systems, to give but a few examples. Roles in any area of the fast-growing biomedical, biotechnology and healthcare sectors.

## Graduate Attributes

We recognise the importance of desirable attributes among our graduates in a company setting. Apart from excellent scientific training, our range of modules also encourage our students to develop into balanced, outgoing, professional, articulate individuals with an ability to use their own initiative and to work as part of a team.

Students are available for interview from October onwards. For more information, contact:  
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| Year 1                                    | Year 2   | Year 3                                    | Year 4   |
|---|--|---|--|
| Introduction to Programming               | Advanced Programming                             | Immunology and Cell Biology for Engineers | Image Processing and Analysis                    |
| Electricity and Magnetism                 | Digital and Analogue Electronics                 | Quantum Physics II                        | Advanced Bio Materials and Processing Technology |
| Physics Laboratory                        | Anatomy  | Relativity, Nuclear and Particle Physics  | Quantum Electronics                              |
| Introduction to Computing                 | Laboratory General Physics                       | Statistical Physics                       | Microfluidics                                    |
| Physiology for Health Sciences            | Linear Algebra                                   | Wave Optics                               | Final Year Project                               |
| Physics                                   | Calculus of Several Variables                    | Physics Laboratory Level 3                | Applied Spectroscopy                             |
| Calculus                                  | Quantum Physics                                  | <b>INTRA</b>                              | Biophotonics                                     |
| Thermal and Physical Properties of Matter | Vibrations and Waves Physics of Renewable Energy | <b>INTRA</b>                              | Professional Development                         |
| Chemistry for Health Related Professions  | Biomechanics of Human Movement                   |   |  |
|   | Electro-magnetism                                |   |  |