# UCT
# FACULTY OF HEALTH SCIENCES

## 2014
## BSc(Med)(Honours)
## Specialising in the following programmes:

Applied Anatomy
Biological Anthropology
Bioinformatics
Cell Biology
Human Genetics
Forensic Genetics
Infectious Diseases and Immunology
Medical Biochemistry
Structural Biology
Physiology (including Neuroscience)
Radiobiology

**PREFACE**

BSc(Med)(Hons) degrees at the University of Cape Town Medical School are offered by the Departments of Clinical Laboratory Sciences (CLS) and Human Biology (HUB). Honours training and research also incorporates staff and projects in associated departments (such as Surgery and Medicine), and research groupings such as the Institute of Infectious Disease and Molecular Medicine (IIDMM), the International Centre for Genetic Engineering and Biotechnology (ICGEB), and various MRC Units and Groups.

This booklet is aimed at students interested in reading for Honours degrees in:

- **Applied Anatomy / Biological Anthropology**
- **Physiology (including Neurophysiology)**
- **Cell Biology**
- **Bioinformatics**
- **Human Genetics**
- **Forensic Genetics**
- **Infectious Diseases and Immunology**
- **Medical Biochemistry**
- **Structural Biology**
- **Radiobiology**

Overall programme convenor (2014):

Associate Professor Sharon Prince
Dept. of Human Biology (Cell Biology)
Email: Sharon.Prince@uct.ac.za

Secretary – Khalida Crawley
Telephone: 021-4047706

For contact details of the specific convenor responsible for the running and administration of each programme: see pages 5-9.

**PLEASE NOTE: A SIMILAR VERSION OF THIS BOOKLET IS AVAILABLE ONLINE AT**
**www.health.uct.ac.za/departments/cls/study/**

## INTRODUCTION

The Honours programme will introduce students to an academic or research career in a broad range of biomedical science disciplines. It aims to prepare students for relevant Masters and PhD programmes, and/or career directions in professional scientific research and service. All programmes will introduce students to exciting and relevant topics in biological and biomedical research; provide students with a solid, contemporary training in laboratory and field research skills relevant to the chosen discipline; teach students to develop their thinking skills and critical analysis of the scientific literature; give students a range of opportunities to develop an ability to communicate knowledge and findings in written and oral forms.

## COURSE DESCRIPTION

The programme consists of two general modules, four program modules and a research project.

**General modules:**

- **Laboratory techniques course** (7 weeks): this practical module will teach students basic and more advanced molecular and biochemical techniques, applied bioinformatics, as well as applied statistics. For certain components, students are given specific training according to their programmes. Molecular science students receive training in DNA/RNA engineering and cloning, SDS-PAGE and Western Blot Analysis / FACS Analysis and ELISA, protein expression and purification; Anatomy students learn human anatomy and anatomical techniques; Physiology students will focus on techniques for physiology and neuroscience such as animal handling, stereotaxtic methods, drug infusion, and behavioural measures as well as SDS-PAGE and Western blot analysis.

- The **Scientific communication module** runs throughout the academic year and trains in the art of scientific writing and comprehension.

**Programme modules:**

Students need to attend four course program modules. Each module covers a specific field and generally runs over a three-week period. Three modules should be in the programme module list appropriate to the chosen stream (e.g. Physiology, Cell Biology etc.) and one more module from the same stream or any of the other honours programmes. Between 20 and 30 modules are offered. The Structural Biology module choices will be programmed differently and may follow a different timetable to other programs.

**Research project:**

The Honours programme requires a substantive research project component. The research project begins in April and ends in October. Students choose their research project from a variety of projects on offer by researchers within the appropriate Divisions and other associated researchers and laboratories. During the research project period, students become integrated into research groups and participate in weekly research discussions and seminars. They will develop their research proposal and carry out their research in accordance with requirements within each Division / laboratory. Students are required to write and present a research project report in the form of a (written) scientific paper and an (oral) 'conference' presentation.

## BSc(Med)(Honours) in Applied Anatomy (HUB4002W)
## BSc(Med)(Honours) in Biological Anthropology (HUB4001W)

**Programme Convenor:** Prof Alan Morris
**e-mail:** alan.morris@uct.ac.za
**Website:**
http://www.health.uct.ac.za/departments/humanbiology/anatomy/about/

**Applied anatomy** is the field of study that tries to understand human structure and function. It includes topics such as clinical anatomy, structural embryology, growth and development, and comparative anatomy. **Biological anthropology** is the field of study that tries to understand human variation and human evolution. It includes topics such as comparative growth studies, demography, primate behaviour, skeletal biology and forensic anthropology. Current research interests focus on forensic anthropology

**Admission requirements:**
BSc or equivalent degree in the biological sciences or a MBChB degree or an approved degree in the Health & Rehabilitation Sciences

## BSc(Med)(Honours) in Physiology (HUB4040W)

**Programme Convenor: A/**Professor Dirk Lang
**e-mail: Dirk.Lang@uct.ac.za**
**Website:**
**http://www.health.uct.ac.za/departments/humanbiology/physiology/about/**

This course provides students with an understanding of the function & regulation of the human body and physiological integration of the organ systems to **maintain homeostasis. The main research fields include the cardiovascular system and neuroscience research, animal models of human disorders, and the effects of stress, aging and exercise on the brain**

**Admission requirements:**
BSc or equivalent degree in the biological sciences or a MBChB degree or an approved degree in the Health & Rehabilitation Sciences

## BSc(Med)(Honours) in Cell Biology (HUB4000W)

**Programme Convenor:** Dr Lester Davids
**e-mail:** Lester.Davids@uct.ac.za
**Website:**
http://www.health.uct.ac.za/departments/humanbiology/cellbiology/about

Research in cell biology encompasses diverse approaches to understanding normal cellular processes and how they are altered in disease. This includes the study of melanocytes and melanoma, neuronal development and regeneration, stem cells and the identification of novel therapeutic approaches to treat diseases ranging from pigmentary and neuronal disorders to cancer as well as vascular biology in ocular development and disease.

**Admission requirements:**
BSc or equivalent degree in the biological sciences or a MBChB degree or an approved degree in the Health & Rehabilitation Sciences

## BSc(Med)(Honours) in Human Genetics (LAB4001W)

**Programme Convenor:** Dr Collet Dandara
**e-mail:** Collet.Dandara@uct.ac.za
**Websites:**
http://web.uct.ac.za/depts/genetics and www.iidmm.uct.ac.za

Human genetics describes the study of inheritance as it occurs in human beings. Human genetics encompasses a variety of overlapping fields including: classical genetics, cytogenetics, molecular genetics, biochemical genetics, genomics, population genetics, developmental genetics, clinical genetics and genetic counseling. Research interests include cardiogenetics, genetic blindness, neurodegenerative disorders and family bipolar affective disorder.

**Admission requirements:**
BSc or equivalent degree in the biological sciences or a MBChB degree

## BSc(Med)(Honours) in Forensic Genetics (LAB4007W)

**Programme Convenor:** Dr Collet Dandara
**e-mail:** Collet.Dandara@uct.ac.za
**Websites:**
http://web.uct.ac.za/depts/genetics and www.iidmm.uct.ac.za

The programme is aimed at introducing students to an academic or research career in human genetics particularly as it relates to the use of DNA in solving crime. The stream will be aligned with the BSc (Med)(Hons) in Human Genetics. The program feeds into the MSc in Forensic Science. Research interests include medico-pharmacogenetics, detection of low copy number DNA, use of DNA in identification, paternity testing, and many more.

**Admission requirements:**
BSc or equivalent degree in the biological sciences or a MBChB degree

## BSc(Med)(Hons) in Medical Biochemistry (LAB4003W)

**Programme Convenor:** Professor Arieh Katz
**e-mail**: Arieh.Katz@uct.ac.za
**Websites: http://www.medicalbiochemistry.uct.ac.za/ and www.iidmm.uct.ac.za**

Medical biochemistry is the study of the complex chemical reactions in the human body and their application to medicine. Research interests include discovery of biomarkers of disease, molecular mechanisms of oesophageal and cervical cancer, molecular biology and protein function studies in the porphyrias and drug design for treatment of cardiac and renal disease.

**Admission requirements:**
BSc or equivalent degree in the biological sciences, or chemistry or a MBChB degree

## BSc(Med)(Hons) in Structural Biology (course code to be assigned)

**Programme Convenor:** Professor Trevor Sewell
**e-mail**: Trevor.Sewell@uct.ac.za
**Websites: http:// sbio.uct.ac.za**
**www.medicalbiochemistry.uct.ac.za and www.iidmm.uct.ac.za**

Structural Biology has made a huge impact on modern biology and medicine over the past decade. It plays a pivotal role in the growth of medical, agricultural and industrial biotechnology worldwide and provides a complete and coherent picture of biological phenomena at the molecular level. This course will enable students to engage with the methods and applications of Structural Biology. In addition, it will focus on the molecular and structural basis of biology, disease and drug discovery. Students will study a wide range of problems from a structural and mechanistic perspective using a range of biophysical modalities including X-ray crystallography, electron microscopy and other biochemical methods.

**Admission requirements:**
BSc or equivalent degree in the biological, physical or chemical sciences, or a MBChB degree

**BSc(Med)(Honours) in Infectious Diseases and Immunology [IDI] (LAB4004W)**

**Programme Convenor: Dr William Horsnell**
**email: wghorsnell@gmail.com**
**Programme Co-convenor:** Dr. Digby Warner
**email:** digby.warner@uct.ac.za
**Websites:** http://www.virology.uct.ac.za
http://www.medmicro.uct.ac.za
http://www.health.uct.ac.za/departments/cls/immunology/about
and www.iidmm.uct.ac.za

The IDI programme is organised under the auspices of Medical Virology, Microbiology, Immunology and the South African TB Vaccine Initiative (SATVI). Research interests include fundamental immunology, neglected tropical infectious diseases, Mycobacterium tuberculosis (MTb), TB and HIV vaccines, Human Papillomavirus (HPV), HIV antibiotic resistance, drug discovery and development for tuberculosis therapy and the immunology of HIV-associated tuberculosis.

**Admission requirements:**
BSc degree in the biological sciences with a major in either chemical, biological, cellular or molecular sciences; or MBChB degree.

## BSc(Med)(Honours) in Bioinformatics (LAB4005W)

**Programme Convenor:** A/Prof Nicola Mulder
**e-mail:** Nicola.mulder@uct.ac.za
**Website:** http://www.cbio.uct.ac.za/

Bioinformatics is the study of biological processes by developing and using intensive computational techniques. Bioinformatics research at UCT ranges from comparative genomics, to pathogen bioinformatics, protein structure and gene expression bioinformatics as well as computational molecular evolution.

**Admission requirements:** BSc or equivalent degree in computer science, or biological sciences, or in mathematics/statistics or a MBChB degree with some computing background.

## BSc(Med)(Honours) in Radiobiology (RAY4000W)

**Programme Convenor: Dr Alistair Hunter**
**e-mail:** Alistair.Hunter@uct.ac.za
**Website:**
http://www.health.uct.ac.za/departments/radiation_med/radiation_onco/honours/

This course aims to provide advanced knowledge of the effects of radiation on living systems with particular emphasis on radiation oncology and cancer therapeutics. Basic and applied radiation biology will be learned including the biological effects of radiation on cells, organs and tumours and how such effects can be modulated. Research in the laboratory concentrates on molecular, cellular and physiological studies with strong links to the medical disciplines.

**Admission requirements:**
BSc or equivalent degree in the biological sciences or a MBChB degree or an approved degree in the Radiation Sciences.

## APPLICATION AND REGISTRATION

Generally, to be considered, a student requires a BSc or equivalent degree, with a major in any of the biological, life, biochemical or molecular sciences, or chemistry; or an MBChB degree. In some programmes admission may also be considered to students with an approved degree in Health & Rehabilitation Sciences.

Applications are considered from June and students must apply by the end of September at the latest. Numbers of students are limited and the acceptance process is therefore competitive (and generally based on merit).

Application should be made online at www.uct.ac.za and select 'Apply online to study at UCT' on the Highlights menu.

Alternatively click on:
http://applyonline.uct.ac.za

**Application enquiries should be addressed to:**
Taryn-Lee.Safers@uct.ac.za Tel. 021 406 6028 Fax. 0865191342

All accepted Honours students will be required to register on Friday 31st January 2014 and the course will start for all students on Monday 3rd February.

## BURSARIES AND SCHOLARSHIPS

Bursaries for BSc(Med)(Honours) students are available from the NRF and UCT. Bursaries applications for the coming academic year close, in some cases, at the end of August in the preceding year.

Application forms and further information are available from the Postgraduate Centre and Funding Office at the Graduate Centre, Otto Beit Building, Upper Campus and the UCT website
http://www.uct.ac.za/apply/funding/postgraduate/applications/