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What is a BBiomedSc in Functional Human Biology?

A BBiomedSc in Functional Human Biology explores how the body works in health and disease. Ultimately, human health depends on the normal functioning of the cells, tissues and organ systems of the body. Understanding of disease requires determining how the function of cells, tissues and organs becomes abnormal. Thus, studying the normal function of body systems leads on to an exploration of how pathological processes impact on our health.

Physiology is a key component of Functional Human Biology. Knowledge of physiology forms the basis of understanding the processes that support life and is crucial to understanding the abnormalities in life processes that lead to disease. To understand asthma, we need to understand how lungs work; to understand diabetes, we need knowledge of blood sugar regulation; to understand heart disease the intricacies of heart muscle function have to be explored; and so on, through all the organ systems of the body.

Functional Human Biologists, like Physiologists, often work with specialists from other disciplines such as anatomy, biochemistry, genetics, microbiology and pharmacology, to learn more about normal life processes and disease processes, and to develop treatments for diseases.

For further information regarding a BBiomedSc degree check out the following website: <http://www.otago.ac.nz/courses/qualifications/bbiomedsc.html>

Functional Human Biology at Otago — an Overview

The BBiomedSc is a three-year degree combining subject areas that promote understanding of the scientific basis of health and disease in humans and animals. This degree shares many courses in common with a BSc programme, and focuses on human health and disease. Six major subjects are offered: Drugs and Human Health (DRHH); Infection and Immunity (INIM); Molecular Basis of Health and Disease (MBHD); Nutrition, Metabolism and Human Health (NMHH); Reproduction, Genetics and Development (REGD), and of course Functional Human Biology (FUHB).

The Functional Human Biology major provides an overview of the mechanisms of functioning of all systems of the human body and explores specific areas in depth, with a research-informed focus.

You are not alone on this journey; every step of the way there is a lab tutor, lecturer and course convener to facilitate your learning and handle questions you may have. Practical classes are organised into small groups, each with a personal tutor, so no matter how large the class, we can offer a high level of personal attention.

The following is an overview of the Functional Human Biology coursework requirements. Additional information about specific courses can be found in subsequent sections of this booklet.

First Year

If you intend to major in **Functional Human Biology** (BBiomedSc), you must pass the following 100-level papers:

- BIOC 192: Foundations of Biochemistry
- CELS 191: Cell & Molecular Biology
- CHEM 191: The Chemical Basis of Biology & Human Health
- HUBS 191: Human Body Systems I
- HUBS 192: Human Body Systems II
- PHSI 191: Biological Physics

and a further 18 points (one paper) from any degree schedule.

Second Year

At 200-level the major comprises three physiology papers:

- PHSL 231: Neurophysiology
- PHSL 232: Cardiovascular & Respiratory Physiology
- PHSL 233: Cellular, Gastrointestinal & Renal Physiology

and a choice of three more papers from:

- ANAT 241: Human Biology: Cells & Systems
- ANAT 242: Neurobiology
- BIOC 223: Cellular Biochemistry & Metabolism
- HUNT 221: Macronutrients & Health
- HUNT 222: Vitamins, Diets & Health
- HUNT 223: Minerals, Undernutrition & Health
- MICR 221: Microbes to Medicine
- MICR 223: Infection & Immunity
- PATH 201: Foundations in Human Pathology
- PHAL 211: Introductory Pharmacology
- PHAL 212: Introductory Therapeutics & Toxicology

and a further 18 points (one paper) from any degree schedule.

Third Year

At 300-level the major comprises two physiology papers:

PHSL 345: Physiological Aspects of Health & Disease

PHSL 343: Cellular & Epithelial Physiology

and a choice of two more papers from:

ANAT 331: Functional Anatomy

ANAT 332: Cell Biology

ANAT 335: Neurobiology

BIOC 353: Molecular Basis of Health & Disease

HUNT 311: Metabolism, Health & Disease

HUNT 312: Nutrition in Cancer and Heart Disease

MICR 332: Health Microbiology

MICR 334: Advanced Immunology

PATH 301: Applied Pathology

PHAL 304: Human Pharmacology

PHAL 305: Molecular and Immunopharmacology

PHSL 341: Molecular, Cellular & Integrative Neurophysiology I, or

PHSL 342: Molecular, Cellular & Integrative Neurophysiology II or

PHSL 344: Cardiovascular Physiology

and at least a further 36 points (two papers) from any degree schedule.

N.B. If more than one of PHSL 341, 342, 344 is taken, the second or third of these have to be taken as part of the “further 36 points from any degree schedule”.

Functional Human Biology with a Neuroscience flavour

This can be achieved by careful selection of optional papers from the “choice” list, use of the “18 or 36 points from any degree schedule” and by taking papers in excess of the 360 points of the BBiomedSc degree.

Neuroscience papers are:

PSYC 111	Brain and Behaviour
ANAT 242	Neurobiology
PHSL 231	Neurophysiology
PSYC 211	Brain and Cognition
ANAT 335	Neurobiology
PHSL 341	Molecular, Cellular & Integrative Neurophysiology I
PHSL 342	Molecular, Cellular & Integrative Neurophysiology II
PSYC 313	Cognition & Neuropsychology
PSYC 317	Biopsychology
PSYC 323	Sensation & Perception
ZOOL 314	Neurobiology

Functional Human Biology — a year at a time

First Year

Training for a BBiomedSc in Functional Human Biology begins in the first year with papers in Human Body Systems (HUBS 191 & 192), Cell and Molecular Biology (CELS 191), Biochemistry (BIOC 192), Chemistry (CHEM 191) and Physics (PHSI 191).

HUBS 191: Human Body Systems I (first semester) 18 pts

An introduction to the structure and function of the musculoskeletal, nervous, endocrine and immune systems in the human body.

HUBS 192: Human Body Systems II (second semester) 18 pts

Prerequisite HUBS 191

An introduction to the structure and function of the human cardiovascular, respiratory, gastrointestinal, renal/urinary and reproductive systems including organ development.

CELS 191: Cell and Molecular Biology (first semester) 18 pts

An introduction to the biology of cells; fundamentals of molecular biology; organismal and molecular genetics; human genetic variation; diversity and biology of microorganisms; microbial virulence and disease processes.

CHEM 191: The Chemical Basis of Biology and Human Health (first semester) 18 pts

An introduction to the concepts of chemistry underlying important processes in biology and human health, including chemical bonding, energetics, kinetics, equilibria and solubility, properties of water and solutions, acids, bases, complexation and electron transfer, hydrolysis, mechanisms of organic reactions and properties of amino acids and carbohydrates.

BIOC 192: Foundations of Biochemistry (second semester) 18 pts

Prerequisite CHEM 191

An introduction to the structure and function of proteins as essential elements of life processes; principles of enzymology; introductory bioenergetics; conservation of the energy of food for body processes; digestion and catabolism of fats, proteins and carbohydrates; terminal pathways of oxidation, anaerobic and aerobic metabolism, mitochondrial metabolism; energy storage and utilisation; the molecular basis of disease; illustrative topics in metabolism.

PHSI 191: Biological Physics (first semester) 18 pts

Foundations of physics for the health sciences including mechanics, properties of fluids and solids, thermodynamics, optics, electrostatics and DC circuits, and radiation and health.



Second Year

For a BBiomedSc in Functional Human Biology, the second year comprises three Physiology papers (PHSL 231, 232 and 233), and at least 54 points (three papers): from Anatomy (ANAT 241, 242), Biochemistry (BIOC 223), Human Nutrition (HUNT 221, 222, 223), Microbiology (MICR 221, 223), Pathology (PATH 201) or Pharmacology (PHAL 211, 212), plus 18 further points of your choice.

PHSL 231: Neurophysiology

(first semester) 18 points

This paper explores the mechanisms by which the nervous system integrates sensory information from the environment and coordinates the body's responses at whole organism, cellular and molecular levels.

Timetable:	Lectures: Mon, Tues, 9 a.m. & fortnightly Thurs 9 a.m.
	Laboratories: Mon, Thurs or Fri, 2-5 p.m. (fortnightly)
	Tutorials: Optional, usually available during scheduled lab sessions.
Prerequisites:	HUBS 191 & three of: BIOC 192/CELS 191/CHEM 191/PHSI 191/HUBS 192 or BIOL 112.
Textbook:	Koeppen & Stanton, Berne & Levy Physiology, 7 th edition, Elsevier Mosby, 2018.
Outline of Paper:	Introduction (2 Lectures, 1 lab); Cellular Neurophysiology (4 lectures, 1 lab); Cell Communication (2 lectures); Skeletal Muscle (4 lectures, 1 lab); Systems Neurophysiology (6 lectures, 1 lab); Special Senses (7 lectures, 2 labs); Neuroendocrinology (6 or 7 lectures).
Laboratories:	All labs involve experimental work designed to highlight and reinforce essential principles and develop basic technical skills. Labs include group discussions of the results obtained and links made to the lecture material; labs will also provide opportunity to clarify and revise lecture material.
Outline of Assessment Procedures:	Two evening 1-hour tests on material from lectures and labs (in weeks 7 & 13 of semester 1, each contributing 15% to the final grade). Final exam is of 3 hours duration, contributing 70% to final grade.
Terms Requirements:	Satisfactory attendance at both progress tests and satisfactory attendance and active participation in all laboratory classes is required for the award of terms.

Note: Minor modifications to paper outlines and assessment procedures may occur from year to year.

PHSL 232: Cardiovascular & Respiratory Physiology

(second semester) 18 points

This paper explores cardiovascular and respiratory function and integration. Examples are taken from health (e.g., exercise) and disease states (e.g., cardiovascular or lung disease, sleep apnea) to illustrate the principles of function and integration.

Timetable:	Lectures: Mon, Tues, 9 a.m. & fortnightly Wed 9 a.m.
	Laboratories: Mon, Thurs or Fri, 2-5 p.m. (fortnightly)
	Tutorials: Optional, usually available during scheduled lab sessions.
Prerequisites:	HUBS 191 & HUBS 192, and two of: BIOC 192/CELS 191/CHEM 191/PHSI 191.
Textbook:	Koeppen & Stanton, Berne & Levy Physiology, 7 th edition, Elsevier Mosby, 2018. Supplementary texts: <ul style="list-style-type: none">• Vander's Human Physiology, 14th edition, McGraw Hill, 2016;• Lecture Notes on Human Physiology, 5th edition, Blackwell Scientific, 2007.
Outline of Paper:	Introduction (1 lecture); Cardiovascular System (11 lectures, 3 labs); Respiratory System (10 lectures, 2 labs); CVS & Respiratory Pathophysiology (5 lectures) Integration of Cardio & Respiratory System (5 lectures, 1 lab).
Laboratories:	All labs involve experimental work designed to highlight and reinforce essential principles and develop basic technical skills. Labs include group discussions of the results obtained and links made to the lecture material; labs will also provide opportunity to clarify and revise lecture material.
Assessment & Terms Requirements as for PHSL 231, with tests in weeks 7 &12 of semester 2.	

Note: Minor modifications to paper outlines and assessment procedures may occur from year to year.

PHSL 233: Cellular, Gastrointestinal and Renal Physiology

(second semester) 18 points

In this paper the epithelial and integrative functions of the gastrointestinal and renal systems of the human body will be examined at the cellular and molecular levels. Examples of pathophysiological conditions will be highlighted.

Timetable:	Lectures: Thurs, Fri 9 a.m. & fortnightly Wed 9 a.m.
	Laboratories: Mon, Thurs or Fri, 2-5 p.m. (fortnightly)
	Tutorials: Optional, usually available during scheduled lab sessions.
Prerequisites:	HUBS 191 & HUBS 192, and two of: BIOC 192/CELS 191/CHEM 191/PHSI 191.
Textbook:	Koeppen & Stanton, Berne & Levy Physiology, 7 th edition, Elsevier Mosby, 2018.
	Supplementary text: Boron & Boulpaep, Medical Physiology, 3 rd edition, Elsevier Saunders, 2017.
Outline of Paper:	Introduction (1 lecture); Cell Physiology (5 lectures, 1 lab); Epithelia (2 lectures, 2 labs); Cell Trafficking (5 lectures, 1 lab); Cell Signalling (2 lectures); Renal Physiology (8 lectures, 1 lab); Gastrointestinal Physiology (9 lectures, 1 lab).
Laboratories:	All labs involve experimental work designed to highlight and reinforce essential principles and develop basic technical skills. Labs include group discussions of the results obtained and links made to the lecture material; labs will also provide opportunity to clarify and revise lecture material.
Assessment & Terms Requirements as for PHSL 231, with tests in weeks 6 &11 of semester 2.	

Note: Minor modifications to paper outlines and assessment procedures may occur from year to year.

Choose at least three of the following:

ANAT 241: Human Biology: Cells and Systems (1st semester) 18 pts

The structural and functional organisation of the human body at cellular, tissue, system and regional levels.

ANAT 242: Neurobiology (2nd semester) 18 pts

The structural and functional organisation of the nervous system at cellular, tissue, system and integrative levels.

BIOC 223: Cellular Biochemistry and Metabolism (2nd semester) 18 pts

Metabolism provides the fuels and molecules for life. How metabolic processes are regulated and coordinated in animals. Human disease states that arise from metabolic imbalances.

HUNT 221: Macronutrients and Health (1st semester) 18 pts

Essentials of the physiology and biochemistry of the macronutrients; introduction to anthropometry, obesity and diabetes.

HUNT 222: Vitamins, Diet and Health (2nd semester) 18 pts

Essentials of the physiology and biochemistry of the vitamins; overview of dietary assessment; foods; food patterns.

HUNT 223: Minerals, Undernutrition and Health (2nd semester) 18 pts

Essentials of the physiology and biochemistry of the minerals; malnutrition in developing countries.

MICR 221: Microbes to Medicine (1st semester) 18 pts

Fundamental concepts in microbiology, building from the characteristics of microorganisms, through the handling and containment of microorganisms, to medical microbiology and immunology.

MICR 223: Infection and Immunity (2nd semester) 18 pts

The epidemiology and pathogenesis of infectious diseases, the response of the immune system to microbial antigens, and how the response is measured.

PATH 201: Foundations in Human Pathology (2nd semester) 18 pts

An outline of pathological processes underlying diseases in humans, including cell death, inflammation, immunological reactions, tissue healing and cancer, and the molecular mechanisms of each.

PHAL 211: Introductory Pharmacology (1st semester) 18 pts

The basic principles of pharmacology; how drugs get to their site of action; and how they work when they get there.

PHAL 212: Introductory Therapeutics and Toxicology (2nd semester) 18 pts

An introduction to both the use of drugs in the treatment of disease and the field of toxicology.

Third Year

For a BBiomedSc in Functional Human Biology, the third year comprises two Physiology papers (PHSL 345 and 343), at least 36 points from Anatomy (ANAT 331, 332, 335), Biochemistry (BIOC 353), Human Nutrition (HUNT 311, 312), Microbiology (MICR 332, 334), Pathology (PATH 301), Pharmacology (PHAL 304, 305) or Physiology (PHSL 341 or 342 or 344), and 36 further points of your choice. *For invitation into the BBiomedSc Honours programme you need to take a minimum of seven papers at 200-level or above in your third year, and maintain a B+ average in your four FUHB 300-level papers. For Honours in 2019 you will likely be required to complete a fifth 300-level paper to be eligible for BBiomedSc Honours.*

PHSL 345: Physiological Aspects of Health and Disease

(first semester) 18 pts

The application of knowledge about human molecular, cellular and systems physiology in understanding the physiology and pathophysiology of the human body.

Timetable:	Lectures: Mon, Thurs, 10 a.m. Laboratories: Mon or Fri, 2-5.50 p.m.
Prerequisites:	PHSL 232 and PHSL 233
Textbook:	Lists of chapters from various textbooks, selected monographs and articles will be provided.
Outline of Paper:	This paper will be taught in 3 modules of 8 lectures and 3 laboratory/problem-based sessions per module. In 2018 the modules will be (1) Heart Failure, (2) Atherosclerosis and (3) Epithelial ion channels in the lung.
Assessment:	The final grade is determined by the student's performance in internal assessment exercises and a final examination. To pass the paper as a whole, a mark of at least 45% must be attained in the final examination. (i) Internal assessment: Each of the three modules requires a mix of individual lab reports, group poster presentations and problem-based assignments (each assessment being worth 10-15% to a total of 40%). (ii) Final examination: This contributes 60% of the final mark, is 3 hours in duration and requires essay-style answers based on lecture, laboratory and problem-based material.
Terms Requirements:	Full attendance at all laboratory sessions and satisfactory completion of all laboratory work, presentations and reports.

Note: Minor modifications to paper outlines and assessment procedures may occur from year to year.

PHSL 343: Cellular & Epithelial Physiology

(second semester) 18 pts

This paper focuses on the cellular and molecular basis of the mechanisms and regulation of epithelial transport and the effect of representative diseases on these processes.

Timetable:	Lectures: Wed, Thurs, 9 a.m. Laboratories: Tues & Wed, 2-5.50 p.m. (alternate weeks with PHSL 344)
Prerequisite:	PHSL 233
Textbook:	There is no textbook for the course. Individual lecturers will prescribe reading material from a variety of sources.
Outline of Paper:	26 lectures and 12 laboratory sessions covering the following: <ul style="list-style-type: none">• Recent advances in our understanding of the cellular and molecular basis of absorption and secretion of fluid and electrolytes by epithelia;• Protein trafficking in epithelial cells;• Cell biology and physiology of diseases such as cystic fibrosis, Liddle's Syndrome, Nephrogenic Diabetes Insipidus and gout. The laboratories provide time for an introduction to the research activity of the staff and then in small groups students design, perform and analyse their own experiment through the semester.
Assessment:	The final grade is determined by the student's performance in internal assessment exercises and a final examination. To pass the paper as a whole, a mark of at least 45% must be attained in the final examination. (i) Internal assessment: Laboratory work contributes 40% of the final mark and includes two group poster presentations (25%), and a research proposal abstract (15%) based upon experiments carried out in the laboratory sessions. (ii) Final examination: This contributes 60% of the final mark, is 3 hours in duration and requires essay-style answers based on both lecture and laboratory material.
Terms Requirements:	Full attendance at all laboratory sessions and satisfactory completion of all laboratory work and internal assessment.

Note: Minor modifications to paper outlines and assessment procedures may occur from year to year.

Choose at least two of the following:

ANAT 331: Functional Anatomy (1st semester) 18 pts

Prerequisite: ANAT 241

Functional anatomy of the musculoskeletal system.

ANAT 332: Cell Biology (2nd semester) 18 pts

Prerequisite: ANAT 241

Selected topics from current issues in cell and molecular biology. Practical experience in molecular biology, cell culture and microscopy.

ANAT 335: Neurobiology (2nd semester) 18 pts

Prerequisite: ANAT 242

Structure and function of the mammalian brain, including the brain circuits and how the biology of its cells can lead to degenerative changes.

BIOC 353: Molecular Basis of Health and Disease: (2nd semester) 18 pts Prerequisite: BIOC 222 or 223

Cell signalling: how signals are received and transmitted within cells. Steroid hormone and redox signalling. Regulation of growth, development and cell death. Diseases associated with aberrant cell signalling.

HUNT 311: Metabolism, Health and Disease (1st semester) 18 pts

Prerequisites: HUNT 221, 222, 223

Vitamin and mineral metabolism; biochemical assessment of nutrient status.

HUNT 312: Nutrition in Cancer and Heart Disease (1st semester) 18 pts

Prerequisites: HUNT 221, 222, 223

Nutrition in the aetiology and prevention of cancer and heart disease; the jigsaw of plausible biological mechanisms, observational epidemiology, and the latest results of randomised controlled trials.

MICR 332: Health Microbiology (2nd semester) 18 pts

Prerequisites: MICR 223

Disease mechanisms of key microbial pathogens, including bacteria, protozoa and fungi. Treatment and control of microbial diseases. Role of the human microbiome and commensals in health and disease.

MICR 334: Advanced Immunology (1st semester) 18 pts

Prerequisites: MICR 223

Mechanisms of immune activation and tolerance, molecular immunology, allergy, autoimmunity, immunodeficiency, immunoendocrinology, tumour immunotherapy and transplant immunology. Tools for tumour immunotherapy, fluorescent cell sorting, lymphocyte activation, cytotoxicity and cytokine assays.

PATH 301: Advanced Pathology (1st semester) 18 pts

Prerequisite: PATH 201; Recommended prerequisites ANAT 241, BIOC 221

Pathology of human disease; applied and theoretical concepts relating to pathological conditions, including immuno-pathology, congenital and developmental disorders, cardiovascular pathology, haematological disorders, neuropathology, forensic and diagnostic pathology.

PHAL 304: Human Pharmacology (2nd semester) 18 points

Prerequisites: PHAL 211 & 212.

The application of pharmacological knowledge and principles in the development and assessment of new drugs and the treatment of disease.

PHAL 305: Molecular & Immunopharmacology (1st semester) 18 pts

Prerequisites: 18 points at 200-level in PHAL, ANAT, BIOC, GENE, MICR or PHSL; BIOC192, CHEM191, two of CELS191, HUBS191, 192.

The action of existing and potential drugs on molecular and immune systems. New targets for drug action generated by new movements in science.

One of:

PHSL 341: Molecular Cellular & Integrative Neurophysiology I (1st semester) 18 pts

Prerequisite: PHSL 231

Current research in neurophysiology at the molecular, cellular and systems levels. *(Also see Appendix.)*

Or PHSL 342: Molecular Cellular & Integrative Neurophysiology II (1st semester) 18 pts

Prerequisite: PHSL 231

Current research in neurophysiology at the molecular, cellular and systems levels. *(Also see Appendix.)*

Or PHSL 344: Cardiovascular Physiology (2nd semester) 18 pts

Prerequisite: PHSL 232

This paper focuses on the cardiovascular system during health and disease at molecular, cellular and system levels. Themes are based on research areas of teaching staff. See <http://phsl.otago.ac.nz/undergraduates.php> for current topics. *(Also see Appendix.)*

Postgraduate Opportunities

After graduation with a BBiomedSc degree in Functional Human Biology, there are exciting opportunities for advanced studies, including the one-year postgraduate Honours, one-year PGDipSci, two-year MSc and, after BBiomedSc (Hons) or MSc, the three-year PhD.

The prerequisites to keep in mind during your undergraduate planning are below. For more information see the Postgraduate Booklet.

Postgraduate BBiomedSc Hons: Entry into Honours is by invitation from the Dean of the Otago School of Medical Sciences. Entry requires completion of the requirements for the three-year BBiomedSc degree with an average grade of at least B+ for the four prescribed 300-level papers. Your third year must also comprise a total of 7 papers (126 points) and as well as the four prescribed 300-level papers, the other three must be at 200-level or above.

Note: from 2019 you will likely be required to complete a fifth 300-level paper in your degree to be eligible for BBiomedSc Honours.

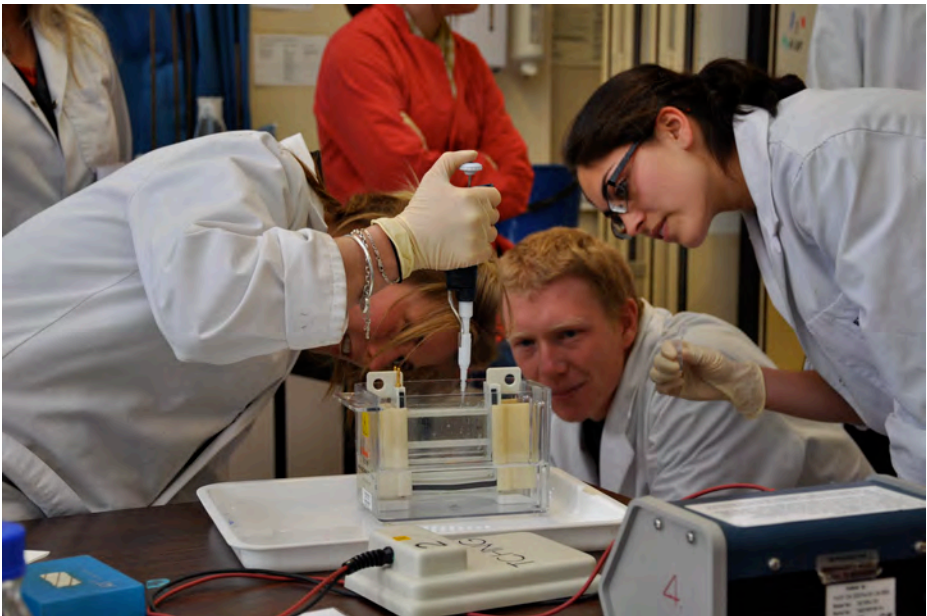
The 400-level Honours year is a 120-point programme (BMED 4BF – the code for Functional Human Biology) comprising a Research Thesis (research proposal, literature review, final thesis) and some internally assessed course work. For further details see the Physiology/Functional Human Biology postgraduate booklet.

If you have completed a BBiomedSc Honours degree, with a first class award, you may enrol for a PhD. This is a full-time research degree lasting at least three years, involving full-time research into a chosen topic. By the time your thesis is completed, you will be an expert in this field and will have contributed significantly to our understanding of this topic. If your BBiomedSc Hons is awarded a 2.1 then you may need to complete a one-year Masters thesis before enrolling for a PhD.

Postgraduate Diploma in Science (PGDipSci)*: The PGDipSci (Postgraduate Diploma in Science) involves academic study for one year of advanced topics in Physiology and a research project leading to a PGDipSci thesis. This can lead to a further year of research for a MSc thesis.

* For most BBiomedSc graduates, we advise the PGDipSci followed by one-year Masters thesis route to a PhD as opposed to a two-year MSc.

See the separate Physiology booklet (“Course Information for Postgraduate Studies”) (<http://phsl.otago.ac.nz/postgraduates.php>) describing the PGDipSci, MSc and PhD degrees.



What sort of jobs do Functional Human Biology graduates get?

A training in Functional Human Biology opens up a wide array of career options and is a good qualification to travel with.

- **Basic and applied research careers** in various settings such as:
 - ❑ university departments,
 - ❑ research institutes,
 - ❑ pharmaceutical and biotechnology industries,
 - ❑ hospital, private clinical laboratories and diagnostic laboratories,
 - ❑ the biomedical equipment and service industries.
- **Non-research oriented careers** for our graduates, include:
 - ❑ development, marketing and sales representative positions in the above industries,
 - ❑ university and school teaching,
 - ❑ policy advisors and consultants in government departments and agencies concerned with health, science and technology,
 - ❑ media development, public relations and science journalism.
- A solid and relevant base for entry into **health science professional courses** such as:
 - ❑ dentistry,
 - ❑ medicine,
 - ❑ pharmacy,
 - ❑ physiotherapy.

Biomedical science graduates are also well placed to take advantage of new careers that are constantly becoming available in the new frontier areas of scientific knowledge and application.

If you can see yourself in any of these roles, a BBiomedSc major in Functional Human Biology can help get you there!

A BBiomedSc Graduate

Tracey Righton



Like many first year university students I came to Otago to do first year health science with the hope of going on into medicine. However the diversity of university study took me down a different path where I did a degree in Biomedical Science with Honours, majoring in functional human biology. I am now a respiratory physiologist working at the Green Lane Clinical Centre in Auckland, where I am involved in patient care, working with a team of professionals and applying the skills I learnt through my studies everyday.

Working as a respiratory physiologist, my job is to test patients' lung function, volumes, oxygen diffusing capacity of the lungs, exercise tolerance and many more aspects of the respiratory system. The job involves dealing with a large range of respiratory diseases and differing patients on a day-to-day basis.

The strength of doing a honours degree in biomedical science gave me not only the background knowledge of the physiology and principles behind the respiratory system but also a hands-on experience with scientific equipment you don't get to see during your undergraduate studies – “it's a real eye opener”. This hands on experience put me a step ahead for my new job as it meant I already had a basic knowledge of the equipment used daily in the respiratory department, some of the equipment includes spirometry, plethysmography, ECG and an ergometer all of which I used in my honours year.

I am also grateful for the “one-to-one contact” with the lecturers that Otago offer. The physiology department is a friendly faculty so there's plenty of opportunity to talk to the staff. They're always available, not just in fourth year, but throughout the course of the degree.

Appendix

Course information for additional Physiology papers on offer.

PHSL 341: Molecular Cellular & Integrative Neurophysiology I

Prerequisite is PHSL231, (first semester) 18 pts

Current research in neurophysiology at the molecular, cellular and systems levels. Themes may vary from year to year and are distinct from those in PHSL342. See <http://phsl.otago.ac.nz/undergraduates.php> for current topics.

Timetable:	Lectures: Mon, Tues, 9 a.m. Laboratories: Tues & Wed, 2-5.50 p.m. (alternate weeks with PHSL 342)
Prerequisite:	PHSL 231
Textbook:	There is no textbook for the course. Individual lecturers will prescribe reading material from a variety of sources.
Outline of Paper:	25 lectures and 12 laboratory sessions covering the cellular and molecular underpinnings of neuronal development, signalling, and communication.
Assessment:	The final grade is determined by the student's performance in internal assessment exercises (40%) and a final written examination (60%). To pass the paper as a whole, a mark of at least 45% must be attained in the final examination. (i) Internal assessment (40% of the overall final grade): three tasks, 1) written research proposal worth 5% of the final grade, 2) written research report (25%), 3) oral or poster research presentation (10%). (ii) Final examination: 3 hours to write 3 essays contributing a total of 60% of the final grade on topics covering the entire course, with some choice.
Terms Requirements:	Full attendance and participation in all laboratory sessions. Satisfactory completion of all laboratory work and a minimum total of at least 45% on internal assessment tasks.

Note: Minor modifications to paper outlines and assessment procedures may occur from year to year.

PHSL 342: Molecular Cellular & Integrative Neurophysiology II

Prerequisite is PHSL231, (first semester) 18 pts

Current research in neurophysiology at the molecular, cellular and systems levels. Themes may vary from year to year and are distinct from those in PHSL341. See <http://phsl.otago.ac.nz/undergraduates.php> for current topics.

Timetable:	Lectures: Wed, Thurs, 9 a.m. Laboratories: Tues & Wed, 2-5.50 p.m. (alternate weeks with PHSL 341)
Prerequisite:	PHSL 231
Textbook:	There is no textbook for the course. Individual lecturers will prescribe reading material from a variety of sources.
Outline of Paper:	26 lectures and 10 laboratory sessions explore the physiology of the mammalian central nervous system, integrating across levels from the molecular to the behavioural.
Assessment:	The final grade is determined by the student's performance in internal assessment exercises (40%) and a final written examination (60%). To pass the paper as a whole, a mark of at least 45% must be attained in the final examination. (i) Internal assessment (40% of the overall final grade): three tasks, 1) written research proposal worth 5% of the final grade, 2) written research report (25%) 3) oral or poster research presentation (10%). (ii) Final examination: 3 hours to write 3 essays contributing a total of 60% of the final grade on topics covering the entire course, with some choice.
Terms Requirements:	Full attendance and participation in all laboratory sessions. Satisfactory completion of all laboratory work and a minimum total of at least 45% on internal assessment tasks.

Note: Minor modifications to paper outlines and assessment procedures may occur from year to year

PHSL 344: Cardiovascular Physiology

Prerequisite is PHSL232, (second semester) 18 pts

The cardiovascular system during health and disease at molecular, cellular and system levels. Themes are based on research areas of teaching staff. See <http://phsl.otago.ac.nz/undergraduates.php> for current topics.

Timetable:	Lectures: Mon, Tues, 9 a.m.
	Laboratories: Tues & Wed, 2-5.50 p.m. (alternative weeks with PHSL 343)
Prerequisite:	PHSL 232
Textbook:	There is no textbook for the course. Individual lecturers will prescribe reading material from a variety of sources.
Outline of Paper:	26 lectures, 10 laboratory and a seminar session explore the physiological, cellular and molecular regulation of cardiovascular function, with specific focus on (i) autonomic control and diabetes; (ii) signalling in the cardiovascular system; (iii) reperfusion injury and role of microRNAs in the cardiovascular system.
Assessment:	The final grade is determined by the student's performance in internal assessment exercises and a final examination. To pass the paper as a whole, a mark of at least 45% must be attained in the final examination. (i) Internal assessment (40%): consists of a poster presentation, lab test, lab report, abstract and an oral presentation. (ii) Final examination (60%): This contributes 60% of the final mark, is 3 hours in duration and requires 4 essay-style answers based on lecture, laboratory and problem-based material.
Terms Requirements:	Full attendance at all laboratory and seminar sessions and satisfactory completion of all laboratory work, in-lab worksheets, oral presentations and reports.

Note: Minor modifications to paper outlines and assessment procedures may occur from year to year.