Pathology

The aim of these subjects is to introduce the student to the scientific study of disease processes and their investigation. The causes, mechanisms of development and possible outcome of disease are covered in Basic Principles of Pathology 531-201/202. Current concepts of cell interaction and methods of investigation of cells, molecules and genes involved in disease processes will be studied in 531-301, 531-302, 531-303, 531-304 and 531-305 by means of lectures, seminar/discussions, experimental projects and laboratory practical work in a variety of research areas.

The overall objective of teaching Pathology within the Faculty of Science is to provide a theoretical foundation and practical training from which a student could take up a career in the wider fields of medicine and biomedical research or medical technology and laboratory investigation within a university, hospital, institute of medical research or in the pharmaceutical and biotechnology industries.

Suggested subjects

100-level subjects

600-141 and 600-142 biology; chemistry 610-141 plus 610-142; other 100-level Science subjects.

200-level subjects

Basic Principles of Pathology, 531-201 and Biochemistry and Molecular Biology 521- 211/221 and 521- 212/222; and other 200 level subjects selected from anatomy and cell biology 516-201, physiology 536-201, -202, -211 and -203; biotechnology, genetics, microbiology, pharmacology and chemistry.

300-level subjects

Students wishing to major in pathology should undertake 300-level pathology subjects (50 points or more), and other 300-level subjects offered by the following departments: anatomy and cell biology, biochemistry and molecular biology, microbiology, physiology, pharmacology or genetics. It is intended that 300-level pathology will be taken as a full year course. Students wishing to undertake Semester 2 pathology subjects will not be accepted without successful completion of 531-301 and 531-302.

Bachelor of Science (Honours)

For information about the Faculty *and* departmental entry requirements for honours, please refer to *Bachelor of Science (Honours) and Bachelor of Information Systems (Honours) (p.883)*. These requirements should be considered when planning your course.

Subject descriptions

531-201 Basic Principles of Pathology-Science

Note: This subject will run concurrently with 531-202 (Optometry).

Students are reminded that entry into any of the 300-level pathology subjects requires the subjects Biochemistry and Molecular Biology 521-211/221 and 521-212/222.

Credit points: 12.5 **HECS-band:** 2

Coordinator: Dr M M Ayers; Dr J R Underwood

Prerequisites: Biology 600-141 and 600-142; chemistry 610-141 and 610-142

Recommended: anatomy and cell biology 516-201

Contact: 24 lectures (two per week) and 24 hours practical (2 hours per week) *(Semester 2)*.

Description: On completion students will:

- learn the basic principles of pathology through the study of the causes, mechanisms of development and the possible outcomes of disease;
- understand the defence and repair processes which are commonly used by the body when a malfunction of a tissue/organ occurs;
- comprehend the basic terminology of disease and repair mechanisms; and
- be supported in appreciation of the principles by practical sessions studying microscopic pathological specimens.

The topics covered include cell injury; repair, regeneration, fibrosis; infectious disease; immunopathology; haemo-dynamic disorders; vascular disease; and growth disorders including neoplasia.

Assessment: A 2-hour end-of-semester written examination worth 70% of total marks; two multiple choice question tests during the semester worth 15% each of total marks.

Prescribed texts: V Kumar, R S Cotran, S L Robbins, *Basic Pathology*, latest edition, W B Saunders Co. **or** E Rubin and J L Farber, *Essential Pathology*, latest edition, J B Libbincott Co. Note: Students intending to complete a major in pathology may purchase the larger text: R S Cotran, Robbins Pathologic Basis of Disease, Saunders, latest edition. OR: E Rubin, J L Farber Pathology, Lippincott, latest edition.

531-202 Basic Principles of Pathology-Optometry

Note: This subject will run concurrently with 531-201 (Science).

Credit points: 12.5 **HECS-band:** 2

Coordinator: Dr M M Ayers

Prerequisites: Enrolment in optometry.

Contact: 24 lectures (two per week) and 24 hours practical work (2 hours per week) *(Semester 2)*.

Description: as for 531-201

Assessment: A 2-hour end-of-semester written examination worth 70% of total marks; two multiple choice question tests during the semester worth 15% each of total marks.

Prescribed texts: V Kumar, R S Cotran, S L Robbins, *Basic Pathology*, latest edition, W B Saunders Co. **or** E Rubin and J L Farber, *Essential Pathology*, latest edition, J B Libbincott Co.

531-301 Cellular Basis of Disease

Note: This subject may be taken as part of a major in pathology or as a single pathology subject. Students intending to complete a major in pathology are required to enrol in both 531-301 and 531-302.

To enrol in 531-303 and 531-304 or 531-305, a pass grade must be achieved in both 531-301 and 531-302.

Credit points: 12.5 **HECS-band:** 2

Coordinator: Dr M M Ayers; Dr J R Underwood

Prerequisites: Basic Principles of Pathology 531-201; Biochemistry and Molecular Biology 521-211/221 and 521-212/222;

Corequisites: (for pathology majors) 531-302 Techniques for Investigation of Disease.

Recommended: Anatomy and cell biology 516-201; biochemistry and molecular biology 521-301 and/or 521-302; or microbiology and immunology 526-304 plus 526-324.

Contact: 36 lectures (three per week) *(Semester 1)*.

Description: Students completing this subject will:

- extend and deepen studies of the principles of pathology begun in 531-201, through the scientific study of the causes, mechanisms of development and the possible outcomes of disease;
- understand the cellular and molecular basis of defence and repair processes commonly used by the body when a malfunction of a tissue/organ occurs;
- appreciate the spectrum and limitations of the possible biological mechanisms of response to injury, and be able to relate these mechanisms to those which have been established as the basis of normal cell/molecular biology; and
- gain a deeper theoretical and practical understanding of the way in which questions about disease processes are formulated and investigation of these questions is carried.

The topics to be studied are cell injury, inflammation, regeneration, repair and fibrosis in particular disease contexts; infectious disease; immunopathology; haemo-dynamic disorders; vascular disease and shock; neoplasia; nutritional pathology; environmental pathology; aging; and genetic disease and diagnosis.

Assessment: A 3-hour end-of-semester written examination worth 70% of total marks; two multiple choice question tests to be held during the semester worth 15% each of total marks.

Prescribed texts: R S Cotran, *Robbins Pathologic Basis of Disease*, latest edition, Saunders. **or** E Rubin and J L Farber, *Pathology*, latest edition, Lippincott.

531-302 Techniques for Investigation of Disease

Note: Students intending to complete a major in pathology are required to enrol in both 531-301 and 531-302.

To enrol in 531-303 and 531-304 or 531-305, a pass must be achieved in both 531-301 and 531-302. Credit cannot be gained for 531-302 and 531-301 prior to 2000.

Credit points: 12.5 **HECS-band:** 2

Coordinator: Dr J R Underwood; Dr M M Ayers

Prerequisites: Basic Principles of Pathology 531-201, Biochemistry and Molecular Biology 521-211/221 and 521-212/222

Corequisites: 531-301 Cellular Basis of Disease

Recommended: Anatomy and cell biology 516-201; biochemistry and molecular biology 521-301 and/or 521-302; or microbiology and immunology 526-304 plus 526-324.

Contact: A maximum of 54 hours practical comprising six 6-hour laboratory-based practicals and 6 3-hour written data-exercises directly related to the laboratory work *(Semester 1).*

Description: Students completing this subject will:

- gain a deeper theoretical and practical understanding of the way in which questions about disease processes are formulated and investigation of these questions is carried out using sophisticated laboratory-based techniques; and
- take part in hands-on laboratory experiments using current techniques (see below) appropriate for investigation of a variety of diseases; also complete written exercises based on interpretation of unseen experimental data.

The techniques to be studied are immunofluorescence and immunocytochemistry, ELISA, immunoblotting and molecular biology techniques.

Assessment: Practical laboratory work (continuous assessment) including work records, practical reports.

Prescribed texts:

A laboratory manual and references to current scientific journal articles will be available at the beginning of the semester.

531-303 Molecular/Genetic Basis of Disease-Lect

Note: Students enrolling in this subject must also enrol in 531-304 or 531-305. Entry into this subject is dependent on successful completion of both 531-301 and 531-302 and will be finalised after publication of results. Credit cannot be gained for both 531-304 and 531-305. Credit cannot be gained for 531-303 and 531-302 prior to 2000. *See Department for details*.

Credit points: 12.5 **HECS-band:** 2

Coordinator: Dr J R Underwood; Dr M M Ayers

Prerequisites: 531-301 Cellular Basis of Disease; 531-302 Techniques for Investigation of Disease; Biochemistry and Molecular Biology 521-211/221 and 521-212/222

Recommended: Biochemistry and molecular biology 521-301 and/or 521-302; microbiology 526-304 and microbiology 526-324

Corequisites: 531-304 Molecular and Genetic Basis of Disease - General Practical, OR 531-305 Molecular and Genetic Basis of Disease - Advanced Laboratory Project

Contact: 36 lectures (three a week) *(Semester 2).*

Description: The material in this subject is directly integrated with and follows on from 531-301 Cellular Basis of Disease. It forms a core group of lectures to be taken by students enrolled in 531-304 and 531-305. This unit will expand and deepen the study of disease processes and their investigation; the genetic and molecular causes and results of these processes will be considered under the following theme headings: immunological disease, neurological disease, neoplasia, genetic disease and gene therapy. The lectures will focus on questions under investigation in current areas of research related to these topics.

Assessment: A 3-hour end-of-semester written examination worth 60% of total marks and two multiple choice question tests during the semester, worth 20% each of total marks.

Prescribed texts:

References to current scientific journal articles will be given during the lectures.

531-304 Molecular/Genetic Basis of Disease-Prac

Note: Students taking this subject must also enrol in 531-303 Molecular and Genetic Basis of Disease - Lectures. Credit cannot be gained for both 531-304 and 531-305. Practical project allocation will be completed after publication of results in 531-301 and 531-302 and finalised during the mid-year semester break. Entry into this subject is dependent on successful completion of 531-301 and 531-302. *See Department for details*.

Credit points: 12.5 **HECS-band:** 2

Coordinator: Dr J R Underwood; Dr M M Ayers

Prerequisites: Cellular Basis of Disease 531-301 and Techniques for Investigation of Disease 531-302; Biochemistry and Molecular Biology 521-211/221 and 521-212/222.

Recommended: Biochemistry and molecular biology 521-301 and/or 302; or microbiology 526-304 and microbiology 526-324.

Corequisites: 531-303 Molecular and Genetic Basis of Disease - Lectures

Contact: 60 hours practical (5 hours per week) *(Semester 2).*

Description: Students completing this subject will:

- develop an appreciation of the spectrum of cellular, molecular and genetic responses to injury and the approaches and techniques used for their investigation; and
- carry out under supervision a group experimental project chosen from the following areas: neuropathology, ophthalmic pathology, immunopathology, transplantation, toxicology, oncology, vascular pathology, virology, renal pathology, liver pathology, haematology in a departmental research laboratory. The project will demonstrate the thought processes, techniques, data collection, analysis and interpretation involved in experimental work investigating disease.

Assessment: Practical laboratory work (continuous assessment) including work records; a group seminar presentation; project report (1500 words).

Prescribed texts:

References to current scientific journal articles will be given during the semester.

531-305 Molecular/Genetic Basis of Disease-Lab

Note: Students taking this subject must also enrol in 531-303 Molecular and Genetic Basis of Disease - Lectures. Credit cannot be gained for both 531-304 and 531-305. A booklet of projects will be available for prior to the start of second semester. See Department for details. Project allocation will be completed after publication of results in 531-301 and 531-302 and finalised during the mid-year semester break. Entry into 531-305 is dependent on successful completion of both 531-301 and 531-302. Credit cannot be gained for 531-305 and 531-303 prior to 2000.

Credit points: 25 **HECS-band:** 2

Coordinator: Dr J R Underwood

Prerequisites: 531-301 Cellular Basis of Disease; 531-302 Techniques for Investigation of Disease; Biochemistry and Molecular Biology 521-211/221 and 521-212/222

Corequisites: 531-303 Molecular and Genetic Basis of Disease - Lectures

Recommended: Biochemistry and molecular biology 521-301 and/or 521-302 or microbiology 526-304 and microbiology 526-324.

Contact: 120 hours practical (a minimum of ten hours a week for 12 weeks) *(Semester 2).*

Description: Students completing this subject should be able to:

- develop an appreciation of the spectrum of cellular, molecular and genetic responses to injury and the approaches and techniques used for their investigation;
- carry out under supervision of research personnel, an individual experimental practical project in a departmental or hospital pathology research laboratory. A list of projects from which students can choose, will be issued prior to the start of Semester 2. Every effort to accommodate student preference will be made but final allocation will rest with the Department;
- complete one project chosen from the following areas: clinical chemistry, clinical microbiology, forensic pathology, haematology, immunopathology, liver pathology, neuropathology, oncology, ophthalmic pathology, renal pathology, transplantation, toxicology, vascular pathology, and virology.

Assessment: Practical laboratory work (continuous assessment) including work records; a seminar presentation; a 2000-word project report.

References to current scientific journal articles will be given during the semester.