

# BIOLOGICAL SCIENCES (BIOS)

## BIOS 0001 Biology (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios0001/>) **Legacy Code:** 900022

Biology is the study of the cellular processes that occur within organisms and the interactions that occur between organisms within the biosphere. The subject is therefore seen to have relevance to the lives of students. It is important for students to develop an understanding of the biological principles that will enable them to make informed decisions about the advances that are occurring in biotechnology and biomedical science. Undergraduate study in the life sciences requires the student to have acquired a basic body of knowledge that focuses on the diversity and the unity of living things as well as skills in collecting and analysing information and writing concise and coherent explanations.

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## BIOS 0002 Focus on Biology (WSTC Prep) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios0002/>) **Legacy Code:** 700232

Biology is the study of integrated living systems, from the level of molecular systems that constitute cells to the interactions that occur within and between organisms that together make up the biosphere. This subject will equip students to undertake tertiary level biological subjects that emphasise both the unity (cell biology) and diversity (evolution) of living organisms. Students will learn about the basic molecular biological underpinnings of cellular structure and function within an integrated framework that proceeds through major themes of bioenergetics, gas exchange and transport systems within multicellular organisms, inheritance and evolution. Students will develop a fundamental body of essential biological concepts, as well as build skills in collecting and analysing information, and writing coherent explanations.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** BIOS 0003 - Focus on Biology (WSTC) BIOS 0001 - Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## BIOS 0003 Focus on Biology (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios0003/>) **Legacy Code:** 900104

Biology is the study of integrated living systems, from the level of molecular systems that constitute cells to the interactions that occur within and between organisms that together make up the biosphere. This subject will equip students to undertake tertiary level biological subjects that emphasise both the unity (cell biology) and diversity (evolution) of living organisms. Students will learn about the basic molecular biological underpinnings of cellular structure and function within an integrated framework that proceeds through major themes of bioenergetics, gas exchange and transport systems within multicellular organisms, inheritance and evolution. Students will develop a fundamental body of essential biological concepts, as well as build skills in collecting and analysing information, and writing coherent explanations.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** BIOS 0002 - Focus on Biology (UWSCFS)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## BIOS 1001 Biodiversity (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1001/>) **Legacy Code:** 300802

How many species walk, fly, swim or slither, crawl, hop, wriggle or just float, hitchhike or move so slowly that they appear not to move at all? No one knows and new species appear almost every day. This subject focuses on this spectacular diversity of living things and the process of evolution. Students explore and classify biodiversity and how organisms function, acquire and assimilate resources and co-ordinate growth and reproduction. Organisms interact with one another and their environment forming a complex set of interactions in ecosystems. It is these interactions that have driven evolution. Ultimately human survival depends on the sustainable use of this biodiversity and ecosystems.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1006 - Biology A – The Diversity of Life BIOS 1002 - Biodiversity BIOS 1005 - Biology 2 BIOS 1003 - Biodiversity

**Incompatible Subjects:** LGYA 3841 - Foundation Biology 2 LGYB 5438 - Biological Sciences 12 LGYB 9635 - General Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## BIOS 1003 Biodiversity (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1003/>) **Legacy Code:** 700095

How many species walk, fly, swim or slither, crawl, hop, wriggle or just float, hitchhike or move so slowly that they appear not to move at all? No one knows and new species appear almost every day. This subject focuses on this spectacular diversity of living things and the process of evolution. Students explore and classify biodiversity and how organisms function, acquire and assimilate resources and co-ordinate growth and reproduction. Organisms interact with one another and their environment forming a complex set of interactions in ecosystems. It is these interactions that have driven evolution. Ultimately human survival depends on the sustainable use of this biodiversity and ecosystems.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1002 - Biodiversity LGYB 0458 - Biodiversity (UWSC) BIOS 1001 - Biodiversity

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## BIOS 1010 Bioscience 1 (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1010/>) **Legacy Code:** 401002

This subject will be replaced from Autumn 2022 by 401469 Bioscience 1. This subject introduces nursing and midwifery students to the terminology and major introductory concepts related to normal structure and function of the human body and its relationship to performances of activities of living and healthy lifestyle practices.

**Level:** Undergraduate Level 1 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1011 Bioscience 2 (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1011/>) **Legacy Code:** 401006

This subject will be replaced from Autumn 2022 by 401470 Bioscience 2. This subject extends knowledge gained in Bioscience 1 and introduces nursing students to concepts associated with alterations in health and wellness as a consequence of life transition. It includes an introduction to pathophysiology, pharmacology, immunology and microbiology. The subject also focuses on the impact of microorganisms on the health of people and the body's natural defences, as well as pharmacological interventions, in dealing with infections and injuries and its significance for nursing.

**Level:** Undergraduate Level 1 subject

**Co-requisite(s):** BIOS 1010

**Equivalent Subjects:** BIOS 1021 - Introduction to Health Breakdown

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1012 Cell Biology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1012/>) **Legacy Code:** 300816

Cells are the most basic form of all life, and underlying normal cell function are the molecules used to build complex cellular structures, generate energy, and propagate dynamic life. The subject will study the fundamental processes through which key biomolecules, including lipids, carbohydrates, amino acids and nucleic acids are manipulated to generate and store energy, and build a broad array of important biological macromolecules including DNA, membranes and proteins. To sustain life, cells respire for energy and replicate for growth and sexual reproduction. Accordingly the subject will examine cellular respiration, transcription, translation, mitosis, meiosis, transmission and how genes are inherited and modified providing insight into the phenomena of life. The role of DNA technologies in the fields of medicine, biotechnology and environmental science will provide students with real world applications.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1013 - Cell Biology BIOS 1007 - Biology B - Cellular Processes BIOS 1004 - Biology 1 BIOS 1014 - Cell Biology (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1014 Cell Biology (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1014/>) **Legacy Code:** 700125

Cells are the most basic form of all life, and underlying normal cell function are the molecules used to build complex cellular structures, generate energy, and propagate dynamic life. The subject will study the fundamental processes through which key biomolecules, including lipids, carbohydrates, amino acids and nucleic acids, are manipulated to generate and store energy, and build a broad array of important biological macromolecules including DNA, membranes and proteins. To sustain life, cells respire for energy and replicate for growth and sexual reproduction. Accordingly the subject will examine cellular respiration, transcription, translation, mitosis, meiosis, transmission and how the genetic code is inherited and modified providing students insights into the phenomena of life. The role of DNA technology in the fields of medicine, biomolecular plant and animal science, food, forensic and environmental science will provide students with real world applications.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1013 - Cell Biology BIOS 1007 - Biology B – Cellular Processes LGYB 0459 - Cell Biology (UWSC) BIOS 1012 - Cell Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1022 Introduction to Human Biology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1022/>) **Legacy Code:** 300361

This subject gives a basic understanding of the human body and introduces the scientific and medical terminology used for anatomy, physiology and biochemistry. It deals with gross structure and microscopic structure of the human body. It also examines microbial organisms, their classification, how they differ from eukaryotic cells and how our body defends against them. Where appropriate, examples of functional diseases will be discussed.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** LGYA 7033 - Human Medical Sciences 1 LGYA 5170 - Physical and Biological Sciences 1 LGYB 7586 - Human Biology 1 BIOS 1023 - Introduction to Human Biology (WSTC)

**Incompatible Subjects:** NATS 1013 - Introduction to Anatomy BIOS 1025 - Introduction to Physiology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1023 Introduction to Human Biology (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1023/>) **Legacy Code:** 700061

This subject gives a basic understanding of the human body and introduces the scientific and medical terminology used for anatomy, physiology and biochemistry. It deals with gross structure and microscopic structure of the human body. It also examines microbial organisms, their classification, how they differ from eukaryotic cells and how our body defends against them. Where appropriate, examples of functional diseases will be discussed.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** Students must pass NATS 0006 - Fundamentals of Health Science (WSTC Prep) prior to enrolling in this unit (except for those enrolled in 7019 - Diploma in Health Science Fast Track as NATS 0006 is not in the Fast Track course structure)

**Equivalent Subjects:** BIOS 1022 - Introduction to Human Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1027 Management of Aquatic Environments (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1027/>) **Legacy Code:** 300824

This subject introduces students to the physical, chemical and biological nature of water systems and the linkages to human activity. These linkages include a development of an appreciation of the essential services and broad uses and values of water in modern human society, and the natural environment. Students are challenged to examine the causes and effects of water pollution and environmental degradation. Students are introduced to scientific water sampling, analysis and reporting of water quality and pollution.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1028 - Management of Aquatic Environments

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1030 Resource Sustainability (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1030/>) **Legacy Code:** 300810

Resource sustainability deals with the local, national, and global sustainability issues concerning human interactions with the environment. The subject uses current resource issues and scientific concepts to provide the practical and theoretical information needed for students to think critically about environmental issues and to contribute to the sustainable management of natural and built environments. Students will also learn how science and society interact in the management of resources. Using the concept of ecologically sustainable development as a foundation, students will use critical thinking skills to research a resource issue of their choice at the local, national and/or international level. Students will communicate their research using new media exploring the issue and make recommendations for improving sustainability.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1029 - Resource Sustainability BIOS 1031 - Resource Sustainability (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1031 Resource Sustainability (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1031/>) **Legacy Code:** 700099

Resource sustainability deals with the local, national, and global sustainability issues concerning human interactions with the environment. The subject uses current resource issues and scientific concepts to provide the practical and theoretical information needed for students to think critically about environmental issues and to contribute to the sustainable management of natural and built environments. Students will also learn how science and society interact in the management of resources. Using the concept of ecologically sustainable development as a foundation, students will use critical thinking skills to research a resource issue of their choice at the local, national and/or international level. Students will communicate their research using new media exploring the issue and make recommendations for improving sustainability.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1029 - Resource Sustainability BIOS 1030 - Resource Sustainability

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1033 Concepts in Human Physiology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1033/>) **Legacy Code:** 301254

This subject introduces the core concepts and terminology necessary to provide a basic understanding of the physiological responses of the human body using relevant examples. These include the processes of homeostasis, cell-cell interactions and the physical and chemical transport processes that are required to carry out integrated functions. Students will explore these key physiological concepts through practical hands-on experiments and in interactive group work in prac and tutorial classes, respectively. The subject provides the foundation to study the physiology of human organ systems.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** NATS 1009 NATS 1021

**Incompatible Subjects:** BIOS 1025 Introduction to Physiology BIOS 1022 Introduction to Human Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1034 Management of Aquatic Environments (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1034/>) **Legacy Code:** 700297

This subject introduces students to the physical, chemical and biological nature of water systems and the linkages to human activity. These linkages include a development of an appreciation of the essential services and broad uses and values of water in modern human society, and the natural environment. Students are challenged to examine the causes and effects of water pollution and environmental degradation. Students are introduced to scientific water sampling, analysis and reporting of water quality and pollution.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1027 Management of Aquatic Environments BIOS 1028 Management of Aquatic Environments

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1035 Anatomy and Physiology in Health (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1035/>) **Legacy Code:** 301350

This subject introduces the levels of structural organisation of the human body together with scientific and medical terminology used in anatomy and physiology. It deals with gross structure and function of the major organ systems of the human body and where appropriate, a brief outline of environmental factors and personal health practices that affect optimal human body function will be introduced. It also deals with basic biomechanics of musculoskeletal system.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** LGYA 7033 - Human Medical Sciences 1 LGYA 5170 - Physical and Biological Sciences 1 LGYB 7586 - Human Biology 1 BIOS 1023 - Introduction to Human Biology (WSTC) BIOS 1022 - Introduction to Human Biology

**Incompatible Subjects:** NATS 1013 - Introduction to Anatomy BIOS 1025 - Introduction to Physiology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1036 Human Development and Disease across the lifespan (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1036/>) **Legacy Code:** 401394

This subject builds on fundamental assumed knowledge of anatomy and physiology and introduces the study of human disease processes or pathophysiology through the framework of human development as a way of examining growth, health and disease at different stages of the lifespan. General concepts underlying human diseases as well as disorders relating to the lifespan will be studied. Developmental changes in physical, cognitive, social, intellectual, perceptual, personality and emotional growth are discussed. Common communicable and non-communicable, acute, chronic and degenerative health conditions are discussed from a pathophysiological, psychosocial and epidemiological perspective, and their impact on the day to day function of individuals and populations is explored. Risk factors for conditions and disease trajectory are explored at individual and society level, as well as the impact of these conditions on individuals, the health system and wider society.

**Level:** Undergraduate Level 1 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1037 Human Development and Disease across the Lifespan (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1037/>) **Legacy Code:** 700314

This subject builds on fundamental assumed knowledge of anatomy and physiology and introduces the study of human disease processes or pathophysiology through the framework of human development as a way of examining growth, health and disease at different stages of the lifespan. General concepts underlying human diseases as well as disorders relating to the lifespan will be studied. Developmental changes in physical, cognitive, social, intellectual, perceptual, personality and emotional growth are discussed. Common communicable and non-communicable, acute, chronic and degenerative health conditions are discussed from a pathophysiological, psychosocial and epidemiological perspective, and their impact on the day to day function of individuals and populations is explored. Risk factors for conditions and disease trajectory are explored at individual and society level, as well as the impact of these conditions on individuals, the health system and wider society.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1036 Human Development and Disease across the lifespan

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1038 Anatomy and Physiology in Health (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1038/>) **Legacy Code:** 700316

This subject introduces the levels of structural organisation of the human body together with scientific and medical terminology used in anatomy and physiology. It deals with gross structure and function of the major organ systems of the human body and where appropriate, a brief outline of environmental factors and personal health practices that affect optimal human body function will be introduced. It also deals with basic biomechanics of musculoskeletal system.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1035 Anatomy and Physiology in Health (WSTC)

LGYA 7033 Human Medical Sciences 1

BIOS 1022 Introduction to Human Biology

BIOS 1023 Introduction to Human Biology (WSTC)

**Incompatible Subjects:** NATS 1013 Introduction to Anatomy

NATS 1014 Introduction to Anatomy (WSTC)

BIOS 1025 Introduction to Physiology

BIOS 1026 Introduction to Physiology (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 1039 Biodiversity (UG Cert) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios1039/>) **Legacy Code:** 500050

How many species walk, fly, swim or slither, crawl, hop, wriggle or just float, hitchhike or move so slowly that they appear not to move at all? No one knows and new species appear almost every day. This subject focuses on this spectacular diversity of living things and the process of evolution. Students explore and classify biodiversity and how organisms' function, acquire and assimilate resources and co-ordinate growth and reproduction. Organisms interact with one another and their environment forming a complex set of interactions in ecosystems. It is these interactions that have driven evolution. Ultimately human survival depends on the sustainable use of this biodiversity and ecosystems.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** BIOS 1003 Biodiversity BIOS 1002 Biodiversity LGYB 0458 Biodiversity (UWSC) BIOS 1001 Biodiversity

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2005 Botany (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2005/>) **Legacy Code:** 300836

From microscopic algae to giant flowering angiosperms, this subject develops students knowledge and understanding of plants on earth. The subject covers the topics of plant anatomy and morphology, classification and systematics, and evolution. Students will examine the major groups of plants: green algae, bryophytes, lycophytes, monilophytes, gymnosperms and angiosperms. Laboratory and field work involves the study of common Australian plants and economically significant plants.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** BIOS 1001

**Equivalent Subjects:** LGYB 5440 - Botany LGYA 5941 - Botany

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2006 Comparative Physiology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2006/>) **Legacy Code:** 300838

Building on the underlying physical and chemical principals/laws that define physiology, this subject from both a systems (e.g. Respiratory) and environmental (e.g. Marine) perspective, seeks to compare the functional physiology of organisms at all levels of organisation. Particular attention will be paid to respiration, temperature tolerance & regulation, living in water, sensory and neurophysiology. Students will have the opportunity to carry out a defined research project.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** BIOS 1012 Cell Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2008 Ecology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2008/>) **Legacy Code:** 300839

We live in a society where environmental problems dominate public debate. Ecology is one of the sciences required to find solutions to such problems; terms and ideas that came originally from ecology are used in public discussions, and in legislation. This subject will introduce students to ecology: what is studied, how it is studied, what are the strengths and limitations of ecology. Current ecological thinking will be covered, from the scale of individual organisms, through populations, and up to communities and ecosystems. Methods of study will be highlighted using evidence from molecular ecology through to field investigations.

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** LGYB 8458 - Ecology 21 BIOS 2007 - Ecology LGYB 8449 - Ecology 21 (V1)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject



**BIOS 2011 Exercise Nutrition, Body Composition and Weight Control (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2011/>) **Legacy Code:** 400884

In 2016, this subject is replaced by 401141 - Exercise Nutrition. This subject provides students with an understanding of the interdependent areas of nutrition, body composition and body weight control within the context of sport, physical activity, and exercise. Nutritional needs and recommendations for all levels and types of physical activity are covered along with the links between nutrition and health, body composition, control of body weight and composition. Students will develop skills in nutritional analysis, body composition assessment and the development of exercise programs for weight control. Students will use these skills and knowledge in the individualisation of advice on exercise nutrition and body composition control.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** NATS 1009 AND  
NATS 1010 AND  
BIOS 1015

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2012 Exercise Physiology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2012/>) **Legacy Code:** 401142

This subject covers the essential physiology that helps us understand how we control our exercise behaviour. In lectures there is a focus on physiological control, with emphasis on neuromuscular, cardiovascular, respiratory and thermoregulatory responses during exercise, as well as adaptation of these responses in response to ageing, disease and exercise training. In laboratory classes, there is a focus on the acquisition and interpretation of physiological responses during exercise.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** NATS 1009 AND  
NATS 1010 AND  
SPRT 1001 AND  
NATS 1022

**Equivalent Subjects:** BIOS 2037 - Sport and Exercise Physiology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2014 Functional Proteins and Genes (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2014/>) **Legacy Code:** 300936

Biochemistry is the study of the chemistry of life. By understanding the structure and roles of biological macromolecules found in cells students will develop the concept of self assembly of these molecules to form life. Topics include the structure of carbohydrates, lipids, proteins, and nucleic acids and how they function in the lipid and aqueous environments of the cell. Basic metabolism is introduced with an overview of the major pathways in cells, mechanisms of regulation, and an introduction into important cofactors and intermediary molecules. These concepts will be reinforced through practical classes that teach critical skills in experimental design, analysis and interpretation.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** BIOS 1012 AND  
CHEM 1005

**Equivalent Subjects:** BIOS 2001 - Biochemistry 1 BIOS 2036 - Proteins and Genes

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2016 General Microbiology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2016/>) **Legacy Code:** 300844

Microorganisms play a crucial role in soil and water ecosystems, in health and disease of plants and animals, including humans, as well as in industries such as the food and brewing industries. The subject builds on students existing knowledge of cell biology and biodiversity, and explores the characteristics of micro-organisms, the conditions required for their growth and survival, methods of control and their significance in the environment, health and industry. The theory and practice of microbiology are integrated in the laboratory component in which students learn techniques of handling, observing, growing and counting microorganisms.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** BIOS 1012 OR  
BIOS 1001

**Equivalent Subjects:** BIOS 2015 - General Microbiology

**Incompatible Subjects:** LGYC 0093 - Microbiology 11 BIOS 2023 - Microbiology 1 BIOS 2022 - Microbiology 1

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2018 Genetics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2018/>) **Legacy Code:** 300845

Our ability to rapidly and cheaply sequence a genome, ranging from humans, to native and domesticated plants and animals, and infectious bacteria and viruses, has revolutionised the field of genetics. More than ever, we understand our genetic relationship to life on earth, uncovering surprising similarities between our genome and the genomes of small worms and fruit flies. This subject will compare the genomes of different organisms and apply the methodology and theory of modern genetics to understand how the diversity of genetic variability impacts the structure and evolution of genomes, the expression of genes, and ultimately on the health and form of an organism.

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** LGYB 5446 - Genetics 22 BIOS 2019 - Human Genetics BIOS 2017 - Genetics

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2021 Metabolism (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2021/>) **Legacy Code:** 300848

Organisms degrade food molecules to generate energy and converts excess food molecules into internal fuel stores. This subject will cover topics including: bioenergetics; the structures of key molecules; glycolysis, gluconeogenesis, glycogen synthesis and breakdown; fatty acid oxidation and synthesis; amino acid catabolism; urea synthesis; citric acid cycle; electron transport and oxidative phosphorylation. Emphasis will be on the regulation and integration of these pathways, including their responses to hormonal regulation. The effects of altered dietary and hormonal status on metabolic pathways and their consequences for the organism will be discussed.

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** BIOS 2002 - Biochemistry 2 CHEM 2005 - Human Metabolism Disease

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2022 Microbiology 1 (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2022/>) **Legacy Code:** 300833

In this subject students will use an inquiry-based approach to explore the origin and diversity of microorganisms and their significance in the environment, in foods and industry as well as in health and disease. Students will be introduced to the structure, reproduction, classification, cultivation and enumeration of bacteria, viruses, fungi and protists. The conditions required for growth and survival of microorganisms will be studied as well as physical and chemical methods of control. In laboratory classes students will develop skills in culturing and observing microorganisms and in designing experiments to test microbiological concepts. This subject is a pre-requisite for Microbiology 2 and Level 3 Microbiology subjects.

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** BIOS 2023 - Microbiology 1

**Incompatible Subjects:** BIOS 2015 - General Microbiology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2024 Microbiology 2 (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2024/>) **Legacy Code:** 300896

The subject focuses on the origins of genetic variation and the process of gene regulation in prokaryotes and explores the metabolic diversity of microorganisms from a variety of habitats and their application in industry and biotechnology. Using published scientific literature, students will learn how scientists research functional microbial physiology in the postgenomic era. The principles and applications of recombinant DNA techniques are discussed. Laboratory classes introduce students to techniques used to study microbial physiology and biotechnology based on microbial metabolism, such as examining the activity of antimicrobials and biotechnology such as microbial fuel cells.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** BIOS 2022

**Equivalent Subjects:** BIOS 2025 - Microbiology 2

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2026 Molecular Biology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2026/>) **Legacy Code:** 300817

Molecular biology is central to many fields of the biomedical and natural sciences, and includes genetics, immunology, cell biology, biochemistry, and forensics. Through comparative studies of different organisms, this subject will describe fundamental concepts and methods in the study of DNA and RNA and the application of molecular biology in advanced fields such as genomics. Subjects will include DNA replication; transcriptional, post-transcriptional and epigenetic regulation of gene expression; microarrays, and an introduction to bioinformatics. Practical work will provide opportunities to become familiar with the methods of molecular biology, with an emphasis on the development of problem solving and analytical skills

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** BIOS 2014 OR

BIOS 2018 OR

BIOS 2021

**Equivalent Subjects:** BIOS 3020 - Molecular Biology BIOS 3015 - Human Molecular Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2032 Plant Physiology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2032/>) **Legacy Code:** 300865

Plants are the primary producers of terrestrial ecosystems and moderators of climate change. This subject introduces students to how plants grow and interact with their environment. Students will learn how leaves turn sunlight energy into sugars; stems transport water, solutes and organic compounds; roots acquire water and mineral nutrients by themselves or in association with soil microbes; and hormones regulate plant development and responses to the environment. This knowledge set is crucial for managing our Century's key challenges of food security and climate change. Students will be required to travel to the Hawkesbury campus where the practicals take place.

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** LGYA 5946 - Introductory Plant Physiology BIOS 2033 - Plant Physiology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2034 Principles of Evolution (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2034/>) **Legacy Code:** 300980

This subject is designed to impart an understanding of the core concepts in modern evolutionary theory, and an appreciation of the central position it plays in unifying all sub-disciplines of biology. The subject will cover modern synthesis, phylogenetics, phylogeography, origin of variation, genetic drift, natural selection, and coevolution, with a major emphasis on evolutionary mechanisms and analytical techniques.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** BIOS 1001 AND

BIOS 1012

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2035 Principles of Zoology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2035/>) **Legacy Code:** 300979

Explores the diversity of invertebrate and vertebrate life in a phylogenetic context. Taxonomy, anatomy, ecology, ethology and physiology of major groups of animals are examined. Patterns will be examined from an evolutionary perspective and the subject will focus on structure and function to examine specialisations and adaptations of animals to their environment. The subject will use lectures and laboratory sessions to allow an interactive appreciation of the diversity of biological mechanisms and processes in the Animal Kingdom.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** BIOS 1001

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2040 Invertebrate Zoology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2040/>) **Legacy Code:** 301256

More than 99% of animals are invertebrates and due to their key role in all ecosystems, renowned biologist E. O. Wilson famously described them as the 'little things that run the world'. Besides their ecological importance, many invertebrates are useful to humans, whereas others are harmful to agriculture, human and veterinary health. This subject introduces invertebrate diversity in the context of their ecological and economic importance. It also develops skills necessary to classify and distinguish between the major invertebrate taxa. This subject includes fundamental hands-on laboratory and field studies skills for students with broad career pathways in science (e.g. animal, environmental, forensic and medical sciences) as well as agriculture, environmental management, and education.

**Level:** Undergraduate Level 2 subject

**Equivalent Subjects:** NATS 3026 Forensic Biology BIOS 2035 Principles of Zoology

**Incompatible Subjects:** BIOS 3017 Invertebrate Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2041 Vertebrate Zoology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2041/>) **Legacy Code:** 301257

This subject examines the functional ecology and diversity of vertebrate animals (fish, amphibians, reptiles, birds and mammals). It combines anatomy, physiology, ecology and behaviour, to explain how vertebrates survive and reproduce in relation to their environment. We will uncover the evolutionary relationships among vertebrate groups, and examine their adaptations to different environmental challenges. The subject also explores patterns in vertebrate diversity, with a focus on Australian ecosystems. Students further develop their knowledge of the scientific method to conduct their own project to investigate how environmental factors influence vertebrate animal abundance and diversity. Students may be required to travel to another campus to undertake this subject.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** BIOS 1001

**Incompatible Subjects:** BIOS 3023 Vertebrate Biodiversity

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 2042 Biochemistry (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios2042/>) **Legacy Code:** 301460

Biochemistry is the study of the chemistry of life. By understanding the structure and roles of biological macromolecules found in cells students will develop the concept of self assembly of these molecules to form life. Topics include the structure of carbohydrates, lipids, proteins, and nucleic acids and how they function in the lipid and aqueous environments of the cell. Basic metabolism is introduced with an overview of the major pathways in cells, mechanisms of regulation, and an introduction into important cofactors and intermediary molecules. These concepts will be reinforced through practical classes that teach critical skills in experimental design, analysis and interpretation.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** CHEM 1012 Essential Chemistry

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3001 Advanced Cell Biology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3001/>) **Legacy Code:** 300850

Cells of the body are studied in the context of health and disease, including mechanisms by which cells respond to the environment and integrate in and around tissue. Fundamental cellular processes are discussed that are important in embryonic development, stem cells, haematology and cancer. This subject investigates the action of hormones, growth factors and morphogens; their receptors and signalling pathways and the cellular responses they trigger. This subject covers modern techniques in cell culture, tissue engineering, advanced microscopy and other modern experimental approaches that enable dynamic understanding of live cell function.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** BIOS 2021 OR

BIOS 2014 OR

BIOS 2026 OR

BIOS 2020

**Equivalent Subjects:** LGYA 6014 - Mammalian Cell Biology and Biotechnology BIOS 3011 - Cell Signalling

**Incompatible Subjects:** LGYA 5857 - Cell Signalling and Molecular Immunology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3003 Advanced Sports Physiology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3003/>) **Legacy Code:** 400888

In 2017, this subject is replaced by 401146 - Applied Physiology. This subject presents the knowledge and laboratory skills essential to understanding the physiological demands on the sports participant, as well as to develop, implement and evaluate sports-specific training programs. Students will develop the knowledge and skills necessary to perform and interpret results for a number of standard laboratory and field-based physiological tests used in talent identification and the assessment of high performance athletes. Prescription focuses on the development and implementation of sport specific fitness programs. Also covered are the physiology of ergogenic aids, overtraining, muscle fatigue and soreness; physiological factors limiting performance; and physiological responses to exercise in challenging environments.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** HLTH 2006 AND

HLTH 2004 AND

BIOS 2037

**Equivalent Subjects:** BIOS 3022 - Sports Physiology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3004 Analytical Microbiology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3004/>) **Legacy Code:** 300866

The subject provides a theoretical and practical introduction to wide range of microbiological techniques that are commonly used in medical science, industrial and food microbiology, environmental science, and research. Building on a basic understanding of microbiology the subject shows how microorganisms can be isolated, identified, and enumerated using traditional microbiological methods, modern variations on traditional methods, and more recent immunological and molecular methods. The laboratory component is an integral component of the subject as the students use a variety of techniques, methods and commercial systems that are applied in microbiological laboratories, and incorporates problem solving and inquiry based exercises.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** BIOS 2022

**Equivalent Subjects:** BIOS 3031 - Analytical Microbiology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3005 Applied Biomechanics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3005/>) **Legacy Code:** 401147

To fully understand the science underlying the optimisation of human movement, students require a comprehensive working knowledge of Biomechanics. This subject represents a theoretical and applied study of selected topics in Biomechanics. It builds on the basic principles of Biomechanics that are presented in the subject Biomechanics and applies this knowledge to the analysis of sporting and human exercise performance. To achieve this, advanced methods and concepts in the biomechanical analysis of human performance are identified and explored.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** HLTH 2003

**Equivalent Subjects:** BIOS 3006 - Applied Biomechanics of Exercise  
BIOS 3007 - Applied Biomechanics of Sport and Exercise

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3007 Applied Biomechanics of Sport and Exercise (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3007/>) **Legacy Code:** 400889

To fully understand the science underlying the optimisation of human movement, students require a comprehensive working knowledge of Biomechanics. This subject represents a theoretical and applied study of selected topics in Biomechanics. It builds on the basic principles of Biomechanics that are presented in the subject Introduction to Biomechanics and applies this knowledge to the analysis of sporting and human exercise performance. To achieve this, advanced methods and concepts in the biomechanical analysis of human performance are identified and explored.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** HLTH 2008

**Equivalent Subjects:** BIOS 3006 - Applied Biomechanics of Exercise

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3012 Conservation Biology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3012/>) **Legacy Code:** 300855

Most species disappearances have occurred in major extinction events spread over geological time. Are we in the midst of and the cause of another mass extinction event? This subject will explore this idea by examining the processes that have led to, and are leading to species extinction and the current biodiversity crisis. Many of the methods and issues used in and associated with conservation will be covered in a variety of case studies, field and laboratory activities.

**Level:** Undergraduate Level 3 subject

**Equivalent Subjects:** LGYA 6073 - Environmental Biology LGYA 6182 - Conservation Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3013 Ecosystem Carbon Accounting (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3013/>) **Legacy Code:** 300856

A critical part of society's response to climate change is to measure the movement of greenhouse gases. Once this is done, steps taken to reduce these gases can be correctly targeted and the impact of such steps monitored. This subject will introduce students to the scientific measurement of greenhouse gas uptake and emissions, including assessment of uncertainties and verifiability of measurement. Ecosystem-level models will be used to estimate and quantify movement of greenhouse gases, allowing quantification of the net greenhouse gas emissions over the life cycle of a product. These approaches are vital steps in moving our society to a sustainable future.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** EART 2001

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3014 Genes, Genomics and Human Health (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3014/>) **Legacy Code:** 300820

A genome is all of the genetic information that makes us who we are. Beginning with an overview of the evolution of the human genome, this subject will introduce you to current concepts in gene regulation and how genetic variability is correlated with susceptibility to rare and common disease in individuals and populations. You will also gain practical experience in key methods and analyses of genetic variation and understand how such techniques are delivering new insights into the origins and treatment of human disease.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** BIOS 2018 Genetics

**Restrictions:** Please see the Subject Details page for any restrictions for this subject



**BIOS 3017 Invertebrate Biology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3017/>) **Legacy Code:** 300918

Invertebrates are the most diverse and abundant organisms in aquatic and terrestrial environments. Due to their key role in many ecosystems, biologist E. O. Wilson coined the phrase of invertebrates as the 'little things that run the world'. Besides their ecological importance, many invertebrates are useful to humans, whereas others are harmful to agriculture, human and veterinary health. This subject highlights invertebrate diversity and life histories as well as their key ecological and economic importance. It also includes hands-on laboratory and field studies. This subject is designed for students with career pathways in science (e.g. animal, environmental, forensic and medical sciences) as well as agriculture, environmental management and education.

**Level:** Undergraduate Level 3 subject

**Equivalent Subjects:** BIOS 3018 - Invertebrate Biology NATS 3026 - Forensic Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3019 Marine and Aquatic Ecology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3019/>) **Legacy Code:** 300978

Temperate freshwater, estuarine and marine aquatic ecosystems play vital roles in providing food, water, recreation and other ecosystem services to human society and habitats for important species that make up global biodiversity. Yet aquatic habitats are the most threatened ecosystems on earth, under threat from global climate change and urbanisation. Through inquiry and problem solving this subject will equip students with the necessary techniques in experimental design and analysis needed to investigate aquatic ecosystems and knowledge of the main animal and plants in aquatic and marine ecosystems. The logic and philosophy of science, scientific studies and experimental analyses will be used to understand temperate aquatic ecosystems throughout this subject. On completion students will have the background knowledge and skills communicate to a range of audiences, so that they can contribute beneficially to management and/or conservation of waterways and oceans and the biodiversity within.

**Level:** Undergraduate Level 3 subject

**Equivalent Subjects:** BIOS 3009 - Aquatic Ecology BIOS 3010 - Aquatic Ecology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3021 Plant Health and Biosecurity (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3021/>) **Legacy Code:** 300921

This subject explores needs of world food production systems for improved plant health and biosecurity, from paddock to plate and environmental consequences of management practices. Through their studies, students will learn to recognise the significance of plant pests (invertebrates, microorganisms and weeds) and their impact on human society and food security, and methods of reducing their damage to plants and plant products. Major areas of study include: recognition of pests and diseases and assessment of field damage; strategies for reducing pest damage (including legislative, physical, biological, genetic and chemical control methods) and their benefits and limitations; the theory and practice of integrated pest and disease management systems; and issues associated with quarantine and biosecurity.

**Level:** Undergraduate Level 3 subject

**Equivalent Subjects:** LGYA 6250 - Plant Microbiology and Protection  
**Incompatible Subjects:** LGYA 5948 - Plant Microbiology Interactions  
LGYA 6200 - Plant Protection

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3023 Vertebrate Biodiversity (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3023/>) **Legacy Code:** 300861

This subject examines the functional ecology and diversity of vertebrate animals (fish, amphibians, reptiles, birds and mammals). It takes an integrative approach, combining anatomy, physiology, ecology and behaviour, to explain how vertebrates survive and reproduce in relation to their environment. We will uncover the evolutionary relationships among vertebrate groups, and examine their adaptations to different environmental challenges. The subject also explores patterns in vertebrate diversity, with a focus on Australian ecosystems. Students will apply their knowledge of the scientific method to design and conduct their own research project to investigate how environmental factors influence vertebrate animal abundance and diversity.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** BIOS 1001

**Equivalent Subjects:** LGYA 5856 - Animal Form Function BIOS 3024 - Vertebrate Biodiversity

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3026 Evolution and Genetics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3026/>) **Legacy Code:** 301253

This subject will ensure students are able to understand the core concepts in modern evolutionary theory and the central position that evolution plays in unifying all sub-disciplines of biology. It will also enable students to distinguish the major genetic mechanisms that underpin these theories and critically assess the general importance of genetics in the evolutionary process. In particular, students will gain an in depth knowledge on speciation and population divergence, origin of genetic variation, genetic drift and founder effects, natural and sexual selection, migration, mutation and coevolution, with a major emphasis on genetic mechanisms and the analytical techniques used to assess them. Students may be required to travel to a different campus to undertake this subject.

**Level:** Undergraduate Level 3 subject

**Incompatible Subjects:** BIOS 2034 Principles of Evolution

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3027 Molecular Biology of the Cell (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3027/>) **Legacy Code:** 301251

Molecular biology is central to many fields of the biomedical and natural sciences, and includes genetics, immunology, cell biology, biochemistry, and forensics. Through comparative studies of different organisms, this subject will explain fundamental concepts and methods in the study of DNA and RNA, extending to the application of molecular biology in more advanced fields such as genomics. Subjects will include DNA replication; transcriptional, post-transcriptional and epigenetic regulation of gene expression; microarrays, and an introduction to bioinformatics. Practical work will provide opportunities to become familiar with the methods of molecular biology, with an emphasis on the development of problem solving and analytical skills. Students may be required to travel to a different campus to undertake this subject.

**Level:** Undergraduate Level 3 subject

**Incompatible Subjects:** BIOS 3015 Human Molecular Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3028 Pathological Basis of Human Disease (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3028/>) **Legacy Code:** 301260

Pathology is the study of disease. Students will gain an understanding of human pathogenesis, general and systems pathological processes, and the scientific basis of diagnostic and treatment options. The subject builds upon the students' fundamental knowledge of physiological processes and knowledge of normal human tissue and organ histology, and examines histopathological changes evident in disease states. Students may be required to travel to another campus to undertake this subject.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** BIOS 2029 OR

BIOS 2030 OR

NATS 2035

**Incompatible Subjects:** BIOS 2027 Pathological Basis of Disease

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3029 Biotic interactions (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3029/>) **Legacy Code:** 301266

This subject will introduce the diversity of biotic interactions observed in nature, with an emphasis on their significant roles in maintaining ecosystem function and regulating biological diversity. Major themes will include the role of microbes in plant and animal health and nutrient acquisition via the soil and gastrointestinal microbiomes, the chemical ecology of interactions between plants, and herbivores and pollinators, and interactions between predators and prey. The consequences of biotic interactions for participants can vary from mutual benefit to benefit for one participant and harm for the other, however these outcomes can often change through time and space. Students will be guided to an understanding of how ecological circumstances determine the consequences of biotic interactions.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** BIOS 2008 AND

BIOS 1001

**Equivalent Subjects:** BIOS 3012 Conservation Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3030 Global Change Ecology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3030/>) **Legacy Code:** 301268

Students in Global Change Ecology synthesise and apply their knowledge about how ecological systems are responding to human impacts occurring in the Anthropocene, and how adaptation and mitigation can moderate these impacts. Students will demonstrate attributes expected of Ecology graduates, including skills in oral and written communication, quantitative analysis, and critical thinking. Guest speakers from the research community and industry will be invited to represent potential career paths related to ecological sustainability and the broader career destinations of science graduates.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** BIOS 2008 AND

EART 2001

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3032 Plant Science (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3032/>) **Legacy Code:** 301272

Plants are the primary producers of terrestrial ecosystems and moderators of climate change. This subject introduces students to how plants grow and interact with their environment. Students will learn how leaves turn sunlight energy into sugars; stems transport water, solutes and organic compounds; roots acquire water and mineral nutrients by themselves or in association with soil microbes; and hormones regulate plant development and responses to the environment. This knowledge set is crucial for managing our Century's key challenges of food security and climate change. Students will be required to travel to the Hawkesbury campus where the practicals take place.

**Level:** Undergraduate Level 3 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3033 Applied Bioinformatics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3033/>) **Legacy Code:** 301406

The ability to perform computational experiments and analyse data is a key component for a successful career in the biological sciences. This subject focuses on how biology has been enhanced through advances in technology, genomics, transcriptomics, proteomics and metabolomics in the development of cell phenotype. Using model systems, this subject shows how research biologists use computational cell biology to form hypotheses, mine data, analyse experiments, and synthesise information. Students will apply bioinformatics and engage with next-generation DNA sequencing data. Students will apply web-based bioinformatics toolkits to construct and compare model genomes, transcriptome, proteome and metabolome information to profile cell genotype and phenotype. Students will undertake a project that interprets and communicates research findings in the context of real world applications, legal and ethical frameworks.

**Level:** Undergraduate Level 3 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3034 Molecular Biotechnology (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3034/>) **Legacy Code:** 301405

Molecular techniques in cell biology are rapidly developing and offer new solutions to disease mitigation, as well as sustainable solutions to environmental and industrial imperatives. The fundamental cellular processes along with stem cell development, transformation, transfection, cell engineering and re-programming are some of the advanced applications covered in this unit. Students will conduct guided projects investigating the action of hormones, growth factors, morphogens and bio-actives; their receptors and signalling pathways and the cellular responses they trigger. Molecular Biotechnology covers modern techniques in cell screening, cell culture, advanced characterization and experimental approaches enabling dynamic understanding of live microbial, animal and plant cells.

**Level:** Undergraduate Level 3 subject

**Equivalent Subjects:** BIOS 3001 - Advanced Cell Biology

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3035 Sustainable Environments (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3035/>) **Legacy Code:** 301409

As a student in Sustainable Environments you will synthesize and apply your knowledge about how ecological systems are responding to human impacts in the Anthropocene and how adaptation and mitigation can moderate these impacts. You will demonstrate knowledge of the role of biological and physical processes in provision of ecosystem services. You will apply analytical skills to identify sustainable solutions in social-ecological systems. You will incorporate social and cultural contexts, including relevant Aboriginal perspectives, in communicating science-based knowledge related to the United Nations sustainable development goals in an independent, problem-based sustainability project.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** BIOS 2008

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3036 Agricultural Biosecurity (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3036/>) **Legacy Code:** 301450

Students will be exposed to current and emerging biosecurity issues world food production systems are expected to comply with and develop to ensure sustainable and safe animal and plant products. This subject will enable you to recognise, monitor and control animal and plant pests (invertebrates, microorganisms and weeds) and their impact on human society and food security. Major areas of study include strategies and procedures to identify, record and assess damage to animal and plant products. Included in this subject are key issues related to legislative, physical, biological, genetic and chemical control methods, along their benefits and limitations. Theory and practice of integrated pest and disease management systems and issues associated with quarantine and biosecurity are contextually embedded in subject content and activity.

**Level:** Undergraduate Level 3 subject

**Equivalent Subjects:** LGYA 6250 Plant Microbiology and Protection BIOS 3021 Plant Health and Biodiversity

**Incompatible Subjects:** LGYA 5948 Plant Microbiology Interactions LGYA 6200 Plant Protection

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 3037 Climate change and biodiversity conservation (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios3037/>) **Legacy Code:** 301480

**Level:** Undergraduate Level 3 subject

**Equivalent Subjects:** EART 3001 Biological Adaptation to Climate Change

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 4001 Science, Technology and Environment Honours Project (30 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios4001/>) **Legacy Code:** 300412

This is a 60 credit point year-long subject taken over two terms (30 credit points in each term). The aim of this subject is to further develop the student's research and problem solving skills. The student is required to implement a research plan, complete a substantive piece of research in a relevant field within Science, Technology and the Environment and to communicate the results of that work to an interested and technically literate audience. Students will present their research as a thesis with a substantial chapter detailing research objectives, methodology and research outcomes. The thesis topic and structure will vary according to the area of interest of the student and the expertise of the supervisor. The project is meant to be a significant undertaking and to incorporate some element of innovation. Throughout this subject regular planned consultations between the student and supervisor(s) will occur and students will be required to attend seminar series or regular research meetings; these may be formal components of other subjects within the Bachelor (Honours) program. Students are expected to work to a schedule devised in consultation with their supervisor. The schedule will include dates set for progress reports and the presentation of draft chapters for review by the supervisor. The subject builds upon the skills developed in the undergraduate program, extending students' competencies in a range of practical techniques and processes of critical thinking. Students who successfully complete the Honours program will have achieved the appropriate background to enable them to pursue further postgraduate research and/or coursework in the sciences or pursue a career in industry or profession.

**Level:** Undergraduate Level 4 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 7001 Emerging Technologies for Biological Science (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios7001/>) **Legacy Code:** 800186

This subject serves to enhance the technological education and training for students undertaking research in biological, agricultural and medical sciences. The subject will teach current and emerging technologies utilised in biological investigations with a focus on model species of animals, plants, insects and microorganisms. The subject is structured around emerging technologies in research fields of: 1) whole organism physiology, 2) cell molecular biology and biochemistry, and 3) genomic and epigenomic processes encoded by the nucleus. Students will be exposed to a systems approach in order to investigate complex interactions with a view towards understanding the impacts of the environment on biological interactions. Teaching will be undertaken by Western Sydney University-HIE staff who are world leaders in their respective research fields.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 9001 Higher Degree Research Thesis - Animal Science (10,20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios9001/>) **Legacy Code:** 800164

**Level:** PhD and Research Masters Level 9 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 9002 Higher Degree Research Thesis - Biological Sciences (10,20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios9002/>) **Legacy Code:** 800081

**Level:** PhD and Research Masters Level 9 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**BIOS 9003 Higher Degree Research Thesis - Microbiology (10,20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/bios9003/>) **Legacy Code:** 800083

**Level:** PhD and Research Masters Level 9 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject