

# Bachelor of Animal Science and Management

## First-year subjects

### 650-111 Biology of Australian Flora & Fauna

See full subject details on page 1.

### 650-141 Biology of Cells and Organisms

See full subject details on page 1.

### 650-142 Genetics & The Evolution of Life

See full subject details on page 1.

### 202-103 Biology for Land and Food Resources

See full subject details on page 1.

### 208-108 Animals in Society

**Note:** This subject involves the use of animals. Students should be aware that this is an essential part of the course and exemption from this is not possible.

**Availability:** Parkville (utilising animal houses and facilities at the joint facility in Werribee).

**Credit points:** 12.5

**Coordinator:** Prof Paul Hemsworth

**Corequisites:** 202-103 Biology for Land and Food Resources or 650-141 Biology of Cells and Organisms.

**Contact:** Thirty-six hours of lectures and 24 hours of tutorials and practical work (*Semester 1*).

**Description:** The objective of this subject is to examine and evaluate society's use of domestic animals, and highlight the ethical, scientific and economic impact of human interactions with animals in production, research and amenity systems.

Topics covered include origins, history and domestication of domestic animals; world distribution and use of domestic animals; animal ethics vs personal and social ethics; society expectations and their implications; human-animal relationships vs development and their effects on both humans and animals; and ethical dilemmas in livestock production, research education and amenity systems.

At completion of this subject students should:

- understand the prominent roles in modern society of farm, companion and laboratory animals;
- understand the nature of global focus on animals in relation to modern farming practices and biotechnology; and
- understand issues in food safety, human health and the quality of life for both humans and animals.

**Assessment:** Two practical assignments (10% each of final marks), one written presentation of 2000 words (20% of final marks), one 10-minute oral presentation (10% of final marks) and 3-hour written essay or short-answer style examination (50% final marks).

**Prescribed texts:** L R Scott, *Careful How You Hold Me: An Insight into Caring for Laboratory Animals*, MUP Multimedia Program. • NH&MRC, *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes*.

### 202-101 Chemistry for Land and Food Resources

See full subject details on page 1.

### 610-141 Chemistry A

See full subject details on page 2.

### 202-107 Mathematics for Land and Food Resources

See full subject details on page 1.

### 202-104 Information Technology and Communication

See full subject details on page 1.

### 640-121 Physics A (Adv)

See full subject details on page 2.

### 640-141 Physics A

See full subject details on page 2.

### 640-161 Physics: Principles & Applications A

See full subject details on page 3.

### 208-109 Australian Agriculture

See full subject details on page 1.

### 208-111 Working with Animals

**Note:** This subject involves the use of animals. Students should be aware that this is an integral part of the course and exemption from this is not possible.

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Dr Brian Leury

**Contact:** Thirty-six hours of practical work (including a weekend excursion) and 24 hours of seminars and tutorials (*Semester 2*).

**Description:** The objective of this subject is to provide early in the course soundly-based principles and practices for the management and care of animals, emphasising the responsibilities and ethical requirements in human contact with animals.

On completion of this subject students should:

- have experience in best practice in the handling, care and management of laboratory animals, domestic livestock and companion animals in various field and laboratory conditions;
- be familiar with a range of routine procedures in animal management and best standard practices under Animal Welfare and Ethics guidelines;
- have experience in observation, measurement and sampling procedures applicable in routine care, survey studies and experimentation; and
- have participated in informed debate on contemporary issues and community concerns relating to human interactions with animals.

**Assessment:** One 3-hour written examination (50%), written assignments equivalent to 4000 words (40%), one 10- minute seminar presentation.

### 610-142 Chemistry B

See full subject details on page 2.

### 640-122 Physics B (Adv)

See full subject details on page 2.

### 640-142 Physics B

See full subject details on page 3.

### 640-162 Physics: Principles & Applications B

See full subject details on page 3.

### 207-101 Land, Food and Resource Economics

See full subject details on page 2.

## Second-year subjects

### 208-201 Comparative Nutrition

See full subject details on page 5.

### 208-202 Animal Physiology

See full subject details on page 6.

### 654-202 Vertebrate Structure and Function

See full subject details on page 1.

### 654-204 Ecology: Individuals and Populations

See full subject details on page 2.

### 208-215 Animal Health and Epidemiology

**Note:** This subject involves the use of animals. Students should be aware that this is an essential part of the subject and exemption from this component is not possible.

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Dr Peter Cakebread

**Prerequisites:** 202-103 Biology for Land and Food Resources or 650-141 Biology of Cells and Organisms.

**Contact:** Twenty-four hours of lectures, 12 hours of tutorials and 36 hours of practical work, with computer aided-learning enhancement (*Semester 2*).

**Description:** The objectives of this subject are to provide students with an understanding of the nature of health and health disorders of animals in individuals and populations. Content includes:

- evolutionary development and adaptations to disease; parasitic relationships;
- causes of disease: toxic, neoplastic, infectious, traumatic, developmental and degenerative; the biological basis of parasitic disease: bacteria, viruses, fungi, protozoa, helminths, ectoparasites;
- disease processes: inflammation and healing;
- diagnostic procedures; therapeutic techniques; and
- epidemiological concepts; analysis of incidence and prevalence; disease in populations; sensitivity and specificity; infectious disease modelling; biosecurity.

At completion of this subject students should:

- understand the role of a non-veterinary graduate in prevention, detection and management of health disorders in animals;
- understand the biological basis of disease causality;
- understand the processes of disease including inflammation and healing;
- be familiar with diagnostic procedures;
- be familiar with therapeutic techniques;
- be familiar with epidemiological concepts and terminology; and
- understand the application of bio-security strategies.

**Assessment:** One 3-hour written essay or short-answer style examination (40% of total marks), three practical assignments equivalent to 2000 words (each worth 20% of total marks).

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### 202-202 Experimental Design/Statistical Methods

See full subject details on page 2.

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### 208-203 Ecology & Management of Grazing Systems

See full subject details on page 6.

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### 208-207 Animal Management and Production

See full subject details on page 7.

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### 208-242 Companion Animal Biology and Management

**Note:** This subject involves the use of animals. Students should be aware that this is an essential part of the subject and exemption from this component is not possible.

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Dr Brian Leury and Dr Sarah Chaplin

**Prerequisites:** 202-103 Biology for Land and Food Resources, or 600-141 Biology of Cells and Organisms.

**Contact:** Thirty-six hours of practical/project work and 24 hours of lectures, seminars and tutorials (*Semester 2*).

**Description:** On completion of this subject students should be aware of the particular management requirements of the major vertebrate companion animals species. In particular students should:

- know the key anatomical and physiological features of the major vertebrate companion animal species;
- understand how these affect housing and nutritional requirements;
- appreciate the importance of the environment in the management of companion animals;
- understand the genetics and reproduction of these animals and the consequences of breeding strategies, including hereditary conditions;
- understand the health requirements of companion animals, including preventative care and zoonoses;
- know the behavioural characteristics of companion animals and how these relate to behavioural problems, training and welfare; and
- be able to solve problems related to the management of companion animals.

**Assessment:** Two hour written examination (50%), two written assignments totalling 6000 words (total 40%), one seminar presentation equivalent to 1500 words (10%).

**Prescribed texts:** Campbell, J.R., Kenealy, M.D. and Campbell, K.L. (2002), *Animal Sciences: the biology, care and production of domestic animals*, McGraw-Hill, London.

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### 208-247 Biotechnology for Land and Food

See full subject details on page 3.

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### 521-211 Biochemistry & Molecular Biology Part A

See full subject details on page 1.

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### 521-212 Biochemistry & Molecular Biology Part B

See full subject details on page 2.

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### 526-201 Principles of Microbiology & Immunology

See full subject details on page 1.

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## Third-year subjects

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### 202-001 Industry Placement#

See full subject details on page 4.

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### 202-301 Industry Project

See full subject details on page 4.

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### 202-302 Human Resource Management

See full subject details on page 3.

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### 202-303 Industry Project

See full subject details on page 4.

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### 208-302 Molecular Biology and Breeding

See full subject details on page 8.

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### 208-303 Animal Production Systems

See full subject details on page 8.

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### 208-304 Advanced Topics in Animal Science

See full subject details on page 8.

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### 208-323 Equine Management Systems

**Note:** This subject involves the use of animals. Students should be aware that this is an essential part of the subject and exemption from this component is not possible.

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Dr Peter Cakebread

**Contact:** Twenty-four hours of lectures, 12 hours of lectures and 36 hours of practical work, with computer-aided learning enhancement (*Semester 2*).

**Description:** The objective of this subject is to provide students with an understanding of the systems in which horses are produced, raised and trained and provide a prerequisite for the application of scientific and technical knowledge to management.

Content includes the horse industry, its structures and activities; management procedures, training routines for thoroughbred racing, harness racing, equestrian sports; horse industry specific equipment, facilities and enterprises; critical factors influencing production and performance in studs and stables including selection strategies, nutritional and pasture-based management issues, and preventative health strategies, therapies and biosecurity at national, regional and enterprise levels.

At completion of this subject students should:

- be familiar with common horse management procedures on studs, training stables and equestrian centres;
- be familiar with the structure and control within the horse industry;
- be able to recognise the factors affecting efficiency in studs and stables;
- understand the application of selection procedures for breeding and performance horses;
- understand the genetic selection strategies used by breeding enterprises and breed organisations; and
- understand the application of health procedures for prevention, diagnosis, and therapy.

**Assessment:** One 3-hour written essay or short-answer style examination (40% of final marks) and three practical assignments equivalent to 2500 words (each worth 20% of final marks).

**Prescribed texts:** J Gordon, *The Economic Contribution to the Horse Industry*, RIRDC.

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### 208-324 Applied Animal Behaviour

**Note:** This subject involves the use of animals. Students should be aware that this is an essential part of the course and exemption from this component is not possible.

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Professor Paul Hemsworth

**Prerequisites:** 202-103 Biology for Land and Food Resources or 650-141 Biology of Cells and Organisms.

**Contact:** Twenty-four hours of lectures and 24 hours of tutorials and practical work (*Semester 2*).

**Description:** Domestic animals, such as farm, companion or laboratory animals, play a prominent and important role in society providing a range of benefits to humans including improvements in human health and welfare. A thorough understanding of animal behaviour is essential in the humane care and efficient management of these domestic animals. This subject describes and examines the behaviour of farm, companion and laboratory animals and highlights our understanding of the causation and function of behaviour.

Topics covered include:

- describing, recording and measuring behaviour; development of behaviour;
- stimuli and communication;
- motivation and decision making;
- learning and memory;
- genetic influences on behaviour;
- hormonal influences on behaviour;
- organisation of behaviour;
- social behaviour; sexual behaviour; and
- maternal behaviour and dam-neonate interactions; and behavioural problems.

The subject provides students with the opportunity to understand the behavioural requirements of domestic animals that are fundamental to their welfare and their ability to efficiently grow and reproduce and remain healthy. Such an understanding is a prerequisite for the efficient and humane management of domestic animals.

**Assessment:** A 3-hour examination, which may include essay and short-answer sections (50%), one written presentation (2000 words, 35%) and one oral presentation (15%).

**Prescribed texts:** A F Fraser and D M Broom, *Farm Animal Behaviour and Welfare*, CAB International, 1990. • B L Hart, *The Behavior of Domestic Animals*, W. H. Freeman & Co., 1985. • A Manning and M S Dawkins, *An Introduction to Animal Behaviour*, 4th edition, Cambridge University Press, 1993.

### 208-325 Applied Animal Reproduction

**Note:** This subject involves the use of animals. Students should be aware that this is an essential part of the subject and exemption from this component is not possible.

**Availability:** Parkville campus.

**Credit points:** 12.5

**Coordinator:** Dr Brian Leury

**Prerequisites:** 202-103 Biology for Land and Food Resources or 650-141 Biology of Cells and Organisms; 208-202 Animal Physiology.

**Contact:** Twenty-four lectures; six hours tutorials; 18 hours practical work to be undertaken at Parkville and Werribee (*Semester 2*).

**Description:** The aim of this subject is to give students of animal science and management the fundamentals of applied reproductive biology and to develop the skills necessary for the management of reproductive performance of domestic animals. The content includes comparative structure and function of male and female reproductive organs; endocrinology and neuro-endocrinology of reproductive cycles; mating, fertilisation, pregnancy, parturition and lactation; environmental control of reproduction, nutrition-reproduction interactions, seasonality, and stress and behavior; use of exogenous hormones to manipulate reproduction; reproductive biotechnologies including embryo transfer; and manipulating male reproduction.

At the completion of this subject students should:

- understand the comparative structure and function of male and female reproductive systems;
- understand the endocrine and neuroendocrine control of reproductive cycles;
- understand factors affecting reproduction and reproductive potential, and the importance of appropriate management of domestic animals for optimising reproductive performance; and
- understand, and be able to apply, techniques, including new and emerging technologies, for modifying reproductive performance.

**Assessment:** One problem-based learning project with assessment (20% of final marks), two written practical reports of not more than 2000 words (15% each of final marks), one 3-hour written essay or short-answer style examination (50% of final marks).

### 208-326 Exercise and Environmental Physiology

**Note:** This subject involves the use of animals. Students should be aware this is an essential part of the course and exemption from this is not possible

**Availability:** Parkville campus.

**Credit points:** 12.5

**Coordinator:** Dr Brian Leury and Dr Peter Cakebread

**Prerequisites:** 208-202 Animal Physiology.

**Contact:** 24 lectures; six hours tutorials; 18 hours practical work to be undertaken at Parkville and Werribee (*Semester 1*).

**Description:** The aim of this subject is to enable students of animal science to develop skills and knowledge in exercise, environmental and stress physiology in domestic and companion animals and to be able to apply this knowledge in management of the environment for improved animal performance and welfare.

The content includes a comparative overview of basic physiological processes important in exercise physiology and environmental adaptation such as circulation; gas exchange; electrolytes and water balance; heat production and thermoregulation; physiological and metabolic adaptations during exercise and training, including environmental effects on training management; diversity in environments and the nature of stress, including physical, psychological and nutritional factors; physiological regulation and response to stress, including key role of nervous system and hormones; metabolic adaptation; behavioural adaptation; and management of the environment including aspects of housing.

At the completion of this subject students should:

- understand how different animals cope with changing and diverse environments;
- understand the nature of stress and stressful environments;
- understand the nature of physiological regulation and adaptation;
- understand how management can influence the animal-environment interaction and have developed experimental skills to study animal-environment interactions;
- understand the biomechanics of, and the physiological and metabolic adaptations occurring during, training and exercise; and
- understand the effects of environment on training management.

**Assessment:** Problem-based learning tutorials and practicals with five reports each of 1000 words (each 10% of final marks), one 3-hour written essay or short-answer style examination (50% of final marks).

**Recommended texts:** D Randall, W Burggren & K French, *Eckert Animal Physiology: Mechanisms and Adaptations*, 4th edn, W H Freeman & Co., 1997.

### 208-339 Genetics and Animal Breeding

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Prof Mike Goddard

**Contact:** 24 hours of lectures and 36 hours of practical work (*Semester 1*).

**Description:** This subject covers the application of genetics to the breeding of animals. On completion of the course students should understand the application of quantitative and molecular genetics, have a sound knowledge of practical breeding programs and be able to design and manage these programs. The topics to be covered include:

- definition of breeding objectives in economic terms;
- the meaning of genetic parameters such as heritability;
- estimation of breeding values;
- use of genetic improvement tools such as selection and crossbreeding;
- the effects of inbreeding and how to minimise them;
- the use of molecular and reproductive technology; and
- design of breeding programs.

**Assessment:** 3-hour written examination (50%), three written practical reports and assignments totalling 5000 words (35%), one seminar presentation equivalent to 2000 words (15%).

## Fourth-year subjects

### 202-401 Honours Research Project

See full subject details on page 5.

### 202-402 Honours Research Project

See full subject details on page 5.

### 202-403 Honours Research Project (MYE)

See full subject details on page 5.

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**208-405 Advanced Animal Management Systems**

**Note:** This subject may involve the use of animals. Students should be aware that this is an essential part of the course and exemption from this component is not possible.

**Availability:** Parkville campus (not offered in 2004)

**Credit points:** 12.5

**Coordinator:** Prof David Chapman

**Prerequisites:** 208-207 Animal Management and Production 1; 208-303 Animal Management and Production 2.

**Contact:** Twenty-four hours lectures, 12 hours tutorials and 36 hours of practical work, with computer-aided learning tools (*Not Offered*).

**Description:** The objective of this subject is to further develop the problem-solving skills and systems approach of students with particular content devoted to animal systems and utilizing discipline-based knowledge acquired in and beyond other subjects in the course.

Content includes systems analysis skills and the structure, function and operation of models, along with core material on quantification of animal functions and management of animal systems. Students will apply theoretical knowledge to the solution of practical problems and investigate opportunities in the management of animals. They will be introduced to a range of models, from simple conceptual representations of animal growth, to more complex mathematical descriptions of physiological processes, to integration of animal systems. They will apply appropriate models in problem-based learning exercises, supplement model outputs with other scientific information and produce a set of conclusions and recommendations.

At the conclusion of this subject students should:

- be able to critically analyse models of animal functioning;
- be familiar with the capabilities and operation of a range of models that can be used as research or decision-making tools;
- be able to apply appropriate models to the solution of complex animal management problems or the exploitation of animal production opportunities;
- understand the role of analytical tools in the development and management of animal systems; and
- have developed systems thinking and problem-solving skills to an advanced level.

**Assessment:** Three practical assignments equivalent to 2000 words (each worth 20% of final marks), one 2-hour written essay or short-answer style examination (40% of final marks).

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**208-406 Advanced Topics in Equine Systems**

**Note:** This subject may involve the use of animals. Students should be aware that this is an essential part of the course and exemption from this component is not possible.

**Availability:** Parkville campus (not offered in 2004)

**Credit points:** 12.5

**Coordinator:** Dr Peter Cakebread

**Prerequisites:** 208-323 Equine Management Systems.

**Contact:** Twenty-four hours lectures, 12 hours tutorials and 36 hours of practical work, with computer-aided learning enhancement (*Not Offered*).

**Description:** The objective of this subject is to provide the student with advanced knowledge including current research on equine management and horse performance issues.

Content includes major issues for the horse industry; strategies for sustainability at enterprise and industry level; system-based approaches, complexity and applications of modelling methodology; analysis of wastage. Epidemiological approaches to reproductive, selection and health issues; models of infectious disease; sustainable use of antibiotics and anthelmintics; analysis of performance; locomotion and application of structural models in exercise physiology. At the completion of the subject students should:

- be familiar with system methodologies relevant to horse industry problems;
- be able to develop strategies to solve common enterprise management problems;
- understand epidemiological analysis techniques;
- be able to design epidemiological investigation strategies;
- understand the application of structural analysis of locomotion within exercise physiology; and
- be able to analyse locomotion and exercise physiological data within structural models.

**Assessment:** Three practical assignments equivalent to 2000 words (each worth 20% of final marks), one 3-hour written essay or short-answer style examination (40% of final marks).

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**208-407 Genetics and Animal Breeding**

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Prof Mike Goddard

**Contact:** Twenty-four hours lectures and 36 hours of practical work (*Semester 1*).

**Description:** Refer to 208-339 Genetics and Animal Breeding.

**Assessment:** Three-hour written exam (50%), three written practical reports and assignments totaling 5000 words (35%), one seminar presentation equivalent to 2000 words (15%).

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**208-408 Special Studies in Animal Science**

**Availability:** Parkville campus (not offered in 2004)

**Credit points:** 12.5

**Coordinator:** Prof David Chapman

**Prerequisites:** At least 50 points towards a defined focus area of study and admission to honours year.

**Contact:** Two tutorials per week (year long). Self-paced learning with supervision (*Not Offered*).

**Description:** The objective of this subject is to provide the student, under supervision, to investigate a selected topic and gain further special knowledge in a discipline field of animal science, for example physiology, nutrition, behaviour, molecular biology.

Available topics will be posted during Semester 2 of the preceding year.

At the completion of this subject students should have:

- in-depth knowledge of a specific contemporary topic in animal science;
- the ability to analyse and report on the topic in a manner appropriate to the methodology developed; and
- an advanced capability for development of processes for acquisition, management, analysis, integration and interpretation of data and information.

**Assessment:** Written work totalling 5000 words (75% of final marks), one 30-minute seminar with 10 minutes open discussion followed by 10-minute closed oral examination (25% of final marks).

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**208-409 Animal Welfare**

See full subject details on page 10.