

# Bachelor of Resource Management

## First-year subjects

### 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.

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

See full subject details on page 1.

### 650-141 Biology of Cells and Organisms

See full subject details on page 1.

### 202-104 Information Technology and Communication

See full subject details on page 1.

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

See full subject details on page 1.

### 202-106 Land Resources

See full subject details on page 2.

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

See full subject details on page 2.

### 207-103 Ecology

**Availability:** Dookie and Burnley campuses.

**Credit points:** 12.5

**Coordinator:** Dr Steve Hamilton

**Contact:** Thirty-six hours of lectures and 36 hours of practical exercises, including two 3-day field trips (*Semester 2*).

**Description:** On completion students should have knowledge of the structure and function of aquatic and terrestrial ecosystems, with an emphasis on the impact of human and natural disturbances on these ecosystems; and an ability to evaluate the role of individual organisms, species and populations within ecosystems and communities.

**Assessment:** A 3-hour examination (40%), one assignment of 2000 words minimum (30%), and two assignments of 1000 words minimum (15% each).

### 207-113 Australian Rural Landscapes

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Mr Rowan Reid

**Contact:** 36 hours lectures, one 2-day field excursion, three 1-day field practicals and six hours of group study (*Semester 1*).

**Description:** The forests, farmlands, urban areas and reserves of the Australian rural landscape are the result of natural and human history acting on a unique biophysical base. Their management requires appreciation of this history, understanding of the individual components, and recognition of how they interact and are interdependent.

Students will be introduced to different land uses and their impacts, and will gain an insight into the perspectives and interests of landowners, community and industry. An introduction to current management approaches, including forest and catchment management planning and community participation, will highlight holistic approaches to landscape management.

The subject's content will include:

- An introduction to Australian biophysical resources, vegetation and climate;
- the human story including the history of aboriginal management, European settlement and forest use, and the development of modern land-use systems;
- the distribution and composition of forest, woodland and grassland ecosystems as a reflection of biophysical resources, climate, fire patterns and human history;
- determinants of the pattern of development and location of agricultural and forest enterprises in Australia;
- the contribution of natural and cultured landscapes to Australia's society and economy;

- sustainability and conservation of forests, soil, water and biodiversity; and
- the role of the conservation movement, local communities and industry in decision-making.

**Assessment:** One 2-hour examination (50% of final marks), one major assignment task based on the field practicals (20% of final marks), and up to three short assignments (totalling 30% of final marks).

**Recommended texts:** J B Kirkpatrick, *A Continent Transformed: Human Impact on the Natural Vegetation of Australia*, Oxford University Press, Melbourne, 1999. • L R Malcolm, P Sale, and A Egan, *Agriculture in Australia: An Introduction*, Oxford University Press, Melbourne, 1996. • N F Barr, and J W Cary, *Greening a Brown Land: An Australian Search for Sustainable Land Use*, Macmillan, Melbourne, 1992.

## Second-year subjects

### 202-201 Plant Function

See full subject details on page 2.

### 202-202 Experimental Design/Statistical Methods

See full subject details on page 2.

### 202-203 Soil and Water Resources

See full subject details on page 3.

### 207-202 Australian Flora

**Availability:** Parkville campus.

**Credit points:** 12.5

**Coordinator:** Dr Steve Hamilton

**Prerequisites:** 202-103 Biology for Land and Food Resources.

**Contact:** Twenty-four hours lectures and 30 hours tutorials/practicals (*Semester 2*).

**Description:** At completion of this subject students should have the knowledge and an ability to identify the major taxonomic groups of the fungi, algae, non-vascular and vascular plants, and their basic biology, distribution and significance within the broader ecology of aquatic and terrestrial communities and ecosystems, and their roles in natural resource management.

The basic content includes:

- function and life cycle of the various major phylum groups within the Kingdom Plantae (Dinophyta, Chrysophyta, Bacillariophyta, Chlorophyta, Phaeophyta, Rhodophyta, Hepatophyta, Bryophyta, Lycophyta, Filicophyta, Coniferophyta and Magnoliophyta);
- selected groups within the Kingdom Fungi (Deuteromycota, Zygomycota, Ascomycota, Basidiomycota, Oomycota, Mycophyta) and Monera (Cyanobacteria);
- the roles of these groups within the major ecosystems of Australia;
- further identification of these groups, with a major emphasis on the higher land plants; and
- preparation of a collection of vascular and non-vascular land plants.

**Assessment:** A 2-hour examination (40%), one practical test (20%), one 2000 word assignment (20%) and a plant collection of 50 specimens (20%).

### 207-203 Techniques of Resource Assessment

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Mr Graham Brodie

**Contact:** Twenty-four hours of lectures and 36 hours of practicals. Students are expected to undertake additional study of at least 1 hour for each hour of contact (*Semester 2*).

**Description:** This subject introduces the student to surveying, basic land survey methodology and instruments, and field experience. This will involve soil, plant and animal surveys on a catchment scale.

The subject will introduce techniques such as:

- map reading, field surveying and global positioning systems;
- soil, plant and animal surveys, and tree and forest measurement;
- land capability assessment;
- data-loggers, remote sensing, photogrammetry and GIS; and
- GIS; remote sensing and;
- appropriate sampling and analysis strategies.

On completion of this subject the students should be able to:

- understand the basic principles of mapping and performing land surveys;
- describe the major techniques available to evaluate land and biological resources;
- observe, sample and record data in field situations;

- interpret results from the use of such techniques; and
- understand how to apply them in a natural resource management context.

**Assessment:** A three-hour end-of-semester examination (50%), one major assignment (up to 2000 words, 20%) and three practical reports (each up to 1000 words, each 10%).

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### 207-205 Human Dimensions of Resource Management

**Availability:** Parkville campus.

**Credit points:** 12.5

**Coordinator:** Dr Kathryn Williams

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

**Description:** This subject provides an introduction to human social and psychological processes as they relate to management of natural resources. Students should develop an understanding of the psychological and contextual factors that shape community engagement in conserving and utilising natural environments and resources. Students should develop skills and conceptual frameworks necessary for engaging with social issues in resource management.

Student understanding will be extended through interaction with guest speakers from a range of resource management professions, field trips, and through application of theory to resource management case studies.

The content includes:

- human understanding of natural systems;
- psychological benefits of nature;
- environmental aesthetics;
- environmental concern;
- environmentally significant behaviours; and
- engaging communities in resource management.

These will be examined in the context of influencing human environmental behaviour to protect natural resources or promote adoption of new technologies, designing and evaluating extension projects, dealing with conflict in resource management, planning for leisure and recreation, and interpreting natural resources.

**Assessment:** One 3-hour examination worth 50% of final mark. Two assignments each equivalent to 3000 words and each worth 25% of final mark.

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### 207-211 Australian Fauna

**Availability:** Parkville campus.

**Credit points:** 12.5

**Coordinator:** Ms Cheryl O'Dwyer

**Prerequisites:** 202-103 Biology for Land and Food Resources.

**Contact:** Twenty-four hours lectures and 24 hours practicals (*Semester 2*).

**Description:** This subject should provide students with an understanding of the identification, biology and ecology of Australian vertebrate and invertebrate fauna.

The content includes:

- origins and diversity of Australian vertebrates and invertebrates, nomenclature and taxonomy of the Australian fauna;
- biology and ecology of the major invertebrate and vertebrate groups; and
- identification of insects, reptiles, amphibians, birds and mammals.

**Assessment:** A 2-hour examination (40%), a practical examination (30%), and a 3000-word assignment (30%).

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## Third-year subjects

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### 207-339 Hydrology and Catchment Management

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Dr Leon Bren

**Contact:** 24 hours lectures and 26 hours practical time (*Semester 1*).

**Description:** On completion of this subject students should have a detailed understanding of the hydrologic cycle and its impact on society, be familiar with the possible changes in water values that can be changed by land management, and the costs and benefits of such changes to society, be aware of the hydrologic, social, political, and economic factors involved in matters of catchment management, and have some feeling for the level of inaccuracy involved in hydrologic measurements.

Content includes:

- hydrologic cycle and "randomness" inherent in it;
- surface water flows and surface water modelling;
- groundwater flow and groundwater modelling;
- water quality and its measurement;

- impacts of land use on water quality and quantity;
- salinity and its impacts on native rivers and streams;
- principles of catchment management;
- questions of water rights and water trading;
- water use conflicts and their resolution;
- restoration hydroecology; and
- long term variations in stream flow.

The subject will draw heavily on Australian examples, and will involve an overnight excursion to the River Murray area.

**Assessment:** One 3 hour exam (60% of final mark) and two essays, each of 3000 words (each essay 20% of final mark). Participation in a number of non-assessable exercises.

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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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## Fourth-year subjects

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### 202-401 Honours Research Project

See full subject details on page 5.

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## Elective subjects

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### First year

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

See full subject details on page 1.

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### Second year

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#### 625-101 Earth Sciences - The Global Environment

See full subject details on page 1.

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#### 121-018 Geomorphology

See full subject details on page 3.

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#### 121-021 Environmental Politics and Management

See full subject details on page 3.

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#### 220-213 Trees and Forests

See full subject details on page 1.

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### Third and fourth year

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#### 207-201 Resource Management Economics

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Dr Brian Davidson

**Prerequisites:** 207-101 Land, Food and Resource Economics or 316-102 Introductory Microeconomics.

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

**Description:** At the end of the course students should be able to:

- understand basic economic concepts applied to problems of resource use and conservation;
- understand the issues associated with public versus private ownership of resources; and
- apply economic tools (eg. benefit-cost analysis) to the analysis of decisions about resource use and conservation.

The material will be applied in the context of resource issues of concern across agriculture, forestry and horticulture such as:

- alternate land uses;
- harvesting timber;
- water allocation pricing and policy;
- soil and flora conservation; and
- pollution and environmental degradation;

Students should learn to apply the following concepts and methods to issues of resource use:

- introductory benefit/cost analysis;
- social welfare - consumer surplus, producer surplus, social welfare;
- willingness to pay - measuring in actual situations;
- market failure - definition, dynamic, renewable and non-renewable resources;
- externalities - measurement of the magnitude and inclusion in empirical analysis; and
- implications of property rights/public goods for decision making.

Stream specific tutorial work is to be used.

**Assessment:** A three-hour exam (70%) and two short tests conducted during classes (worth 15% each).

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### 207-301 Global Environment and Sustainability

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Dr Tony Weatherley

**Contact:** Thirty-six hours of seminars and tutorials (average of three hours per week) and up to 36 hours of self-directed learning. This subject begins in early February and finishes one month before the end of Semester 1 (*Semester 1*).

**Description:** The subject challenges the student to take on the perspective of different stakeholders in issues relating to the environment and sustainable production systems in both a regional and a global context. The student will become part of a global classroom as a member of a group formed from students from several international universities and facilitated by local classroom discussions, postings to discussion forums and chat rooms on the internet. Compressed video technology is used to present the global seminar, held every two to three weeks, in which students from all universities play an active role. Subject content is presented via case studies developed by the participating universities (currently Cornell, Uppsala, Wageningen, Zamorano and EARTH) in topical areas of environment and sustainable production systems.

Content will vary depending on the institution involved but will cover issues such as:

- global warming and climate change;
- biodiversity prospecting and global trade;
- population demographics;
- water quality and quantity;
- waste management; and
- genetically modified foods and food security.

**Assessment:** The assessment tasks are a project report of 3000 words (25%), a seminar on the project report (15%) and a 1000-word reflection paper on each case study (40%) and postings to discussion forums (20%).

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### 207-305 Revegetation and Landscape Restoration

**Availability:** Burnley campus with use made of Dookie campus facilities through extended field trips

**Credit points:** 12.5

**Coordinator:** Dr Greg Moore and Dr Steve Hamilton

**Prerequisites:** 207-202 Australian Flora and 207-211 Australian Fauna or 207-105 Horticulture II.

**Contact:** Thirty-six hours lectures, 36 hours field excursions (*Semester 2*).

**Description:** At completion of this subject, students should be able to:

- define agroforestry, revegetation and habitat creation systems;
- select appropriate species for habitat creation and revegetation situations;
- assess and prepare sites for planting and habitat creation;
- plan, implement and cost plantings and the creation of habitat landscapes;
- evaluate, design and implement urban and rural revegetation programs;
- recognise the relationships between flora and fauna in relevant systems;
- prepare a management plan for a revegetation or habitat creation site;
- determine the best land use options for a unit of land;
- describe the benefits of revegetation and habitat creation; and
- identify relevant aesthetic and design principles and philosophies.

The topics to be studied in the subject include:

- agroforestry, habitat creation and revegetation philosophies and definitions;
- costs and benefits of revegetation and habitat creation management;
- site assessment and modification;
- products and markets;
- species selection;
- site preparation and amelioration;
- revegetation schemes;

- techniques for creating habitats and diversifying flora and fauna;
- sites and their management; planting and establishment costs;
- labour;
- plantings and wildlife;
- government policy;
- career structures; and
- land use options and management.

**Assessment:** A 3-hour examination (60%) and two assignments equivalent to 2500 words (each 20%).

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### 220-307 Fire Ecology and Management

See full subject details on page 4.

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### 207-328 Working with Community Groups

See full subject details on page 7.

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### 207-330 GIS and Remote Sensing

**Availability:** Parkville campus.

**Credit points:** 12.5

**Coordinator:** Mr Graham Brodie

**Contact:** Twenty-four hours lectures and 36 hours practical work, including use of Dookie campus (*Semester 1*).

**Description:** This subject should provide students with an understanding of the principles of geographic information system and remote sensing technologies and their application to urban and rural resource management.

The content includes:

- introduction to database management systems;
- introduction to geographic information systems;
- global position systems and automatic data acquisition;
- integration of conventional data analysis tools with GIS;
- passive and active sensing systems;
- image processing and interpretation; and
- remote sensing for improved resource management.

**Assessment:** One 3-hour written examination (50%), two 2500-word assignments (40%) and a practical assignment (10%).

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### 207-401 Soil Management and Conservation

See full subject details on page 10.

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### 207-402 Management of Plant and Animal Invasions

**Availability:** Parkville

**Credit points:** 12.5

**Coordinator:** Prof Roger Cousens

**Prerequisites:** A basic ecology subject, such as 207-202 Australian Flora; or 207-211 Australian Fauna; or 208-203 Ecology and Management of Grazing Systems; or 207-275 Forest Ecology; or 654-204 Ecology: Individuals and Populations

**Contact:** Twenty-four hours of lectures, and 36 hours of tutorials and presentations (*Semester 2*).

**Description:** This subject will explore the ecology of invasions of exotic organisms, and the approaches that can be taken to manage them. It will be divided into three sections:

- general principles - dispersal mechanisms; population dynamics; chemical control methods; biological control; policies and regulations;
- case studies of plant invasions; and
- case studies of animal invasions.

On completion of the subject, students should be able to assess the potential of a species to invade; design a management strategy for an invading species; and be familiar with strategic and policy issues relating to plant and animal pests.

**Assessment:** Examination of two hours duration (40%), two assignments of 3000 words (30% each).

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### 207-416 Management of Australia's Fauna

**Availability:** Parkville campus

**Credit points:** 12.5

**Coordinator:** Ms Cheryl O'Dwyer

**Prerequisites:** At least one of 207-202 Australian Flora; 207-211 Australian Fauna; 208-203 Ecology and Management of Grazing Systems; 207-275 Processes in Forest Ecology; 654-204 Ecology Individuals and Populations; 208-324 Applied Animal Behaviour; or an equivalent ecology subject.

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

**Description:** This subject will explore the concepts of ecological processes that regulate native and exotic faunal populations in Australia; techniques used to monitor and manage faunal populations that are at risk; current methods of control and harvesting techniques; and fauna legislation and regulation. Case studies will be used to validate the above points.

**Assessment:** One 5000 word written assignment (40%), a 2500 word written assignment (20%), and a two-hour examination.

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### **208-308 Irrigation and Water Management**

See full subject details on page 9.

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### **220-407 Parks and Recreation**

See full subject details on page 6.

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### **207-410 Agroforestry**

See full subject details on page 5.

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### **207-413 Community Natural Resource Management**

See full subject details on page 6.

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### **207-414 Social Research Methods**

See full subject details on page 10.

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### **208-411 Research Philosophies and Statistics**

See full subject details on page 4.