Bachelor of Forestry

First year subjects

202-101 Chemistry for Land and Food Resources
See full subject details on page 1.

202-103 Biology 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.

207-101 Economics of Resource Use
See full subject details on page 1.

207-106 Conservation of Australian Forests
Availability: Parkville campus.

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

Coordinator: Dr Christopher Weston

Contact: 36 hour lectures, two one-day field excursions, a two-day field practical and 6 hours self study instruction or laboratory practicals *(Semester 1)*.

Description: By completion of the subject the student should:

- understand the current status of conservation of Australian forest communities;
- have a basic knowledge of the complexities of forest conservation issues and of the ecosystems involved; and
- be able to develop a rational and well-argued position on conservation issues concerning Australian forests and woodlands.

The subject includes:

- an introduction to Australian forest communities and their conservation;
- recent historical patterns of change in Australian landscapes;
- current issues in the conservation of Australian forests;
- sustainable management in forest communities and the implications for old growth forests and conservation of forest types and wildlife; and
- the implications of plantation expansion for native forest management.

Assessment: A 3-hour examination (50%), one major assignment (3000 words) partially based on the 2-day field practical (20%), and up to 3 short assignments based on the field excursions (totalling 30%).

Prescribed texts: L F Costermans, *Trees of Victoria and Adjoining Areas*, Costermans Publ., 1994. • J B Kirkpatrick, *A Continent Transformed: Human Impact on the Natural Vegetation of Australia*, Melbourne Oxford University Press, 1999.

600-111 Biology of Australian Flora & Fauna
See full subject details on page 1.

600-142 Genetics & The Evolution of Life
See full subject details on page 1.

610-141 Chemistry
See full subject details on page 2.

610-142 Chemistry
See full subject details on page 2.

620-081 Preliminary Mathematics A
See full subject details on page 12.

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 2.

207-270 Wood Science
Availability: Creswick campus.

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

Coordinator: Dr Matthew Leitch

Contact: 24 hours lectures and 36 hours practical work *(Semester 2)*.

Description: On completion of this subject, students should be able:

- to describe the macroscopic and microscopic features of hardwood and softwood xylem and phloem;
- comprehend information regarding variability of wood;
- understand methods used to identify timbers;
- describe the processes of wood and bark formation including cell differentiation, cell wall layering and modifications;
- understand the effects of cell wall organisation on some wood properties;
- have a basic understanding of the chemical composition and properties of wood;
- understand anatomical, chemical and physical characteristics associated with heartwood formation, growth stresses, reaction wood and natural features in wood; and
- comprehend the meaning of a number of wood physical properties and basic wood-moisture relationships.

Subject content includes:

- wood and bark structure, anatomy and ultrastructure;
- macroscopic and microscopic features of wood;
- tree growth and wood quality, woody cell development, reaction wood, variability of wood;
- identification methods, growth rings and measurement of wood properties;
- wood chemistry, extractives, collapse;
- chemical utilisation of wood;
- engineering properties of wood; and
- natural characteristics, and physical properties of wood.

Assessment: A three-hour end-of-semester examination (50%), a term project (20%), a practical exam (15%) and two worksheet assignments (7.5% each).

Prescribed texts: K Wilson and D J B White, *The Anatomy of Wood: Its Diversity and Variability*, Stobart & Son Ltd, London, 1986.

207-271 Forest Mensuration & Surveying
Availability: Creswick campus.

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

Coordinator: Mr Ian Wild

Corequisites: 202-202 Experimental Design and Statistical Methods.

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

Description: On completion of this subject students should:

- possess basic skills in surveying;
- be able to prepare briefs and provide supervision for projects involving complex surveying or engineering; and
- be able to assess a forest and process inventory data successfully, estimate standing volume and yields, and understand how these are affected by site productivity and stand density.

Contents include:

- introduction to basic surveying instruments;
- closed traversing, distribution of errors;
- basic levelling procedure;
- measurement and computation of perimeter, area;
- pegging of simple curves;
- use of GPS systems;
- the use of standard equipment to measure tree and stand parameters such as diameter, basal area, height, volume, bark and crown;
- stem geometry, stem analysis and defects in trees and logs; and
- standard statistical techniques of sampling (random, stratified random, systematic and probability-proportional-to-size) for both resource inventory and experimental research.

Assessment: One three-hour written examination (50%) and two assignments equivalent to 3000 words (each worth 25%).

207-275 Forest Ecology
Availability: Creswick campus.

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

Coordinator: Dr Christopher Weston

Prerequisites: 202-103 Biology for Land and Food Resources, 600-142 Genetics and the Evolution of Life.

Corequisites: 207-276 Field Studies and Dendrology.

Contact: 24 hours lectures and 36 hours practical work *(Year long).*

Description: On completion of this unit, students should be:

- competent in categorising Australian vegetation on both a structural and a floristic basis;
- identifying the major components of the Australian flora using keys; and
- familiar with basic ecological concepts from the organisational levels of the organism through to the biosphere, particularly in relation to forests.

Content includes:

- plant systematics, taxonomy and nomenclature; construction and use of keys; forest ecology;
- the environment, the organism, the population, the community, the ecosystem, the biosphere.

Assessment: One three-hour examination (50%), a practical test (10%) and two practical assignments equivalent to 2500 words (each worth 20%).

Prescribed texts: C Krebs, *Ecology*, Academic Press, 1985. • I Clarke & H Lee, *Name that Flower*, MUP, 1987.

207-276 Field Studies and Dendrology

Availability: Creswick campus.

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

Coordinator: Mr Ronald Hateley

Prerequisites: 202-103 Biology for Land and Food Resources and 600-142 Genetics and the Evolution of Life.

Contact: 24 hours lectures and 36 hours practical work *(Year long).*

Description: On completion of this subject, students should:

- have a better understanding of the integrated nature of forestry and land management in Australia;
- have basic skills including first aid, bush survival and dealing with emergencies; care, use and maintenance of hand-tools and chain-saws;
- have an appreciation of the setting in which field activities are conducted through exposure to forest work gangs, experienced field supervisors and Landcare groups;
- understand the use of computers in forestry;
- have an ability to use keen observation to interpret and analyse field observations; and have basic skills in fire survival and fire suppression methods;
- be competent in the identification, taxonomy and morphology of eucalypts, conifers, deciduous hardwoods and important elements of the Australian flora; and
- be aware of the distribution, characteristics and uses of many Australian forest species.

Assessment: One two-hour written examination (40%), and three assignments equivalent to 2500 words (each worth 20%). Attendance at a minimum of 80% of field days.

Prescribed texts: L Costermans, *Native Trees and Shrubs of South-Eastern Australia*, Rigby, 1981.

207-277 Forest Inventory and GIS

Availability: Creswick campus.

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

Coordinator: Mr Ian Wild

Prerequisites: 207-271 Forest Mensuration and Surveying or 600-203 Environmental Measurement.

Contact: 24 hours lectures and 36 hours practical work *(Semester 2).*

Description: On completion of this subject, students should:

- understand the role of inventories in forest planning;
- learn to design, implement and manage timber, vegetation and/or wildlife inventories (multi-stage, multi-phase and variable probability); and
- learn the basic terminology, principles and characteristics of remote sensing and Geographic Information Systems (GIS) technology, the use of GIS for interpreting, measuring and mapping natural resources, and how to apply advanced sampling theories and project management tools in the design and conduct of inventories using either remote sensing and/or ground inventory methods.

The course covers:

- photographic and digital remote sensing;
- vector and raster GIS, thematic map overlay;
- modelling and its use in forest management and planning; and
- the technical and managerial requirements for introducing remote sensing and GIS technologies.

Methods and processes for generating, evaluating and selecting alternative plans for the management of the resources (timber and others) will be introduced.

Assessment: One three-hour written examination (50%) and two assignments equivalent to 3000 words (25% each).

Third year subjects

207-307 Fire Ecology and Management

Availability: Creswick campus.

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

Coordinator: Dr Kevin Tolhurst

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

Description: On completing this subject, students should be competent in:

- basic fire-weather forecasting;
- understanding the principles of fire behaviour and the bases of fire danger ratings;
- understanding the principles of fire protection;
- having skills in planning and selecting appropriate fire-protection strategies;
- understanding the role and impact of fire in forest ecosystems; and
- having a knowledge of fire law.

The topics to be covered will include:

- fire history in Australia;
- combustion theory;
- forest fire behaviour prediction;
- fuel hazard assessment;
- fire weather observation and forecasting;
- fire danger rating systems;
- ecological effects of fire in forests;
- prescribed burning techniques;
- fire planning;
- fire suppression strategies and techniques; and
- fire law and fire management principles.

Assessment: A three-hour written examination (60%) and practical assignments equivalent to about 2000 words totalling 40%.

207-309 Timber Management and Harvesting

Availability: Creswick campus.

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

Coordinator: Dr Leon Bren

Prerequisites: 207-277 Forest Inventory and GIS.

Contact: 24 hours lectures and 36 hours practical work *(Semester 2).*

Description: On completion of the subject, students should:

- understand geometric alignment of roads, balancing of earthworks, construction principles and practices;
- understand concepts and methods for managing forests for sustainable timber production, and be aware of forest use conflicts and methods to resolve them;
- obtain an introduction to basic forest harvesting equipment;
- obtain an introduction to the role of harvesting in forest management;
- obtain an introduction to environmental scheduling and management problems associated with forest harvesting;
- obtain an introduction to cash flow planning, preparation of logging plans, avoidance of fraudulent practice and meeting constraints imposed on Australian loggers by Codes of Forest Practice;
- and learn about the role of forest management information systems (including GIS) in decision-making; wood production in even and uneven-aged forests; growth and yield predictions; yield regulation; computer modelling in decision-support systems; and different methods and criteria for evaluation alternative management strategies.

Assessment: One three-hour written examination (50%), and practical assignments (totalling 50%).

207-311 Forest Products

Availability: Creswick campus.

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

Coordinator: Professor Peter Vinden

Prerequisites: 207-270 Wood Science.

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

Description: On completion of this subject, students should:

- be able to write a technical report which meets a minimum standard in terms of presentation and content;
- understand the basic principles, mechanisms, industry structure and issues involved in timber gluing, wood preservation, timber drying, and chemical modification of wood; understand the sawmilling process, types of products produced and timber grading; and
- describe the basic manufacturing steps and industry structure for solid and composite wood products and pulp and paper products; analyse, synthesise and evaluate information concerning wood and fibre properties, product properties, process and technology limitations, and basic market forces with regard to the use of forests for timber utilisation.

Content includes:

- wood adhesives, drying and preservation;
- sawmilling, timber grading, further processing and value-adding; and
- raw material requirements, properties and markets, and production of solid and composite wood products, pulp and paper and alternative forest products.

Assessment: One three-hour written examination (50%), a practical test (10%) and two assignments equivalent to 2500 words (each worth 20%).

207-317 Native Forest Silviculture

Availability: Creswick campus.

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

Coordinator: Mr Ronald Hateley

Prerequisites: 202-201 Plant Function, 207-275 Forest Ecology (or equivalent).

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

Description: On completion of this subject, students should:

- have an appreciation of a range of silvicultural techniques;
- understand the constraints placed on each by ecological and social factors; understand regeneration processes in Australian forests and woodlands;
- understand the significance of diseases in forestry, and strategies for their management; and
- be able to plan and supervise silvicultural operations involving regeneration and tending of a range of Australian forest types.

The course includes:

- the role of silviculture and its relationship to forest policy, internationally and within Australia;
- sources of regeneration, flowering and seed production, seedbed requirements, factors affecting seedling establishment and monitoring of seedling regeneration;
- the principal groups of pathogens, host-parasite relationships, epidemiology and control;
- regeneration biology of selected Australian forest types, and regeneration methods or silvicultural systems appropriate to them; and
- stand tending methods and their relevance to various Australian forest types.

Assessment: One three-hour examination (50%); and assignments and reports on practical work (totalling 50%).

207-323 Plantation Silviculture

Availability: Creswick campus.

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

Coordinator: Dr Christopher Weston

Prerequisites: 202-201 Plant Function, 207-275 Forest Ecology (or equivalent).

Contact: 24 hours lectures and 36 hours practical work *(Semester 2).*

Description: Trees are planted for a range of uses, including wood production, water table control and salinity mitigation, carbon credits and shade and shelter for stock. On completion of this subject, students should have developed a sound understanding of:

- methods for the mass propagation of selected trees;
- species and site matching for purposes such as salinity mitigation and optimum growth;
- the eco-physiology of water and nutrient use in farmed forests;
- management of the interaction between light, water and nutrients to maximise carbon gain (growth) in planted trees;
- the processes of tree improvement through tree breeding programs; and
- the changing political and environmental base for farming trees in Australia.

Assessment: One three-hour examination (50%), and up to four assessment tasks throughout the semester (totalling 50%).

207-329 Field Studies II

Availability: Creswick campus.

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

Coordinator: Mr Ronald Hateley

Prerequisites: 207-276 Field Studies and Dendrology.

Contact: Field days and practical work *(Year long).*

Description: On completion of this subject, students should:

- have a detailed understanding of the integrated nature of forestry and land management in Australia;
- be able to contrast and compare issues and practices; and
- have skills in communication, conflict resolution, supervision, dealing with the media and personnel management.

The course includes 20 field days, most conducted in the field, including one week involving the harvesting of trees from a coupe and the processing of logs in a sawmill. Small projects involve students managing local areas of land for specified purposes. An excursion of up to 10 days will examine the forestry and land management issues of regions too remote to be serviced by the field days.

Assessment: Attendance at a minimum of 80% of field days, and submissions of workbook.

207-331 Forest Entomology and Pathology

Availability: Creswick campus.

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

Coordinator: Dr Leon Bren

Prerequisites: 202-103 Biology for Land and Food Resources, 202-201 Plant Function, 207-275 Forest Ecology, 207-317 Native Forest Silviculture.

Corequisites: 207-323 Plantation Silviculture.

Contact: 24 hours of lectures and 36 hours practical work *(Semester 2).*

Description: On completion of this subject, students should have an understanding of:

- the biology of forest pathogens and insect pests;
- the effects of these organisms on production forestry; and
- the extent to which forest management practices can increase or reduce problems; and what measures can be taken to avoid, reduce or overcome damage caused by pests and diseases.

The content includes:

- forest pathology: the significance of diseases in forestry, the principal groups of pathogens, host-parasite relationships, epidemiology and disease control; and
- forest entomology: classification, anatomy, morphology, biology, frequency of distribution, control and importance of insects in forestry.

Assessment: One three-hour examination (50%), and up to three assignments (totalling 50%), including a collection of insects.

207-334 Special Studies in Forestry

Availability: Creswick campus.

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

Coordinator: Dr Leon Bren

Prerequisites: 75 points of 200-level forestry subjects including two of 202-201 Plant Function, 207-271 Forest Mensuration and Surveying or 207-275 Forest Ecology.

Contact: 24 hours of lectures and 36 hours of practical work *(Year long).*

Description: This subject will expose students to a number of specific discipline areas of current community interest and which are the subject of active research. Students take two modules covering advanced topics in forestry, such as catchment hydrology and management, landscape ecology and management, tree development or biometry and data analysis. The subject aims to make students aware of the skills required for accessing and assessing published literature, for performing the kinds of data analysis common in forestry research, and for high-level report-writing and oral presentation.

Assessment: Two two-hour written examinations (50%), and practical or review-based assignments throughout the year (totalling 50%).

Fourth year subjects

202-001 Industry Placement#

See full subject details on page 3.

202-301 Industry Project

See full subject details on page 3.

202-302 Human Resource Management

See full subject details on page 3.

202-401 Industry/Research Project

See full subject details on page 4.

207-406 Environmental Mngt Systems and Policy

Availability: Parkville campus.

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

Coordinator: Prof Ian Ferguson

Contact: 24 hours lectures and 36 hours practical work *(Semester 2).*

Description: On completion of this subject students should have an understanding of the principles and policies relating to environmental management systems for sustainable land use; including the legal and institutional processes, and the roles and relationships of land use planning, management plans and codes of practice.

Covered in the subject:

- principles of sustainable land use and environmental management systems;
- standards and certification systems, including ISO 14001 and FSC systems;
- hierarchy of planning and management processes;
- land use planning;
- management plans and planning techniques for multiple uses;
- codes of practice;
- implementation; and
- review.

The second half of the subject on policy will comprise lectures by visiting experts and reading assignments on policy.

Assessment: A three-hour written examination (50%) and two practical reports each up to 1500 (25% each).

Elective subjects

Note: Insufficient enrolments may lead to a subject being suspended.

207-301 Global Env'ment & Sustain Prod Systems

See full subject details on page 7.

207-407 Parks and Recreation

Availability: Parkville campus.

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

Coordinator: Dr Leon Bren

Contact: 24 hours of lectures and 36 hours practical work *(Semester 2).*

Description: On completion of this subject, students should have:

- an appreciation of the complexities of issues involving park management; and
- some competence in preparing plans to meet the challenge of these issues.

The content includes:

- factors important to the management of parks;
- tangible and intangible aims;
- conflicts of values and the concept of 'balance';
- role of legislation in the management of such areas;
- difficulties in implementation of legislation in the field;
- methods for protection of natural values from visitor pressure;
- conflict between priced and non-priced goods and services; and
- management of visitor areas and facilities.

Assessment: One three-hour examination (50%), a practical test (10%), and two practical work assignments equivalent to 2500 words (20% each).

207-409 Commercial Forest Management

Availability: Parkville campus.

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

Coordinator: Ian Wild

Prerequisites: 207-309 Timber Management and Harvesting.

Contact: 24 hours of lectures: 36 hours practical work *(Semester 2).*

Description: On completion of the subject, students should have:

- an understanding of the principles of commercial forestry; and
- an ability to prepare budgets and undertake financial management; and understand and have skills in using forest planning techniques.

The content includes:

- commercial objectives;
- advanced budgeting, financial management and valuation, advanced silviculture;
- long and short-term planning systems;
- linear programming and simulation models for forest planning;
- cost-competitiveness and technological improvement;
- marketing; and
- product mix.

Assessment: A three-hour examination (50%) and two practical reports of 3000 words (each 25%).

207-410 Agroforestry

Availability: Parkville campus.

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

Coordinator: Mr Rowan Reid

Prerequisites: 202-201 Plant Function and 202-203 Soil and Water Resources.

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

Description: This course covers in detail the technical aspects of farm revegetation planning. Students will be expected to participate in field-based learning exercises and information gathering, and to contribute to discussion and debate. By the end of the subject students should:

- have a working knowledge of agroforestry diagnosis and design as an approach to the development of farm tree management opportunities on farms in Australia and overseas;
- have an understanding of the role of trees in providing for private landowner needs and aspirations;
- appreciate the importance of assessing landowners' needs, aspirations and performance criteria when designing agroforestry projects and development strategies;
- be able to develop technical design criteria for effective revegetation for resource conservation, agricultural production and direct commercial purposes;
- be able to undertake a multipurpose revegetation design project;
- be familiar with the opportunities for landowners to produce commercial forest products from private native forests; and
- be familiar with approaches to tree monitoring and evaluation.

Assessment: A design project (25%), farm forestry strategy project (25%) and three-hour examination (50%).

207-411 Processes in Forest Ecosystems

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

Coordinator: Dr Chris Weston

Prerequisites: Any one of 202-203 Forest Soils, 207-275 Forest Ecology, 606-204 Plant Ecology and 606-207 Flora of Victoria

Contact: 24 hours lectures, 36 hours practical work, including a 10-day excursion in February *(Summer semester).*

Description: This subject will cover the ecosystem processes that determine the distribution, diversity and productivity of forests and woodlands in south-eastern Australia, and their regeneration potential. The subject aims to provide a sound theoretical and practical basis for understanding processes and methods in forest ecology. The subject will include:

- vegetation and soils of forest ecosystems of south eastern Australia, including assessment of floristic and faunal diversity, and animal-plant interactions;
- quantitative analysis of forest biomass, nutrient and bio-geochemical data at stand and catchment levels;
- forest productivity and nutrient cycling;
- the relevance of forests and forest soils in global carbon cycling and the emerging carbon economy; and
- the potential of reafforestation for sequestration and storage of atmospheric carbon.

The subject involves the preparation, writing and oral presentation of a scientific report developed from the field practical.

Assessment: One major report (30%), an oral presentation (20%) and a 3-hour written examination (50%).

Prescribed texts: R H Groves, *Australian Vegetation, 2nd ed,* Cambridge University Press, 1994. • P M Attiwill and G W Leeper, *Forest Soils and Nutrient Cycles*, Melbourne University Press, 1987.

207-413 Community Mgt Of Land & Natural Resource

Availability: Parkville campus.

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

Coordinator: Dr John Petheram

Contact: 36 hours of equivalent contact time and 24 hours independent study, plus assignment work *(Semester 2).*

Description: On completion, students will be able to demonstrate sound understanding of theories underpinning community participation in management, and of processes and techniques of group facilitation, participatory appraisal, planning and management of resources.

The content and learning process are designed by a panel of specialists from agriculture, forestry and other areas of natural resource management to meet the needs of graduates entering careers in these areas. The subject is presented under seven main headings:

- philosophy and evolution of participation and community management
- models of community management of forests and other natural resources - overseas and in Australia
- policy and institutional issues in community management
- process and techniques in participatory enquiry, planning and management
- issues in Koori community resource management
- forms of evaluation in community management programs
- conflict management

The prescribed literature will be from current journals and reports of research and practice in community participation and management of natural resources.

Assessment: A 3000-word assignment in specialist interest area (40%); a practical exercise (30%); a two hour final examination (30%).

208-412 Advanced Topics in Genetics and Breeding

See full subject details on page 11.