

Bachelor of Forestry

First year subjects

202-101 Chemistry for Land and Food Resources

See full subject details on page 591.

202-103 Biology for Land and Food Resources

See full subject details on page 591.

202-106 Land Resources

See full subject details on page 591.

209-101 Economics of Resource Use

See full subject details on page 591.

211-101 Conservation of Australian Forests

Availability: Parkville campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Dr Christopher Weston

Contact: 26 hour lectures, two one day field excursions, a two day field practical and 6 hrs 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 Uni Press, 1999.

600-111 Biology of Australian Flora & Fauna

See full subject details on page 791.

600-142 Genetics & The Evolution of Life

See full subject details on page 792.

610-142 Chemistry

See full subject details on page 800.

Second year subjects

Complete descriptions of second and later year subjects will be available in the 2002 Handbook or from the course coordinator.

202-201 Plant Function

See full subject details on page 592.

202-202 Experimental Design/Statistical Methods

See full subject details on page 592.

202-203 Soil and Water Resources

See full subject details on page 592.

211-261 Wood Science

Availability: Parkville campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Mr Branco Hermesceec

Prerequisites: 202-101 Chemistry for Land and Food Resources, 202-103 Biology for Land and Food Resources and 202-201 Plant Function.

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

Description: On completion of this subject students should:

- 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 organization 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.

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

Prescribed texts: Haygreen, J.G., & Bowyer, J.L., *Forest Products and Wood Science: an Introduction*, 2nd ed. Iowa State University Press.

211-262 Forest Mensuration and Surveying

Availability: Creswick campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Mr Ian Wild

Prerequisites: 202-202 Experimental Design and Statistical Methods.

Contact: 24 hrs lectures and 36 hrs 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, so as to 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 leveling 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;
- the course will also cover stem geometry, stem analysis and defects in trees and logs;
- and students should also learn to apply 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%).

211-263 Forest Ecology

Availability: Creswick campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Dr Christopher Weston

Prerequisites: 211-264 Field Studies and Dendrology, 202-103 Biology for Land and Food Resources, 600-142 Genetics and the Evolution of Life.

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

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

- competent in categorizing 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;
- and 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: Krebs, C., *Ecology*, 1985 Academic Press. • Clarke, I. & Lee, H., *Name that Flower*, MUP, 1987.

211-264 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 hrs lectures and 36 hrs 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 analyze 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%).

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

211-265 Forest Inventory and GIS

Availability: Creswick campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Mr Ian Wild

Corequisites: 211-262 Forest Mensuration and Surveying or 600-203 Environmental Measurement.

Contact: 24 hrs lectures and 36 hrs 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;
- modeling 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

211-305 Fire Ecology and Management

See full subject details on page 617.

211-321 Timber Management and Harvesting

Availability: Creswick campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Dr Leon Bren

Prerequisites: 211-265 Forest Inventory and GIS.

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

Description: On completion of the subject, students should:

- understand geometric alignment of roads, balancing of earthworks, construction principles and practices;
- control of sediment and other major problems, 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 the Code 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 modeling in decision-support systems; and different methods and criteria for evaluation alternative management strategies.

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

211-322 Forest Products

Availability: Creswick campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Mr Branco Hermesce

Prerequisites: 211-261 Wood Science.

Contact: 24 hrs lectures and 36 hrs 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; analyze, synthesize 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 utilization.

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

211-323 Native Forest Silviculture

Availability: Creswick campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Mr Ronald Hateley

Prerequisites: 202-201 Plant Function, 211-263 Plant Function (or equivalent).

Contact: 24 hrs lectures and 36 hrs 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 (totaling 50%).

211-324 Plantation Silviculture

Availability: Creswick campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Dr Christopher Weston

Prerequisites: 202-201 Plant Function, 211-263 Forest Ecology (or equivalent).

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

Description: On completion of this subject, students should:

- understand the factors associated with the propagation of plants for plantation programs;
- understand the process of species and site selection for a plantation program;
- understand the factors that limit site productivity and how they can be ameliorated through site preparation, fertilizer addition, control of inter and intra specific competition;
- understand the processes of tree improvement through tree breeding programs;
- have a knowledge of the major insect pests of softwood and eucalypt plantations;
- and appreciate the changing political and environmental base of plantation programs in each Australian state.

Assessment: One three-hour examination (50%), one assignment equivalent to 3500 words (25%) and up to 3 short reports (totaling 25%)

211-325 Field Studies II

Availability: Creswick campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Mr Ronald Hateley

Prerequisites: 211-264 Field Studies and Dendrology.

Contact: 24 hrs lectures and 36 hrs 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: One two-hour written examination (40%), and three assignments equivalent to 2500 words (each worth 20%).

211-326 Forest Entomology and Pathology

Availability: Creswick campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Dr Peter Ades

Prerequisites: 202-101 Biology for Land, 202-103 Biology for Land and Food Resources, Food Resources, 202-201 Plant Function and 211-263 Forest Ecology.

Corequisites: 211-323 Native Forest Silviculture and 211-324 Plantation Silviculture.

Contact: 24 hrs of lectures and 36 hrs 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.

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

211-364 Forestry Elective

Availability: Parkville campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Dr Steve Read

Prerequisites: 75 points of 200-level forestry subjects including two of 211-212 Forest Mensuration and Surveying 211-215 Forest Ecology, 211-256 Tree Physiology, 211-262 Forest Mensuration and Surveying or 211-263 Forest Ecology.

Contact: 24 hrs of lectures and 36 hrs 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 any two of a range of 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 (totaling 50%).

Fourth year subjects

202-001 Work Experience

See full subject details on page 593.

202-302 Human Resource Management

See full subject details on page 593.

202-401 Industry/Research Project

See full subject details on page 593.

211-406 Environmental Management Systems&Policy

Availability: Parkville campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Prof Ian Ferguson

Contact: 24 hrs lectures and 36 hrs 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.

211-405 Fire Ecology and Management

Availability: Creswick campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Dr Kevin Tolhurst

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

Description: On completing this subject, students should:

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

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 (50%) and practical assignments equivalent to about 2000 words and worth up to 20% each.

211-407 Parks and Recreation

See full subject details on page 617.

211-409 Industrial Forestry

Availability: Parkville campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Ian Wild

Prerequisites: 211-321 Timber Management and Harvesting.

Contact: 24 hrs of lectures: 36 hrs 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.

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

211-410 Agroforestry

See full subject details on page 617.

211-411 Processes in Forest Ecosystems

See full subject details on page 635.

211-412 Advanced Topics in Genetics & Breeding

Availability: Parkville campus.

Credit points: 12.5

HECS-band: 2

Coordinator: Dr Peter Ades

Prerequisites: 211-324 Plantation Silviculture or other subjects as approved by the coordinators.

Contact: 30 hours lectures and 36 hours practical classes (*Semester 1*).

Description: On completion of this subject students should:

- understand genetics as it is applied to practical animal and forest tree breeding;
- have a sound knowledge of operational genetic improvement programs;
- and be able to apply this knowledge in design and management of these programs.

The topics to be covered include:

- defining breeding objectives in economic terms;
- the meaning of genetic parameters such as heritability;
- estimating breeding values;
- the effects of inbreeding and how to minimise them;
- the structure of natural and domesticated populations;
- use of genetic resources, cross and hybrid breeding;
- the design of genetic improvement programs;
- the use of reproductive biology and molecular technology in genetic improvement;
- disease-resistance breeding;
- genetic conservation;
- and genetics of economically important traits appropriate to the target species.

Assessment: One 3-hour written examination (50%) and a series of written practical reports and assignments including at least one of up to 5000 words.

211-413 Community Mgt of Land & Natural Resource

Availability: Parkville campus.

Credit points: 12.5

HECS-band: 2

Semester: Semester 2

654-308 Conservation Biology

See full subject details on page 877.