



THE UNIVERSITY  

---

*of* ADELAIDE

**Postgraduate Coursework  
Courses**

**2011**

# Contents

FACULTY OF SCIENCES.....	3	Physics.....	11
Science (Faculty-Level Courses).....	3	Plant Science.....	14
Agribusiness.....	3	Soil and Water.....	19
Agriculture.....	5	Urban Habitat Management.....	20
Agronomy.....	5	Veterinary Science.....	21
Biometrics.....	5	Viticulture.....	22
Environmental Biology.....	5	Wine Marketing.....	23
Geology.....	7	Index of Courses.....	30
Horticulture.....	8		
Oenology.....	8		

# FACULTY OF SCIENCES

## Science (Faculty-Level Courses)

### SCIENCE 7020

#### Communicating Science

3 units - semester 2

Up to 5 hours per week

Available for Non-Award Study

Assessment: Assignment, 2 presentations & weekly blog posts

Overview of science communication in the 21st century; Science writing: structuring articles and reports, writing effectively for both specialist and non-specialist audiences; Use of oral presentations and displays to communicate science; Use of emerging online social media in science communication.

## Agribusiness

### AGRIBUS 7031WT

#### Topics in Agricultural Business B

3 units - semester 1 or semester 2

Up to 3 hours per week

Assessment: Written assignments & oral presentations

The course will offer the opportunity to the student to cover a range of topics in Agricultural Business (including wine and food) as it relates to the students study program and the teaching and research interests of staff and visiting academics.

### AGRIBUS 7041WT

#### Topics in Agricultural Business A

3 units - semester 1 or semester 2

Up to 3 hours per week

Assessment: Written assignments, oral presentation

The course will offer the opportunity to the student to cover a range of topics in Agricultural Business (including wine and food) as it relates to the student's study program and the teaching and research interests of staff and visiting academics.

### AGRIBUS 7046WT

#### Problems in Agricultural Business A

3 units - semester 1 or semester 2

Up to 3 hours per week

Assessment: Written assignments, oral presentations

This course will offer the student the opportunity to investigate a problem in the agricultural business area (including wine and food). The problem will relate to the student's study program and the teaching and research interests of staff and visiting academics.

### AGRIBUS 7047WT

#### Problems in Agricultural Business B

3 units - semester 1 or semester 2

Up to 3 hours per week

Assessment: Written assignments & oral presentations

This course will offer the student the opportunity to investigate a problem in the agricultural business area (including wine and food). The problem will relate to the students study program and the teaching and research interests of staff and visiting academics.

### AGRIBUS 7050AWT/BWT

#### Research Project in Agribusiness Part 1 & 2

12 units - full year

By supervision

Assessment: To be staff

### AGRIBUS 7051WT

#### Research Project in Agribusiness F/T

12 units - semester 1 or semester 2

By supervision

Assessment: To be staff

### AGRIBUS 7052WT

#### Agroecosystems and Value Chains

3 units - semester 2

Up to 3 hours per week

Available for Non-Award Study

Assessment: Assignments, Oral Presentation and Exam

Food and agricultural markets are adapting to our planet's rapidly increasing population, incomes and caloric intakes. This course examines the resource and environmental implications resulting from evolving domestic and global food chains and the emerging borderless firms that shape supply systems, impose private quality standards and respond to and influence consumer demands. Students explore the local and global economic and environmental outcomes resulting from diverse forces, including: (i) the environmental sustainability of ongoing food retail and processing sector transformations; (ii) how private quality standards of domestic and global supermarkets impact on water, soil and biodiversity; (iii) how an increasingly carbon constrained world economy impacts food value chains; (iv) the economic implications of national and international environmental policy initiatives, and (v) emerging opportunities for agricultural business to profit from producing and selling environmental services.

### AGRIBUS 7053WT

#### Globalisation & Agriculture in Emerging Economies

3 units - semester 2

Up to 3 hours per week

Available for Non-Award Study

Assessment: Assignments, Oral Presentation and Exam

This course examines the causes and consequences of the rapidly transforming food and agriculture markets in the emerging economies of Asia, Africa and Latin America. Students examine these market transformations from traditional, unorganized markets consisting of small-scale traders with only modest vertical coordination and little transmission of information about quality, health and safety attributes to more organized market channels in which larger-scale buyers coordinate supplies and impose greater quality and food safety standards. Supermarkets are one aspect of this transformation. So too are food processors and exporters, as well as private and public institutions designed to transmit quality and safety preferences of consumers back to the farm level.

### AGRIBUS 7054WT

#### Global Food & Agricultural Policy Analysis

3 units - semester 1

Up to 3 hours per week

Available for Non-Award Study

Assessment: Assignments, Oral Presentation and Exam

Policies affecting agricultural and food businesses are examined using an economic framework and an international perspective. Students develop a solid understanding of the agricultural and food policy environment, the policy formulation process, and the role, rationale and economic consequences of government intervention in food and agricultural markets. They will develop the skills and working knowledge necessary to critically assess current and potential changes to domestic and global agricultural and food policy, trade policy, environmental and natural resource policy, and market regulations. Basic economic theoretical concepts and analytical tools are used to deal with the policy issues being discussed. For example, students will gain experience conducting cost benefit analyses using various policy instruments and programs. Each topic is motivated by a current or emerging issue facing the food and agricultural sectors of the economy.

#### **AGRIBUS 7055WT**

##### **Global Food and Agricultural Markets**

3 units - semester 2

Up to 3 hours per week

Available for Non-Award Study

Assumed Knowledge: Basic understanding of Agriculture & food production &/or business principles

Assessment: Assignments Oral Presentation and Exams

International food and agricultural markets have changed dramatically over the last several decades due to technological change, increased international trade, industry integration, consolidation and regulation, and issues such as increasing disposable incomes, food safety and environmental concerns. The agri-food system has evolved from producing and selling primarily homogeneous agricultural commodities to focusing more on value-adding, differentiation and coordination with other firms in the food chain. In order to remain competitive, some agribusiness firms are developing more of a marketing orientation, focusing increasingly on product development to meet heterogeneous consumer preferences and distinct market segments. The dynamic and increasingly global nature of food systems increases the need for sophisticated skills in market analysis, market planning and marketing management. This course approaches global food and agricultural marketing from a managerial perspective. The unique technical aspects of food and agricultural production, processing, distribution, wholesaling and markets are integrated with business marketing principles and strategy. Students will gain an understanding of the unique and changing structural, institutional, organizational and political aspects of food chains, as well as the fundamental economic theories and concepts necessary for analysis of global food and agricultural markets. Business marketing principles are then applied with strategic marketing extensions, and a focus on the final consumer of food products.

#### **AGRIBUS 7056WT**

##### **Management and Performance of Global Food Chains**

3 units - Offered in 2012

Up to 3 hours per week

Available for Non-Award Study

Assessment: Assignments, Oral presentation and Exam

Agricultural value chains employ half the global labour force, control half of the world's assets and account for some forty percent of consumer purchases. This course explores the management and performance issues surrounding agriculture and food value chains. Students learn the practical, conceptual and academic aspects of value chain assessment and management, including: (i) learning techniques and methods for mapping supply chains and assessing performance; (ii) examining how value chain relationships and information flows impact business outcomes; (iii) investigating

strategic supply chain management concepts; (iv) studying the major trends in value chain management; and (v) understanding industrial organization paradigms and strategic behaviour.

#### **AGRIBUS 7057WT**

##### **Trends & Issues in the World Food System**

3 units - semester 1

Up to 3 hours per week

Available for Non-Award Study

Assessment: Assignments, Tests and Oral Presentation

Constantly evolving market forces and ever changing local, national, regional and international policies influence food and agricultural systems. At the same time, continually evolving socioeconomic trends shape and influence public policies. An important aim of this course is to explore, research, and analyse how key change agents and public policies impact on businesses, firms, households, producers, retailers, traders, consumers and governments. Issues we address include economic development, growth, trade, technology, food safety, nutrition, health, diet, intellectual property rights, environment, finance, supermarkets and risk. This seminar based course motivates students to grapple with the same kinds of decisions and dilemmas policy makers and business leaders confront. Students both absorb information, strategies and concepts and practice teamwork skills to resolve issues and problems.

#### **AGRIBUS 7058WT**

##### **Global Food & Agric Business Research Project**

12 units - semester 1 or semester 2

Up to 4 hours per week

Pre-Requisite(s): 24 units in the MGFAB

Assessment: Literature Review, Project Report, Presentation

Students analyse real-world food or agricultural business problems, issues or strategic opportunities. They have the opportunity to choose between two types of research projects. The first option involves conducting a case study related to and possibly working with an existing business or a proposed business venture. Students apply and utilize the appropriate conceptual and theoretical models and skills to address the relevant issue or opportunity the business is facing. The second research project option involves investigating a current food industry or agribusiness issue through primary data collection (e.g. conducting a survey) or the use of secondary data. This option may require the use of decision-support systems and/or statistical software. Students work with an academic supervisor to identify a research project in an area of interest to both the student and faculty member. The academic supervisor provides guidance and advice on content, methodology, literature, tools, techniques, models and frameworks. Students are expected to meet fortnightly with their supervisor.

#### **AGRIC 7004AWT**

##### **Project F (AW) Part 1**

6 units - semester 1 or semester 2

By supervision

Assessment: To be advised

Projects comprise some or all of laboratory experiments, field trials, case studies, and critical literature reviews, and normally culminate in a seminar and a substantial written report. Topics for projects are chosen in consultation with the Project Supervisor. This course is the first half of a project that is completed over 2 semesters.

## **AGRIC 7004BWT**

### **Project F (AW) Part 2**

12 units - full year

By supervision

Assessment: To be advised

Projects comprise some or all of laboratory experiments, field trials, case studies, and critical literature reviews, and normally culminate in a seminar and a substantial written report. Topics for projects are chosen in consultation with the Project Supervisor. This course is the second half of a project that is completed over 2 semesters.

## **Agriculture**

## **AGRIC 7014WT**

### **Project F (ANR)**

12 units - semester 1 or semester 2

By supervision

Assessment: to be advised

Projects comprise some or all of laboratory experiments, field trials, case studies, and critical literature reviews, and normally culminate in a seminar and a substantial written report. Topics for projects are chosen in consultation with the Project Supervisor.

## **Agronomy**

## **AGRONOMY 7130WT**

### **Viticultural Engineering and Irrigation**

3 units - semester 1

Up to 6 hours per week tical per week

Assumed Knowledge: CHEM ENG 1001, SOIL&WAT 2013RW or equivalent

Incompatible: AGRONOMY 7021WT

Assessment: May include practical reports, trip reports, assignments, individual projects, exam

Note: This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Students will be introduced to concepts and techniques used in the engineering aspects of trellis design, tractor operation and maintenance, oil hydraulic systems and irrigation systems.

## **Biometrics**

## **BIOMET 7000WT**

### **Research Methodology and Experimentation**

3 units - semester 2

5 days during the Mid Year break

Pre-Requisite(s): Completed degree in Agricultural Science or Science

Assumed Knowledge: Biometry or Introductory Statistics

Assessment: Written assignment, final written exam

The Statistical Package GENSTAT 5 for Windows is introduced and utilised extensively throughout the course. Revision of basic regression and analysis of variance methodology. A selection of topics from the following: extension of regression (both linear and non linear); design and analysis of complicated multi-factor experiments; Latin squares; analysis of covariance; generalised linear models (including probit analysis and logistic regression); multiple comparisons.

As part of the course a selection of case studies will be discussed to illustrate the important steps involved during a research program (ie

development of aims, setting of hypotheses, design of the experiment, collection of data, analysis and interpretation of results).

## **Environmental Biology**

## **ENV BIOL 7016**

### **Climate Change: Past, Present and Future**

3 units - semester 2

Up to 2 hours per week

Restriction: Available to MSustain students only

Available for Non-Award Study

Assessment: Tutorial assignments, major assignment.

The Earth has existed for billions of years with a constantly changing climate. The course will study the evolution of the earth system over geological time and the causes and consequences of ancient climate change events. The impact of these changes on the biota has been extraordinary. The role of climate in the production of flora and fauna of our island continent over the last 80 million years, the period during which the Australian biota developed into its current form, and will be examined.

During industrial times, there has been almost a degree Celsius of global warming. This human-caused change in climate is now affecting the lives of millions of people and thousands of species. It is increasingly seen as one of the most urgent challenges facing the global community, with its consequences expected to rapidly worsen during this century. An overview of the impacts, implications and required actions for mitigation will be presented.

## **ENV BIOL 7017**

### **Issues in Sustainable Environments**

3 units - semester 2

Up to 6 hours per week

Assessment: Reports, research proposal, oral presentations, essay

This course is designed to teach students to conceptualise and analyse our natural and built environments as an interconnected system. This means that it is multi-disciplinary in content and will require students to understand the trade-offs between use and conservation of resources. The course will emphasise the biophysical, social and economic dimensions of current and emerging environmental and resource management issues. It comprises a series of seminars by invited speakers from research, government, community and business sectors. Students will be expected to improve their skills in critical thinking and issue analysis, present a logical and succinct opinion piece on an environmental issue and write a scientifically informed article suitable for popular media.

## **ENV BIOL 7018EX**

### **Thinking Critically About Global Warming**

3 units - winter semester

Up to 3 hours per week

Available for Non-Award Study

Assessment: Tutorial assignments, discussion board contribution, magazine-style article research essay

Scientists have developed a vast body of knowledge about the processes, causes and consequences of global warming and the more general issue of climate change through time. In addition, social scientists and economists have modelled its possible impact on the economy and our everyday lives. Yet a strong current of critical discussion persists in our society about whether recent global warming is real, if it is all really as bad as people make out, whether we can or should do something about it. As our window of

opportunity to choose to respond effectively to climate change narrows, the inaction caused by such doubt is increasingly perilous to future generations. In this course, designed for students with no specific science background, a balanced assessment of the scientific answers to a host of commonly-raised questions about the causes, consequences of, and solutions to fixing, global warming. The focus will be on teaching the students to think critically when confronted with apparently strongly contrasting viewpoints and uncertain or conflicting scientific evidence. Each lecture will also include a talk by an expert in the specific area being discussed.

#### **ENV BIOL 7019**

##### **Sustainable Development: Concepts and Applications**

3 units - semester 2

Up to 3 hours per week

Available for Non-Award Study

Assessment: Tutorial presentation and participation, written assignments, major report

Human activities are having a significant impact on natural systems. This course explores the concept of sustainable development and methodologies for its implementation. It includes the main theoretical interpretations of sustainability, and the role of international organisations and national and local governments in its adoption. The influence of limits to growth, factor 4 (10) and natural capitalism in advancing thinking towards sustainability. The role of institutional and governance arrangements, the development of guiding principles, models and tools for integrating sustainability considerations into policy, planning and programs, and monitoring and reporting systems will be explored. Use of futures thinking and consideration of risk and uncertainty in understanding alternative climate futures. Case studies from the public and private sectors will illustrate the development and adoption of different planning, project and reporting processes and their effectiveness in delivering sustainable outcomes.

#### **ENV BIOL 7020**

##### **Research Project: Sustainability**

12 units - summer semester or semester 1 or semester 2

Restriction: Available to MSustain & MSustain(Adv) students only

Pre-Requisite(s): 24 units in the MSustain or MSustain(Adv)

Assessment: Major Research Report

The course will provide students with the opportunity to spend a semester conducting a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on an area of research spanning governance, technology and innovation, social responsibility, science and the environment and/or economic issues relevant to climate change and sustainability.

#### **ENV BIOL 7021**

##### **Research Project; Carbon Management**

12 units - summer semester or semester 1 or semester 2

Restriction: Available to MCarbMan students only

Pre-Requisite(s): 24 units in the MCarbMan

Assessment: Major research report

The course will provide students with the opportunity to spend a semester conducting a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on an area of research spanning the science of climate change, the carbon economy or aspects of carbon management. The academic supervisor provides guidance and advice on content, methodology,

literature, tools, techniques, models and frameworks. Students are expected to meet at least fortnightly with their supervisor.

#### **ENV BIOL 7022**

##### **Monitoring Technologies for Ecological Systems**

3 units - semester 1 or semester 2

Up to 3 hours per week

Pre-Requisite(s): Completed Bachelor of Science or Bachelor of Engineering degree

Assessment: Four written reports

Students will be given a background to existing and emerging environmental sensing and monitoring technologies that are relevant to ecological systems and the scientific basis of the tools. At the end of the course, they will have an awareness of the tools available for environmental monitoring, and have practical experience in the use of a number of these tools, including remote sensing, hydrodynamics, molecular and genomic analysis, wildlife ecology, involving communities and citizens in environmental monitoring and environmental and occupational health.

#### **ENV BIOL 7025A/B**

##### **Industry Research Project Part A & B**

12 units - full year

Restriction: Available to GDEMT & MEMT students only

Pre-Requisite(s): Completion of core courses in the MEMT or the GDEMT. Students must have completed Industry Research Project A or be undertaking it in the same semester

Assessment: Major Research Report

The course will provide students with the opportunity to conduct a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on an area of applied research spanning environmental monitoring technologies.

#### **ENV BIOL 7027**

##### **Designing Environmental Monitoring Programs**

3 units - semester 1

3 hour workshops comprising lectures, tutorials and practicals

Assumed Knowledge: Bachelor of Science or Bachelor of Engineering or equivalent

Assessment: four written reports and group presentation

Students will be given a background to regulatory framework for environmental monitoring, environmental law, the design and analysis of environmental monitoring programs and will become aware of the political and governance issues of environmental monitoring. At the end of the course, they will have a awareness of how to plan, design, interpret and present an environmental monitoring program and have practical experience in the use of a number of tools, including atmospheric monitoring, geostatistics, telemetry, datalogging and the use of video.

#### **ENV BIOL 7300**

##### **EMT: Research Methods**

3 units - summer semester or semester 1 or semester 2

By supervision

Restriction: Master of EMT

Assessment: Literature review and research proposal

The course will enable students to explore research methodologies towards an industry research project under the direction of a University of Adelaide supervisor with a government and/or industry

partner as appropriate. The project will focus on areas of research spanning environmental monitoring technologies

#### **ENV BIOL 7301A/B**

##### **EMT: Industry Project Pt A & B**

12 units - full year

Restriction: Available to MEMT students only

Pre-Requisite(s): ENV BIOL 7300

Assessment: Major research report & presentation

The course will provide students with the opportunity to conduct a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on an area of applied research spanning environmental monitoring technologies.

#### **ENV BIOL 7302**

##### **EMT: Industry Project**

12 units - semester 1 or semester 2

Restriction: Available to MEMT students only

Pre-Requisite(s): ENV BIOL 7300

Assessment: Major Research Report & presentation

The course will provide students with the opportunity to conduct a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on an area of applied research spanning environmental monitoring technologies.

#### **ENV BIOL 7305**

##### **Carbon Management: Research Methods**

3 units - summer semester or semester 1 or semester 2

By supervision

Restriction: Master of Carbon Management

Pre-Requisite(s): Completion of Master of Carbon Management courses to the value of 21 units

Assessment: Literature review and research proposal

The course will enable students to explore research methodologies towards a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on areas of research spanning the science of climate change, the carbon economy or aspects of carbon Management.

#### **ENV BIOL 7306A/B**

##### **Carbon Management: Research Project Pt A & B**

12 units - full year

Restriction: Available to MCarbMan students only

Pre-Requisite(s): ENV BIOL 7305

Assessment: Major Research report & presentation

The course will provide students with the opportunity to spend a semester conducting a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on an area of research spanning the science of climate change, the carbon economy or aspects of carbon Management.

#### **ENV BIOL 7307**

##### **Carbon Management: Research Project**

12 units - semester 1 or semester 2

Restriction: Available to MCarbMan students only

Pre-Requisite(s): ENV BIOL 7305

Assessment: Major Research report & presentation

The course will provide students with the opportunity to spend a semester conducting a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on an area of research spanning the science of climate change, the carbon economy or aspects of carbon Management.

#### **ENV BIOL 7310**

##### **Sustainability: Research Methods**

3 units - summer semester or semester 1 or semester 2

By supervision

Restriction: Available to MSustain & MSustain(Adv) students only

Pre-Requisite(s): Completion of 21 units in MSustain or MSustain(Adv)

Assessment: Literature review and research proposal

The course will enable students to explore research methodologies towards a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on areas of research spanning governance, technology and innovation, social responsibility, science and the environment and/or economic relevant to sustainability.

#### **ENV BIOL 7311A/B**

##### **Sustainability: Research Project Pt A & B**

12 units - full year

Restriction: Available to MSustain & MSustain(Adv) students only

Pre-Requisite(s): ENV BIOL 7310

Assessment: Major Research report & presentation

The course will provide students with the opportunity to spend a semester conducting a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on an area of research spanning governance, technology and innovation, social responsibility, science and the environment and/or economic issues relevant to climate change and sustainability.

#### **ENV BIOL 7312**

##### **Sustainability: Research Project**

12 units - semester 1 or semester 2

Restriction: Available to MSustain & MSustain(Adv) students only

Pre-Requisite(s): ENV BIOL 7310

Assessment: Major Research report & presentation

The course will provide students with the opportunity to spend a semester conducting a research project under the direction of a University of Adelaide supervisor with a government or industry partner where appropriate. The project will focus on an area of research spanning governance, technology and innovation, social responsibility, science and the environment and/or economic issues relevant to climate change and sustainability.

## **Geology**

#### **GEOLOGY 7002**

##### **Mineral Exploration for Project Managers**

3 units - semester 1

4 day workshop

Assessment: Written assignments, take-home exam

This course is designed to provide a general background in mineral exploration techniques and outcomes to project managers. Areas covered by the course include an overview of geological, geophysical and geochemical exploration approaches used in defining target areas. Exploration and resource development of mine sites will be covered. The emphasis will not be on technical and scientific details, but instead on the strengths and weaknesses of different exploration methods, and the sequences of approaches that are used to develop a mine. The course will be taught on the assumption of no background technical knowledge being brought to the class, including any background in chemistry, physics and geology.

## Horticulture

### HORTICUL 7000WT

#### Production Horticulture

3 units - Even years only

Up to 6 hours per week

Assessment: Exam, assignments

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The course examines production of commercial fruit, vegetable and nut crops including limits to production and characteristics for cultivars, management and irrigation, harvesting and marketing. Crops considered include citrus, apple and pears, grape vines, soft vines (berries), stone fruits, almond, walnut, macadamia, pistachio, and the tropical fruit, pineapple, banana, mango, and avocado. Vegetables include tomato, potato, brassicas, cucurbits, lettuce and the onion group.

### HORTICUL 7001WT

#### Horticulture Systems

3 units - semester 1

Up to 6 hours per week

Assessment: Mid-semester exam, final exam, assignments

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The importance of horticulture to the community, sustainability and economic value, horticultural production areas and environmental factors involved. Fruit crop growth and its control using cultural and chemical methods. Horticultural propagation methods. The basis of production systems which include horticulture, and systems which combine different types of horticulture. Plant improvement and breeding. The significance of pollination to horticulture.

### HORTICUL 7052WT

#### Olive Production and Marketing

3 units - winter semester

Up to 20 hours per week in the Mid Year break

Assessment: Exams, practical and tour reports, major assignments, group oral presentations

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course examines production aspects of olive oil and pickling fruit. Characteristic requirements regarding cultivar selection, climate, soils and location; growing practices plus management of irrigation, pest and diseases; development budget financial planning; harvesting and oil quality assessment; marketing of olives including market evaluation, market plan development in product, pricing, distribution and marketplace decisions. Students are

required to participate in field visits to growing/marketing enterprises as arranged.

## Oenology

### OENOLOGY 7000EX

#### Introductory Grape and Wine Knowledge

3 units - semester 1

External, 5 day Residential School in Mid Semester Break

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Assessment: Semester written exams, practical tests

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Grapevine morphology, growth and development; grape berry development; changes in grape berry composition during ripening; physiology of smell and taste; basic winemaking principles. Practical exercises sessions designed to train student's palate in wine sensory evaluation and to differentiate between Australian wine types and styles.

### OENOLOGY 7000NW

#### Introductory Grape and Wine Knowledge

3 units - semester 1

Up to 3 hours per week, plus 5 day residential school in Mid Semester break

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Assessment: Semester written exams, practical tests

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Grapevine morphology, growth and development; grape berry development; changes in grape berry composition during ripening; physiology of smell and taste; basic winemaking principles. Practical exercises sessions designed to train student's palate in wine sensory evaluation and to differentiate between Australian wine types and styles.

### OENOLOGY 7002EX

#### Vineyard and Winery Operations A

3 units - semester 2

External, 5 day Residential School in Mid Semester Break

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Pre-Requisite(s): OENOLOGY 7000NW or OENOLOGY 7000EX

Assessment: Semester written exams, practical tests

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Climatic requirements for grapevines; vineyard design, establishment and operations including pruning, irrigation, canopy management, soil management and pest and disease management; characteristics of major white wine grape varieties; principles and practices of white and sparkling wine production; major white wine styles of the world; oak in winemaking.

Practical sessions relate to lecture topics and include viticulture exercises and wine sensory evaluation.

### OENOLOGY 7002NW

#### Vineyard and Winery Operations A

3 units - semester 2

Up to 2 hours per week, plus 5 day residential school in Mid Semester break

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Pre-Requisite(s): OENOLOGY 7000NW or OENOLOGY 7000EX

Assessment: Semester written exams, practical tests

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Climatic requirements for grapevines; vineyard design, establishment and operations including pruning, irrigation, canopy management, soil management and pest and disease management; characteristics of major white wine grape varieties; principles and practices of white and sparkling wine production; major white wine styles of the world; oak in winemaking.

Practical sessions relate to lecture topics and include viticulture exercises and wine sensory evaluation.

### **OENOLOGY 7002WT**

#### **Vineyard and Winery Operations A**

3 units - semester 2

Up to 2 hours per week, plus 5 day residential school in Mid Semester break

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Pre-Requisite(s): OENOLOGY 7000NW or OENOLOGY 7000EX

Assessment: Semester written exams, practical tests

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Climatic requirements for grapevines; vineyard design, establishment and operations including pruning, irrigation, canopy management, soil management and pest and disease management; characteristics of major white wine grape varieties; principles and practices of white and sparkling wine production; major white wine styles of the world; oak in winemaking.

Practical sessions relate to lecture topics and include viticulture exercises and wine sensory evaluation.

### **OENOLOGY 7003EX**

#### **Vineyard and Winery Operations B**

3 units - semester 1

External, 5 day Residential School in Mid Semester Break

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Pre-Requisite(s): OENOLOGY 7000NW or OENOLOGY 7000EX

Assessment: Semester written exams, practical tests & reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Characteristics of major red wine grape varieties; principles and practices of red wine production; major red wine styles of the world; techniques for grapevine improvement and biotechnology, as applied to the wine industry; wine packaging, bottling operations and quality standards; sensory science. Practical sessions relate to lecture topics and will include tasting sessions.

### **OENOLOGY 7003NW**

#### **Vineyard and Winery Operations B**

3 units - semester 1

Up to 2 hours per week, plus 5 day residential school in Mid Semester break

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Pre-Requisite(s): OENOLOGY 7000NW or OENOLOGY 7000EX

Assessment: Semester written exams, practical tests & reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Characteristics of major red wine grape varieties; principles and practices of red wine production; major red wine styles of the world; techniques for grapevine improvement and biotechnology, as applied to the wine industry; wine packaging, bottling operations and quality standards; sensory science. Practical sessions relate to lecture topics and will include tasting sessions.

### **OENOLOGY 7003WT**

#### **Vineyard and Winery Operations B**

3 units - semester 1

Up to 2 hours per week, plus 5 day residential school in Mid Semester break

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Pre-Requisite(s): OENOLOGY 7000NW or OENOLOGY 7000EX

Assessment: Semester written exams, practical tests & reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Characteristics of major red wine grape varieties; principles and practices of red wine production; major red wine styles of the world; techniques for grapevine improvement and biotechnology, as applied to the wine industry; wine packaging, bottling operations and quality standards; sensory science. Practical sessions relate to lecture topics and will include tasting sessions.

### **OENOLOGY 7004WT**

#### **Wine Packaging and Quality Management**

3 units - semester 2

Up to 6 hours per week

Pre-Requisite(s): OENOLOGY 7010WT & OENOLOGY 7047WT

Assessment: Practicals, reports, written assignments & exams

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Science and technology of bottling and packaging systems including chemical and physical properties of packaging materials, principles of filling machinery, design and process control of wine filling/packaging systems.

Wine and food laws and commercial forces as quality standards. Taints and residues in grapes and wine as quality issues. Approaches and systems of quality management using the wine industry as a focus, including the development of corporate quality cultures, standards and specifications. Visits will be made to commercial plants.

### **OENOLOGY 7010WT**

#### **Stabilisation and Clarification**

3 units - semester 1

Up to 6 hours per week

Pre-Requisite(s): OENOLOGY 7028WT

Assessment: Practicals, reports, written assignments, exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Principles and practices of wine clarification and stabilisation. Protein, tartrate, metal, colour oxidative, and microbiological stability

and stability testing of wine. Wine clarification by means of settling, centrifugation, filtration and fining.

### **OENOLOGY 7019WT**

#### **Sensory Studies**

3 units - semester 2

Up to 6 hours per week

Assessment: Practical report, tasting tests, group oral presentation, written exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course provides a scientifically based introduction to sensory evaluation and its relationship to the winemaking process, and promotes the development of technically accurate wine assessment skills. The physiology of taste receptors, olfaction and the structure of oral mucosa are examined. Recent advances in knowledge, including the function of signal transduction molecules and protein structure are used to explain current models of flavour, astringency and taste perception. Basic flavour chemistry of grapes and wine is introduced. An introduction to sensory measurement theory, psychophysics, aroma and taste interactions, threshold measurement, and the psychological and physiological factors affecting perception is presented. The concept of adaptation and its application to the sensory evaluation of wines, and elements of good sensory practice including data collection and statistical analysis are described. The practical program will be used to develop basic skills in sensory assessment of wines leading to the interpretation of wine characteristics in terms of wine style and quality. This is achieved by a progressive development of sensory skills, using model solutions to depict basic tastes and their interaction, followed by a detailed examination of white and red table, fortified and sparkling wines.

### **OENOLOGY 7022WT**

#### **Cellar and Winery Waste Management**

3 units - semester 1

Up to 6 hours per week

Pre-Requisite(s): OENOLOGY 7028WT

Co-Requisite(s): OENOLOGY 7047WT

Assessment: Final exam, practical reports & tutorial papers

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Vintage planning; occupational health and safety, winery record keeping; microbial control, cellar hygiene; winery waste management, environmental Management.

### **OENOLOGY 7028WT**

#### **Introductory Winemaking**

3 units - semester 2

Up to 7 hours per week

Assessment: Practical reports, written assignments, written exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Introduction to the Australian wine industry. Chemistry and unit processes of winemaking. Production of table wines, including dry floral fruity white, full bodied white, sweet white, rose, medium and full bodied red wines. Introduction to wine stabilisation and maturation processes.

### **OENOLOGY 7038WT**

#### **Distillation, Fortified and Sparkling Winemaking**

3 units - semester 2

Up to 10 hours per week

Pre-Requisite(s): OENOLOGY 7028WT, OENOLOGY 7019WT & OENOLOGY 7022WT

Assessment: Practical reports, assignments, written exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Distillation principles and wine distillation practices. Production of Australian and overseas grape spirits for fortified wine and brandy production. Production of potable distilled beverages other than brandy. Legal requirements of fortified wine production and distillation. Production of Australian and overseas sparkling wine styles. Sensory evaluation of spirits, fortified and sparkling wines.

### **OENOLOGY 7046WT**

#### **Fermentation Technology**

3 units - semester 2

Up to 10 hours per week

Restriction: Available to GradCertOenology, GradDipOenology & MOenology students only

Co-Requisite(s): OENOLOGY 7028WT & OENOLOGY 7019WT

Assessment: Exam, written work, practical reports, group oral presentations

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This practical course provides students with the opportunity to gain hands on winemaking experience that expands on areas of fermentation technology and preparation of wine for bottling post vintage. The course introduces students to the planning and managing of winemaking strategies, and importantly complements the theory covered in the other wine technology courses for table wine production. Another objective of this course is to help students make a considerable progression in the development of their wine sensory evaluation skills

### **OENOLOGY 7047WT**

#### **Winemaking at Vintage**

3 units - semester 1

Up to 7 hours per week

Restriction: Available to GradCertOenology, GradDipOenology, Moenology, GradDipViticult & MViticult students only

Pre-Requisite(s): OENOLOGY 7028WT & OENOLOGY 7019WT

Co-Requisite(s): OENOLOGY 7022WT

Assessment: To be advised

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This practical course provides students with the opportunity to gain hands on winemaking experience over the vintage period. The course introduces students to the planning and managing of winemaking strategies. It covers all aspects of grape processing, white juice preparation and red wine fermentation and is designed to complement the theory covered in the other wine technology courses for table wine production. This course also aims to help students make a considerable progression in the developments of their wine sensory evaluation skills.

## **OENOLOGY 7048WT**

### **Advances in Oenology**

3 units - semester 2

Up to 8 hours per week

Assumed Knowledge: OENOLOGY 7028WT

Assessment: Written exam, reports on practical exercises, industry visits

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Current research and practices in oenology. Particular emphasis will be placed on grape and wine phenolics and flavour compounds; methods of analysis in wine science; yeast biochemistry including nutrition, sugar transport, nitrogen and organic acid metabolism, ethanol toxicity, sulphur dioxide production and tolerance, yeast aroma compounds; the malolactic fermentation - biochemical and molecular approaches. Wine industry visits will focus on modern practices and recent developments to increase production efficiencies and wine quality

## **OENOLOGY 7500WT**

### **Industry Experience (Oenology) PG**

3 units - semester 1 or semester 2

Up to 40 hours per week in full time employment for 10 weeks

Restriction: Available to MOenology students only

Pre-Requisite(s): OENOLOGY 7047WT & OENOLOGY 7022WT

Assessment: Written diary, written report, oral presentation

This course is largely practically orientated, based on work experience at a commercial winery during vintage. A specified level of proficiency in the following operations is expected: grape receipt and weighbridge; crushing; draining and pressing; fermentation and post-fermentation operations and quality control procedures. Furthermore, an understanding of the contribution of each of the specified unit operations to the overall winemaking process is required. Students can undertake this course in either semester.

## **Physics**

## **PHYSICS 7002**

### **Advanced Astrophysics**

3 units - semester 2

Available for Non-Award Study

A survey of the Universe at all scales and wave lengths/energies. Studies of the interstellar medium and magnetic fields. Cosmic ray acceleration and propagation; pulsars, gamma-ray astrophysics; radio and x-ray astronomy.

## **PHYSICS 7003**

### **Advanced Atmospheric and Environmental Physics**

3 units - semester 2

Available for Non-Award Study

A review of radiation and fluid dynamics including the role of waves in planetary atmospheres and ionospheres.

## **PHYSICS 7004**

### **Advanced Electromagnetism**

3 units - semester 1 or semester 2

Available for Non-Award Study

Boundary value problems, with applications to electrostatics and magnetostatics, time varying fields, and radiating systems.

## **PHYSICS 7007**

### **Fourier Techniques & Applications**

3 units - semester 1

Up to 2 hours per week

Assessment: Examination, assignments

An introduction to statistical and Fourier techniques, with applications to experimental design and data analysis.

## **PHYSICS 7008**

### **Gauge Theory**

3 units - semester 2

Available for Non-Award Study

An introduction to quantised non-Abelian gauge theories, including Feynman diagrams, weak models, and quantum chromodynamics.

## **PHYSICS 7009**

### **General Relativity**

3 units - semester 2

Available for Non-Award Study

An outline of differential geometry with applications to General Relativity, including the Schwarzschild solutions, weak fields and gravitational waves.

## **PHYSICS 7010**

### **Non-Linear Optics**

3 units - semester 1

Available for Non-Award Study

A review of laser physics and an introduction to non-linear optical phenomena with applications.

## **PHYSICS 7011**

### **Nuclear and Radiation Physics**

3 units - semester 1

Available for Non-Award Study

Production, transmission and measurement of ionising radiation, with medical and environmental applications, taught from experimental viewpoint.

## **PHYSICS 7013**

### **Quantum Field Theory**

3 units - semester 1

Available for Non-Award Study

Photons and the electromagnetic field, Lagrangian field theory and Klein-Gordon field, the Dirac field and photons: co-variant theory, the S-matrix expansion, Feynman diagrams and rules in QED; QED processes in lowest order, radiative corrections.

## **PHYSICS 7014**

### **Relativistic Quantum Mechanics & Particle Physics**

3 units - semester 1

Available for Non-Award Study

Relativistic wave equations, including Dirac equations, spinors, and introduction to field quantisation.

### **PHYSICS 7016**

#### **Research Project (M.Sc. Physics)**

12 units - semester 1 or semester 2

Supervised research project, usually in the same area as the advanced topic selected for PHYSICS 7017 Advanced Topic in Physics.

### **PHYSICS 7017**

#### **Advanced Topic in Physics**

6 units - semester 1 or semester 2

Supervised reading: a review of contemporary developments and research in applied physics, astrophysics, atmospheric physics, optics and lasers or theoretical physics.

### **PHYSICS 7024**

#### **Topics in Mathematical Physics A**

3 units - semester 1 or semester 2

Supervised reading: a review of contemporary developments and research in mathematical physics.

### **PHYSICS 7025**

#### **Topics in Mathematical Physics B**

3 units - semester 1 or semester 2

Supervised reading: a review of contemporary developments and research in mathematical physics.

### **PHYSICS 7028**

#### **Experimental Physics**

3 units - semester 2

Up to 8 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 2510 & PHYSICS 2520

Incompatible: PHYSICS 3002

Assessment: Laboratory work, formal report on selected experiment, open & closed book tests

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Laboratory experiments in selected areas including atomic and nuclear physics, optics and electromagnetism, plus a practical analogue electronics course.

### **PHYSICS 7032**

#### **Advanced Dynamics and Relativity**

3 units - semester 1

Up to 4 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 2532, PHYSICS 2534, MATHS 2101 or MATHS 2201, MATHS 2102 or MATHS 2202

Incompatible: PHYSICS 3006

Assessment: Assignment, written exam

This course will give students a working knowledge of analytical mechanics and relativity to the standard required for further study in physics.

Mechanics: Lagrangian mechanics, variational techniques, conservation laws, Noether's theorem, small oscillations, Hamiltonian mechanics, Poisson brackets. Relativity: space-time vectors and tensors, relativistic mechanics, electrodynamics, field-strength tensor, Lienard-Wiechert potentials.

### **PHYSICS 7035**

#### **Statistical Mechanics**

2 units - semester 1

Up to 2.5 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 1100 & PHYSICS 1200, APP MTH 2000 & APP MTH 2002

Assumed Knowledge: PHYSICS 2100 or PHYSICS 2004 & PHYSICS 2200

Incompatible: PHYSICS 3009

Assessment: Exam, assignments

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course introduces concepts essential for the understanding of both classical and quantum statistical mechanics. Topics covered include the classical laws of thermodynamics and their application, postulates of statistical mechanics, statistical interpretation of thermodynamics, microcanonical, canonical and grand canonical ensembles. The methods of statistical mechanics are then used to develop the statistics for Bose-Einstein, Fermi-Dirac and photon gases. Selected topics from low temperature physics and electrical and thermal properties of matter will be discussed.

### **PHYSICS 7042**

#### **Electromagnetism**

2 units - semester 1

Up to 2.5 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 2100 & PHYSICS 2200 or PHYSICS 2211 & PHYSICS 2004, APP MATHS 2000 & APP MATH 2002

Assumed Knowledge: PHYSICS 2002

Incompatible: PHYSICS 3001, PHYSICS 3018, PHYSICS 3019, PHYSICS 7027 & PHYSICS 7044

Assessment: Exam, continuous assessment of tutorial work

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

"Electrostatics and potential, magnetostatics and vector potential, Maxwell's equation, electromagnetic boundary conditions, electromagnetic wave equation, waveguides, energy in electromagnetism, Poynting's theorem.

Interaction of electromagnetic waves with media, Lorentz electron oscillator, reflection and refraction at interfaces."

### **PHYSICS 7100**

#### **Diploma Project (Physics)**

6 units - semester 1 or semester 2

Assessment: Report & seminar

Supervised research project in physics.

### **PHYSICS 7104**

#### **Electronics for Data Acquisition**

3 units - semester 1

Up to 3 hours per week

Available for Non-Award Study

A quota of 10 applies

Assessment: Practical work, Practical exam

This course provides an introduction to analogue and digital electronics used for signal conditioning, data acquisition and

experiment control in experimental and applied physics. It includes applications of operational amplifiers, comparators, digital gates and flip-flops, astable and monostable multivibrators, digital to analog converters, analog to digital converters, and PIC (peripheral interface controller) chips.

### **PHYSICS 7209**

#### **Photonics P**

3 units - semester 2

Up to 5.5 hours per week

Pre-Requisite(s): PHYSICS 2100, PHYSICS 2200, PHYSICS 2009

Assumed Knowledge: PHYSICS 3018

Incompatible: PHYSICS 7043

Assessment: Exam, marked assignments, laboratory work, formal report

Interaction of light with matter, time dependent perturbation theory, stimulated and spontaneous emission and absorption, stability of resonators, mode matching, advanced laser resonators, macroscopic description of the gain medium, rate equations, gain saturation and broadening, hole burning, MOPA's, CW lasers, frequency stabilisation, pulsed lasers, gain switching, Q-switching, injection-seeding, mode-locked lasers. Review of common lasers, optical fibres, microstructured optical fibres, fibre Bragg gratings, fibre sensors, optical materials, photonic crystals. Practical work in laser modulation, laser stabilisation, optical fibres, characteristics of semi conductors.

### **PHYSICS 7532**

#### **Atmospheric and Astrophysics**

3 units - semester 1

Up to 4 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 2510, PHYSICS 2534, MATHS 2101 or MATHS 2201, MATHS 2102 or MATHS 2202

Incompatible: PHYSICS 3013, PHYSICS 3014, PHYSICS 3532

Assessment: Examination, Assignments, Tutorials

This course will provide students with a knowledge of modern techniques, theory, and observational results relating to energetic processes in astrophysics and cosmology, and introduce the physics of planetary atmospheres with special emphasis on the atmosphere of the Earth. It also will provide students with knowledge of the physical processes that govern weather and climate.

Content will include:

Introduction to planetary atmospheres and the solar system. Radiative transfer in the sun-earth system. Thermodynamics of the atmosphere, including cloud physics, atmospheric motions and circulation. Introduction to the roles of aerosols and minor atmospheric constituents such as water vapour, carbon dioxide and ozone. The impact of anthropogenic processes. An introduction to relevant astrophysics terminology. Binary stars and accretion processes. The structure and evolution of the Milky Way and other galaxies. Active galaxies and unified models. Aspects of special and general relativity relevant to astrophysics. Cosmology, observations and theory.

### **PHYSICS 7534**

#### **Computational Physics**

3 units - semester 2

Up to 4 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 2532, PHYSICS 2534, MATHS 2101 or MATHS 2201, MATHS 2102 or MATHS 2202

Incompatible: PHYSICS 3000, PHYSICS 3534

Assessment: Written examination, project, tests

This is a hands-on course which provides an introduction to computational methods in solving problems in physics. It teaches programming tactics, numerical methods and their implementation, together with methods of linear algebra. These computational methods are applied to problems in physics, including the modelling of classical physical systems to quantum systems, as well as to data analysis such as linear and nonlinear fits to data sets. Applications of high performance computing are included where possible, such as an introduction to parallel computing and also to visualization techniques.

### **PHYSICS 7536**

#### **Electromagnetism**

3 units - semester 1

Up to 3 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 2510, MATHS 2101 or MATHS 2201, MATHS 2102 or MATHS 2202

Assumed Knowledge: PHYSICS 2532, PHYSICS 2534

Incompatible: PHYSICS 3004, PHYSICS 3542

Assessment: Tests, assignments, written exam

This course develops concepts in electric field and scalar potential, magnetic field and vector potential, Maxwell's

equations, electromagnetic boundary conditions, electromagnetic wave equation, waveguides, energy in

electromagnetism. Electromagnetic wave propagation in vacuum, conducting and dielectric media, and at interfaces.

### **PHYSICS 7540**

#### **Optics and Photonics**

3 units - semester 2

Up to 4 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 2520, PHYSICS 3542, MATHS 2101 or MATHS 2201, MATHS 2102 or MATHS 2202

Incompatible: PHYSICS 3020, PHYSICS 3230, PHYSICS 3001, PHYSICS 3540

Assessment: Tests, practical work, written exam

This course provides students with a working knowledge of optical physics, including diffraction and physical optics, atomic physics and optical spectroscopy, laser physics and photonics. It also provides a basis for further study in optics and photonics.

Content will include:

Optical fibres, microstructured optical fibres, fibre Bragg gratings, fibre sensors, optical materials, photonic crystals.

Lorentz electron oscillator and dispersion, Fresnel equations and multi-layer dielectric coatings, polarisation and birefringence. Fresnel-Kirchhoff integral and diffraction, Fourier optics, Abbe's theory of imaging, image processing.

Lasers; Einstein equations, stimulated and spontaneous emission and absorption, optical amplification, resonators and modes, rate equations, pulsed and continuous lasers, mode-locked lasers.

## **PHYSICS 7542**

### **Quantum Mechanics A**

3 units - semester 1

Up to 3 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 2510, MATHS 2101 or MATHS 2201, MATHS 2102 or MATHS 2202

Assumed Knowledge: PHYSICS 2532, PHYSICS 2534

Incompatible: PHYSICS 3004, PHYSICS 3542

Assessment: Tests, assignments, written exam

This course develops concepts in quantum mechanics such that the behaviour of the physical universe can be understood from a fundamental point of view. It provides a basis for further study of quantum mechanics.

Content will include: Review of the Schrodinger equation, operators, eigenfunctions, compatible observables, infinite

well in one and three dimensions, degeneracy; Fourier methods and momentum space; Hermiticity; scalar products of wave functions, completeness relations, matrix mechanics; harmonic oscillator in one and three dimensions; sudden approximation; central potentials, quantisation of angular momentum, separation of radial and angular variables, spherical harmonics, hydrogen atom, spin.

## **PHYSICS 7544**

### **Quantum Mechanics B**

3 units - semester 2

Up to 4 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 3542 or PHYSICS 7542, MATHS 2101 or MATHS 2201, MATHS 2102 or MATHS 2202

Assumed Knowledge: PHYSICS 2532

Incompatible: PHYSICS 3022

Assessment: Written examination, tests

This course will introduce Dirac's bra-ket formulation of quantum mechanics and make students familiar with various approximation methods applied to atomic, nuclear and solid-state physics, and to scattering.

Content will include:

Dirac's formulation of quantum mechanics: kets and bras, quantum oscillator, angular momentum, measurement, Bell's inequality, generalised Uncertainty Principle, connection with wave and matrix mechanics. Time-independent and time-dependent perturbation theory, Schrödinger, Heisenberg and Interaction pictures, radiative transitions. Identical particles, atoms, exchange forces, periodic systems, energy bands in solids. Symmetries, translations in space and time, parity and time reversal, rotations and angular momentum, addition of angular momenta, fine structure of Hydrogen, L-S and j-j coupling in atoms and nuclei. Hartree-Fock and Thomas-Fermi approximations, variational and WKB methods. Scattering: Born approximation, S-matrix, partial waves.

## **PHYSICS 7546**

### **Statistical Mechanics**

3 units - semester 1

Up to 3 hours per week

Available for Non-Award Study

Pre-Requisite(s): PHYSICS 2510, MATHS 2101 or MATHS 2201, MATHS 2102 or MATHS 2202

Assumed Knowledge: PHYSICS 2532, PHYSICS 2534

Incompatible: PHYSICS 3004, PHYSICS 3542

Assessment: tests, assignments, written exam

This course develops concepts in classical laws of thermodynamics and their application, postulates of statistical mechanics, statistical interpretation of thermodynamics, microcanonical, canonical and grand canonical ensembles; the methods of statistical mechanics are used to develop the statistics for Bose-Einstein, Fermi-Dirac and photon gases; selected topics from low temperature physics and electrical and thermal properties of matter are discussed.

## **PHYSICS 7550**

### **Radiation Biology, Protection & Epidemiology**

3 units - semester 2

Up to 2 hours per week

Assumed Knowledge: PHYSICS 7011

Assessment: assignment, exam

The aim of this on-line course is to provide an understanding of the effects of radiation in vivo, operational health physics, radiation protection and epidemiological methods appropriate for practice as a medical or health physicist. The reading-tutorial course consists of 25 topics covering various aspects of Radiation Biology, Protection and Epidemiology. Lecture notes are available on the internet. Topics include: radiation protection quantities, risk and exposure, radiation chemistry, biological effects of radiation on cells and tissues, dose fractionation, Linear Energy Transfer, Relative Biological Effectiveness, clinical radiobiology, sources of radiation, Radon-222 and its daughters, medical exposure, man-made & industrial sources of radiation, survivors of radiation exposure, health effects of low levels of ionising radiation, early and late effects from high doses of radiation, shielding calculations in medical equipment installations, radiation safety in the laboratory and clinical environment, personnel protection and monitoring, radiation protection legislation, genetic effects and risks, introduction to epidemiology, association vs causation, non-ionising radiation risks and radiation epidemiology.

## **Plant Science**

### **PLANT SC 7004WT**

#### **Mineral Nutrition of Plants**

3 units - semester 2

Up to 6 hours per week

Pre-Requisite(s): PLANT SC 2001WT, ENV BIOL 2003, APP ECOL 1003RW or equivalent

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

An advanced course, which takes its brief from the acute deficiency in minerals of most South Australian soils, and the pre-eminent role of nutrition in successful agricultural production in this State. Topics are discussed in a context of both agricultural and horticultural industries, and include factors affecting nutrient acquisition by roots, diagnosis and correction of macro and micronutrient problems, fertiliser strategies, nutritional effects on produce quality, including nutritional quality, nutrition and disease resistance and genetic control of adaptation to nutrient limitations in soils.

### **PLANT SC 7013WT**

#### **Plant Molecular Biology**

6 units - semester 2

Up to 8 hours per week

Assumed Knowledge: BIOCHEM 2105, ANIML SC 2029WT, BIOCHEM 2000A/B or equivalent

Assessment: Practicals, tutorial projects, research plant & review, final exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course provides a current review of our knowledge in plant development, environmental responses and plant-microbe interactions. There is an emphasis on the molecular mechanisms directing plant gene expression under diverse environmental and developmental stimuli. This knowledge is central to our ability to modify plant responses and properties for commercial gains in biotechnology and agriculture. Areas covered in the course include: plant genes and genomes; mechanisms that control plant gene expression; molecular-genetic analysis of important characteristics; signal transduction; molecular biology of plant development, reproduction, and responses to disease and other environmental factors. In the laboratory classes, students will perform some of the techniques currently used to generate plant molecular biology information and undertake a research project related to current research in plant molecular biology and biotechnology.

### **PLANT SC 7020WT**

#### **Strategies and Practices for Pest Mgmt & Eradication**

3 units - winter semester

Up to 20 hours per week for 3 weeks

Restriction: Available to GradCertPHB, GradDipPHB, MHB students only

Assumed Knowledge: PLANT SC 7201WT

Assessment: final exam, tutorials, assignments & reports

This course considers some key factors in the development and implementation of practices for pest management and eradication. It considers pest identification, sampling and surveillance, decision-making, pesticide chemistry and application, and the design and evaluation of integrated pest management programs, including pest eradication.

### **PLANT SC 7021AEX/BEX**

#### **Integrated Weed Management Part 1 & 2**

3 units - full year

Online, plus 2 day Residential School in Mid Semester break

Co-Requisite(s): Students must enrol in APP ECOL 3022BEX Integrated Weed Management Part 2

Assumed Knowledge: At least 1 Level II Plant Biology course

Assessment: Part of PLANT SC 7141AEX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The impact of weeds on agricultural and natural ecosystems. Important characteristics of weed biology. Ecology of weeds. Methods of sampling and monitoring weed infestations. Biological, cultural and chemical methods for weed management. Integrating management techniques for weeds in a range of ecosystems, including: cropping enterprises, perennial pastures, national parks and recreation areas and horticultural systems.

### **PLANT SC 7022EX**

#### **Invasion Biology: Foundations of Biosecurity**

3 units - semester 2

External

Available for Non-Award Study

Assessment: Major project, Practical reports, online quizzes

An understanding of invasion biology provides a foundation for the principles and practices of biosecurity. This course will consider

case studies of insects, plant diseases and weeds that have invaded ecosystems. This will lead to a consideration of the ecological theory that applies to biological invasions, including colonisation and propagule pressure, population growth, predator-prey and pathogen host interactions, Allee effects and population viability, the factors that affect the spread of invasive species, and the genetics and evolution of founding populations. The biological and ecological factors that influence the impact of invasive species will be evaluated.

### **PLANT SC 7023EX**

#### **Biosecurity Plant Pests: Weeds**

3 units - semester 1

External

Available for Non-Award Study

Assessment: Major project, two essays, online quizzes

This course will consider: Weed ecology, and the invasion biology of plant species. The biology, ecology of weeds, including "sleeping weeds". Weed surveillance strategies. Weed identification. Weed eradication and containment. Successful and unsuccessful weed eradication programs. Weed management principles and weed control strategies in relation to eradication and containment of invasive weeds. The course will be delivered in external mode.

### **PLANT SC 7120WT**

#### **Molecular Diagnostic Methods in Plant Health**

3 units - semester 2

Up to 20 hours per week for 3 weeks

Restriction: Available to GradCertPHB, GradDipPHB, MHB students only

Assumed Knowledge: PLANT SC 7220WT

Assessment: Final exam, practical & site visit protocols, project reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Molecular and biochemical diagnostic methods target unique components of plant pathogens. These methods are now critical for the accurate identification of all disease agents. They have the advantages of sensitivity, reliability, efficiency and speed. They currently complement classical diagnostic methods but in some cases are the only practical way to identify pathogens. They utilise the principles of molecular biology and therefore new techniques are constantly evolving. This course will explain the principles of the use of immunology and pathogen genome nucleotide sequence information in plant pathogen diagnosis. Practical work in immunology will include a range of antibody-based diagnostic tests, and students will be encouraged to compare various methods for relevance to a number of problems. Practical work in nucleic acid based methods will include hybridisation, PCR, sequence comparisons, again with an evaluation of the appropriateness of specific techniques for addressing specific problems in pathogen diagnosis.

### **PLANT SC 7121WT**

#### **Biosecurity and Incursion Management**

3 units - semester 2

Up to 7 hours per week

Restriction: Available to GradCertPHB, GradDipPHB, MHB students only

Assumed Knowledge: PLANT SC 7220WT

Assessment: Final exam, tutorials, assignments, reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Natural and agricultural ecosystems are under siege by many harmful species of plants, animals and diseases. This course deals with emergency plant pests and biosecurity issues related to the biological characteristics of invasive species, dis-infection and hygiene in trade, surveillance and detection of exotic organisms, quarantine, risk assessment and risk management, and the containment and eradication of exotic organisms. The students will examine case studies, where invasions threaten biological diversity by causing population declines of native species and agricultural production systems. Particular emphasis is on the fact that the problem is a global one and that the exotic species problem is neither trivial nor transitory. Students will learn how to employ and integrate new methods from a large management tool box: eradication, containment, biocontrol, monitoring, and, most importantly, prevention. Strong emphasis is on mathematical approaches to risk management, decision-making tools and normative and specialised risk analysis. The course will review and discuss existing and emerging legislation and regulatory controls, the role of national and international agencies and the function of networks in extension disaster education.

#### **PLANT SC 7122WT**

##### **Management and Regulation in Plant Health**

3 units - semester 2

Up to 9 hours per week for 3 weeks

Restriction: Available to GradCertPHB, GradDipPHB, MHB students only

Assumed Knowledge: PLANT SC 7220WT

Assessment: Major project, tutorials, reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course will consider the legislative and regulatory frameworks that influence plant health in Australia and internationally. This will include Australia's obligations under international treaties and protocols as well as national regulations such as the weed risk assessment process. Students will consider issues surrounding market access for plant products, including the management of quarantine. The course will also cover risk management for genetically modified crops including protocols used in Australia and other countries. Students will conduct a major project focussed on a current problem of their choice in quarantine, market access or risk management of genetically modified organisms.

#### **PLANT SC 7123WT**

##### **Applications of Plant Biotechnology in Production**

3 units - semester 2

Up to 8 hours per week for 6 weeks

Restriction: Available to GradCertBiotech, GradDipBiotech & MBiotech students only

Assumed Knowledge: PLANT SC 7225WT & PLANT SC 7226WT

Assessment: Reports, assignments

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

In addition to the currently commercial applications of plant biotechnology, such as insecticide synthesis and herbicide resistance, there is a large number of other potential applications of plant biotechnology to enhance plant productivity and quality. In this course, a range of potential applications will be investigated, and the implications of the deployment of this powerful technology discussed. The effects of biotechnology on reducing inputs and increasing or altering outputs will be covered. Yield increase and

yield maintenance will be compared, and the influence of biotechnology on quality traits will be studied. Students will look at alterations in disease resistance, abiotic stress tolerance, crops for biofuels, and crops as future factories.

#### **PLANT SC 7124WT**

##### **Applics of Plant Biotech in Health & Nutrition**

3 units - semester 2

Up to 12 hours per week for 3 weeks

Restriction: Available to GradCertBiotech, GradDipBiotech & MBiotech students only

Assumed Knowledge: PLANT SC 7225WT & PLANT SC 7226WT

Assessment: Reports, assignments

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Plant biotechnology has an extraordinary capacity to increase the quality of food, both by enabling the exploitation of existing variation more efficiently, and by generating novel variation beyond that available in extant gene pools. The most famous example of this is 'Golden Rice', where enhanced synthesis of beta-carotene in rice endosperm increased the nutritional value of milled rice. In this course, the range of these potential applications will be investigated, and the implications of the deployment of this powerful technology discussed. The effects of biotechnology on increasing micronutrient levels, increasing digestibility, decreasing pathogenicity, carcinogenic properties, diabetes prevalence, etc will be covered. The use of crops for production of pharmaceuticals, vaccines and other medically useful compounds will also be investigated.

#### **PLANT SC 7125WT**

##### **Mgmt, Commercialisation & Regulation Plant Biotech**

3 units - semester 2

Up to 13 hours per week for 3 weeks

Restriction: Available to GradCertBiotech, GradDipBiotech & MBiotech students only

Assumed Knowledge: PLANT SC 7225WT

Assessment: Tutorials, assignments, reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Plant biotechnology is seen by different groups as a potential source of substantial revenue, as a key tool in maintaining world food production, or as a potential cause of major environmental problems. This course will examine the issues related to revenue capture from plant biotechnology, in particular aspects of the generation and management of intellectual property including patents, plant breeders' rights and germplasm exchange. The risk management and regulation of plant biotechnology both within Australia and overseas will be covered and discussed in conjunction with related regulation on quarantine and food safety. This course will also consider the funding and management of plant biotechnology research and development. This will include funding from public and private sources, related issues of valuation of intellectual property and germplasm, and marketing.

#### **PLANT SC 7126WT**

##### **Techniques in Plant Biotechnology**

3 units - semester 2

Up to 11 hours per week for 6 weeks

Restriction: Available to GradCertBiotech, GradDipBiotech & MBiotech students only

Assumed Knowledge: PLANT SC 7225WT & PLANT SC 7226WT

Assessment: Practical reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Recent advances in techniques for gene discovery and analysis have revolutionised the options available for the investigation of plant development, responses to disease and abiotic stresses and to engineer plants with new properties. This course will provide an opportunity for students to learn and try out key new methods for plant genomics and biotechnology. This will include techniques for transcript profiling using microarrays and quantitative PCR, the use of large insert DNA libraries and genetic data for positional cloning, metabolomics and proteomics including protein modelling, in situ localisation of mRNA and proteins, new methods for plant transformation and a range of bioinformatics tools and applications that underpin the various techniques. The bioinformatics component will also teach students how to use key genomics databases and resources.

### **PLANT SC 7130WT**

#### **Plant Pathology**

3 units - semester 1

Up to 6 hours per week

Assumed Knowledge: PLANT SC 2004WT, PLANT SC 2003WT & ENV BIOL 2006

Assessment: Written exam, practical exercises, critical review, mini-internship

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

A senior level course designed to provide sufficient background in plant pathology for graduates to take employment in plant disease control or to progress into postgraduate study in plant pathology or related disciplines. The course will consider the recognition of biotic plant diseases and how they are defined; evaluate economic factors; describe loss assessment; and describe the use of disease forecasting for decision making in management. The components of plant disease systems will be considered separately (pathogen, host and environment). Specifically, the course will examine the biology, taxonomy and disease cycle of plant pathogens; host resistance strategies; the physiology of the diseased plant; both inherent and introduced genetic factors; environmental factors; and the role of vectors in the spread of disease. This information will be integrated to illustrate the complex interactions required for the onset and progress of disease epidemics. Descriptors of epidemics and the strategy of using epidemiology as a basis for the management of disease by manipulating the components of epidemics will lead into an evaluation of the methods available for control of plant diseases. Case studies will be used where appropriate. Practical skills in working with fungi, bacteria, nematodes and viruses will be acquired both in the field and the laboratory. Experience in evaluation of research and report writing will be an outcome of the course.

### **PLANT SC 7131WT**

#### **Integrated Pest Management A**

3 units - semester 1

Up to 7 hours per week

Assessment: Exam, practical exercises, assignments

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course provides an introduction to the theory and practice of pest management. Topics considered are: the development, regulation and use of pesticides; strategies and tactics for managing pests (biological, cultural, genetic and chemical control); integrated pest management; economics of pest management; the diagnosis

of disease; strategies and tactics for managing disease outbreaks; integrated weed Management.

### **PLANT SC 7220WT**

#### **Foundations of Plant Health**

6 units - semester 1

Up to 19 hours per week for 6 weeks

Restriction: Available to GradCertPHB, GradDipPHB, MHB students only

Incompatible: PLANT SC 7225WT

Assessment: Final exam, mid-course exams, project-based exercises

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

In this course, the interplay between the plant, environmental conditions and other organisms within the plant's environment will be explored with a particular emphasis on what organisms and abiotic stresses cause disease, how they cause disease, why that disease occurs and the economic, environmental and social implications of disease. Students will learn about resistance and tolerance strategies employed by the plants when challenged by biotic and abiotic stress. The subsequent induction of a wide variety of responses will be explored in this course and the use of this information to breed for tolerance and/or resistance to biotic and abiotic stresses will be discussed. The course also provides the biological information and background required to devise strategies to adapt to or avoid potentially crippling environmental stresses as well as to devise pest management strategies. Case studies on specific plant-pathogen interactions, plant-pest interactions, abiotic stresses, herbicide damage and interactions essential to plant health will be presented. The course will include a description of appropriate biometrical methods needed to design, summarise and analyse experiments and an introduction to the different forms of scientific communication available to present results to different target audiences.

### **PLANT SC 7221WT**

#### **Classical Diagnostic Methods in Plant Health**

3 units - semester 2

Up to 20 hours per week for 3 weeks

Restriction: Available to GradCertPHB, GradDipPHB, MHB students only

Assumed Knowledge: PLANT SC 7220WT

Assessment: Final exam, tutorials, assignments, reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Plant health may be compromised by biotic factors, such as pathogens, arthropod pests and weeds, and by abiotic factors, such as nutrient deficiency and herbicide damage. This course focuses on the detection and diagnosis of diseases, arthropod pests and abiotic disorders in crops and natural ecosystems. Students will learn how to recognise symptoms and signs of damage in the field, assess the incidence and severity of the damage and collect appropriate samples for subsequent diagnosis in the laboratory. Laboratory-based diagnosis will involve detailed examination of specimens, including microscopic studies of symptomatic plant material and pests, where appropriate following incubation to induce sporulation of fungal pathogens. Methods for culturing microbial pathogens will be explored, including the use of selective media and the establishment and maintenance of pure cultures. Identification of pathogens and pests on the basis of morphology and, where appropriate, cultural characteristics, will be undertaken. Koch's postulates will be used to prove the pathogenicity of selected organisms. Students will examine case studies of selected

diseased and disorders. Throughout the course, attention will be given to the development of skills in verbal and written communication.

#### **PLANT SC 7222WT**

##### **Advanced Principles Pest Mgmt & Biosecurity**

3 units - semester 1

Up to 20 hours per week for 3 weeks

Restriction: Available to GradCertPHB, GradDipPHB, MHB students only

Assumed Knowledge: PLANT SC 7220WT

Assessment: Final exam, tutorials, assignments, reports

Effective management of pests in a variety of systems (broad-acre crops, fruits, vegetables and international trade is founded on an understanding of the ecological, economic and sociological factors that influence pest populations and the effectiveness of management practices. This course considers fundamental ecological topics that include population dynamics of pest organisms, pest movement and invasion biology, population modelling, and resistance of plants to pest attack. Non-chemical approaches to pest suppression such as biological controls, resistant plant varieties, cultural practices, mating disruption by pheromones, and sterile insect technique are covered in this course.

#### **PLANT SC 7223AWT/BWT**

##### **Extended Research Project (Plant Health) Part 1 & 2**

24 units - full year

Restriction: Available to MBiotech & MPHB students only

Assessment: Literature review, Scientific manuscript, Seminar presentation

This course focuses on a research project that is carried out over 10 months. Students also develop advanced communication skills in tutorial sessions. This aspect focuses on written and oral communication as they relate to the plans and results of the project. Each student reports the results of their research in a scientific manuscript for publication.

#### **PLANT SC 7224WT**

##### **Research Project (Plant Health)**

12 units - semester 1

Up to 3 hours per week

Restriction: Available to MBiotech & MPHB students only

Assessment: Literature review & project proposal, Scientific manuscript, Seminar presentation

This course focuses on a research project that is carried out over five months. Students also develop advanced communication skills in tutorial sessions. This aspect focuses on written and oral communication as they relate to the plans and results of the project. Each student reports the results of their research in a scientific manuscript for publication.

#### **PLANT SC 7225WT**

##### **Foundations of Plant Biotechnology**

6 units - semester 1

Up to 17 hours per week for 6 weeks

Restriction: Available to GradCertPHB, GradDipPHB, MHB students only

Incompatible: PLANT SC 7220WT

Assessment: Final exam, project-based exercises

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

In this course, students will explore the basic concepts central to understanding how genotype contributes to phenotype in plants. The emphasis will be on how factors at the cellular level contribute to the expression of genotypes and hence to phenotypic variation, and how plant breeding can be used to exploit genetic variation to develop and/or select genotypes that are superior for specific purposes. The course will provide an introduction to plant physiology, molecular biology, basic genetics and plant breeding. Students will learn how to use biotechnology to study genotypic and phenotypic variation with particular reference to the impact of the environment on resource capture, growth, development and reproduction in plants. Case studies for plant breeding strategies, gene expression/regulation and post-translational modification will be provided. The course will also include a description of appropriate biometrical methods needed to design, summarise and analyse experiments and an introduction to the different forms of scientific communication available to present results to different target audiences.

#### **PLANT SC 7226WT**

##### **Molecular Plant Breeding**

3 units - winter semester

Up to 24 hours per week for 3 weeks

Restriction: Available to GradCertPHB, GradDipPHB, MHB students only

Assumed Knowledge: PLANT SC 7225WT

Assessment: Final exam, tutorials, assignments, reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Plant molecular biology can be incorporated into crop improvement programs via plant transformation (gene technology) and/or via the application of genetic marker information. Plant cell and tissue culture is used in plant transformation and has other applications in plant breeding. This course considers the scientific basis for the application of plant transformation, molecular markers and cell and tissue culture in plant breeding.

#### **PLANT SC 7227WT**

##### **Plant Genomics**

3 units - semester 1

Up to 20 hours per week for 3 weeks

Restriction: Available to GradCertPHB, GradDipPHB, MHB students only

Assumed Knowledge: PLANT SC 7225WT

Assessment: Final exam, tutorials, assignments, reports

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Students learn about the tools of genomics and can apply these tools to increase their understanding of plant function. Topics include: Accessing and utilising bioinformatics resources for plant biotechnology; Identification of candidate genes using genetic information (positional cloning), using biochemical and expression analysis (microarray analysis, proteomics, metabolomics); characterization and functional analysis of candidate genes: transformation, mutant populations, knockout systems, heterologous expression systems, protein analysis.

## **PLANT SC 7228WT**

### **Research Project (Plant Biotechnology)**

12 units - semester 1

Assessment: To be staff

## **PLANT SC 7229AWT/BWT**

### **Extended Research Project (Plant Biotech) Part 1 & 2**

24 units - full year

Restriction: Available to MPH students only

Assessment: To be advised

This course focuses on a research project that is carried out over five months. Students also develop advanced communication skills in tutorial sessions. This aspect focuses on written and oral communication as they relate to the plans and results of the project. Each student reports the results of their research in a scientific manuscript for publication

## **Soil and Water**

### **SOIL&WAT 7003WT**

#### **Topics in Soil and Land Systems**

3 units - semester 1 or semester 2

Up to 5 hours per week

Pre-Requisite(s): Completed degree in Science, Agricultural Science or Environmental Science

This course may be offered from time to time as a means of examining current topics in soil science, soil management and land evaluation that are related to the research and teaching interests of staff and visiting scientists. Candidates should consult the Head of the Discipline for topics currently available.

### **SOIL&WAT 7005WT**

#### **Environmental Toxicology and Remediation**

3 units - summer semester

Pre-Requisite(s): A minimum of a Credit in PLANT SC 1001RW or a Pass in CHEM 1100 & CHEM 1200 or CHEM 1101 & CHEM 1201 or equivalent

Incompatible: SOIL&WAT 3004WT

Assessment: Theory, practicals/assignments

The goals of this course are to provide students with an understanding of the monitoring, fate and risk assessment of contaminants in environmental and biological systems. Classes of contaminants discussed include heavy metals, pesticides, and other water-, soil- and food-borne toxicants. The properties of contaminants which influence their environmental distribution and transformations and the characteristics of the environment which influence contaminant toxicity to organisms are discussed. Students are introduced to the principles of toxicology necessary for an understanding of the environmental consequences of contaminants

### **SOIL&WAT 7007WT**

#### **GIS for Environmental Management**

3 units - summer semester

15 days during the Summer vacation

Assumed Knowledge: Basic computing skills in Windows environment

Incompatible: SOIL&WAT 3014WT

Assessment: Practical exercises, case study, written exam

The course deals with concepts and theory of geographic information systems and their use for environmental mapping, spatial modelling and analysis. Topics covered include the relationship of GIS models to real world perception and map representation, vector and raster systems; spatial modelling; translation of problems into GIS procedures; attribute manipulation and recoding, operations including arithmetic and Boolean overlay, reclassification, proximity and neighbourhood analyses; input of data to GIS; database structures; interpolation of surfaces from point and vector data; applications and case studies. Practical work uses PC-based software to teach basic skills in GIS data entry, analysis and output, emphasising a problem-solving approach through environmental and agricultural GIS case studies.

### **SOIL&WAT 7008**

#### **Remote Sensing**

3 units - semester 2

Up to 5 hours per week

Incompatible: GEOLOGY 3010

Assessment: Practical exercises, written assignments and exam

The course deals with use of satellite and airborne imagery for environmental and agricultural applications such as land mapping, site evaluation and monitoring degradation and change. Topics include the interaction of electromagnetic radiation with the earth's surface, spectral characteristics of earth surface materials, the nature of imagery collected by a variety of current earth-observation sensors, the use of this imagery for detecting, mapping and monitoring environmental features, collection of field data to interpret imagery, integration of remote sensing and geographic information systems (GIS) for environmental monitoring and modelling, and specialised forms of imagery such as radar, thermal, airborne video and digital photography. Practicals use computer-based image analysis software to enhance and interpret digital images, produce thematic maps, analyse change over time and combine images and map data. Field-based practicals include the use of spectroradiometers for collecting reflectance data about land cover.

### **SOIL&WAT 7024WT**

#### **Soil Ecology and Nutrient Cycling**

3 units - semester 1

Up to 6 hours per week

Pre-Requisite(s): SOIL&WAT 2005WT or SOIL&WAT 1000RW

Assessment: Exam, practical reports, research proposal

The course will provide students with a comprehensive view of ecological interactions in soils. It deals with the interactions between plants, soil and soil organisms, the roles played by soil organisms in decomposition of organic material, nutrient cycling (C, N, P) and stability of agricultural and natural ecosystems. Other topics include the importance of soil organisms for soil fertility, mycorrhizas and their effects on plant productivity and plant communities, soil microbial ecology, root growth, the biology of the rhizosphere and the impact of climate change on nutrient cycling.

### **SOIL&WAT 7025WT**

#### **GIS for Agricultural Sciences**

3 units - semester 2

Up to 6 hours per week

Incompatible: SOIL&WAT 3007WT & SOIL&WAT 3014WT

Assessment: Case study, practical assessments, written exam

Geographic information systems have become an important tool far beyond the geographic disciplines. Applications in the agricultural

sciences range from simple cartographic tools to precision fertiliser applications and growth models. This course gives an overview of the history and the rapid recent development of this technology and gives examples of commercially available state-of-the-art equipment. Hands on computer exercises involve data capture, processing and presentation of results. Special emphasis is placed on precision agriculture and the optimal and timely treatment of spatial variability in agricultural production systems. Students will learn what can be seen from space and airborne remote sensing and how this information can be combined with other sources of information in order to minimise effort and optimise production.

#### **SOIL&WAT 7027WT**

##### **Soil & Water: Management and Conservation**

3 units - semester 1

Up to 6 hours per week, plus fieldwork

Pre-Requisite(s): SOIL&WAT 7003WT or SOIL&WAT 2500 or SOIL&WAT 2500WT

Incompatible: SOIL&WAT 3002WT or SOIL&WAT 3012WT or SOIL&WAT 7002WT or SOIL&WAT 7026WT

Assessment: Exam, practical reports, quizzes

This course covers topics in soil and water management and conservation important to students of agricultural, viticultural, and environmental sciences. Processes that degrade the soil and water resources of Australia (e.g. erosion, salinity, alkalinity and sodicity, as well as acidification, water repellence, and degradation of soil structure) are examined, and their measurement, avoidance and management discussed. There is a strong focus on quantitative theory and practice of measuring and managing soil water using commercially available technology, particularly in relation to interception, storage and movement of water in dryland and irrigated agro-ecosystems. Broader issues in soil and water conservation (e.g. State and Commonwealth legislation) are also covered. Practical classes consist of laboratory, computer and field exercises designed to illustrate the concepts covered in lectures.

### **Urban Habitat Management**

#### **URBH 7000A/B**

##### **Research Methodology and Dissertation F/T Pt 1 & 2**

24 units - full year

Up to 2 hours per week

Restriction: Available to GradCertUrbHabMgt, GradDipUrbHabMgt & MUrbHabMgt students only

Pre-Requisite(s): 24 units of Urban Habitat Management courses

Assessment: 15,000-20,000 word dissertation

This course will introduce students to the methodology of Urban Habitat Management research and assist them to acquire the skills necessary to plan, undertake and present successfully the results of research in this field. To complete the course, student must meet regularly with their dissertation supervisor, submit a satisfactory proposal for a research topic and a satisfactory research plan early in the course, provide a satisfactory account of progress made with the research topic midway through the course, and submit a satisfactory dissertation on the methodology and results of the research and deliver a seminar on their work by the end of the course.

#### **URBH 7001A/B**

##### **Research Methodology & Dissertation P/T Part 1 & 2**

24 units - full year

Restriction: Available to MUrbHabMgt students only

Pre-Requisite(s): 24 units of Urban Habitat Management courses

Assessment: 15,000-20,000 word dissertation

This course will introduce students to the methodology of Urban Habitat Management research and assist them to acquire the skills necessary to plan, undertake and present successfully the results of research in this field. To complete the course, students must meet regularly with their dissertation supervisor, submit a satisfactory proposal for a research topic and a satisfactory research plan early in the course, provide a satisfactory account of progress made with the research topic midway through the course, and submit a satisfactory dissertation on the methodology and results of the research and deliver a seminar on their work by the end of the course.

#### **URBH 7002**

##### **Research Project F/T**

12 units - semester 1 or semester 2

Restriction: Available to MUrbHabMgt students only

Pre-Requisite(s): 12 units of Urban Habitat Management courses

Assessment: Seminar presentation, research project report

This course will provide students with the opportunity to spend a semester conducting a research project under the direction of a University of Adelaide supervisor and, where necessary, liaise with a Biocity partner. The research project will contribute to the policy development, planning, management or research activities relating to urban environments and/or BioCity. The role of the University supervisor will be to assist students to acquire any skills necessary to undertake the research project and to prepare the research project paper.

#### **URBH 7003A/B**

##### **Research Project P/T Part 1 & 2**

12 units - full year

Restriction: Available to MUrbHabMgt students only

Pre-Requisite(s): 12 units of Urban Habitat Management courses

Assessment: Seminar presentation, research project report

This course will provide students with the opportunity to spend a semester conducting a research project under the direction of a University of Adelaide supervisor and, where necessary, liaise with a Biocity partner. The research project will contribute to the policy development, planning, management or research activities relating to urban environments and/or BioCity. The role of the University supervisor will be to assist students to acquire any skills necessary to undertake the research project and to prepare the research project paper.

#### **URBH 7102**

##### **Internship in Urban Habitat Management**

6 units - semester 1

Restriction: Available to GradDipUrbHabMgt & MUrbHabMgt students only

Pre-Requisite(s): 12 units of Urban Habitat Management courses

Assessment: Seminar presentation, project report

This course will provide students with the opportunity to spend a semester as a professional 'intern' working either within a government, community-based, business or industry organisation or with a University of Adelaide researcher, while completing supervised project work in the field of Urban Habitat Management. Student placements will depend on the availability of internship opportunities. It is the responsibility of the student to find a suitable industry partner and to secure a member of academic staff to supervise their project. These arrangements must be made prior to

the student enrolling in the Internship course. The seminars during the first part of the course will be used to prepare students for their internships, while those during the second part will be used to monitor the progress of the internships and assist students to prepare their project reports.

#### **URBH 7202**

##### **Internship in Urban Habitat Management**

6 units - semester 2

This course will provide students with the opportunity to spend a semester as a professional 'intern' working either within a government, community-based, business or industry organisation or with a University of Adelaide researcher, while completing supervised project work in the field of Urban Habitat Management. Student placements will depend on the availability of internship opportunities. It is the responsibility of the student to find a suitable industry partner and to secure a member of academic staff to supervise their project. These arrangements must be made prior to the student enrolling in the Internship course. The seminars during the first part of the course will be used to prepare students for their internships, while those during the second part will be used to monitor the progress of the internships and assist students to prepare their project reports.

## **Veterinary Science**

#### **VET SC 7000RW**

##### **Veterinary Pathology**

6 units - semester 1

Up to 12 hours per week

Restriction: Available to DVM students only

Assessment: In class tests, practical assessment, exam

Pathology is a core discipline in veterinary medicine. Students will learn general principles about the processes involved in disease. These general principles will then be demonstrated by study of specific diseases of animals and how they affect the major body systems.

#### **VET SC 7001RW**

##### **DVM Professional Skills**

3 units - semester 1

Up to hours per week

Restriction: Available to DVM students only

Assessment: Assignment, practical tests, final exam, practical animal handling assessment

This course is to enable students to acquire the necessary skills in veterinary practice management, restraint and handling of common veterinary species and clinical examination and techniques commonly used in veterinary practice.

At the end of this course there will be an animal handling competency assessment that must be passed before entry into Clinical Extra-Mural Studies placements.

#### **VET SC 7002RW**

##### **Veterinary Practice Fundamentals A**

3 units - semester 1

Up to 5 hours per week

Restriction: Available to DVM students only

Assessment: Assignments, in-class tests, exam, practical assessment

This course will introduce basic principles of surgery, provide students with a knowledge and understanding of anaesthesia in veterinary species, and teach the student a safe practical approach to veterinary diagnostic imaging.

#### **VET SC 7003RW**

##### **Veterinary Practice Fundamentals B**

6 units - semester 2

Up to 14 hours per week

Restriction: Available to DVM students only

Assumed Knowledge: VET SC 7002RW

Assessment: In class tests, exam, practical assessment

This course will provide students with a knowledge and understanding of clinical toxicology, pharmacology & therapeutics, and clinical pathology. In addition students will gain a knowledge and understanding of animal breeding including the ability to recognise, diagnose and treat the important clinical conditions affecting the reproductive system in domestic species. Students will also gain a basic understanding and knowledge of clinical neurology and ocular diseases.

#### **VET SC 7004RW**

##### **Intensive Production Medicine**

3 units - semester 2

Up to 6 hours per week

Restriction: Available to DVM students only

Assumed Knowledge: VET SC 7000RW

Assessment: Written assignments, in-class tests, final theory and practical exams

This course will provide students with a basic knowledge and understanding of intensive production species and the common problems encountered within these systems. Emphasis will be placed on pigs, poultry and aquaculture industries.

#### **VET SC 7005RW**

##### **Clinical Research Project**

3 units -

Up to 11 hours per week

Restriction: Available to DVM students only

Assumed Knowledge: VET SC 7001RW

Assessment: Oral or Poster presentation, written report

The course consists of a clinical or clinically-related research project or other scientific endeavour as selected. Students can choose to identify and prepare a clinical case report, conduct original clinically-related research, or conduct a literature review of a standard suitable for submission for publication. Students are required to identify a relevant research advisor and submit a proposed topic, research plan & budget, and a signed statement confirming the advisor's participation to the course co-ordinators prior to the commencement of the relevant semester.

Students will be required to maintain a research log book and attend weekly meetings with their research advisor. Students will have the option of selecting either an oral or poster presentation, and will be required to concurrently submit a written report on the results of the research. Students will be required to attend the poster and oral presentation of other students enrolled in the course, and will be encouraged to submit their results for publication.

## Viticulture

### VITICULT 7001WT

#### Advances in Viticultural Science

3 units - semester 2

Up to 1 hour per week

Restriction: Available to GradCertViticult, GradDipViticult & MViticult students only

Assessment: Assignments, presentations

Current research in viticultural science will be examined through tutorial-based discussion of seminal research papers and attendance at research seminars. Current problems and challenges in viticulture will be focused upon, that may include: water use efficiency, canopy management, irrigation techniques, salinity, flavour development, nutrient use efficiency, and manipulation of vines for fruit quality.

### VITICULT 7002WT

#### Viticultural Science A

3 units - semester 2

Up to 6 hours per week

Assessment: Final exam, mid-term exam, practical reports, practical exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

NOTE: Viticultural Science begins on the Monday of O-Week. Attendance at these classes is required for completion of the course.

Viticultural Science covers the entire life cycle of the cultivated grapevine with an emphasis on fruit production for wine making. The practical component of the course takes advantage of the vine growth phases that occur from flowering and fruit-set leading up to harvest. Topics covered include: The growth cycle of the grapevine and the biology that underpins the different phenological stages. Grapevine physiology as it is relevant to growth and vine form, flowering, water use, mineral nutrition, berry development and ripening. Grapevine anatomy of the vegetative and reproductive parts. Techniques to monitor berry maturity development, and yield potential. Taxonomy of grapevines, characteristics of fruiting varieties and variety identification. Tutorial and practical sessions will focus in more depth on the following topics: vine and bud anatomy, shoot and fruit based variety identification, and yield estimation, canopy measurements, maturity sampling and grapevine mineral nutrition.

Approximately one half of the lectures encompassing Viticultural Science will be provided from Botany II. The selection of lectures from Botany II will cover topics relating to the general principles of plant biology including structure and function, systematics, floral biology and the physiology of growth and development. These lectures are intended to complement the Viticulture based lecture material of Viticultural Science with topics of whole plant biology that are common amongst most plant systems.

### VITICULT 7021WT

#### Viticultural Science B

3 units - semester 1

Up to 6 hours per week, plus 5 full days in orientation week

Restriction: Available to GradCertOenology, GradCertViticult, GradDipOenology, GradDipViticult, MOenology & MViticult students only

Assumed Knowledge: VITICULT 7002WT

Assessment: Midterm and Final exam, Practical reports, Essays

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

Principles behind the establishment of a viticultural enterprise comprising site selection, choice of planting material and the design and establishment of the vineyard. Trellising design, pruning principles, practices and mechanisation. The relationship between production aspects and the physiology of the vine including phenology and shoot development, effect of node position on fruitfulness, interaction with climate response to pruning, trellising and canopy management. Vineyard management practices including: pests and diseases of grapevines; their recognition and control; propagation; soil management comprising weed control by chemical and non-chemical methods; the response of grapevines to irrigation; principles of irrigation scheduling and strategic irrigation practices; harvesting and handling methods used for winegrapes; cultural practices employed to produce winegrapes of particular end-use specification.

### VITICULT 7038WT

#### Viticultural Methods and Procedures

3 units - semester 2

Up to 6 hours per week

Assumed Knowledge: VITICULT 7002WT

Assessment: Assignments, practical reports, exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The practices associated with the development and operation of a viticultural enterprise. This includes training in the monitoring of pests and diseases, soil and plant water and nutritional status; yield estimation; experimentation. Lecture topics include: biotechnology in viticulture, organic viticulture, advanced propagation techniques, use of growth regulators in viticulture, control of bird pests. Tutorial/practical sessions include: climatic assessment for vineyard site selection; principles and practices of vineyard operations including spray equipment calibration and spray application; pruning, training, trellis erection and repair, propagation, canopy management and other activities, vineyard monitoring - phenological stages, bud fruitfulness, physiological pruning, yield estimation, pests and diseases, soil and plant water status; computer-aided decision-making systems such as VineLogic and precision viticulture. This course includes visits to commercial vineyards and equipment suppliers.

### VITICULT 7230WT

#### Viticultural Practice

3 units - semester 2

Up to 2 hours per week, plus field work in Summer break

Assumed Knowledge: VITICULT 7002W, 7038WT & 7021WT

Assessment: Logbook, research & other projects, employers report

Students will complete 10 weeks of work in a large commercial vineyard providing an opportunity to experience, observe and report on the major activities undertaken in a typical vineyard operation.

### VITICULT 7240WT

#### Engineering for Viticulture & Oenology B

3 units - semester 2

Up to 6 hours per week

Available for Non-Award Study

Co-Requisite(s): VITICULT 7002WT & OENOLOGY 7028WT

Assessment: Exam, written reports, project work

This course provides an overview of the concepts and techniques used in the engineering aspects of viticulture (irrigation systems,

water management, vine water relations) and winemaking (process calculations (mass and energy balances), process utilities (refrigeration, process heating and cooling), steam systems, electrical power systems, heat transfer and heat exchangers, must, juice and wine transfer methods, centrifugation and filtration, process control and instrumentation) processes.

## Wine Marketing

### WINEMKTG 7003EX

#### Advertising and Promotion

3 units - semester 1

External

Assumed Knowledge: WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course will provide the student with an overview of the Integrated Marketing Communications process. Students will learn to manage the formal communications process in the context of wine and agricultural businesses. Attention will be paid to developing communication plans and understanding strategic applications of advertising, sales promotion and public relations tools. Students should expect to gain knowledge of communications theory as well as practical application through study of texts and real world cases.

### WINEMKTG 7003WT

#### Advertising and Promotion

3 units - semester 1

Up to 3 hours per week

Assumed Knowledge: WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course will provide the student with an overview of the Integrated Marketing Communications process. Students will learn to manage the formal communications process in the context of wine and agricultural businesses. Attention will be paid to developing communication plans and understanding strategic applications of advertising, sales promotion and public relations tools. Students should expect to gain knowledge of communications theory as well as practical application through study of texts and real world cases.

### WINEMKTG 7005EX

#### Wine & Food Tourism and Festivals

3 units - semester 1

External

Assumed Knowledge: WINEMKTG 7055WT or WINEMKTG 7055EX

Assessment: To be advised

This course explores the basics of tourism and the structure of the tourism industry as it relates to both wine and food. It addresses the basics concepts of wine tourism and hospitality, wine and food festivals in the broad context of tourism and hospitality, and wine tourism as a vehicle to build a brand image for the wine(ry) business and/or wine region. Specific focus areas include wine tourism visitor (consumer) behaviour, the role of the winery cellar-door in wine marketing/distribution, the functions of wine routes/roads, wine region brand building, and wine and/or food festival event fundamentals and Management.

### WINEMKTG 7005WT

#### Wine & Food Tourism and Festivals

3 units - semester 1

Up to 3 hours per week

Assumed Knowledge: WINEMKTG 7055WT or WINEMKTG 7055EX

Assessment: Assignment and Final Exam

This course explores the basics of tourism and the structure of the tourism industry as it relates to both wine and food. It addresses the basics concepts of wine tourism and hospitality, wine and food festivals in the broad context of tourism and hospitality, and wine tourism as a vehicle to build a brand image for the wine(ry) business and/or wine region. Specific focus areas include wine tourism visitor (consumer) behaviour, the role of the winery cellar-door in wine marketing/distribution, the functions of wine routes/roads, wine region brand building, and wine and/or food festival event fundamentals and Management.

### WINEMKTG 7006EX

#### Wine Retail and Distribution Management

3 units - semester 2

External

Pre-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

Assessment: Assignments, exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course focuses on the principles of establishing and managing a retail concern. It will expose the student to the theoretical and practical aspects of selling and retail practices. Some of the areas this course will cover include: distribution and information systems, selling and marketing technology and trends, retail and wholesale operations, negotiation skills. The course can involve some fieldwork and practical case studies.

### WINEMKTG 7006WT

#### Wine Retail and Distribution Management

3 units - semester 2

Up to 3 hours per week

Pre-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

Assessment: Assignments, exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course focuses on the principles of establishing and managing a retail concern. It will expose the student to the theoretical and practical aspects of selling and retail practices. Some of the areas this course will cover include: distribution and information systems, selling and marketing technology and trends, retail and wholesale operations, negotiation skills. The course can involve some fieldwork and practical case studies.

### WINEMKTG 7030EX

#### Wine and Society

3 units - semester 1

External

Assumed Knowledge: WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The student will be exposed to studies that cover the history and future of the Australian wine industry, presented in the wider context

of European and other New World wine industries. Topics covered include: the origins of grape and wine production, the religious and cultural symbolism of wine, the development of an international wine trade in the 20th century, the role of fashion in wine markets, and examination of wine and other forms of alcohol and health issues. Also covered are alcohol and wine consumption habits and attitudes, education and awareness programs, communication of wine information, food and wine complementarity, labelling and product laws.

#### **WINEMKTG 7030WT**

##### **Wine and Society**

3 units - semester 1

Up to 3 hours per week

Assumed Knowledge: WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The student will be exposed to studies that cover the history and future of the Australian wine industry, presented in the wider context of European and other New World wine industries. Topics covered include: the origins of grape and wine production, the religious and cultural symbolism of wine, the development of an international wine trade in the 20th century, the role of fashion in wine markets, and examination of wine and other forms of alcohol and health issues. Also covered are alcohol and wine consumption habits and attitudes, education and awareness programs, communication of wine information, food and wine complementarity, labelling and product laws.

#### **WINEMKTG 7033WT**

##### **Research Methodology and Methods**

3 units - semester 1 or semester 2

Up to 3 hours per week

Assessment: Written assignments, seminar presentations

This course familiarises the student with the methodology of scientific research in wine business, ie. the system of rules and procedures on which wine business research is based and against which claims for knowledge are appraised; and the methods or techniques commonly used in wine business research, including quantitative techniques and computer techniques. Coverage of techniques emphasises the types of problems each technique is suitable for, and the strengths and limitations of each technique. The first half of the course concentrates on methodology, the second half on methods. Concepts required for writing a research proposal are presented in the first half of the semester. The methods are presented during the second half of the semester. During the second half of the semester, a student completes and successively refines his/her proposal to be presented at the end of the semester.

#### **WINEMKTG 7035EX**

##### **International Wine Law**

3 units - semester 1

External

Assumed Knowledge: WINEMKTG 7054EX

Assessment: To be advised

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The course will cover import and export licensing, labelling and standards requirements, appellation and place names requirements and restrictions, contracts for international sale and financing of sale

and for transport, conflict of laws, the role of the OIV and other international agencies, treaties and trade agreements, and tax laws as related to the international wine trade.

#### **WINEMKTG 7035WT**

##### **International Wine Law**

3 units - semester 1

Up to 3 hours per week

Assumed Knowledge: WINEMKTG 7054EX

Assessment: To be advised

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The course will cover import and export licensing, labelling and standards requirements, appellation and place names requirements and restrictions, contracts for international sale and financing of sale and for transport, conflict of laws, the role of the OIV and other international agencies, treaties and trade agreements, and tax laws as related to the international wine trade.

#### **WINEMKTG 7039EX**

##### **Applied Marketing Research**

3 units - semester 2

External

Assumed Knowledge: WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The aim of this course is to study quantitative and qualitative marketing research for pro-active and reactive marketing intelligence systems as it applies to wine and food marketers. Topics included are problem analysis, types of data collection systems, steps in research projects, controls of a research project, questionnaire design, statistical methodology for data reduction, sampling theory and the industry and operative organisations. Dealing with a market research organisation will be a significant aspect of the course which is not aimed at producing researchers but clients who understand the intricacies of the process - and the limitations. The focus will be the application of the theory for use in new wine or food evaluation, advertising measurement, corporate/product/range analysis, attitudinal research, as primary sources. Secondary sources such as trade, governmental or syndicated data will be explored and assessed.

#### **WINEMKTG 7039WT**

##### **Applied Marketing Research**

3 units - semester 2

Up to 3 hours per week

Assumed Knowledge: WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The aim of this course is to study quantitative and qualitative marketing research for pro-active and reactive marketing intelligence systems as it applies to wine and food marketers. Topics included are problem analysis, types of data collection systems, steps in research projects, controls of a research project, questionnaire design, statistical methodology for data reduction, sampling theory and the industry and operative organisations. Dealing with a market research organisation will be a significant aspect of the course which is not aimed at producing researchers but clients who understand the intricacies of the process - and the limitations. The focus will be the application of the theory for use in

new wine or food evaluation, advertising measurement, corporate/product/range analysis, attitudinal research, as primary sources. Secondary sources such as trade, governmental or syndicated data will be explored and assessed.

#### **WINEMKTG 7049EX**

##### **Global Wine Market**

3 units - semester 1

External

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Co-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course provides students with insights into the structure, mechanisms, regulatory agencies, and complexities of the world wine marketing. It uses a typology of open, government-regulated and emerging wine markets as the frame work within which to present this. In addition, it examines key drivers in the world wine marketing and their impact on wine marketing dynamics and characteristics. Throughout there is an emphasis on wine consumer behavioural aspects and successful marketing strategies employed in the major wine consuming markets.

#### **WINEMKTG 7049WT**

##### **Global Wine Market**

3 units - semester 1

Up to 3 hours per week

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Co-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course provides students with insights into the structure, mechanisms, regulatory agencies, and complexities of the world wine marketing. It uses a typology of open, government-regulated and emerging wine markets as the frame work within which to present this. In addition, it examines key drivers in the world wine marketing and their impact on wine marketing dynamics and characteristics. Throughout there is an emphasis on wine consumer behavioural aspects and successful marketing strategies employed in the major wine consuming markets.

#### **WINEMKTG 7052WT**

##### **Applied Management Science**

3 units - semester 1

Up to 4 hours per week

The aim of this course is to introduce a collection of management science techniques that helps business managers make better decisions and to foster a logical, consistent and systematic approach to problem formulation, problem solving and decision making. Emphasis is placed on model formulation and interpretation rather than algorithms. Topics to be covered include mathematical programming, network modelling, Monte Carlo simulation, decision analysis under risk, and time series forecasting.

Assessment: theory, and practical exams, case studies, other assignments

#### **WINEMKTG 7053EX**

##### **Introduction to Managerial & Financial Accounting**

3 units - semester 1 or semester 2

External

Assessment: Assignments, final open book exams

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course provides an introduction to the principles of accounting appropriate to the wine industry. The course deals with those accounting principles from the perspective of a winery business manager. The course does not seek to teach the detailed techniques of accounting, but rather to equip students with sufficient knowledge and skills of accounting to be better managers in the wine industry. The first half of the course deals with financial accounting matters, with a special emphasis on equipping students to be able to analyse financial statements, and to understand the techniques of managing cash flows in wine businesses. In the second half of the course, management accounting techniques such as product costing, budgeting, cost-volume-profit analysis and project evaluation are covered. At the end of the course, students will be able to deal with financial statements, management reports, and be able to make more effective decisions where financial implications are involved.

#### **WINEMKTG 7053WT**

##### **Introduction to Managerial & Financial Accounting**

3 units - semester 1

Up to 3 hours per week

Assessment: Assignments, final open book exams

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course provides an introduction to the principles of accounting appropriate to the wine industry. The course deals with those accounting principles from the perspective of a winery business manager. The course does not seek to teach the detailed techniques of accounting, but rather to equip students with sufficient knowledge and skills of accounting to be better managers in the wine industry. The first half of the course deals with financial accounting matters, with a special emphasis on equipping students to be able to analyse financial statements, and to understand the techniques of managing cash flows in wine businesses. In the second half of the course, management accounting techniques such as product costing, budgeting, cost-volume-profit analysis and project evaluation are covered. At the end of the course, students will be able to deal with financial statements, management reports, and be able to make more effective decisions where financial implications are involved.

#### **WINEMKTG 7054EX**

##### **Legal Issues in Wine Marketing**

3 units - semester 2

External

Assessment: Exam, assignments

This course provides a general introduction to the Australian legal system and institutions, and to Australian commercial law. Emphasis will be placed on those parts of the law that have particular relevance to marketing, such as contract, sale of goods, consumer protection, trace practices and intellectual property law. The legal principles discussed have general commercial applicability, but where possible will be illustrated by topical examples drawn from wine and food marketing.

#### **WINEMKTG 7055EX**

##### **Wine and Food Marketing Principles**

3 units - semester 1

External

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The aim of this course is to give students an understanding of the role of the marketing manager through an introduction to the basic concepts and practices in marketing with particular emphasis on wine and food products. The topics covered include the marketing environment and marketing strategy formulation. There will be particular examination of product, price, place and promotion strategies

#### **WINEMKTG 7055WT**

##### **Wine and Food Marketing Principles**

3 units - semester 1

Up to 3 hours per week

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The aim of this course is to give students an understanding of the role of the marketing manager through an introduction to the basic concepts and practices in marketing with particular emphasis on wine and food products. The topics covered include the marketing environment and marketing strategy formulation. There will be particular examination of product, price, place and promotion strategies

#### **WINEMKTG 7056EX**

##### **Internet Marketing and E-Commerce**

3 units - semester 1

External

Co-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The course examines issues concerning the process, development and impact of e-commerce, and the use of Internet marketing in wine and food business from a managerial viewpoint, and within the context of creating consumer value. Topics include the underlying technology of e-commerce, conceptual foundations of marketing in an electronic environment; e-commerce business models; consumer attitudes and behaviour on the Internet; Internet marketing research; e-commerce and supply chain management, and advertising and promotional strategies in e-commerce. Coverage also includes issues associated with developing strategy, planning, designing, implementing, out-sourcing, securing and managing e-commerce systems and technologies. Emphasis will be on establishing a framework to keep abreast of the technology in a relatively new but fast moving field.

#### **WINEMKTG 7057EX**

##### **Food Marketing**

3 units - semester 1

External

Pre-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course examines key issues in the development and marketing of primary and processed food and beverages products. Emphasis is placed on such areas as supply chain management, managing product development, exporting Australian food and beverage products, market research, packaging and labelling, consumer food consumption trends, food marketing strategies, and value-adding in Australian food and beverage industries.

#### **WINEMKTG 7057WT**

##### **Food Marketing**

3 units - semester 1

Up to 3 hours per week

Pre-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course examines key issues in the development and marketing of primary and processed food and beverages products. Emphasis is placed on such areas as supply chain management, managing product development, exporting Australian food and beverage products, market research, packaging and labelling, consumer food consumption trends, food marketing strategies, and value-adding in Australian food and beverage industries.

#### **WINEMKTG 7058EX**

##### **International Marketing of Wine & Agric Products**

3 units - semester 2

External

Assumed Knowledge: WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course aims to provide a comprehensive review of the theory and practice of international marketing in relation to wine and agricultural products. Topics include: environmental factors affecting global wine marketing, especially the socio-cultural implications of international trade and wine export, strategic planning and organising for international marketing, market research for wine and agricultural products, decisions on segmentation, wine product policy, pricing, channels of distribution, international wine advertising, and coordinating and controlling global wine marketing operations.

#### **WINEMKTG 7058WT**

##### **International Marketing of Wine & Agric Products**

3 units - semester 2

Up to 3 hours per week

Assumed Knowledge: WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course aims to provide a comprehensive review of the theory and practice of international marketing in relation to wine and agricultural products. Topics include: environmental factors affecting global wine marketing, especially the socio-cultural implications of international trade and wine export, strategic planning and organising for international marketing, market research for wine and agricultural products, decisions on segmentation, wine product policy, pricing, channels of distribution, international wine advertising, and coordinating and controlling global wine marketing operations.

#### **WINEMKTG 7059EX**

##### **Strategic Marketing Management**

3 units - semester 2

External

Pre-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

The critical role of strategic marketing in meeting the challenges facing organisations in complex markets will be the primary focus of this course, and will seek to explore how formulating and implementing unique strategic marketing moves serve not only to ensure survival, but also to yield significant and sustainable competitive advantage.

Drawing on current and emerging perspectives on strategic marketing, the material covered will be structured in terms of a basic strategic marketing model, which deals with company, competition, customer, environment, strengths and weaknesses, objectives and goals, strategy formulations and implementation.

In order to contextualise this material, students will be encouraged to develop an understanding of the practical necessity for interdependency and synergy between an organisation's corporate, business, and functional levels of strategy.

### **WINEMKTG 7060EX**

#### **Consumer Behavioural Analysis**

3 units - semester 1

External

Pre-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

The aim of this course is to alert students to the many variables that impact upon the purchase and consumption of goods and services, especially wine. Within this multi-disciplinary course are the studies of perception, attitudes, human motivation, consumer information processing and decision making, the sociology of people, cultural and sub-cultural variables, group influences and the segmentation of consumers into manageable communicable target groups for wine markets. Knowledge of consumer behaviour provides direction and the basis for wine marketing efforts such as advertising, promotion, public relations, wine packaging, pricing, distribution and the nature of the wine product.

Assessment: to be advised

### **WINEMKTG 7062EX**

#### **Microeconomic Principles**

3 units - semester 1

External

Assessment: Assignments, final exam

The course provides an introduction to the essential elements of microeconomics, with emphasis on demonstrating how the understanding of microeconomic principles can lead to better analysis of management and marketing of wine and food products, and government microeconomic policies. Broadly, the course covers how production and consumption decisions of individual economic units are made and coordinated. Specific topics include fundamentals of supply and demand analysis, production economics, analysis of short and long-run costs of production, market structure, pricing policies and methods, market failure, welfare and public policy issues and the markets for factors of production.

### **WINEMKTG 7063EX**

#### **Macroeconomic Essentials for Wine & Food Business**

3 units - semester 2

External

Assessment: Assignments and final exam

This course develops understanding of the macroeconomic environment in which wine and food businesses operate; and the ability to analyse the implications of specific macroeconomic events (eg, change in the interest rate, tax cut, or increasing unemployment) to success and profitability, and marketing

strategies of wine and food businesses. Emphasis is on applications and policies, not formal economic theory. Coverage include: measurements of national income, cost of living, and unemployment; productivity and economic growth; the monetary system; the causes and effects of inflation and unemployment; impacts of monetary and fiscal policies; factors influencing the international flows of goods and capital; and current debates over macroeconomic policies.

### **WINEMKTG 7065EX**

#### **Database Marketing for Food and Wine Business**

3 units - semester 2

External

Pre-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

Assessment: Assignments and final exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course presents the evolving field of database marketing, broadly defined as the use of customer databases and information technology to promote one-to-one relationships with customers and to create precisely targeted marketing strategies; and its uses in food and wine businesses, especially for small to medium sized firms. Coverage includes the theories and practices of customer database design, implementation and maintenance; customer relationship management, and acquisition, retention and win-back strategies; applying customer lifetime value techniques; customer segmentation; and database marketing communication. More complex database marketing concepts including geodemographic applications, automatic cluster detection, and market basket analysis will be introduced.

### **WINEMKTG 7065WT**

#### **Database Marketing for Food and Wine Business**

3 units - semester 2

Up to 4 hours per week

Pre-Requisite(s): WINEMKTG 7055WT or WINEMKTG 7055EX

Assessment: Assignments and final exam

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

This course presents the evolving field of database marketing, broadly defined as the use of customer databases and information technology to promote one-to-one relationships with customers and to create precisely targeted marketing strategies; and its uses in food and wine businesses, especially for small to medium sized firms. Coverage includes the theories and practices of customer database design, implementation and maintenance; customer relationship management, and acquisition, retention and win-back strategies; applying customer lifetime value techniques; customer segmentation; and database marketing communication. More complex database marketing concepts including geodemographic applications, automatic cluster detection, and market basket analysis will be introduced.

### **WINEMKTG 7066EX**

#### **Advanced Wine Marketing A**

6 units - semester 1

External

Restriction: Available to M WineBus students only

Pre-Requisite(s): WINEMKTG 7049EX or equivalent, WINEMKTG 7055EX or equivalent & WINEMKTG 7034EX or equivalent

Assessment: Assignments and major marketing research project

This course adopts a multi-disciplinary approach integrated with fundamental wine industry practicalities to address key issues of today's wine marketing coalface. Drawing on current and emerging marketing mix perspectives as these relate to the wine market, the emphasis is on areas of wine marketing application such as new wine product development, strategic wine brand building and management, regional branding approaches, wine market segmentation approaches, pricing strategies, wine distribution channel and advertising and promotion issues. Within this wine marketing framework, there is specific focus throughout on various consumer behavioural aspects, competitiveness issues and the important role of the winery cellar door. Students will need to develop an in-depth understanding at an advanced level of how grounded marketing theory principles relate and apply to the wine marketplace and its issues.

The course's most important outcome is a major primary research project, conducted by students individually, to seek solutions to specific wine marketing issue(s). Students will be involved in all aspects of conducting targeted marketing research, including proposal writing, questionnaire development, data gathering, data analysis and interpretation, and report-writing. In the process a statistical software package will be used after impartation of the required level of statistical analysis knowledge and skills.

### **WINEMKTG 7066WT**

#### **Advanced Wine Marketing A**

6 units - semester 1

Up to 3 hours per week

Restriction: Available to MWineBus students only

Pre-Requisite(s): WINEMKTG 7049WT or WINEMKTG 7049EX & WINEMKTG 7034WT or WINEMKTG 7034EX, or equivalent

Assessment: Assignments, major marketing research project

This course adopts a multi-disciplinary approach integrated with fundamental wine industry practicalities to address key issues of today's wine marketing coalface. Drawing on current and emerging marketing mix perspectives as these relate to the wine market, the emphasis is on areas of wine marketing application such as new wine product development, strategic wine brand building and management, regional branding approaches, wine market segmentation approaches, pricing strategies, wine distribution channel and advertising and promotion issues. Within this wine marketing framework, there is specific focus throughout on various consumer behavioural aspects, competitiveness issues and the important role of the winery cellar door. Students will need to develop an in-depth understanding at an advanced level of how grounded marketing theory principles relate and apply to the wine marketplace and its issues.

The course's most important outcome is a major primary research project, conducted by students individually, to seek solutions to specific wine marketing issue(s). Students will be involved in all aspects of conducting targeted marketing research, including proposal writing, questionnaire development, data gathering, data analysis and interpretation, and report-writing. In the process a statistical software package will be used after impartation of the required level of statistical analysis knowledge and skills.

### **WINEMKTG 7067EX**

#### **Winery Business Management A**

6 units - semester 2

External

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Pre-Requisite(s): WINEMKTG 7053WT or WINEMKTG 7053EX & WINEMKTG 7055WT or WINEMKTG 7055EX

Assessment: Assignments, Major Project

This capstone course integrates all of the interfacing elements between wine, business and marketing management as these relate to the 'real-world' side of the wine industry of today. In the process wine marketing (with a strong emphasis on brand building to differentiate the wine(ry) business), winery cost and management accounting and financial management, strategic winery business management, and organisation development are all examined as these relate to an actual winery. Key focus areas are wine(ry) brand building and management, understanding costs of production, strategic management issues, and financing growth strategies for a wine(ry) business.

Students are required to conduct extensive research of both the winery organisation's internal and external environments, including all its operational and financial issues.

The Key activity performed in this course is the analysis and application of decision-making to winery operations and their application to an actual (operating) winery. The primary course outcome is a major project in the form of a realistic and fully-integrated 5-year strategic business plan for this operating winery including profit and cash budgets and supporting materials.

### **WINEMKTG 7067WT**

#### **Winery Business Management A**

6 units - semester 2

Up to 3 hours per week

Restriction: Available to GradCertWineBus, GradDipWineBus & MWineBus students only

Pre-Requisite(s): WINEMKTG 7053WT or WINEMKTG 7053EX & WINEMKTG 7055WT or WINEMKTG 7055EX

Assessment: Assignments, major project

This capstone course integrates all of the interfacing elements between wine, business and marketing management as these relate to the 'real-world' side of the wine industry of today. In the process wine marketing (with a strong emphasis on brand building to differentiate the wine(ry) business), winery cost and management accounting and financial management, strategic winery business management, and organisation development are all examined as these relate to an actual winery. Key focus areas are wine(ry) brand building and management, understanding costs of production, strategic management issues, and financing growth strategies for a wine(ry) business.

Students are required to conduct extensive research of both the winery organisation's internal and external environments, including all its operational and financial issues.

The Key activity performed in this course is the analysis and application of decision-making to winery operations and their application to an actual (operating) winery. The primary course outcome is a major project in the form of a realistic and fully-integrated 5-year strategic business plan for this operating winery including profit and cash budgets and supporting materials.

### **WINEMKTG 7068NW**

#### **The Australian Wine Industry: Rise of an Icon**

3 units - winter semester

Up to 32 hours, plus field trip during Winter School

Available for Non-Award Study

Incompatible: All other WINEMKTG & OENOLOGY & VITICULT courses

Assessment: Exam, sensory tests, group presentation, field work report, individual essay

The Australian wine industry is internationally renowned for the innovative approaches that have made it a leading instigator of

many 'best-practices' across the entire wine value chain, from grape growing, wine making to consumer satisfaction. This course will provide a broad understanding of the Australian wine industry by embracing a 'whole-of-wine-chain' approach that reflects the industry's core strengths. Students will be introduced to the industry's fascinating history, especially how it grew to become a formidable force in international wine markets and made Australia the leading New World wine-producing country. It will provide knowledge of the principles and practices that underpin successful Australian wine production by covering topics such as grape growing, vineyard management and operation, making of table, sparkling, fortified and dessert wines, sensory evaluation of wines, regional wine styles, and basic flavour chemistry of grapes and wine; emphasising aspects distinctive to the Australian wine industry. The course will comprise lectures and practical sessions, including a full day visit to one of Australia's famous wine regions. The course is aimed at students with an interest in wine but does not require in-depth scientific knowledge.

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

### **WINEMKTG 7068WT**

#### **The Australian Wine Industry: Rise of an Icon**

3 units - winter semester

Up to 32 hours, plus field trip during Winter School

Incompatible: All other WINEMKTG & OENOLOGY & VITICULT courses

Assessment: Exam, sensory tests, group presentation, field work report, individual essay

The Australian wine industry is internationally renowned for the innovative approaches that have made it a leading instigator of many 'best-practices' across the entire wine value chain, from grape growing, wine making to consumer satisfaction. This course will provide a broad understanding of the Australian wine industry by embracing a 'whole-of-wine-chain' approach that reflects the industry's core strengths. Students will be introduced to the industry's fascinating history, especially how it grew to become a formidable force in international wine markets and made Australia the leading New World wine-producing country. It will provide knowledge of the principles and practices that underpin successful Australian wine production by covering topics such as grape growing, vineyard management and operation, making of table, sparkling, fortified and dessert wines, sensory evaluation of wines, regional wine styles, and basic flavour chemistry of grapes and wine; emphasising aspects distinctive to the Australian wine industry. The course will comprise lectures and practical sessions, including a full day visit to one of Australia's famous wine regions. The course is aimed at students with an interest in wine but does not require in-depth scientific knowledge.

This course involves teaching sessions that may be attended by both Undergraduate and Postgraduate students.

## Index of Courses

---

### A

Advanced Astrophysics .....	11
Advanced Dynamics and Relativity .....	12
Advanced Principles Pest Mgmt & Biosecurity .....	18
Advanced Topic in Physics .....	12
Advanced Wine Marketing A .....	27, 28
Advances in Oenology .....	11
Advances in Viticultural Science .....	22
Advertising and Promotion .....	23
AGRIBUS 7031WT .....	3
Agroecosystems and Value Chains .....	3
Applications of Plant Biotechnology in Production .....	16
Applics of Plant Biotech in Health & Nutrition .....	16
Applied Management Science .....	25
Applied Marketing Research .....	24

### B

Biosecurity and Incursion Management .....	15
Biosecurity Plant Pests: Weeds .....	15

### C

Carbon Management: Research Methods .....	7
Carbon Management: Research Project .....	7
Carbon Management: Research Project Pt A & B .....	7
Cellar and Winery Waste Management .....	10
Classical Diagnostic Methods in Plant Health .....	17
Climate Change: Past, Present and Future .....	5
Clinical Research Project .....	21
Communicating Science .....	3
Computational Physics .....	13
Consumer Behavioural Analysis .....	27

### D

Database Marketing for Food and Wine Business .....	27
Designing Environmental Monitoring Programs .....	6
Distillation, Fortified and Sparkling Winemaking .....	10
DVM Professional Skills .....	21

### E

Electromagnetism .....	13
EMT: Industry Project .....	7
EMT: Industry Project Pt A & B .....	7
EMT: Research Methods .....	6
Engineering for Viticulture & Oenology B .....	22
Environmental Toxicology and Remediation .....	19
Experimental Physics .....	12
Extended Research Project (Plant Biotech) Part 1 & 2 .....	19
Extended Research Project (Plant Health) Part 1 & 2 .....	18

### F

Fermentation Technology .....	10
Food Marketing .....	26
Foundations of Plant Biotechnology .....	18
Foundations of Plant Health .....	17
Fourier Techniques & Applications .....	11

### G

Gauge Theory .....	11
General Relativity .....	11
GIS for Agricultural Sciences .....	19
GIS for Environmental Management .....	19
Global Food & Agric Business Research Project .....	4
Global Food & Agricultural Policy Analysis .....	3
Global Food and Agricultural Markets .....	4
Global Wine Market .....	25
Globalisation & Agriculture in Emerging Economies .....	3

### H

Horticulture Systems .....	8
----------------------------	---

### I

Industry Experience (Oenology) PG .....	11
Integrated Pest Management A .....	17
Integrated Weed Management Part 1 & 2 .....	15
Intensive Production Medicine .....	21
International Marketing of Wine & Agric Products .....	26
International Wine Law .....	24
Internet Marketing and E-Commerce .....	26
Internship in Urban Habitat Management .....	20, 21
Introduction to Managerial & Financial Accounting .....	25
Introductory Grape and Wine Knowledge .....	8
Introductory Winemaking .....	10
Invasion Biology: Foundations of Biosecurity .....	15
Issues in Sustainable Environments .....	5

### L

Legal Issues in Wine Marketing .....	25
--------------------------------------	----

### M

Macroeconomic Essentials for Wine & Food Business .....	27
Management and Performance of Global Food Chains .....	4
Management and Regulation in Plant Health .....	16
Mgmt, Commercialisation & Regulation Plant Biotech .....	16
Microeconomic Principles .....	27
Mineral Exploration for Project Managers .....	7
Mineral Nutrition of Plants .....	14
Molecular Diagnostic Methods in Plant Health .....	15
Molecular Plant Breeding .....	18
Monitoring Technologies for Ecological Systems .....	6

### N

Non-Linear Optics .....	11
Nuclear and Radiation Physics .....	11

### O

Olive Production and Marketing .....	8
Optics and Photonics .....	13

### P

PHYSICS 7003 .....	11
PHYSICS 7004 .....	11
PHYSICS 7042 .....	12

PHYSICS 7100	12
PHYSICS 7104	12
PHYSICS 7209	13
PHYSICS 7532	13
Plant Genomics	18
Plant Molecular Biology	14
Plant Pathology	17
Problems in Agricultural Business A	3
Problems in Agricultural Business B	3
Production Horticulture	8
Project F (ANR)	5
Project F (AW) Part 1	4
Project F (AW) Part 2	5

## Q

Quantum Field Theory	11
Quantum Mechanics A	14
Quantum Mechanics B	14

## R

Radiation Biology, Protection & Epidemiology	14
Relativistic Quantum Mechanics & Particle Physics	11
Remote Sensing	19
Research Methodology & Dissertation P/T Part 1 & 2	20
Research Methodology and Dissertation F/T Pt 1 & 2	20
Research Methodology and Experimentation	5
Research Methodology and Methods	24
Research Project (M.Sc. Physics)	12
Research Project (Plant Biotechnology)	19
Research Project (Plant Health)	18
Research Project F/T	20
Research Project in Agribusiness F/T	3
Research Project in Agribusiness Part 1 & 2	3
Research Project P/T Part 1 & 2	20
Research Project: Sustainability	6
Research Project; Carbon Management	6

## S

Sensory Studies	10
Soil & Water: Management and Conservation	20

Soil Ecology and Nutrient Cycling	19
Stabilisation and Clarification	9
Statistical Mechanics	12, 14
Strategic Marketing Management	26
Strategies and Practices for Pest Mgmt & Eradication	15
Sustainability: Research Methods	7
Sustainability: Research Project	7
Sustainability: Research Project Pt A & B	7
Sustainable Development: Concepts and Applications	6

## T

Techniques in Plant Biotechnology	16
The Australian Wine Industry: Rise of an Icon	28, 29
Thinking Critically About Global Warming	5
Topics in Agricultural Business A	3
Topics in Mathematical Physics A	12
Topics in Mathematical Physics B	12
Topics in Soil and Land Systems	19
Trends & Issues in the World Food System	4

## V

Veterinary Pathology	21
Veterinary Practice Fundamentals A	21
Veterinary Practice Fundamentals B	21
Vineyard and Winery Operations A	8, 9
Vineyard and Winery Operations B	9
Viticultural Engineering and Irrigation	5
Viticultural Methods and Procedures	22
Viticultural Practice	22
Viticultural Science A	22
Viticultural Science B	22

## W

Wine & Food Tourism and Festivals	23
Wine and Food Marketing Principles	25, 26
Wine and Society	23, 24
Wine Packaging and Quality Management	9
Wine Retail and Distribution Management	23
Winemaking at Vintage	10
Winery Business Management A	28