Grow.
The course outlines should be read in conjunction with the Prospectus of the School of Forestry, the University of Canterbury Calendar and the Enrolment Handbook of the University of Canterbury. Outlines are given for those subjects offered by the School. Students should consult other Departments/College Offices for outlines to subjects they offer.
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</table>
The School of Forestry in 2015

The School of Forestry aims to produce forestry graduates of the highest calibre who can manage a range of forests and other natural resources. We provide a focused forestry programme that is relevant to employers. We know this because employers tell us so – our students are sought not only by New Zealand forestry organisations but also internationally. The shortage of forestry graduates in Australia means that Canterbury students who have completed studies over the past five years have been recruited by forestry companies in Queensland, New South Wales, Victoria, South Australia and Western Australia. However, because of opportunities in New Zealand, most stay here.

Continuing students will see that there have been some adjustments to the curriculum for the BForSc following the programme reviews in previous years. The major changes are the introduction of BIOL111 – Cellular Biology & Biochemistry to the 1st Year schedule and the change that makes FORE422 – Forest Harvest Planning a compulsory paper rather than an elective paper. There are smaller in-course changes with the greater focus on a biology strand that runs through the academic programme and the ongoing increase in focus on people management, legislative and health and safety issues.

As always, there are things we need to work on. The feedback we receive from you, as students, alongside the information we have gained from employers, makes our review processes relevant and will assist us as we continue to update our teaching content and methodology.

I welcome our new 1st Year students. While you will be working on a campus that resembles a building zone as much as an academic environment, there will be plenty of events for you to enjoy throughout the year both within the School community and the wider UC community. Along with our continuing students we look forward to returning to remediated and updated facilities in the School of Forestry buildings later in the year. These will include our teaching and computer laboratories. The second part of our complex will subsequently close for remediation and we would hope to have a cohesive environment to work in before the end of 2016.

I wish you well for the academic year and look forward to meeting you in class and through social events.

Bruce Manley
Staff

Professor and Head of School
   Forest management planning; Forest estate modelling; Forest valuation

Professor
E.G. Mason, B.Sc.(For), Ph.D. (Cant), F.N.Z.I.F.
   Silviculture; Modelling of forest growth and yield; Artificial intelligence applications
D.A. Norton, B.Sc. (Hons), Ph.D. (Cant), F.L.S., F.N.Z.I.F.
   Restoration ecology; Ecosystem conservation; Forest pattern and process;
   Forest microclimates; Threatened species conservation

Associate Professors
L.A. Apiolaza, B.For.Sc.(Hons), For.Eng., PhD (Massey)
   Tree breeding; Quantitative genetics
J.M. (Rien) Visser, B.E.(Hons), M.E., Dr. nat. techn. (Bodenkultur)
   Harvest systems; Biomass harvesting and transport logistics; Value recovery and marketing;
   Environmental impacts; Forest engineering

Senior Lecturers
C. Altaner, Diplom Holzwirtschaft (Hons) (Hamburg), PhD (Hamburg)
   Wood quality
D.C. Evison, B.A., B.For.Sc.(Hons), Ph.D.(Wash)
   Forest economics

Lecturer
J. Morgenroth, B.Sc., M.F.C., Ph.D. (Cant)
   Urban Forestry, GIS
T. Murray, B.Sc., M.Sc. (Mass), Ph.D. (Lincoln)
   Entomology, biotic diversity and multi-trophic interactions, biodiversity and species interactions

Research Fellow
M. Bloomberg, B.For.Sc., Ph.D. (Lincoln)
   Forest-sale site assessment; forest ecophysiology; silvicultural systems; forest modelling;
   agroforestry and forest influences (shelter and forest microclimates); tropical forestry

Professor (Retired)
J.C.F. Walker, M.A. (Oxf), Ph.D. (Camb)
   Wood processing; Mechanical properties of wood; Drying and preservation;
   Properties of juvenile wood
Adjunct Associate Professor
R.C. Woollons, B.Sc., Ph.D. (Cant), F.N.Z.I.F.
Forest growth modelling; Forest experimental design and analysis; Statistical methods in forestry; Forest mensuration; Time series

Adjunct Senior Fellows
P. Clinton, B.Sc., M.Sc., Ph.D. (Cant)
Soils and tree nutrition
N. Ledgard, QSO, B.Sc. (Auckland), M.Sc. (Bangor)
Trees for cold climates; Specialist timber species; Wilding tree spread; Farm forestry

Adjunct Teaching Staff
C.H. Cochrane, B.Sc., M.Sc.(Hons), Dip. Tchg., Ph.D.
Vertebrate pest impacts
R. Sands, B.Sc.For.(Hons), Ph.D. (ANU) – Emeritus Professor
Tree physiology; Soil science; Silviculture

Technical Staff
D.K. Clark, N.Z.C.S. (Stats)
N. Pink, B.For.Sc.
V. Wilton, B.Sc., Dip.Sc.
L. Kirk, NZCS

School Coordinator
J.C. Allen
Degree Schedules

Bachelor of Forestry Science

1st Year (Canterbury)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111</td>
<td>Cellular Biology &amp; Biochemistry</td>
</tr>
<tr>
<td>BIOL 112</td>
<td>Ecology, Evolution &amp; Conservation</td>
</tr>
<tr>
<td>Chemistry</td>
<td>15 Points at the 100 level (CHEM114 recommended)</td>
</tr>
<tr>
<td>FORE 111</td>
<td>Trees, Forests and the Environment</td>
</tr>
<tr>
<td>FORE 131</td>
<td>Trees in the Landscape</td>
</tr>
<tr>
<td>FORE 141</td>
<td>Forest Growth and Measurement</td>
</tr>
<tr>
<td>FORE 151</td>
<td>Commercial Aspects of Forestry</td>
</tr>
<tr>
<td>STAT 101</td>
<td>Statistics 1</td>
</tr>
</tbody>
</table>

Plus: 1) 1st Year Field Trip to Hanmer Springs; and 2) Forestry General Requirements Unit Standards Training

2nd Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORE 205</td>
<td>Introduction to Forest Engineering</td>
</tr>
<tr>
<td>FORE 215</td>
<td>Introduction to Forest Economics</td>
</tr>
<tr>
<td>FORE 218</td>
<td>Forest Biology</td>
</tr>
<tr>
<td>FORE 219</td>
<td>Introduction to Silviculture</td>
</tr>
<tr>
<td>FORE 222</td>
<td>Biometry 1A</td>
</tr>
<tr>
<td>FORE 224</td>
<td>Biometry 1B</td>
</tr>
<tr>
<td>SOIL 203</td>
<td>Soil Fertility</td>
</tr>
</tbody>
</table>

Plus: 1) FORE 218/2nd Year Field Trip to Hari Hari; 2) FORE 219 Field Trip to Oxford

3rd Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORE 307</td>
<td>Plantation Silviculture</td>
</tr>
<tr>
<td>FORE 316</td>
<td>Forest Management</td>
</tr>
<tr>
<td>FORE 327</td>
<td>Wood Science</td>
</tr>
<tr>
<td>FORE 342</td>
<td>Geospatial Technologies in Forestry</td>
</tr>
</tbody>
</table>

and one further subject from the Option Schedule

Plus: FORE 307/3rd Year Field Trip to St Arnaud

4th Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORE 419</td>
<td>Management Case Study</td>
</tr>
<tr>
<td>FORE 422*</td>
<td>Forest Harvest Planning</td>
</tr>
<tr>
<td>FORE 444</td>
<td>Sustaining Biodiversity on Private Land</td>
</tr>
<tr>
<td>FORE 445</td>
<td>Environmental Forestry</td>
</tr>
</tbody>
</table>

and three further subjects from the Option Schedule

Plus: 4th Year Field Trip to either North or South Island – linked to Case Study client where possible

Option Schedule

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORE 423</td>
<td>Forest Transportation and Road Design</td>
</tr>
<tr>
<td>FORE 426</td>
<td>Forest Products Marketing and International Trade</td>
</tr>
<tr>
<td>FORE 435</td>
<td>Forest Economics 2</td>
</tr>
<tr>
<td>FORE 436</td>
<td>Forest Tree Breeding</td>
</tr>
<tr>
<td>FORE 443</td>
<td>Biosecurity Risk Management</td>
</tr>
<tr>
<td>FORE 414</td>
<td>Dissertation <em>(Only available in Year 4 to Honours students by invitation, additional to standard course of study in 4th Year)</em></td>
</tr>
</tbody>
</table>

15 points from another Faculty; please discuss suitable course options with the School Coordinator.

No more than 30 points from other degrees may be credited to the BForSc. Students are expected to justify their course selection if they apply for a non-Forestry schedule elective.

* May be taken in 3rd Year instead of the subject from the Option Schedule. Students doing this must enrol in four subjects from the Option Schedule in 4th Year
Bachelor of Engineering (Hons) – Forest Engineering

1st Professional Year

- EMTH 210  Engineering Mathematics
- ENCN 213  Design Studio 1
- ENCN 221  Engineering Materials
- ENCN 231  Solid Mechanics
- ENCN 253  Soil Mechanics
- ENFO 204  Forest Measurement
- FORE 205  Introduction to Forest Engineering
- FORE 215  Forest Economics

2nd Professional Year

- ENCN 305  Computer Programming and Stochastic Modelling
- ENCN 353  Geotechnical Engineering
- ENCN 371  Project and Infrastructure Management
- ENFO 327  Wood Science
- ENNR 320  Integrated Catchment Analysis
  Or
- ENCI 335  Structural Analyses
- FORE 316  Forest Management
- FORE 342  Geospatial Technologies in Forestry

3rd Professional Year

- ENFO410  Forest Engineering Research
- FORE 422  Forest Harvest Planning
- FORE 423  Forest Transportation and Road Design

Sufficient courses from the following list to give a total of 120 points:

- FORE 426  Forest Products Marketing and International Trade
- FORE 435  Advanced Forest Economics
- FORE 443  Biosecurity Risk Management
- ENGR 403  Introduction to Fire Engineering
- ENGR 406  Wood and Engineering Wood Products
- ENNR 423  Sustainable Energy Systems
- ENCN 415  Pavement Engineering
- ENCN 452  Advanced Geotechnical Engineering
- ENGE 412  Rock Mechanics and Engineering

Any 15-point 400-level option to be approved by the Director of Studies

Non-Academic Requirements

Both the BForSc and BE(Hons) degrees have non-academic requirements that students are required to meet before they are eligible to graduate. Information on the requirements for BForSc students can be found on Page 21 of this Handbook and the Forestry Science/Forest Engineering Learn page.

BE(Hons) students are required to complete a period of approved practical work (100 days); submit an approved valid 1st Aid Certificate; and complete an approved course of workshop training. Full details on these requirements can be found at [http://www.engf.canterbury.ac.nz/practical/index.shtml](http://www.engf.canterbury.ac.nz/practical/index.shtml)
For specific information on how to sign for the workshop training (Civil), go to the following web link: http://www.civil.canterbury.ac.nz/ugrad/undergrad.shtml and read the section entitled “Workshop Training Course”. You will need to continue on with additional links in that section.

1st Aid training can be sourced through a number of training providers, at varying costs. Students should schedule training in their own time. Some training providers within the Christchurch metropolitan area, with current rates at the time of writing, include:

City First Aid, Workplace First Aid course, $150.00
www.cityfirstaid.co.nz

Life Care Consultants, Workbased First Aid Training, $218.50
www.cpr.co.nz

St John, First Aid Level 2 course, $239.00,
www.stjohn.org.nz/First-Aid/First-Aid-Course-Overview

Red Cross, Comprehensive First Aid course, $210.00
www.redcross.org.nz

RedUC – discounted first aid courses by Red Cross in association with UC. Refer to the Facebook page: https://www.facebook.com/UCREDCHRISTCHURCH

It is YOUR responsibility to ensure that you have completed all the requirements before the due dates in any calendar year.

Assessment details for all FORE and ENFO courses will be handed out in class on the first day of each course. A new centralised timetable system has operated from 2012 – personal timetables will be available on your student web page. Room allocations will be available by looking up course descriptions on the Course Information System at http://www.canterbury.ac.nz/courses.

Graduate Diploma in Forestry

The Graduate Diploma is suitable for providing exposure to forestry for graduates with degrees other than forestry. Applicants with a degree from any university will be considered.

The Graduate Diploma requires courses with a minimum weighting of 120 points. At least 90 points shall be from the 300 and 400-level Forestry schedule. Time required for the Diploma is one year. One course (maximum of 15 points) may be taken from other departments of the university providing they can be timetabled and they are relevant to and of sufficient size and standard to be part of the Graduate Diploma programme.

Postgraduate Diploma in Forestry

The Postgraduate Diploma is suitable (1) for retraining those who already have a forestry degree or associated qualification from the past; (2) for providing some exposure to forestry for graduates with degrees other than forestry; and (3) as a qualification for entry to the Master of Forestry Science for those who are otherwise ineligible. Applicants with a degree from any university will be considered. (Students with degrees other than forestry may have sufficient forestry-approved courses to be eligible to enter the Bachelor of Forestry Science degree in second or third year.)
The Postgraduate Diploma requires 120 points of courses taken from the MForSc schedule (see pages 10-11), excluding Research Report or Thesis. The time required is one year. One course (maximum of 15 points) may be taken from other departments of the university providing they can be timetabled and they are relevant to and of sufficient size and standard to be part of the Postgraduate Diploma programme.

Any student who satisfactorily completes the Postgraduate Diploma in Forestry is eligible for enrolment in the second year of a two year Master of Forestry Science degree.

**Master of Forestry Science**

There are three ways of obtaining the Master of Forestry Science degree:

- a) by examination and report (180 points plus a report, minimum time 2 years);
- b) by examination and thesis (120 points plus a thesis, minimum time 2 years);
- c) by thesis (minimum time 1 year).

*Candidates with a Bachelor of Forestry Science with Honours are entitled to choose from all categories. Candidates with any four-year degree in appropriate subjects at an acceptable grade, or with a Postgraduate Diploma in Forestry may also be considered for all categories depending on their background and the nature of the research topic. Otherwise they will be eligible for categories A and B. Candidates who have met all the requirements for a Postgraduate Diploma in Forestry may transfer to Masters A or C without taking up the Postgraduate Diploma.*

Usually candidates with a three year degree will be required to undertake the Postgraduate Diploma before being enrolled in Masters A, B or C, although some candidates with a good three year degree who wish to pursue research in a specific area will be considered for Masters B. Those candidates who do not have the qualifications listed above but consider that they can provide a case to support admission to candidature can apply to the university for *ad eundum* admission.

The Masters A report is a scholarly document, usually of research, of less than 20 000 words. The thesis in Masters B and C is an original piece of research which may be up to 50 000 words.

**Doctor of Philosophy**

The Doctor of Philosophy is a research degree of at least three years duration. Candidates need a good Honours degree or a Masters degree to enrol. Research undertaken towards a Doctor of Philosophy, and the reporting of it, are required at the highest international standard. The research must be original and make a significant contribution to knowledge. Under some circumstances, candidates enrolled in a Masters degree may transfer to a Doctor of Philosophy degree if progress has been very good and the nature of the research is suitable.

**Papers for Masters Students**

*(Subject to CUAP Approval)*

**1st Semester**

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORE 422</td>
<td>Forest Harvest Planning</td>
</tr>
<tr>
<td>FORE 435</td>
<td>Forest Economics 2</td>
</tr>
<tr>
<td>FORE 436</td>
<td>Forest Tree Breeding</td>
</tr>
<tr>
<td>FORE 610</td>
<td>Research Methods</td>
</tr>
<tr>
<td>FORE 616</td>
<td>Restoration Ecology</td>
</tr>
<tr>
<td>FORE 624</td>
<td>Plantation Silviculture</td>
</tr>
<tr>
<td>FORE 642</td>
<td>Advanced IT Applications in Forestry and Natural Resource Management</td>
</tr>
</tbody>
</table>
2nd Semester

FORE 423  Forest Transportation and Road Design
FORE 426  Forest Products Marketing and International Trade
FORE 443  Biosecurity Risk Management
FORE 610  Research Methods
FORE 618  Wood Quality
FORE 619  Wood Processing
FORE 641  Plantation Forest Management

Thesis/Report Numbers (anytime or S1 or S2 enrolment):

FORE 679  MForSc Report
FORE 690  MForSc Thesis
FORE 790  Forestry PhD

The School reserves the right not to offer a course if the number of student enrolments falls below a minimum level.

Please check with the School Coordinator for information on planned Special Topic courses.

Special Topics/Independent Course of Study

The special topic/independent course of study allows a student to undertake some directed study in an area of interest, or the School to offer a one-off course. For example, a student may wish to study ‘harvesting effects on soil properties and consequences for future production’ or perhaps ‘forest certification in New Zealand and its impact on environmental management and on marketing of forest products’. If the student can come to an agreement with a staff member who is prepared to supervise, then a special topic can be authorised. Usually the assessment will be directed reading and assignments. Also a special topic can be used to undertake the literature review and preparatory planning for a subsequent Masters report or thesis. The one-off course offering can be brought about where the School has an Erskine Fellow teaching for a defined period (typically one term) and we are able to offer a special paper (such as Community Forestry) to all students during the period of the Fellow’s visit.

Unfortunately there is no guarantee that a Special Topic can be offered to students on request. It depends on finding satisfactory supervision.

Please see the School Coordinator for Special Topic numbers and semesters.

Assessment details for all courses will be advised at the commencement of lectures.
Assessment

Grades

The mark/grade/point equivalents used in the School of Forestry are given below.

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 90%</td>
<td>A+</td>
<td>9</td>
</tr>
<tr>
<td>85-89%</td>
<td>A</td>
<td>8</td>
</tr>
<tr>
<td>80-84%</td>
<td>A-</td>
<td>7</td>
</tr>
<tr>
<td>75-79%</td>
<td>B+</td>
<td>6</td>
</tr>
<tr>
<td>70-74%</td>
<td>B</td>
<td>5</td>
</tr>
<tr>
<td>65-69%</td>
<td>B-</td>
<td>4</td>
</tr>
<tr>
<td>60-64%</td>
<td>C+</td>
<td>3</td>
</tr>
<tr>
<td>55-59%</td>
<td>C</td>
<td>2</td>
</tr>
<tr>
<td>50-54%</td>
<td>C-</td>
<td>1</td>
</tr>
<tr>
<td>40-49%</td>
<td>D</td>
<td>0</td>
</tr>
<tr>
<td>&lt;40</td>
<td>E</td>
<td>-1</td>
</tr>
</tbody>
</table>

Failed Courses

Degree regulations have changed and there is no longer a mechanism for Pass Exam as a Whole in any College of Engineering programme – including Bachelor of Forestry Science and BE(Hons)Forest Engineering. Students who fail a paper will be required to repeat it.

Where a student fails the same paper twice he or she must apply in writing to the Dean of Engineering and Forestry for permission to undertake that paper a third time. Where a student fails that paper for a third time, they may be excluded from the BForSc programme (on the recommendation of the Dean of Engineering and Forestry).

Honours

Bachelor of Forestry Science

All Faculties in the University of Canterbury give recognition to their top academic students by awarding their degree with Honours. Many Faculties identify prospective Honours students on the basis of grades achieved in the first years of their study and invite them to enrol in the Honours programme.

In Forestry, we use the grades students obtain in Years 2 and 3 as a basis for inviting academically able students to enrol in FORE 414 Dissertation, a research course taken in addition to the regular Year 4 course of study. The Dissertation is an opportunity for students to gain experience in research methods and analysis, providing a basis for employment in forestry research or postgraduate study. Students who perform consistently well in all their courses in Years 3 and 4, plus Dissertation, may graduate with Honours (First Class, Second Class Division I or Second Class Division II).

The grade point average required for invitation to Honours is 5 (B), taking into consideration the different weighting of the courses (15 and 30 points) in Years 2 and 3. Students with a GPA <5 will only be considered for entry to Honours under exceptional circumstances.
In the calculation of Honours, grade points average for Years 3 and 4 will be based on course weightings (15/30 points), with FORE 414 Dissertation weighted at x2 (equivalent to 60 points).

The grade cut point for the different level of Honours is:

<table>
<thead>
<tr>
<th>Grade Average</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Class</td>
<td>7</td>
</tr>
<tr>
<td>2nd Class, Div I</td>
<td>6</td>
</tr>
<tr>
<td>2nd Class, Div II</td>
<td>5</td>
</tr>
</tbody>
</table>

**Graduate Diploma in Forestry**

The Graduate Diploma is offered by pass and distinction. Distinction is equivalent to a GPA >8.

**Postgraduate Diploma in Forestry**
*(Subject to CUAP Approval)*

The Postgraduate Diploma is offered by pass and distinction. Distinction is equivalent to a GPA >8. Where a candidate has qualified for the award of the Postgraduate Diploma and has demonstrated research potential and has the support of the Head of Department, he or she may abandon the Postgraduate Diploma and transfer to the Master of Forestry Science degree, with such crediting of courses passed as may be approved by the Head of School.

**Master of Forestry Science**
*(Subject to CUAP Approval)*

The Master of Forestry Science degree may be awarded with Distinction (grade range from 8.0 – 9.0) or Merit (grade range 5.5 – 7.9) where candidates complete the degree within the maximum time limits. The weighting for Masters reports and Masters theses are 2 and 4 times that of subject examinations respectively.

Thesis students should ensure they are fully conversant with Degree Regulations and Guidelines, particularly in relation to maximum time limits for completion of the thesis. Copies of these can be obtained from the School Administrator or found on-line at:

http://www.canterbury.ac.nz/postgrad

**Master of International Forestry**

The Master of Forestry Science degree may be awarded with Distinction (grade range from 8.0 – 9.0) or Merit (grade range 5.5 – 7.9) where candidates complete the degree within the maximum time limits and no extension has been granted.
Scholarships and Prizes

There are added incentives to excel. Scholarships and Prizes are awarded to the top students both within the School (the NZ School of Forestry Schlich Memorial Prize at undergraduate level) and throughout the University (the University Prize and the Senior Prize); there is a Dissertation Prize of $300 awarded to the “best and most innovative Dissertation”; and the M.R. Jacobs Prize for the top student in Silviculture.

At postgraduate level there are a number of scholarships available from the University (including the TW Adams, Owen Browning and SCFNZ Ltd Scholarships which are specifically for Forestry students) and the School awards the Graham Whyte Forestry Prize for the top postgraduate each year. The School also offers an award each year to assist postgraduates with expenses related to attending conferences (the McKelvey Prize).

Up-to-date information on scholarships and prizes (including application deadlines) can be found on the University Scholarships website. This is updated regularly and students are encouraged to check the site. The web address is:

http://www.canterbury.ac.nz/scholarships
School of Forestry Policy, Guidelines and Regulations

Handing in assignments

Late Assignments
Late assignments will be accepted at or before 5 pm for up to three days (including weekend days) after the due date in which case there will be a drop of three grades (e.g. B+ to C+). Assignments will not be accepted more than three days after the due date. The only exception to this is when late submission is accompanied by an appropriate medical certificate, or when prior permission has been given by the Head of Department. The reason for these rules is to protect the majority of the class. If there were no penalty for late submission, the late presenter would be at an advantage over other students.

Assessment Declaration
When you hand in assessment material, you are required to complete and attach the Assignment Cover Sheet. This is available from the reception counter.

Electronic Submission of Assignments.
Clicking the Submit or Send button via Learn or e-mail direct to the lecturer denotes confirmation that the assignment you have handed in is your own. As with the assignment declaration form it indicates you are aware that plagiarism, collusion, copying and ghost writing are all forms of dishonest practice.

Where the work is for group assignments, submitting the assignment confirms that the work presented is a collective report that is written only by the individuals within the group.

Use the appropriate referencing systems to identify authors. If in doubt, refer to the sections below on dishonest practice and plagiarism.

Reconsideration of grades

Any student may apply in writing to the Registrar within four weeks of the date of publication of final results for reconsideration of a final grade. The application must be accompanied by the prescribed fee which will be refunded if the application results in a change of grade. The reconsideration will normally consist of a re-marking and re-counting of the final examination script (if any) together with a recount of the marks awarded for any other items of work. (Most often the result of such a re-consideration is no change in grade).

A student may, within 7 days after the result of a major test or other major work is made known, apply to the Head of Department to have it reconsidered. The reconsideration will normally consist of a remarking and re-counting of the work submitted. A major work or test is one which is worth no less than 10% of the final assessment.

Further details on assessment can be found in university Regulations contained in the University Calendar.

Aegrotat consideration

Aegrotat consideration is given for impaired performance (i.e. in the demonstration of what has been learnt) but not where it is the ability to learn that has been impaired.

An aegrotat application must be submitted to the Registrar on or within 7 days of the due date for assessment – together with satisfactory supporting evidence from an appropriate source.
The School may offer an extension without penalty for work (other than tests or examinations) where a student is unable to complete work by the due date for reasons acceptable under the aegrotat regulations.

Further information on aegrotat considerations can be found in the University of Canterbury Calendar. Copies will also be available on noticeboards throughout the School.

**Appeals**

Any student aggrieved by a decision of the Head of Department or the Dean of the Faculty may appeal to the Academic Board. Procedures are given in the University Calendar.

**Disabilities**

Special provisions are available to students with disabilities. If you have a short-term disability that you consider could impair your performance, please register this with the Chair, Forestry Board of Studies at the beginning of your studies (in practical terms, with the School Coordinator). You must also register with the Disability Resource Service located on Level 3 of the Rutherford Building (Room 317) – for ongoing issues this should occur at or before the commencement of an academic year to enable a full assessment of support requirements to be completed and academic and support departments advised.

**Dishonest practice**

This is mainly concerned with cheating. Sometimes students are surprised and dismayed when they find out that what they are doing in their assessment is considered by the university to be cheating. The following describes what is considered to be cheating by the School of Forestry. It is obviously very important that you understand what we mean by cheating because it is taken very seriously and penalties range from being marked, to zero for that component of the paper, through being failed in the whole paper, to being excluded from the university. The following should be considered in conjunction with the section on ‘dishonest practice and breach of instructions’ given in the University of Canterbury Calendar.

1. **copying**

   Copying of another person’s work, with or without his or her consent is cheating.

2. **collusion**

   Students must not present common material in assignments and practicals unless expressly asked to do so. Even when data are collected and discussed in groups, the submission for assessment must be a totally individual effort.

3. **ghost writing**

   Students must not allow others to write their assignments and then present them as though they were their own work.

4. **offering substantially the same work for more than one item of assessment in the same or different subjects.** (If you are in doubt about this, please consult the relevant lecturer.)

5. **plagiarism**
This is probably the most misunderstood form of cheating and is the one that causes students the most problems. It is very important that you understand exactly what constitutes plagiarism. Details are provided below.

**Plagiarism**

(The School of Forestry would like to thank the Political Science Department for permission to reproduce its handout *Conventions of Scholarly Style and the Need for Academic Honesty*).

Plagiarism is the use without proper acknowledgement of someone else’s material. It is considered dishonest and carries the highest penalties in the university. However, while some of the most obvious forms of plagiarism are easily recognised, there are more subtle forms which one can fall into often without even realising it.

It is important to recognise that all scholarship involves using other people’s material in a whole variety of ways. Since normal essays, articles and books all rely heavily on previous scholarship, it is important for a writer to distinguish between the contributions of this scholarship and his or her own contribution. In most cases a writer’s original contribution to scholarship consists mainly of selecting, ordering, summarising and interpreting what other scholars have said. It is therefore important to learn how to reference properly, that is, how to specify clearly what your debts are and how to acknowledge them. Then your own contribution can be more clearly identified and appreciated.

**Common forms of Plagiarism: From the Obvious to the More Subtle**

(a) Copying an essay from another student and submitting it as your own.

(b) Copying a journal article or a section of a book and submitting it as your own.

(c) Lifting sentences or paragraphs from someone else (essay, article, book, web page, etc.), that is, quoting from them verbatim, without using quotation marks and without proper acknowledgement.

(d) Lifting sentences or paragraphs from someone else, without using quotation marks, but with proper acknowledgement. Here the impression is that the idea or information comes from the source cited, but that the phrasing, the choice of words to express it, is your own contribution.

(e) Using significant ideas from someone else, but putting them into your own words and not acknowledging the source of the ideas. Here the impression is that both the ideas, as well as the form of expressing them, belong to you.

(f) Heavy reliance on phrases and sentences from someone else without proper acknowledgement, thus giving the impression that these phrases as well as the idea they express are your own.

At this point plagiarism begins to give way to practices which, while not dishonest in themselves, are nonetheless indicative of weak scholarship.

(g) Excessive reliance on other people’s material, that is, direct quotations (with quotation marks and with proper acknowledgement), so that your sources speak for you and your own contribution is minimal. While this is not dishonest, your own contribution would be greater if you used your own words more and relied less on quotations. Try not to rely excessively on quotations.

Among the most common legitimate uses of quotations are:
(i) When you want to comment on (for example, to criticise it) what someone else has said, and it is important not to distort it by putting it into your own words;

(ii) When someone else's phrasing is uniquely appropriate and you do not wish to lose this. Excessive use of quotations for this reason indicates a lack of originality and should be avoided;

(iii) When the person being quoted really is an authority, so that what they say counts as evidence for the truth of the claim. Students often think that their lecturers, or the authors of books their lecturers recommend, are authorities in this sense, but this is not normally the case. An example of an authoritative quotation would be the words of a cabinet member on the functioning of cabinet meetings. Normally authorities are people whose situation gives them a unique point from which to observe something.

IF YOU ARE IN ANY DOUBT ABOUT WHETHER SOMETHING CONSTITUTES PLAGIARISM, PLEASE ASK YOUR LECTURER BEFORE YOU HAND IN YOUR ESSAY.

English expression

All written assignments in the School of Forestry are expected to be neat, well written and constructed, with proper punctuation and free from grammatical and spelling errors. Marks will be deducted for poor presentation. Please make sure that you have a copy of 'Writing & Report Guidelines', available from Forestry reception. The Academic Skills Centre provides excellent support to students – both international and local – through their support programme and this is highly recommended to students at any level of study. Information on assistance offered can be found at:

http://www.lps.canterbury.ac.nz/lsc/index.php

Referencing and the Internet

There are two qualities, high and low, of references in written work:

(a) The higher quality material is that which has undergone peer review, which is in the public domain and which can reasonably be expected to be able to be found in a library in perpetuity. Normally this would be placed in the list of references at the end of the article.

(b) The lower quality is that material which has not undergone peer review, and material that is a matter of opinion. Personal communications are a good example. Normally this would be referred to in the text and details placed as a footnote at the bottom of that page.

There is no guarantee of quality of information or of permanent record for material sourced from the web. Accordingly material from web sources falls in the low quality category (b). You should place a footnote giving the specific web page address, author(s) or organisation(s), and date of retrieval.

Enrolment in courses

When you commence lectures, double-check your academic transcript to ensure that you are attending the courses you are enrolled for. Each year, students pre-enrol for more courses than they require, or change courses – particularly at mid-year, or forget to add courses before the last date for changes. This omission is often not discovered until too late and students face failing grades and late enrolment fees.
School of Forestry Computer Room Rules

The Computer Room facilities are provided for you to use by the School of Forestry, and the University of Canterbury.

Use of the facilities is subject to the following conditions:

- **No** food or drink is to be consumed inside the computer rooms (note sipper bottles of water are allowed);

- Computers are not to be left locked. Any computer that is left locked may be rebooted;

- You are not to use the system improperly. This includes, but is not limited to, accessing or attempting to access the system inappropriately, the use of the system to harass, the downloading and/or possession of objectionable material, use of illegal software.

In the case of a breach of the first two conditions in the first instance you will receive a verbal warning. In the second instance access will be suspended for a period of 24 hours. If a third occurrence happens access will be suspended or controlled for a longer period in consultation with the Head of School. Note for the third condition formal discipline procedures may occur. Note it is your responsibility to be familiar with the University Computer Use Policy.

Procedural and policy guidelines for postgraduate students are available from the School Administrator.

**Mentoring Programmes**

Trained mentors are available to help students adjust to university life. Mentors are experienced students studying a variety of courses. Your mentor will work with you to help you find your way around the campus, give you lots of survival tips, answer questions about the university and its systems, advise you where to go or who to see, introduce you to other students, and make the place seem less isolating. Your mentor is a friendly face, someone to share worries and concerns with and to provide you with encouragement and support.

For further information go to [www.canterbury.ac.nz/sas/mentoring](http://www.canterbury.ac.nz/sas/mentoring) (includes a link to register for a mentor) or email mentoring@canterbury.ac.nz.

**Code of Student Conduct**
All students agree to comply with the regulations and policies of the University of Canterbury when they accept their Offer of a Place each year at enrolment. These regulations and policies are located in various publications including the UC Calendar, the Policy Library and via paper/online enrolment. Additionally, the School has regulations and codes of practice that students and staff are expected to adhere to. It is our responsibility to ensure that you have access to such information. The School’s regulations and codes are made public via this Handbook and through Induction Sessions and other means (such as Health & Safety forms preceding field trips).

The University of Canterbury’s Code of Conduct explicitly restates that the law of New Zealand applies to all members of the UC community and all who visit its facilities. Other regulations and codes can be found under two areas:

- **The University of Canterbury Calendar**
  [http://www.canterbury.ac.nz/publications/calendar.shtml](http://www.canterbury.ac.nz/publications/calendar.shtml) and include, but is not limited to: discipline regulations; parking and traffic statutes; and general course and examination regulations

- **University Policies**
  [http://www.canterbury.ac.nz/ucpolicy/index.aspx](http://www.canterbury.ac.nz/ucpolicy/index.aspx) and include, but is not limited to: assessment; computer use; drug and alcohol; University field activities; building access; harassment and complaints procedures; and smoke-free policies.
Field Trips and Practical Courses

Field trips and practical courses are an integral and compulsory part of the Bachelor of Forestry Science and attendance and participation in all field trips is required before the degree can be awarded.

<table>
<thead>
<tr>
<th>Year</th>
<th>Trip Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Hanmer Springs</td>
<td>9-10 April</td>
</tr>
<tr>
<td></td>
<td>General Forestry Units</td>
<td>8 April</td>
</tr>
<tr>
<td></td>
<td>1st Aid (see below)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FORE 218</strong></td>
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<tr>
<td></td>
<td>Hari Hari</td>
<td>19-24 April</td>
</tr>
<tr>
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<td><strong>FORE 219</strong></td>
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</tr>
<tr>
<td></td>
<td>Oxford, North Canterbury</td>
<td>expected to be 3-4 September</td>
</tr>
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<td></td>
<td><strong>FORE 307</strong></td>
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<tr>
<td></td>
<td>Silviculture Trip</td>
<td>21-24 April</td>
</tr>
<tr>
<td>4th</td>
<td>Case Study</td>
<td>20-24 April (location to be confirmed)</td>
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Indicative Costs:

<table>
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<tr>
<th>Year</th>
<th>Cost (incl GST)</th>
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<tbody>
<tr>
<td>1st Year (Hanmer Springs only)</td>
<td>$112</td>
</tr>
<tr>
<td>2nd Year</td>
<td>$448</td>
</tr>
<tr>
<td>3rd Year</td>
<td>$293</td>
</tr>
<tr>
<td>4th Year</td>
<td>$216</td>
</tr>
<tr>
<td>General Requirements Training</td>
<td>$36 + GST</td>
</tr>
</tbody>
</table>

The School heavily subsidises transportation costs across all field trips. Please note that the cost of getting to the 4th Year field trip is met by students, the subsidised costs of transportation during the field trip are met by the School.

You will be invoiced in advance for the course/year field trips (charges will be included on your enrolment invoice at the beginning of the year). The General Forestry Unit training will be invoiced on completion of the course. If you already have a current 1st Aid certificate or General Forestry Unit standards (17769), please present the appropriate original certificates or original of your NZQA Record of Learning to the School Administrator.

You are required to present a certificate for 1st Aid Unit standards 6400, 6401 and 6402 (or 6400, 26551 and 26552) at some stage over the period of your degree. Completion of this training is your responsibility.

You can access 1st Aid training through a number of training providers (see Page 9 for information and indicative costs). It is YOUR RESPONSIBILITY to attend the course and present a certificate to the School Coordinator at some stage prior to the final date of lectures in October of your final year of study.

Personal Safety Equipment

All students enrolled in the BForSc and BE(Hons) (Forest Engineering) programmes are required to have their own hard hat, safety boots, hiking shoes and wet weather clothing throughout the duration of their degree. The School has hard hats for sale at the main office.

Vacation Employment
Students are required to complete at least 90 days of work experience. To ensure that University learning is applied in the workplace, this work experience is to be carried out after commencement of study at the School of Forestry. It should consist of:

- A section of 30 days of manually oriented work experience (virtually any field employment in an area related to degree studies; for example forestry operations; forest or conservation inventory; wood processing; other manual work in the forestry sector. Lab work may qualify if it is routine testing or if it involves gathering information in the field (’getting your hands dirty’). Ensure work is relevant to the degree – if in doubt, please check with the School Administrator);

- A section of 30 days of professionally oriented work experience (the focus is on applying university education in a practical situation. Typical examples are: positions involving research & development, investigation, feasibility studies; forest planning and/or valuation; economic study; inventory analysis; laboratory work (other than routine testing); work study; production planning and control; or any well defined task with a significant forestry content.)

- The remaining 30 days may be made up of either manual or professional work experience.

Students must submit two written reports. These reports should be submitted in electronic form direct to the School Coordinator (Jeanette.allen@canterbury.ac.nz). They should relate to two different periods of practical work each of at least 30 days each. One should relate to a period in which the majority of work was manually oriented and the other to a period in which the majority of work was professional practice. It is possible for a report to have both manual and professional components. However the report should clearly document the type of work, either manual or professional, under clear headings and provide a total number of days being submitted as manual work and number of days submitted as professional work.

Each report should relate to a period of work of at least 30 days with a single employer. It is possible for work carried out in different vacations to be aggregated; i.e. the work reported does not have to be carried out solely during the summer vacation.

It is preferable the reports also relate to two different employers. If both periods of work are with the same employer, the reports must be substantially different, i.e. on two different departments or types of work experience (as above). Students are not permitted to submit a single report to be credited as two reports.

The reports must be submitted to the School of Forestry Office by the first Monday in March. The two reports will be reviewed and given a pass/fail grade. Both reports must be passed for the practical work to be credited towards the degree.

The total number of days work experience completed will be recorded as a cumulative total. The manual/professional practice components credited will be reported back to students on the report assessment cover sheet.
Course Outlines

**FORE 111**  **TREES, FORESTS AND ENVIRONMENT**

**Content:** First semester, 3 hours lectures/week; 1 x 2 hour lab/week (labs are run in weeks 2-7 only)

**Coordinator:** Dr Luis Apiolaza

**Objectives:** To introduce students to the dynamic relationship between forests, environment and society; to examine the nature, location and significance of the world’s forests and their relationship to the environment; to introduce the student to the historical and current societal attitudes to forest use; to provide an overview of goods and services provided by forests; to identify key tree species.

**Syllabus:** Uniformity; classification; history; deforestation; environmental benefits; non-wood forest products; urban forestry; community forestry; agroforestry; forest products; plantations; forest industry in New Zealand; forests and climate change; wood production, processing and variability; international forestry case studies; New Zealand’s indigenous forests; sustainable forest management.

**Final Exam:** Date to be advised

**FORE 131**  **TREES IN THE LANDSCAPE**

**Content:** Second semester, 2 x 2 hour lectures per week; plus half-day field trips on dates to be advised.

**Coordinator:** Dr Justin Morgenroth

**Lecturers:** Dr Justin Morgenroth, Mr Nick Ledgard

**Objectives:** To introduce students to the way in which trees are utilised in situations other than large-scale industrial forestry. Emphasis is given to mixed species, environmental legislation and certification, and issues associated with the growth and management of single tree and small woodlot species.

**Syllabus:** An introduction to trees and their environment. A basic theoretical understanding of environmental and climatic effects on trees will underpin methods for species selection, growing and maintaining trees, and site specific management. The theoretical component of the course is followed by a comprehensive examination of operational use of trees in a variety of urban and rural landscapes. The aim is to appreciate how a theoretical understanding of tree function and growth can inform choices of species for use in environmentally and climatically different ecosystems and land use types.

**Final Exam** Date to be advised
FORE 141/ENFO 204

**Content:**
Second semester, 3 x 1 hour lectures/week; 1 x 2 hour lab/week, 1 x 4 hour field trip/week

**Lecturers:**
Prof Bruce Manley and others

**Objectives:**
To introduce students to the way in which trees and forests are measured. Emphasis is given to techniques and technologies associated with single tree and stand measurement.

**Syllabus:**
Tree measurement; stand variables; growth and yield modelling; sampling; forest inventory; log measurement; surveying and area measurement; mapping and aerial photography; introduction to global positioning systems (GPS) and geographic information systems (GIS).

**Final Exam:**
Date to be advised

FORE 151

**COMMERCIAL ASPECTS OF FORESTRY**

**Content:**
First semester, 3 x 1 hour lectures/week; 1 x 2 hour lab/week

**Lecturer:**
Dr David Evison

**Objectives:**
This course provides an overview of the tools of analysis of commercial aspects of the forestry sector. It describes the main commercial disciples, and shows how they are applied in the commercial forestry environment. The course provides a background in micro-economic theory within a forestry context.

**Syllabus:**
Evaluation forestry sector performance at the business and industry level; an introduction to the key commercial disciplines as they are applied to forestry; understanding methods to assess the value of forests in providing timber and non-timber benefits; identifying the strategic choices and issues facing the commercial forestry sector.

**Required Text:**
Lattimore, Ralph G. The New Zealand Economy: an introduction (2011). (Available from the University Bookshop)

**Final Exam:**
Date to be advised
FORE 205  INTRODUCTION TO FOREST ENGINEERING

Content:  First semester, 3 x 1 hour lectures/week; 1 x 5 hour lab/week

Lecturer:  Assoc Prof Rien Visser

Objectives:  Students will understand the importance of timber harvesting, including historical developments; be able to describe the key steps in the harvesting process, including alternatives for each step; know the key factors and variables needed to develop a basic harvest plan; and understand the importance of both safety and protection of the environment in forest operations.

Syllabus:  Introduction
            Timber Harvesting and Forest Engineering
            Extraction and Processing
            Transportation, machines and costings
            Harvest Systems and Productivity
            Harvest Planning
            Forest Roading
            Health and Safety
            Environmental Management, RMA, Resource Consents
            Hydrology, forest operations and catchment studies

Final Exam:  Date to be advised

FORE 215  INTRODUCTION TO FOREST ECONOMICS

Content:  Second semester, 3 x 1 hour lectures/week; 1 x 2 hour lab/week

Lecturer:  Dr David E vision

Objectives:  Students will understand and be able to discuss the basis for forestry as a business; understand and be able to discuss production, consumption and trade in forestry products both in New Zealand and internationally; be able to practically apply their knowledge in the area of analysis of commercial forest investment; be able to describe and discuss the issue of sustainability in a production forestry context; and be able to demonstrate understanding of how to quantify non-timber values in commercial forests.

Syllabus:  The course will cover economic theory and practical applications in three main areas:

- Forestry as a business – analysis of commercial forest investments.
- Production, consumption and trade in forestry products, New Zealand and global.
- Non-timber values of commercial forests.

Final Exam:  Date to be advised
FORE 218  FOREST BIOLOGY

Content: First semester 4 x 1 hour lectures/week; 1 x 3 hour lab/week

Lecturers: Prof David Norton, Dr Tara Murray

Objectives: Students will understand basic systematics and evolution of conifers and angiosperms; be able to describe and explain key ecophysiological factors affecting trees; be able to describe and explain environmental gradients that drive vegetation distributions; be able to discuss the role of disturbance in maintaining vegetation patterns; be able to describe key governmental and private structures involved in forest health and biosecurity; be able to describe and discuss the role of pathogens and insect pests in forests; be able to identify key vertebrate pests and discuss the impacts that they have in production and indigenous forest systems; and be able to describe the impact and mitigation of abiotic forest health factors in forest systems.

Syllabus: Systematic botany of forest trees and biology of New Zealand indigenous forest species; principles of ecology with an emphasis on population, community and ecosystem factors affecting New Zealand’s forests; science and management of forest pests, disease, wind, fire, biosecurity and risk.

Final Exam: Date to be advised

FORE 219  INTRODUCTION TO SILVICULTURE

Content: Second semester, 3 x 1 hour lectures/week; 1 x 3 hour lab/week

Lecturer: Assoc Prof Euan Mason and others

Objectives: To provide a biological background to the study of Silviculture.

Syllabus: The course is broken down into five core topics:

- Introduction;
- Tree physiology – an overview of biological processes relevant to silviculture;
- Silvicultural systems;
- Ecology and management of natural forests; and
- Tree breeding and genetics

Final Exam: Date to be advised
FORE 222  BIOMETRY 1A (co-coded with STAT 201)

Content:  First semester, 3 x 1 hour lectures/week; 1 x 1 hour computer lab/week
Note: you must book online for the lab. The web link to book for the lab is:

http://www.math.canterbury.ac.nz/php/resources/tools/tutorials/enrolment

Lecturers:  Coordinator: Dr Patrick W Saart (Maths & Stats)

Objectives:  To provide a practical introduction to some of the most common statistical techniques. Students will be able to understand a problem involving data and be able to select the correct statistical technique to use to solve the problem; involve problem solving and analysis with emphasis on application to real data; use appropriate software to analyse data so that a problem can be solved; interpret the analysis and results in a way that is easily understood by non-statisticians. Introduce the computer package R.

Syllabus:  Review of basis statistics, sampling distributions, confidence intervals and central limit theorem; hypothesis testing; power analysis and sample size; sampling methods; analysis of variance; multiple comparison methods; two-way analysis of variance; analysis of covariance; experimental design.

Final Exam:  Date to be advised

FORE 224  BIOMETRY 1B (double-coded with STAT 202)

Content:  Second semester, 3 x 1 hour lectures/week; 1 x 1 hour computer lab/week
Note: you must book online for the lab. The web link to book for the lab is:

http://www.math.canterbury.ac.nz/php/resources/tools/tutorials/enrolment

Lecturers:  Assoc Prof Euan Mason, Dr Luis Apioizla

Objectives:  Students will be able to understand a problem involving data and be able to select an appropriate regression technique to use to solve the problem; be able to use appropriate software to implement the regression models for analysing the data so that a problem can be solved; interpret the analysis and results in a way that is easily understood by non-statisticians; be able to identify possible flaws in analysis and comprehend their effects and how they may affect the inferences made; be able to identify alternative more appropriate and/or more advanced techniques where required.

Syllabus:  Review of basis statistics, sampling distributions and confidence intervals; hypothesis testing and analysis of variance; simple linear regression; multiple linear regression; model properties and performance assessment; regression with categorical variables; model comparison; models building and selection; extensions of linear regression models

Final Exam:  Date to be advised

NB:  For both FORE 222 and FORE 224, refer to the following web sites for detailed information on the papers:

http://www.math.canterbury.ac.nz/stat201
http://www.math.canterbury.ac.nz/stat202
**SOIL 203**

**SOIL FERTILITY**

**Content:** Second semester, 3 x 1 hour lectures/week; 1 x 4 hour lab/week (some labs take place at Lincoln University – transport is provided by the School)

**Lecturer:** Dr Mark Bloomberg

**Objectives:** Students will understand and be able to discuss differing soil properties; understand and be able to discuss sustainable land use and its role in environmental protection; and be able to practically apply their knowledge of soil nutrients in the context of plant growth.

**Syllabus:** Basic soil properties; soil formation and soils in the New Zealand landscape; soil chemical and physical properties which are important to sustainable land use and environmental protection; assessment and correction of soil nutrient availability, particularly with respect to forests.

**Final Exam:** Date to be advised

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**FORE 307**

**PLANTATION SILVICULTURE**

**Content:** First semester, 2 x 2 hour, 1 x 1 hour lectures/week; 1 x 5 hour lab/field trip/week

**Lecturer** Assoc Prof Euan Mason

**Objectives:** To understand the principles and tools associated with decision-making in plantations at a stand level.

**Syllabus:** Factors which influence forest product quality and value, effects of site quality, genetics and management. Review of pre-harvest inventory. Log grades and recovery.

Discounted cash flow as a tool for evaluating silvicultural regimes. Costs of operations.

Species choice, tree breeding, and an outline of stand-level modelling.

Effects of rotation length on product quality. Ways of choosing rotation length, risk.

The final crop stocking. Effects of final crop stocking on crop dimensions, interaction with rotation length. Site occupancy, biomass.

Thinning and pruning schedules, silvicultural regimes, software tools for modelling tending regimes.

Establishment of plantations, nursery systems, site manipulation, fertilisation, decision-support systems.

Forest Protection, risk revisited.

Influences of site, planning silvicultural regimes to meet objectives.

Silviculture of alternative species.

**Final Exam:** Date to be advised
FORE 316  
FOREST MANAGEMENT

**Content:**  
Second semester, 4 x 1 hour lectures/week; 4 x 2 hour labs/week

**Prerequisites:**  
Students who are not doing this course as part of the BForSc degree or the Postgraduate Diploma in Forestry are required to have any Maths at the 100 level.

**Lecturer:**  
Prof Bruce Manley

**Objectives:**  
The objective of this course is to provide students with an understanding of (and the ability to apply) the concepts, data requirements, techniques, and systems used to support forest management decision-making. The course follows the definition that forest management is “the study and application of analytical techniques to aid in choosing those management alternatives that contribute most to organisational objectives” (Leuschner, 1984).

Students who successfully pass this course will understand:

- Basic operations research techniques
- Information requirements for forest management planning
- Concepts of forest management planning
- Forest management decision support systems

- Be able to apply these in analyses to support forest management decision-making
- Be able to effectively communicate the results of these analyses

**Syllabus:**  
Operations Research techniques for forest management.  
Information requirements for forest management planning.  
Stand level analysis.  
Forest estate level analysis.  
Integration of the forest estate with manufacturing and marketing decisions.  
Tactical harvest planning.  
Risk and uncertainty  
Carbon forestry  
Human factors of management

**Final Exam:**  
Date to be advised

FORE 327  
WOOD SCIENCE

**Content:**  
Second semester, 3 x 2 hour lectures/week; 1 x 4 hour tutorial or lab/week

**Lecturer:**  
Dr Clemens Altaner

**Objectives:**  
The first part of the course focuses on the chemical, biological and physical phenomena encountered when trying to understand the behaviour of wood as a material. Starting on the molecular scale, the chemical composition and ultrastructure of the woody cell wall will be explored followed by the biological processes responsible for the unique anatomy of wood from individual species.
The chemical and biological aspects are essential to understanding the physical properties of wood such as strength and stiffness, as well as the interaction of wood with water. Finally, wood quality under the above-mentioned premises is considered and implications for silviculture and forest management are discussed.

The second part looks at the processing of wood starting with the breakdown of logs in sawmills into solid wood products and involved processes like timber drying and preservation. These operations are highly complex and vary greatly with the available timber resource. A large portion of the wood resource is broken down into smaller particles of various size and shape and reconstituted into products like wood panels or LVL beams. Another sector using large quantities of wood as raw material is the paper industry. The relevant processes and products are discussed and the advantages and disadvantages for processing wood in a particular way are explained. A final point are the possibilities of using wood as an energy source and the different technologies of converting the solid fuel wood into liquid or gaseous fuels.

Syllabus:
The first 25% of the course focuses on wood science (wood anatomy, wood chemistry and wood physics) and its implication for silviculture and forest management. Then the salient features of sawmilling and solid wood processing in general (40%), of panel products (15%), of pulp & paper (15%), and the energy sector (5%) are examined in turn. The reasons for processing material in a particular way are explained. The approach is not prescriptive and alternative ideas/technologies are discussed.

There is a mix of laboratory periods and visits to industrial operations, to see how much of industry ticks, to observe wood flows through mills and to compare existing equipment and performance with state of the art options (covered in lectures). Almost all visits are within 7 km of the University. While the School offers limited transport in its 10 seater van, students have traditionally pooled their vehicles and shared costs. Stout footwear is essential.

Final Exam:
Date to be advised

FORE 342 GEOSPATIAL TECHNOLOGIES IN FORESTRY

Content:
First semester, 1 x 2, 1 x 1 hour lectures/week, 1 x 3 hour lab/week

Lecturers:
Dr Justin Morgenroth

Objectives:
Students will be introduced to the application of information technology in forestry. Particular attention will be paid to geographic information systems, global positioning systems, and aerial photography. Labs will provide students with practical skills related to the use of data collection technologies and analysis with geographic information systems.

Syllabus:
The course content is arranged into three sections:

• Discussion of a range of forest management situations to which information technology can be applied including conservation management; forest
biosecurity management; forest inventoring; forest roading; forest harvesting; forest asset management; product transportation and logistics; and product chain of custody;

• Teaching of the software and hardware skills required to analyze and solve spatial problems in forest management; and

• Work on the successful application of information technology, including ArcGIS software, GPS technology, data logging and time-series analysis to such problems.

The division of the course into three sections allows students to gain experience in developing critical analyses for the application of the technology to typical problems.

**Final Exam:** No Final Exam
FORE 414  DISSERTATION

Content: Whole Year, irregular seminar sessions to be advised at commencement of academic year

The dissertation is essentially an independent study of any topic within the broad disciplines of forestry. The topic is chosen by the student in consultation with the dissertation coordinator and the faculty adviser. The student meets with the dissertation coordinator early in the term and then with the adviser as needed. There will be a series of seminars students are required to attend. Advance notice will be provided.

Coordinator: Dr David Evison

Objectives: To develop and apply research skills including the art and science of defining a research topic, data collection and analysis, presentation of data and results, interpretation and application of research results; to synthesize professional training and experience to date in the production of an original research paper of professional standard.

Syllabus: There is no set syllabus.

FORE 419  MANAGEMENT CASE STUDY

Content: Whole year, 3 x 1 hour lectures/week, 1 x 2 hour tutorial/week (1st Semester); some ad hoc scheduled sessions in 2nd Semester

The field trip to the case study client will be advised at the commencement of the course.

Coordinator: Prof Bruce Manley

Objectives: To synthesise previous coursework and fieldwork in order to independently analyse and report on a specified forest management problem for a New Zealand client. The exercise will incorporate ecological, silvicultural, financial and market realities.

To successfully communicate that plan in both written form and orally to the client.

Syllabus: Case Study requires students to act as consultants to the client. Terms of Reference will detail the issues that the client wishes the consultants to address. The consultants are then required to bring together information (of a wide range of types, quality and completeness), analyse this information and make recommendations on decisions to be made by the client.

The Terms of Reference will involve a number of tasks within an overarching theme. These tasks could involve all or any of the following:

• Regional resource description: the forest resource in the region.
• Market research: demand in various markets for potential products from the resource.
• Forest description: description of land, forest area, stand history, current crop, yield estimation, croptype.
• Stand simulation: development of alternative management options.
• Forest estate modelling: strategic plan formulation and evaluation.
• Tactical harvest planning: development of 3-5 year plan to schedule stands for harvest.
• Forest valuation: comparable sales, discounted cashflow analysis.
• Manufacturing: identification of downstream processing opportunities for the resource
• Sustainability: certification of sustainable forest management
• Non-wood values: provision (and valuation) of non-wood uses of the estate such as recreation
• Presentation techniques: analysis of effective oral presentation techniques; report writing.

**FORE 422**  
**FOREST HARVEST PLANNING**

**Content:** First semester, 3 x 1 hour lectures/week; 1 x 5 hour lab/week

**Lecturer:** Assoc Prof Rien Visser

**Objectives:** To enable the student to become proficient at identifying and analysing forest harvesting options; to introduce analytical methods developed to determine the productive capacity of harvesting systems; to present the opportunity for the student to integrate the many factors which need to be considered when developing harvesting plans.

**Syllabus:** Harvest planning and analysis of harvesting systems. Machine capability and requirements. Impacts of terrain and stand variables on harvest systems. Ground-based planning including SKIDPC. Advanced cable yarding planning with CYANZ. Landing design and layout. Contract supervision and workforce management. Production planning and control systems.

**Final Exam:** Date to be advised

**FORE 423**  
**FOREST TRANSPORTATION AND ROAD DESIGN**

**Content:** Second semester, 1 x 2 hour, 1 x 1 hour lectures/week; 1 x 5 hour lab/week

**Lecturer:** Assoc Prof Rien Visser

**Objectives:** To give the student an understanding of, and experience in road location and design, including acquiring extensive knowledge of the RoadEng road location software package; to investigate how road design influences vehicle performance; to become acquainted with the regulations regarding various truck configurations and payloads; and to understand some of the geotechnical (soils engineering) aspects of forest roading.
Syllabus: Regulations pertaining to forest trucking; road location, design and construction; road geometric design; contracts, construction supervision, earthwork volume calculations; strengthening forest roads; road management systems; truck/road interaction; truck specifications and allowable loads; truck scheduling, logistics, network analysis; alternative transportation methods in forestry.

The course makes use of RoadEng and ArcView GIS software.

Final Exam: Date to be advised

FORE 426  MARKETING AND INTERNATIONAL TRADE IN FOREST PRODUCTS

Contact: Second semester, 1 x 3 hour lectures, 1 x 1 hour lecture/week; 1 x 3 hour lab/week
Coordinator: Dr David Evison
Lecturer: Andres Katz, Dr Lucie Ozanne
Objectives: This course will provide students with an understanding of modern marketing tools required today by the forest products sector to compete internationally, along with an appreciation of international trade flows for forest products.

Syllabus: Introduction; Trade commodities; Review of marketing related to forest products; Future international trade and strategic development potential for New Zealand and course review
Final Exam: Date to be advised

FORE 435  FOREST ECONOMICS 2

Content: First semester, 2 x 1 hour lectures/week; 1 x 2 hour lab/week
Lecturer: Dr David Evison
Objectives: To provide students with applied skills in the analysis of forest product markets, and to introduce them to advanced concepts in forest economics.

Syllabus: - Econometric analysis and forecasting of log, lumber and stumpage markets
- Forest capital theory and timberland investment strategies
- Microeconomics of forest production and processing
Final Exam: Date to be advised
FORE 436  FOREST TREE BREEDING

Content: First semester, 2 x 1 hour lectures/week

Lecturer: Dr Luis Apiolaza

Objectives: To understand the principles of tree breeding and of tree propagation.


Final Exam: Date to be advised

FORE 443  BIOSECURITY RISK MANAGEMENT

Content: Second semester, 3 x 1 hour lectures/week; 1 x 2 hour tutorials/week

Lecturer: Dr Tara Murray

Objectives: To provide students with an advanced understanding of the issues which underlie the management of biosecurity for New Zealand.

Syllabus: This course will inform students about the broad range of biosecurity threats and issues New Zealand faces, with particular emphasis on the forestry sector, and will exhibit how an integrated social and scientific approach can be taken to the management of those threats.

Lectures are co-taught with BIOS201 in Term 3 plus 2-3 isolated lectures in Term 4.

Final Exam: Date to be advised
FORE 444  SUSTAINING BIODIVERSITY ON PRIVATE LAND

Content: Second semester, 3 x 1 hour lectures/week/ 1 x 4 hour field activity/week TERM 3 ONLY

Lecturer: Prof David Norton (Forestry), Dr Jason Tylianakis (BIOL)

Objectives: The major objective of this course is to provide students with the knowledge to be able to make informed decisions on the best ways to sustain native biodiversity within primary production systems (agricultural, horticultural and plantation forestry systems). This will be achieved through the lectures and field trips focusing on the policy and management tools that can be used to implement sustainable biodiversity conservation in these systems.

Syllabus: Introduction; Policy tools; Sympathetic agriculture; Implementing biodiversity conservation.

Final Exam: Date to be advised

FORE 445  ENVIRONMENTAL FORESTRY

Content: Second semester, 4 x 1 hour lectures/week; 1 x 4 hour lab/week TERM 4 ONLY

Lecturer: Prof David Norton

Objectives: The objective of this course is to provide students with an understanding of the environmental values associated with plantation forests, and the reasons for and skills necessary to manage these values. This will be achieved through the lectures and field trips focusing on the environmental benefits from ‘good’ plantation forest management.

Syllabus: Introduction; Soil and water management; Biodiversity management; Pest management; Certification and consenting

Final Exam: Date to be advised
ENFO204  FOREST MEASUREMENT

Refer to FORE141 on page 25.

ENFO 327  WOOD SCIENCE

Content: Second semester, 3 x 2 hour lectures/week; 1 x 4 hour lab/week (Term 3 only)

Lecturer: Dr Clemens Altaner

Objectives: The course focuses on wood science, i.e. the chemical, biological and physical phenomena encountered when trying to understand the behaviour of wood. Starting on the molecular scale the chemical composition and ultrastructure of the woody cell wall will be explored followed by the biological processes responsible for the unique anatomy of wood from individual species. The chemical and biological aspects are essential to understand the physical properties of wood like strength and stiffness as well as the interaction of wood with water. Finally, wood quality under the above mentioned premises are considered and the implications for silviculture and forest management are discussed.

Syllabus: Wood chemistry; wood biology; wood physics; wood quality;

Final Exam: No final exam

ENFO 410  FOREST ENGINEERING RESEARCH

Content: Second semester, 1 x 2 hour lecture/week, 1 x 2 hour lab/week

Coordinator: Assoc Prof Rien Visser

Objectives: To be able to set up, manage and carry out a specific research project and to understand the process and importance of research in Forest Engineering

Syllabus: Research methods and a major research project focussed on the application of engineering principles to the solution of a forest engineering problem. Project management principles, productivity study techniques and ergonomics will be taught within the scope of the course. Research methods will include effective literature review, research design, data collection, analyses and reporting. Topic to be established in class with industry and student input.

Final Exam: No final exam
**FORE 610 RESEARCH METHODS**

**Content:**
First and Second Semesters
On-line course via LEARN, with additional seminars notified as required.

**Lecturers:**
Assoc Prof Euan Mason and others

**Objectives:**
To assist students in planning research project and in designing and analysing appropriate experiments.

**Syllabus:**
History of the philosophy of science; research planning, bibliographic skills, writing skills, presenting papers at conferences, research planning, statistics and experimental design.

**FORE 616 RESTORATION ECOLOGY**

**Content:**
First semester. 1 x 2 hour lecture/week

**Lecturer:**
Prof David Norton

**Objectives:**
Detailed examination of issues associated with the effects of habitat fragmentation on indigenous biodiversity, the use of restoration as a means to reverse these effects, and the integration of biodiversity conservation into sustainable land management in rural New Zealand.

**Syllabus:**
Topics covered are likely to include the following:

- Edges and corridors – are they important?
- Effects of fragmentation on ecosystem processes.
- Debate: Should we bother protecting small remnants?
- Introduction to restoration ecology.
- Is it possible to restore natural ecosystems?
- Is species origin important for restoration?
- Assembly rules and restoration ecology.
- How can we assess restoration success?

**FORE 618 ADVANCED WOOD SCIENCE**

**Content:**
Second semester (Term 3 only). 3 x 2 hour lectures/week; 1 x 4 hour lab/week

**Lecturer:**
Dr Clemens Altaner

**Objectives:**
Based on a general understanding of wood as a material this course will outline how wood properties are changing with the adoption of short-rotation plantations forestry regimes and explore biological and physiological causes including tropical species.

**Syllabus:**
Wood formation
Molecular structure of cell walls
Material properties of wood
Specialised wood tissues (growth stresses, reaction wood, spiral grain, heartwood)
Juvenile core wood
Wood quality

Final Exam: Date to be advised

FORE 619 WOOD PROCESSING

Content: Second semester (Term 4 only). 3 x 2 hour lectures/week; 1 x 4 hour lab/week

Lecturer: Dr Clemens Altaner

Objectives: The course will look at the wood processing industry. This includes saw milling and solid wood processing in general, drying and preservation, wood panel manufacturing, pulp and paper production and the energy sector. The implications of the variability of wood properties on wood processing are discussed and the advantages and disadvantage for processing wood in a particular way are explained.

The properties, markets and resource demands of the wood-composites are discussed. Their production processes as well as their environmental impacts are discussed as well as their demands on wood properties (highlighting fast-growing short-rotation plantation and tropical species). The ever increasing importance of wood as an energy resource for wood-based production processes and as ‘bio’-fuels are highlighted.

Syllabus: Sawmilling
Timber drying
Timber preservation
Timber grading
Engineered wood products (glulam, plywood, OSB, particle board, MDF)
Pulp & Paper
Wood based chemicals
Wood energy systems

Final Exam: Date to be advised

FORE 624 PLANTATION SILVICULTURE

Content: First semester, 2 x 2 hour, 1 x 1 hour lectures/week; 1 x 5 hour lab/field trip/week

Lecturer: Assoc Prof Euan Mason

Objectives: To understand the principles and tools associated with decision-making in plantations at a stand level, and to develop an in-depth knowledge of a specific aspect of silviculture
**FORE 641  PLANTATION FOREST MANAGEMENT**

**Content:**
Second semester, 4 x 1 hour lecture, 4 x 2 hour labs/week

**Lecturer:**
Prof Bruce Manley

**Objectives:**
The objective of this course is to provide students with an understanding of (and the ability to apply) the concepts, data requirements, techniques, and systems used to support forest management decision-making.

**Syllabus:**
- Operations research techniques
- Information requirements for forest management planning
- Concepts of forest management planning
- Forest management decision support systems
- Stand level analysis
- Forest estate level analysis
- Application for forest management, investment analysis and forest valuation
- Integration of the forest estate with manufacturing and marketing decisions

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**FORE 642  ADVANCED IT APPLICATIONS IN FORESTRY AND NATURAL RESOURCE MANAGEMENT**

**Content:**
First semester, 1 x 2, 1 x 1 hour lectures/week, 1 x 3 hour lab/week

**Coordinator:**
Dr Justin Morgenroth

**Objectives:**
The course is designed to illustrate how information technology can be applied to a range of forestry management problems. It assumes an elementary level of understanding in forest measurement and GIS and integrates material covered in senior undergraduate forestry courses, providing examples of applications in the range of forestry disciplines. Extensive use of ArcView GIS software is made.

**Syllabus:**
The course contents are arranged in three sections: (1) a discussion of a range of forest management situations to which information technology can be applied, including conservation management, forest biosecurity management, forest inventorying, forest roading, forest harvesting, forest asset management, product transportation and logistics, and product chain of custody; (2) the teaching of the software and hardware skills required to analyse and solve spatial problems in forest management; and (3) work on the successful application of information technology including ArcView GIS software and GPS technology, to such problems. The division of the course into three sections allows students to gain experience in...
developing critical analyses for the application of the technology to typical problems.

**FORE 643**

**MODELLING FOR FOREST MANAGEMENT (WEB-BASED COURSE)**

**Content:** First semester

**Lecturer:** Assoc Prof Euan Mason, Prof Jerry Vanclay, Assoc Prof Bruce Manley, Dr Richard Woollons

**Objectives:** To provide managers and novice researchers with a comprehensive introduction to the techniques employed when creating models for forest management.

**Syllabus:** Introduction, SAS software, data requirements and management, taper & volume equations, models for single species and even-aged stands, models for all aged and mixed species stands, modelling regeneration, estate modelling, applications of models.
**FORESTRY STUDENTS SOCIETY (FORSOC)**

FORSOC was initially established during the first School of Forestry (1924-1932) and re-established following the opening of the present school in 1970.

The objectives of FORSOC are to provide a club to foster social interaction for students and staff and to advance the aims and ideals of the forestry profession. Further, FORSOC publishes annually a student magazine “Te Kura Ngahere”. A committee to run FORSOC will be elected at the beginning of the year from all four forestry years. To join please watch the notice boards in the School of Forestry at the beginning of the first term.

**NEW ZEALAND INSTITUTE OF FORESTRY (NZIF)**

The New Zealand Institute of Forestry is a national organisation of people involved in all aspects of the discipline of forestry. Incorporated in 1927, the Institute now has about 800 members from government, industry, research, academic and consulting fields; it provides a professional umbrella for those involved in forest management, whether it be management of natural forests or plantations, for forest products, recreation, wildlife or natural habitat, or soil and water protection. The Institute’s philosophy and forest policy is that forestry is conservation; in the words of the New Zealand Conservation Strategy, “Conservation is the management of human use of the biosphere to yield the greatest sustainable benefits to present generations while maintaining potential to meet the needs and aspirations of future generations.” Conservation management of forests thus include preservation, maintenance, sustainable utilisation, restoration and enhancement of the forests and forest environment.

The objectives of the Institute are to serve members by:

* affording them opportunities to express and exchange views
* overseeing members ethics
* encouraging fraternity and “Esprit de corps”
* providing recognition of professional standards
* the publication of the Journal of New Zealand Forestry.

The Institute is structured into local sections that hold meetings and field days. FORSOC is affiliated to the Institute and is invited to participate in the Canterbury local section activities. **Those who wish to join the Institute as student members can do so by contacting David Evison or Euan Mason.**
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