MEMBERS OF THE INTERIM BOARD OF STUDIES – BACHELOR OF SCIENCE
Senior Deputy Vice-Chancellor's Nominee as Chair (Winthrop Professor Grady Venville)
Academic Board Chair Nominee (Professor Elizabeth Geelhoed)
Dean, Faculty of Science, Humanities and Social Sciences or Nominee (Winthrop Professor Alex Coram)
Dean, Faculty of Engineering, Computing and Mathematics or Nominee (Professor Cara MacNish)
Dean, Faculties of Science (Life and Physical Sciences) or Nominee (Winthrop Professor Brendan Waddell)
Dean, Faculty of Medicine, Dentistry and Health Sciences or Nominee (Professor Peter Henry)
Dean, Faculties of Sciences (Natural and Agricultural Sciences) (Winthrop Professor Tony O'Donnell)
Registrar or Nominee (Mr Wayne Betts)
Guild President or Nominee (Mr Tom Antoniazzi)

IN-ATTENDANCE
Senior Academic Reviewer (Winthrop Professor Ian Reid)

OBSERVER
Dr Kabilan Krishnasamy, Academic Policy Services

INTERIM BOARD OF STUDIES (BACHELOR OF SCIENCE) MEETING –
THURSDAY, 10 FEBRUARY 2011

AGENDA
This is to confirm that the next meeting of the Interim Board of Studies for the Bachelor of Science will be held from 10.00am to 12.00pm on Thursday, 10 February 2011 in the Chancellor's room.

Parts 1 and 2 of the agenda are to be dealt with en bloc by motion of the Chair. Part 3 is for discussion. A member may request the transfer of an item from Parts 1 or 2 to Part 3.

Pip Rundle
Executive Officer
Academic Policy Services
WELCOME
The Chair will welcome new and returning members to the meeting of the Interim Boards of Studies for the Bachelor of Science degree course.

APOLOGIES
The Chair will record any apologies. Members are reminded that apologies should be forwarded to the Executive Officer prior to the meeting.

DECLARATIONS OF POTENTIAL FOR CONFLICT OR PERCEIVED CONFLICTS OF INTEREST
The Chair will invite members to declare potential for conflict or perceived conflicts of interest, if applicable, with regard to items on the agenda.

1. MINUTES – REF: F27160
Confirmation of the minutes of the Interim Board of Studies (Bachelor of Science) meeting held on 2 December 2010.

PART 1 – ITEM(S) FOR INFORMATION TO BE DEALT WITH EN BLOC

2. PHASE TWO PROPOSAL: BIOMEDICAL SCIENCE (DOUBLE) MAJOR – AMENDMENTS – REF: F30505
At its meeting held on 4 November 2010, the Board accepted the proposal for the Biomedical Science (Double) Major (ID1578) with the following errors reported in the final version:

- BIOC2201 Biochemistry of the Cell should be listed as Proposal ID1746, not ID1209; and
- BIOC2001 Introductory Biochemistry should be listed as Proposal ID1209 and noted as “to be deleted from the Major” as it has been replaced by ID1746.

For noting.

3. BROADENING CATEGORY A UNIT LISTING – REF: F28106
Broadening units are taught within an area (or areas) of knowledge other than the one in which the student’s degree-specific major is taught. This includes broadening ‘Category A’ which comprises units that will “have as their main focus some aspects of the globalised and culturally diverse environment in which graduates will be living and working”.

As part of Phase TWO of the undergraduate course development process, the University received 265 broadening ‘Category A’ unit proposals in total across all four degrees (Bachelor of Arts, Bachelor of Commerce, Bachelor of Design and Bachelor of Science). To this end, a total of 68 proposals have been approved by Academic Council.

Attached (Attachment A) for members’ noting is a breakdown of the number of broadening ‘Category A’ units offered in each of the following degrees: Bachelor of Arts, Bachelor of Commerce Bachelor of Design and Bachelor of Science.

For noting.

PART 2– ITEM(S) FOR DECISION TO BE DEALT WITH EN BLOC

4. PHASE TWO PROPOSALS REVISED TO THE SATISFACTION OF THE BACHELOR OF SCIENCE INTERIM BOARD OF STUDIES – REF: F31621; F32169; F31392
At its meeting on 30 June 2010, the Board determined to accept the following proposals, subject to revision to the satisfaction of the Bachelor of Science Interim Board of Studies:

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<td>F32169</td>
<td>1288</td>
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<td>Science, Society and Data Analysis</td>
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The Chair recommends the above listed proposals be unconditionally accepted.

PART 3 – ITEM(S) FOR DISCUSSION AND DECISION

5. CONTINUATION OF MATHEMATICS POLICY – BEYOND 2012 - REF: F11785

The current rules in the Faculty of Life and Physical Science state that students who do not have WACE Mathematics 3C/3D or TEE Applicable Mathematics (or equivalent) are required to undertake level 1 maths units as part of their BSc. This is to ensure they meet the minimum maths graduating requirement of TEE Applicable maths currently in place for the BSc.

Attached (Attachment B) for discussion is the Options Paper: UWA Bachelor of Science Minimum Mathematics Graduation Requirement. Members are requested to consider various options as outlined in the paper for a minimum mathematics graduation requirement for students who will complete the BSc in the New Courses 2012 structure. The paper provides background information relevant to the issue including current rules at UWA and approaches to the issue at Curtin University. Four potential options with regard to a mathematics graduation requirement are outlined.

For discussion

6. NEW PROPOSAL: UNATTACHED ELECTIVE UNIT – MYSTERIES OF FORENSIC SCIENCE – REF: F35163

The Faculty of Life and Physical Sciences proposed a new unattached elective, Mysteries of Forensic Science (ID1781) for the Board’s consideration. The unit is currently run as FNSC2200 Mysteries of Forensic Science.

Attached (Attachment C) for member’s consideration is the following:

- New unattached elective proposal for Mysteries of Forensic Science (ID1781)

For discussion

7. PHASE TWO PROPOSAL: ABORIGINAL HEALTH AND WELLBEING MAJOR – REF: F29649

At its meeting held on 4 November 2010, the Board endorsed the proposal, for the major in Aboriginal Health and Well Being (ID1631) in the Bachelor of Science, as a Phase Two submission (R63/10). At this meeting, the Board also determined that the Aboriginal Health and Wellbeing Major proposal be:

…resubmitted taking into consideration the following:

- Communication skills need further development, in particular, information about how communication will be taught (not just assessed) is needed;
- Further information is required on the structure of the units Aboriginal Health Community Organisation Placement IMED3421 and IMED3422, in particular the teaching and learning content of the units and how they will be assessed;
- The board noted the increase in science content in the major sequence; however, concerns were raised about the science content should students take this major as a second major, this problem needs to be addressed; and
- The board noted the positive changes already made to the major sequence, however would like further evidence of the academic rigour of the major sequence with regard to assessment.

Attached (Attachment D) for member’s consideration are the following:

- Summary of IBoS feedback on the Aboriginal Health and Wellbeing Major proposal and units forming part of the major sequence
- Faculty’s response

For discussion
Items 8 to 11 inclusive (Attachments E to H) ‘for discussion’ are all proposals from the Faculty of Engineering, Computing and Mathematics (ECM) and, in part, will be discussed en bloc. The covering letter to the Chair from Professor Cara MacNish (Attachment E) is relevant for all of the ECM proposals.

8. PHASE TWO PROPOSAL: MATHEMATICS AND STATISTICS MAJOR – REF: F29706

At its meeting held on 4 November 2010, the Board resolved to accept that the Mathematics and Statistics Major proposal (ID1022):

subject to undertaking revision, to the satisfaction of the Bachelor of Science Interim Board of Studies, in line with the following:

- The board noted the development of communication skills requires further attention, in particular, how the embedded communication skills may be crafted to be discipline specific. The Chair suggested attending a workshop provided by CATL, and/or use materials provided by CATL to develop an appropriate table considering the four dimensions of communication, may be useful.
- The board agreed the proposal be further revised and the revisions be considered by the Chair on behalf of the Board.

Attached (Attachment F) for member’s consideration are the following:

- Summary of IBoS feedback on the Mathematics and Statistics Major proposal and units forming part of the major sequence
- Faculty’s response

For discussion

9. PHASE TWO PROPOSAL: COMPUTER SCIENCE AND SOFTWARE ENGINEERING HONOURS – REF: F31408

At its meeting held on 30 June 2010, the Board endorsed (Resolution 59/10) that the Computer Science and Software Engineering Honours proposal (ID701) be:

accepted subject to undertaking revision, to the satisfaction of the Bachelor of Science Interim Board of Studies, in line with the following:

- final acceptance of the core unit in research project within the Honours course.

Attached (Attachment G) for member’s consideration are the following:

- Summary of IBoS feedback on the Computer Science and Software Engineering Honours proposal and units forming part of the major sequence
- New unit proposal for Computer Science and Software Engineering Research Project Part 1 (ID1753)
- New unit proposal for Computer Science and Software Engineering Research Project Part 2 (ID1754)

For discussion

10. RESUBMISSION OF APPROVED PROPOSAL: ENGINEERING SCIENCE MAJOR – REF: F29710

At its meeting on 4 November 2010, the Board endorsed (Resolution 72/10) that the Engineering Science Major proposal (ID610) be approved with a request for the Chair to be informed of the progress of the Faculty’s work on the communication and research skills. The Faculty has now resubmitted the proposal with an amended structure resulting from the progress of these tasks.

Attached (Attachment H) for member’s consideration are the following:

- Engineering Science Major map – attachment H1
- Master of Professional Engineering Pathways – Level 3 Major Sequence Units – attachment H2
- Master of Engineering Science – Level 3 Changes checklist – attachment H3
- New unit proposal for Mechanisms and Machines (ID436) – attachment H4
- New unit proposal for Materials and Manufacturing (ID438) – attachment H5
- New unit proposal for Solid Mechanics (ID967) – attachment H6
- New unit proposal for Fluid Mechanics (ID1767) – attachment H8
- New unit proposal for Geomechanics (ID354) – attachment H11
- New unit proposal for Hydraulics (ID1766) – attachment H12
• New unit proposal for Structural Analysis (ID966) – attachment H15
• New unit proposal for Resource Extraction Technologies (ID361) – attachment H16
• New unit proposal for Environmental Systems (ID1762) – attachment H21

For discussion

11. RESUBMISSION OF APPROVED PROPOSAL: COMPUTER SCIENCE MAJOR AND APPLIED COMPUTING MAJOR – REF: F29708; F29709

At its meeting on 30 June 2010, the Board endorsed (Resolution 54/10) that the Computer Science Major proposal (ID700) and the Applied Computing Major (ID468) be approved. The Faculty has resubmitted the Computer Science Major proposal with an amended structure resulting from an update to the mathematics complementary unit in line with changes in prerequisites. Further, the Computer Science and Applied Computing Major proposals have been resubmitted with changes to the communications complementary unit.

Attached (Attachment I) for member’s consideration are the following:
• Computer Science Major map
• Applied Computing Major map
• Response from Faculty re Computer Science Major: Update to the mathematics complementary unit
• Response from Faculty re Computer Science and Applied Computing Majors: Change to communications complementary unit

For discussion

NEXT MEETING

The next meeting of the Bachelor of Science Interim Board of Studies has been scheduled to be held in the Chancellor’s Room at 10am on Thursday, 10 March 2011.
# NC2012: Broader Category A Unit Offerings Breakdown

<table>
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<tr>
<th>Degrees</th>
<th>No. of Broadening ‘Category A’ Units approved (as at 1st Dec’ 10)</th>
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<td></td>
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<td>Sub-total</td>
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<td>Bachelor of Design</td>
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<td>Bachelor of Science</td>
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<td>Total</td>
<td>68 ‘Category A’ units</td>
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Kabilan Krishnasamy  
Academic Policy Services  
15th December 2010
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<td>English and Cultural Studies</td>
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OPTIONS PAPER: UWA BACHELOR OF SCIENCE
MINIMUM MATHEMATICS GRADUATION REQUIREMENT

TRIM FILE REFERENCE: F11785

FILE PATH ON SERVER: P:\TEACHING & LEARNING\TEACHING & LEARNING COMMON\EDUCATION POLICY SERVICES\BOARDS OF STUDIES\BOS - SCIENCE\MEETINGS\2011\AGENDA\110210\BSC MATHS OPTIONS PAPER 1.0.DOC

DOCUMENT STATUS

☐ Draft  ☐ Ready for Review  ☑ Final

DOCUMENT MODIFICATION HISTORY

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<th>Description of Version</th>
<th>Date Completed</th>
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<td>Final version for presentation to Interim Board of Studies (Bachelor of Science) meeting on 10 February 2011.</td>
<td>1 February 2011</td>
<td>Pip Rundle as Executive Officer of IBoS (BSc)</td>
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DOCUMENT APPROVAL

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Options Paper: UWA Bachelor of Science Minimum Mathematics Graduation Requirement

Members of the UWA Interim Board of Studies (Science) are requested to consider various options as outlined in this paper for a minimum mathematics graduation requirement for students who will complete the Bachelor of Science in the New Courses 2012 structure. This paper provides background information relevant to this issue including current rules at UWA and approaches to the issue at Curtin University. Four potential options with regard to a mathematics graduation requirement are outlined. Members of the IBoS (Science) are asked to consider these options in preparation for the 10th February 2011 meeting so that a recommendation can be made to the Board of Coursework Studies.

Background Information
The current minimum mathematics graduation requirement for students completing a BSc in the Faculty of Life and Physical Science is Applicable Mathematics (for students who did TEE prior to 2010) or WACE courses Mathematics units 3CMAT/3DMAT (for students who did Year 12 in 2010 or later) or equivalent. Students who do not have these minimum requirements from their high school mathematics courses are currently required to upgrade their mathematics during their degree to equivalent levels as indicated in Tables 1 and 2.

The Faculties of Natural and Agricultural Sciences; Engineering, Computing and Mathematics; and Medicine, Dentistry and Health Sciences currently do not have a formal minimum mathematics graduation requirement. Courses in these faculties, however, have various minimum entry mathematics requirements and core mathematics units.

Curtin University
Curtin’s website (http://maths.curtin.edu.au/courses/summerbridging.cfm) clearly states that:

“Students who have only attained 2C/D Level (Discrete in the old syllabus) at high school, must do a complete year of bridging mathematics by enrolling in the units Mathematics 135 and 136.” Further, Curtin’s website states: “Students who have only attained 3A/B Level (for which there is no real equivalent in the old syllabus) at high school, must enrol in Mathematics 136, an enabling unit, a pass in which will allow progress to Mathematics 103 or Engineering Mathematics 120.”

The approach by Curtin is in line with the requirement by LPS in 2011 for students to take two level 1 mathematics units in their first year if they only have WACE Mathematics 2C/2D.

NOTE: It is not clear whether this Curtin requirement applies to all students wanting to graduate from the BSc.

2011 TISC Data: Mathematics Background of Students with Science Preferences
Mr Wayne Betts, the Associate Director of Student Services, provided the following data. Student services extracted the Year 12 subjects of all students who had any kind of science preference at UWA for courses starting in 2011. This included 3-year and 4-year science as well as all the combined courses.

Of the total 3221 students with science preferences:
637 of them have Mathematics 2C/2D (19.8%)
1144 have Mathematics 3A/3B (35.5%)
1436 have Mathematics 3C/3D (44.6%)
617 of the 3221 also have Mathematics: Specialist 3C/3D (19.1% of the total)

Student services will look at the data again once they have access to the scaled scores, to see how many of the 2C/2D students actually get more than 50% and also provide updated data on students who are made an offer.
Special LOTE Provision for Broadening Units
A special LOTE provision has been made with regard to broadening units that is relevant to Option 5 presented below.

Recommendation 9 of the 2008 report Education for Tomorrow’s World (vol. 1 p. 36): “In the case of Languages Other Than English, the general rule that broadening units be taken from areas of knowledge other than the one that teaches the student’s degree-specific major is waived: that is, someone studying for a BA degree may also count LOTE units towards the broadening requirement, provided that these units do not form part of the disciplinary field of the major.”

The rationale for this waiver is based on the University’s priority commitment to internationalisation and cross-cultural competence which is not applicable to mathematics. Supporting arguments can be found on pp. 30-31 of the Issue & Options paper “Courses for Tomorrow’s World” (2007), accessible via the Background Information button in the Staff section of the NC2012 website – http://www.newcourses2012.uwa.edu.au/staff/background

Other Issues to Consider
- Equity: e.g. many mature age students currently enter the BSc with no mathematics or it has been considerable time since they completed any mathematics.
- Second majors: What would be required of non-science students who take a science major as a second major?
- Two majors: How can students who are enrolled in two majors or double majors achieve minimum mathematics graduation requirements as there will be limited ‘space’ in their timetable?
- Students who complete majors with in the FN AS offerings will all complete the unit SCIE1104 Science, Society and Data Analysis. The focus of this unit will be on mastering generic skills in data acquisition and handling and in the analysis of data.
Options

Option 1: No minimum mathematics graduation requirement
This option would require students to meet the minimum entry requirements into the specific majors within the Bachelor of Science. For many BSc majors the minimum entry requirement is currently Discrete Mathematics or WACE mathematics units 2CMAT/2DMAT. These students would not have to complete any further mathematics during their degree unless there are core mathematics units in their major sequence (Table 3).

Option 2: A minimum mathematics graduation requirement is set at the equivalent of 3AMAT/3BMAT
This option would require students who only meet the minimum entry requirement of mathematics units 2CMAT/2DMAT to complete one additional mathematics unit during their degree in order to meet the minimum mathematics graduation requirement (see Table 3). This additional unit would be MATH1050 Introductory Calculus.

Option 3: A minimum mathematics graduation requirement is set at the equivalent of 3CMAT/3DMAT (in line with current LPS rules)
This option would require students who only meet the minimum entry requirement of mathematics units 2CMAT/2DMAT to complete a further two units during their degree in order to meet the minimum mathematics graduation requirement (Table 3). These units would be MATH1050 Introductory Calculus and a statistics unit such as STAT1400 Statistics for Science or STAT2210 Biometrics. With this option, students who entered the BSc with school units 3AMAT/3BMAT would be required to complete one additional mathematics unit during their degree to meet the minimum mathematics graduation requirement (Table 3). This unit would be MATH1045 Intermediate Calculus or STAT1400 Statistics for Science.

Option 4: A minimum mathematics graduation requirement is set at the equivalent of 3CMAS/3DMAS (Specialist)
This option would require students who only meet the minimum entry requirement of mathematics units 2CMAT/2DMAT to complete a further four units during their degree in order to meet the minimum mathematics graduation requirement (Table 3). These units would possibly include MATH1050 Introductory Calculus, MATH1045 Intermediate Calculus and two other units.

Option 5: Broadening option for students to meet minimum mathematics graduation requirement
This option could be recommended in addition to Options 2, 3 or 4. This option would allow students who enter the BSc without the minimum mathematics graduation requirement to take additional mathematics units as needed to meet the minimum mathematics graduation requirement as broadening units. A precedent has been set with the special LOTE provision.

Another Option would be that all students, regardless of entry level mathematics are required to do some mathematics as part of their BSc.
## Tables

**Table 1:** Current minimum mathematics graduation requirements for students completing a BSc in the UWA Faculty of Life and Physical Science based on TEE mathematics subjects (for students who did Yr 12 prior to 2010)

<table>
<thead>
<tr>
<th>School Mathematics Subjects</th>
<th>Minimum Exit Level Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discrete Mathematics (Minimum entry level)</td>
<td>Must complete 1 unit: MATH1050 Calculus C</td>
</tr>
<tr>
<td>Applicable Mathematics (Minimum exit level)</td>
<td>No further requirement</td>
</tr>
<tr>
<td>Calculus</td>
<td>No further requirement</td>
</tr>
</tbody>
</table>

**Table 2:** Current minimum mathematics graduation requirements for students completing a BSc in the UWA Faculty of Life and Physical Science based on WACE Qualifications (students who did Yr 12 in 2010 onwards)

<table>
<thead>
<tr>
<th>School Mathematics Courses</th>
<th>Minimum Graduation Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>2CMAT/2DMAT (Minimum entry level)</td>
<td>Must complete 2 units: MATH1050 Intro Calculus + Statistics Unit</td>
</tr>
<tr>
<td>3AMAT/3BMAT</td>
<td>Must complete 1 unit: MATH1045 Intermediate Calculus or STATT1400 Statistics for Science or STAT2210 Biometrics</td>
</tr>
<tr>
<td>3CMAT/3DMAT (Minimum exit level)</td>
<td>No further requirement</td>
</tr>
<tr>
<td>3AMAS/3BMAS (Specialist)</td>
<td>No further requirement</td>
</tr>
<tr>
<td>3CMAS/3DMAS (Specialist)</td>
<td>No further requirement</td>
</tr>
</tbody>
</table>
Table 3: Minimum graduation requirements for Options 1, 2, 3 and 4

<table>
<thead>
<tr>
<th>School Mathematics Courses</th>
<th>Minimum Graduation Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option 1</strong></td>
<td></td>
</tr>
<tr>
<td>2CMAT/2DMAT (Minimum entry</td>
<td>No further requirement</td>
</tr>
<tr>
<td>requirement)</td>
<td></td>
</tr>
<tr>
<td>3AMAT/3BMAT</td>
<td>No further requirement</td>
</tr>
<tr>
<td>3CMAT/3DMAT</td>
<td>No further requirement</td>
</tr>
<tr>
<td>3CMAS/3DMAS (Specialist)</td>
<td>No further requirement</td>
</tr>
<tr>
<td><strong>Option 2</strong></td>
<td></td>
</tr>
<tr>
<td>2CMAT/2DMAT (Minimum entry</td>
<td>1 additional unit</td>
</tr>
<tr>
<td>requirement)</td>
<td></td>
</tr>
<tr>
<td>3AMAT/3BMAT</td>
<td>No further requirement</td>
</tr>
<tr>
<td>3CMAT/3DMAT</td>
<td>No further requirement</td>
</tr>
<tr>
<td>3CMAS/3DMAS (Specialist)</td>
<td>No further requirement</td>
</tr>
<tr>
<td><strong>Option 3</strong> (Equivalent to current LPS rules)</td>
<td></td>
</tr>
<tr>
<td>2CMAT/2DMAT (Minimum entry</td>
<td>2 additional units</td>
</tr>
<tr>
<td>requirement)</td>
<td></td>
</tr>
<tr>
<td>3AMAT/3BMAT</td>
<td>1 additional unit</td>
</tr>
<tr>
<td>3CMAT/3DMAT</td>
<td>No further requirement</td>
</tr>
<tr>
<td>3CMAS/3DMAS (Specialist)</td>
<td>No further requirement</td>
</tr>
<tr>
<td><strong>Option 4</strong></td>
<td></td>
</tr>
<tr>
<td>2CMAT/2DMAT (Minimum entry</td>
<td>4 additional units</td>
</tr>
<tr>
<td>requirement)</td>
<td></td>
</tr>
<tr>
<td>3AMAT/3BMAT</td>
<td>3 additional units</td>
</tr>
<tr>
<td>3CMAT/3DMAT</td>
<td>2 additional units</td>
</tr>
<tr>
<td>3CMAS/3DMAS (Specialist)</td>
<td>No further requirement</td>
</tr>
</tbody>
</table>

Additional units would be designated from MATH1050 Introductory Calculus, MATH1045 Intermediate Calculus, and STAT1400 Statistics for Science
Unit Proposal

TRIM Ref.
TRIM Reference:

Unit Administration Details
Unit code: New Unit
Unit Title: FNSC2200 Mysteries of Forensic Science
Unit level: 2
Owning Organisational Unit: 00580
Coordinator ID: 17420481
Enrolled Credit Points: 6

Part A: Unit Administration Details
Major sequence: NO
End-on Honours course: NO
Broadening category A unit: NO
Complementary unit: NO
Elective unit: YES
Major sequence: NO
State Major(s): NO
End on Honours Course?
Complementary unit?

Category B? YES, WILLING TO ADMIT TO CATEGORY B
Specify your other reason(s):
150 hours of workload? YES
If NO, explain why:
Material from existing units? NO
If YES, provide details:
Select unit availability: STANDARD SEMESTERS ONLY
Semester 1: N
Semester 2: Y
Summer: N
Non-standard application attached: N

Part A: Unit Rules
Pre-requisites: nil
Incompatible: nil
Co-Requisite: nil

Part B: Unit Academic Details (including Assessment)
Unit Content: This unit introduces students to the application of science to a key public arena - solving crime. Students experience the contextual application of each science discipline to problem solving. The unit calls on the expertise of the State's leading forensic science experts including the police forensic division. The lectures combine a broad view of the application of analytical skills in science with a continuing focus on crime.

Teaching and Learning practices: 25 x 1 hour lectures, 1 x 1.5 hour crime scene practical.
Lectures are held in the evenings from 6pm to enable external professionals (police, forensic practitioners etc) to contribute to the unit.

Technologies: WebCT and Lectopia

Student learning outcomes: At the completion of this unit students should be able to:
1. Describe the various forensic science disciplines, and how they can be applied to the investigation of crime.
2. Appreciate the importance of ethical considerations in forensic science.
3. Use the language of forensic science in an appropriate legal context.
4. Apply concepts learned in forensic science to problem solving.
5. Recognise the overlap of forensic science with other scientific and humanitarian disciplines.
6. Appreciate the diversity of forensic science in the modern global context, with specific reference to Australia.
7. Develop and apply skills in critical thinking.
8. Describe the interplay between science and the law.

Assessments tailored for outcome:

- 2000-3000 word written assignment - Students must choose a forensic topic of interest in consultation with the coordinators. They must review the literature and develop a critical review in order to demonstrate an understanding of contemporary issues relating to the topic.
- Exam - Forensic Science incorporates multiple disciplines, 14 of which are covered at an introductory level in this unit. The exam is designed to allow students to demonstrate an understanding of these disciplines and their application to the investigation of crime.

How will unit be assessed:

- 2000-3000 word written assignment - 30% of unit grade
- 2 hour exam consisting of 60% SAQ's and 40% MCQ's - Standard semester 2 exam period - 70% of unit grade

Part C: Grading Schema for Unit

- Ungraded pass or fail: NO
- A. External Assessors: N
- B. Group Activity: N
- C. Specific skill-aquisition: N

Part D: Demand

- Quota and constraint? NA
- Estimated annual enrolments? 100
- How was estimate arrived at? previous enrolments of up to 100 students have been experienced.
- Are students from other units likely to move to this unit? NA

Part E: Resource Related Matters

- Unit cost from? SCHOOL
- Other unit cancelled? NO
- Staff members: Dadour, W/Prof Ian; Franklin, Assoc/Prof Daniel; Fordham, Assoc/Prof Judith; Watling, W/Prof John; Mack, Adj/A/Prof Peter; Tay, Adj/A/Prof Guan; Gaudieri, Assoc/Prof Silvana; Lee, Professor Garry.
- Library Consultation form: NO
- Central Teaching Facilities: Y
- Dedicated/specialist rooms: N
- New space: N
- Estimate of standard booking requirements? Tues 6 pm to 7 pm
- Accommodation within existing venues(Specific details)? Yes, Simmonds LT and Wilsmore LT
- Ancillary student fees/charges? NO
- Submitted to Dean? N

Part F: Collaborations and Consultations

- Provide details of the consultations: This is an existing unit and consultations were completed at the time of initial introduction. Student feedback has been sought in the past.
- Collaboration with another organisation? YES
- WA Police
- If YES, elaborate: NO
- Does unit content overlap NO
other disciplines?
If YES, what are those disciplines:
Duplication of existing unit: This is an existing unit and content is not duplicated in any other units.

Part G: Publications and Marketing
Provide a paragraph (up to a maximum of 200 words):
This unit introduces students to the application of science to a key public arena - solving crime. Students experience the contextual application of each science discipline to problem solving. The unit calls on the expertise of the State’s leading forensic experts including the police forensic division. Students develop the skills to apply scientific principles to the investigation of crime.

Part H: ESOS Compliance
Unit location(s): CRAWLEY ONLY
Albany: N
Geraldton: N
Hong Kong - Arts: N
Singapore - Business and Management: N
Singapore - Life and Physical Sciences: N
Unit delivery mode: FACE2FACE
### Interim Board of Studies – Proposals (Phase 2)

#### Bachelor of Science - Major

<table>
<thead>
<tr>
<th>TRIM File Reference</th>
<th>Proposal ID</th>
<th>Type of Proposal</th>
<th>Name of Proposal</th>
<th>Recommendations / Feedback</th>
</tr>
</thead>
</table>
| F33108              | 1631        | Major            | Aboriginal Health and Wellbeing | That proposal be accepted subject to undertaking revision, to the satisfaction of the Bachelor of Science Interim Board of Studies, in line with the following:  
- Communication skills need further development, in particular, information about how communication will be taught (not just assessed) is needed;  
- Further information is required on the structure of the units Aboriginal Health Community Organisation Placement IMED3421 and IMED3422, in particular the teaching and learning content of the units and how they will be assessed;  
- The board noted the increase in science content in the major sequence; however, concerns were raised about the science content should students take this major as a second major, this problem needs to be addressed; and  
- The board noted the positive changes already made to the major sequence, however would like further evidence of the academic rigour of the major sequence with regard to assessment. |
<p>| F32369              | 1581        | L1 – Core        | The Dreaming to Darwin             | That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631). |
| F32373              | 1586        | L1 – Core        | Being on Country                  | That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631). |
| F32374              | 1587        | L2 – Core        | Indigenous Knowledge Systems      | That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631). |
| F32317              | 1498        | L2 – Core        | Aboriginal Health and Wellbeing IMED2293 | That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631). |
| F32376              | 1589        | L3 Core          | Indigenous Research and Ethics    | That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631). |
| F32317              | 1498        | L3 – Core        | Aboriginal Health Community Organisation Placement IMED3421 | That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631). |
| F33108              | 1631        | L3 – Core        | Aboriginal Health Community Organisation Placement IMED3422 | That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631). |
| F34530              | 1646        | L3 – Core        | Aboriginal Social and Emotional Wellbeing | That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631). |
| F34531              | 1641        | L3 – Core        | Aboriginal Health Research Project| That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631). |</p>
<table>
<thead>
<tr>
<th>Code</th>
<th>L1 –</th>
<th>Human Biology 1 ANHB1101</th>
<th>That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631).</th>
</tr>
</thead>
<tbody>
<tr>
<td>F32024</td>
<td>1090</td>
<td>L1 – Complementary</td>
<td></td>
</tr>
<tr>
<td>F32041</td>
<td>1120</td>
<td>L1 – Complementary</td>
<td></td>
</tr>
<tr>
<td>F31718</td>
<td>676</td>
<td>L2 – Health and Globalisation PUBHXXX</td>
<td>That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631).</td>
</tr>
<tr>
<td>F31721</td>
<td>680</td>
<td>L2 – Epidemiology and Biostatistics PUBHXXX</td>
<td>That proposal be resubmitted in line with steps taken to address feedback for the Aboriginal Health and Wellbeing major (ID1631).</td>
</tr>
</tbody>
</table>

Attachment D2
21st January 2011

Winthrop Professor Grady Venville
Chair
BSC Interim Board of Studies
University of Western Australia

Dear Grady

RE Aboriginal Health and Wellbeing Major Proposal (ID 1631)

Your Ref: F29649

Further to our phone conversation on the 24th of November, thank you for the opportunity to respond to and clarify some of the issues raised by the IBOS (Science) at its meeting of 4th November when the proposed Aboriginal Health and Wellbeing major was accepted.

1. Embedding communication skills:

   Following the feedback from the IBOS (Sc) and in order to better achieve the aims of NC2012 in relation to embedding communications skills into the Aboriginal Health and Wellbeing Major we propose the inclusion of Communication and Project Planning in Health (PUBHXXXX) as complementary unit at level 2 in addition to development of communication skills, in particular cross cultural, throughout the major.

2. Aboriginal Community Organisation Placement (IMED3241 /3422)

   This is an existing 6 point level 3 unit that has been successfully offered within the Faculty of Medicine, Dentistry and Health Sciences since 2002. The unit checklist resubmitted in April 2010 as a part of the NC2012 process includes the unit description, outcomes and assessment requirements. There are two unit codes as it is currently offered in a flexible format such that students may undertake the unit over both semesters.

   The learning experience in this unit centres on the students placement within an Aboriginal health or health related organisation. This provides students with the opportunity to move beyond the theoretical frame in considering health and health services for Aboriginal peoples. As one of the concluding units for the major sequence, students will have had considerable opportunity in the preceding two years of the major to develop their knowledge and skills in relation to Aboriginal health and wellbeing. The placement provides the opportunity to consolidate what they have learnt, experience the realities of a community organisation working environment and contribute to the work of the organisation in the spirit of reciprocity. As a placement much of the learning occurs whilst students are in the organisation rather than on campus. There is a pre-placement orientation seminar in which
there is an overview of the outcomes of the unit, initial orientation to the organisation they will be placed, expectations of the students and their roles and obligations both in the organisation and as students enrolled in the unit, and the assessment requirements. Towards the end of the placement, students are required to present at a seminar as discussed below. The seminar provides the opportunity for students to consolidate some of their learning and reflect on the experiences that the placement has exposed them to. All students are expected to participate in the discussion that follows the presentation/s.

Assessment in this unit is multiple layered and includes both organisation and university academics. The breakdown of the assessment is as follows:

- Attendance and satisfactory participation during the placement (15%)
- A satisfactory evaluation from the supervisor at the placement (15%)
- Presentation of a seminar based on the student’s experience and achieved objectives stated above, with an emphasis on at least two of the unit objectives (20%)
- Submission of a portfolio based on the students understanding of the organisation, the student’s involvement in activities and contribution to the organisation during the placement (50%)

The organisation supervisor provides feedback on the student’s engagement, participation and attendance. Just as for laboratories or tutorials on campus, it is expected that students attend and successfully engage and participate the organisation. Alternative learning strategies such as lectopia, online learning, or theoretical research are not able to substitute for on-site experience. Non-attendance or attending and only observing rather than participating is not considered satisfactory, hence the 15% allocation towards the final unit mark. In addition, as we are interested in developing the student’s skills in effective ways of working with Aboriginal people, communities and organisations, we ask the organisation supervisor to provide an assessment of the quality of the student’s participation and engagement. The student portfolio is a substantial piece of work hence the significant proportion of the assessment that it contributes.

3. Concerns regarding the level of science content if the Aboriginal Health and Wellbeing major is taken as a second major

If a student is enrolled in the BSc and is enrolled in the Aboriginal Health and Wellbeing major as their second major, then there would be substantial additional science content in their primary major. If a student is enrolled in a bachelors program other than the BSc, then Aboriginal Health and Wellbeing major will provide students with a considerable amount of scientific knowledge from an Indigenous perspective. Indigenous knowledge systems provide a wealth of scientific content in range of areas including traditional land use, herbal and traditional healing, ecology, resource use and sustainability. In addition, students will be gaining a unique perspective from an Indigenous viewpoint in terms of explanatory understandings, origins and development, ways of knowing and ways of working. Further, there is a considerable scientific component to understanding health and disease prevalence, causation, prevention and management.

4. Request for further evidence of the academic rigour of the major sequence with regard to assessment.

The proposers of the Aboriginal Health and Wellbeing major are uncertain as to what underpins the concern of the IBOS (Science) in this area.

All existing units are assessed using the standard tertiary assessment methods such as oral presentations, participation and facilitation in seminars and tutorials and the submission of formal academic written work. The academic written work that contributes to the final assessment in these units are those used commonly at tertiary level, namely essays and
portfolios. As outlined in the unit proposals, the same assessment criteria will be utilised in the new units.

Staff of the Centre for Aboriginal Medical and Dental Health have worked in the tertiary sector in a variety of capacities for many years, decades for some. Since CAMDH was established in 1996, staff have contributed to the formal assessment of students across all years of the courses provided within the Faculty of Medicine, Dentistry and Health Sciences at both undergraduate and postgraduate levels. Currently CAMDH staff coordinate and undertake assessment of students enrolled in full units and components of units across the medical, nursing, dental and podiatric medicine courses. The academic rigour that staff apply to assessment is significant not only because we take our role as academics seriously but also because the health and wellbeing of Aboriginal people depends on the effectiveness of our teaching, learning and assessment strategies.

CAMDH is an international leader in Aboriginal health curriculum development, implementation, assessment and evaluation. CAMDH staff have presented papers at national and international conferences and published in all of these areas. Current staff members of CAMDH played leading roles in the development and endorsement of the Committee of Australian Medical Deans 2004 Indigenous Health Curriculum Framework which has now been incorporated by the Australian Medical Council into the accreditation standards for Australian and New Zealand medical schools. Further, the innovation and rigour that CAMDH applies to its work has been formally recognised via the receipt of six university, state and international awards since 2005.

5. Changes to the major sequence – complementary units

Due to the inclusion of Communication and Project Planning in Health (PUBHXXXX) unit as a complementary unit (level 2) to meet the communication requirements of the major it is no longer possible to offer the Epidemiology and Biostatistics unit (PUBHXXXX) as a complementary unit but this will now be a recommended elective unit.

The other three complementary units in the major remain unchanged.

Please let me know if additional information or clarification is required.

Yours sincerely

David Paul
31 January 2011

W/Prof Grady Venville
Chair, Interim Board of Studies for Science

Dear Grady,

Please find attached the Faculty’s submission for the February Interim Board of Studies meeting. In addition to the two items requested, since this meeting was announced as the deadline for submission of majors and their units, and with the ever pressing need for correct information for publication purposes, the Faculty set this as an internal deadline to bring all our information up to date for communication to the Board.

The most significant update relates to the Level 3 offerings as part of the Engineering Science major. Since the Faculty’s original Phase 2 submission in May 2010, there have been two primary development tasks at the undergraduate level. The first was development of the new foundation units, which were reported in the October 2010 submission. The second was the realignment and integration of the Level 3 “Streams” to take account of both the foundation unit development, and the on-going work on developing the professional masters programmes. While this began prior to October, the work was not sufficiently complete at that time.

A great deal of work and consultation has taken place as part of this revision. The key to this process has been to look at Level 3 not simply as separate “streams”, but rather as pathways to the professional masters programmes. This has allowed us to look for common themes and principles that provide the foundation for further studies, and where possible to share these between programmes.

The result is reflected in the document Master of Professional Engineering Pathways, which is included to provide the Board with an overview of the pathways available to students. In place of the original five streams, we have six pathways to corresponding (proposed) masters programmes. However these are no longer independent, and instead make use of an appropriate “pool” of shared units (shaded), and the total number of units has been reduced in line with the objectives of New Courses. The pathways can be considered as three larger groupings: Mechanical and Chemical; Civil, Mining and Environmental; and Electrical and Electronic.

The details of the proposed amendments are listed in the document Level 3 Changes Checklist, which indexes the relevant documents.

Aside from the Engineering Science major, the Faculty is also proposing minor changes to the complementary units for the Computer Science and Applied Computing majors.

This submission therefore contains the following:

**Responses required by the Board**

1. Mathematics and Statistics Major: Communications Statement
2. Computer Science and Software Engineering Honours: Form C’s for dissertation units

**Additional Submissions from the Faculty**

1. Engineering Science Major: Updates to level 3 units (and pathways)
2. Computer Science Major: Update to the mathematics complementary unit in line with changes in prerequisites
3. Computer Science and Applied Computing Majors: Change to communications complementary unit

Supporting documentation is included as follows:

**Documentation included in the Submission**

1. This cover letter
2. Response to the Interim Board of Studies for Science – Mathematics and Statistics Major
3. 1753 Computer Science and Software Engineering Research Project Part 1
4. 1754 Computer Science and Software Engineering Research Project Part 2
5. Master of Professional Engineering Pathways – Level 3 Major Sequence Units
6. Master of Engineering Science - Level 3 Changes Checklist
7. 436 Mechanisms and Machines
8. 438 Materials and Manufacturing
9. 967 Solid Mechanics
10. 1767 Fluid Mechanics
11. 354 Geomechanics
12. 1766 Hydraulics
13. 966 Structural Analysis
14. 361 Resource Extraction Technologies
15. 1762 Environmental Systems
16. Computer Science Major: Update to the mathematics complementary unit in line with changes in prerequisites
17. Computer Science and Applied Computing Majors: Change to communications complementary unit

Kind regards

Prof Cara MacNish
Deputy Dean (Education)
Faculty of Engineering, Computing and Mathematics
<table>
<thead>
<tr>
<th>TRIM File Reference</th>
<th>Proposal ID</th>
<th>Type of Proposal</th>
<th>Name of Proposal</th>
<th>Recommendations / Feedback</th>
</tr>
</thead>
</table>
| F29706              | 1022        | Major            | Mathematics and Statistics | That proposal be accepted subject to undertaking revision, to the satisfaction of the Bachelor of Science Interim Board of Studies, in line with the following:  
  - Communication skills will be addressed by students taking the Science Communication unit "Introduction to Scientific Practice", yet this does not appear as a complementary unit in the main table.  
  - Some pedagogy and assessment of communication skills in a mathematical setting would seem appropriate (and presumably will occur) in several other units also, but this is not described. |
| F31741              | 709         | Core             | Mathematical Methods 1 | That proposal be accepted as a core within the Mathematics and Statistics major. |
| F31743              | 711         | Core             | Mathematical Methods 2 | That proposal be accepted as a core within the Mathematics and Statistics major. |
| F31843              | 839         | Core             | Introduction to Pure Mathematics | That proposal be accepted as a core within the Mathematics and Statistics major. |
| F31537              | 368         | Core             | Probability and Mathematical Statistics | That proposal be accepted as a core within the Mathematics and Statistics major. |
| F31733              | 695         | Core             | Introduction to Applied Mathematics | That proposal be accepted as a core within the Mathematics and Statistics major. |
| F31540              | 372         | Core             | Analysis and Geometry | That proposal be accepted as a core within the Mathematics and Statistics major. |
| F31538              | 370         | Core             | Dynamics and Control | That proposal be accepted as a core within the Mathematics and Statistics major. |
| F31539              | 371         | Core             | Random Processes and Their Applications | That proposal be accepted as a core within the Mathematics and Statistics major. |
| F31543              | 375         | Core             | Algebraic Structures and Symmetry | That proposal be accepted as a core within the Mathematics and Statistics major. |
| F31541              | 373         | Core             | Scientific and Industrial Modelling | That proposal be accepted as a core within the Mathematics and Statistics major. |
| F31542              | 374         | Core             | Statistical Science | That proposal be accepted as a core within the Mathematics and Statistics major. |
(Endorsed by the Bachelor of Science Interim Board of Studies – R53/10)

| F32384 | 1553 | Complementary | Introduction to Scientific Practices | That proposal be accepted as a complementary unit within the Mathematics and Statistics major. |
Response to the Interim Board of Studies for Science – Mathematics and Statistics Major

- The board noted the development of communication skills requires further attention, in particular, how the embedded communication skills may be crafted to be discipline specific. The Chair suggested attending a workshop provided by CATL, and/or use materials provided by CATL to develop an appropriate table considering the four dimensions of communication, may be useful.
- The board agreed the proposal be further revised and the revisions be considered by the Chair on behalf of the Board.

Response from the School of Mathematics and Statistics

Mathematics and Statistics Major - Communication Skills Requirement

The major meets the minimum requirement by specifying the complementary unit "Introduction to Scientific Practices" offered by the Communication Skills Unit. (However, it may be worth considering the "Professional Engineering" unit offered by FECM be accepted as a substitute unit.) As a complementary unit it should be completed by students before taking level 3 units.

In order to ensure the progressive development of communication skills there are also embedded components as described below. Preliminary to describing these components it is important to recognise that higher mathematics is a language itself; a highly compressed and specialised language that evolved from natural language over a period of two thousand of years. Many of the unique aspects of modern scientific and engineering discourse involve grammatical constructs that arose from mathematical discourse starting around two hundred years ago. Mathematical language cannot exist on its own, rather mathematical meaning is built by embedding the highly specialised, and often highly symbolised, mathematical language in a surrounding text of natural language, which also has a specialised technical register.

Mathematics has three principal uses: modelling (eg. the description of real world phenomena in the language of mathematics), solution and proof (eg. making logic derivations and solving equations) and data analysis (eg. statistical analysis and analysis of risk). These three uses of mathematics broadly relate to the three sub-disciplines of Applied Mathematics, Pure Mathematics, and Probability and Statistics, which can be clearly seen in the structure of the major. Each of the sub-disciplines uses the language of mathematics in subtly different ways.

From the point of view of communication, in level 1 units of the major, students learn the basic essentials of mathematical language. For example, the reading of symbolism, the construction of logical arguments, and technical vocabulary. These skills are tested in the reading of on-line materials for assessment, verbally in tutorials, and written assignments. In the applied mathematics and statistics, there are also "word problems" where students must translate in both directions between natural language and mathematical language.

At level 2 the process of learning mathematical discourse continues and is
By level 3 students will have developed sufficient skill and fluency in mathematical language and its embedding in natural language that units, especially in applied mathematics and statistics, begin to include project-based assessments where the students develop their ability to converse with, and make presentations to, experts and non-experts, through longer written reports and oral presentation.

Often in employment mathematicians and statisticians are required to translate their high-level sophisticated understanding of mathematics and statistics into terms that non-expert users can understand. This is an essential skill that has always been part of learning mathematics, especially applied mathematics and statistics. Even the most esoteric pure mathematics still requires that it is clearly communicated to peers.

Note that the structure of the major is such that at level 2 and 3 students must choose to do units from at least two of the three sub-disciplines, so that all students will be exposed to different modes of mathematical communication.

Specific Components of Major to Address Communication Skills

Writing: Addressed at all levels through written assignments. Students must demonstrate an ability to clearly formulate and present mathematical arguments. At level 3 this includes longer projects and communication with non-experts.

Oral presentations: Introduced at level 3, associated with projects.

Critical information literacy: At all levels students are required to demonstrate the ability to read and comprehend mathematical texts, including the identification of flawed or false arguments. At level 3 this will include the reading of high level research texts.

Interpersonal skills: At all levels this is addressed through interactions in tutorial environments. Traditionally mathematics and statistics units have used group assignment work at all levels. This will certainly continue.

Embedded components by unit

Level 1

Mathematical Methods 1
Mathematical Methods 2

Essential communication in the language of mathematics through reading of materials, written assignments, and oral communication in tutorials.

Level 2

Introduction to Applied Mathematics
Introduction to Pure Mathematics
Probability and Mathematical Statistics
Essential communication in the language of specialised sub-disiplines of mathematics by same methods as level 1 units, with more emphasis on "work problems" in applied mathematics, and mathematical statistics.

Level 3

Dynamical and Control (Applied mathematics)
Scientific and Industrial Modelling (Applied mathematics)
Analysis and Geometry (Pure mathematics)
Algebraic Structures and Symmetry (Pure mathematics)
Randon Processes and Their Applications (Probability and Statistics)
Statistical Science (Probability and Statistics)

Communication at highest level to experts and to non-experts. There will be project-based assessments, that will include oral presentations, especially in applied mathematics units, and Probability and Statistics units. These will include critical examination of research publications, and communication of mathematical concepts and idea to non-experts.
### Interim Board of Studies - Feedback on Proposals (Phase 2)

#### Bachelor of Science - Honours

<table>
<thead>
<tr>
<th>TRIM File Reference</th>
<th>Proposal ID</th>
<th>Type of Proposal</th>
<th>Name of Proposal</th>
<th>Recommendations / Feedback</th>
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<tr>
<td>F31408</td>
<td>701</td>
<td>Honours</td>
<td>Computer Science and Software Engineering</td>
<td>That proposal be accepted as an Honours course, subject to the Interim Board of Studies' consideration and final acceptance of the core unit in research project within the Honours course in the Bachelor of Science.</td>
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<tr>
<td>F31572</td>
<td>415</td>
<td>Core</td>
<td>Scientific Communication</td>
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<td>F31573</td>
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<td>Option</td>
<td>Research Topics in Artificial Intelligence</td>
<td>That proposal be accepted as an option within the Computer Science and Software Engineering course.</td>
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<td>F31574</td>
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<td>Research Topics in Computational Modelling</td>
<td>That proposal be accepted as an option within the Computer Science and Software Engineering course.</td>
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<td>F31575</td>
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<td>Option</td>
<td>Research Topics in Computer Systems</td>
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<td>F31576</td>
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Unit Proposal

TRIM Ref.

TRIM Reference:

Unit Administration Details
Unit code: New Unit
Unit Title: Computer Science and Software Engineering Research Project Part 1
Unit level: 4
Owning Organisational Unit: Computer Science & Software Engineering
Coordinator ID: 19115376
Enrolled Credit Points: 12

Part A: Unit Administration Details
Unit Alpha Prefix: CITS
Major sequence: NO
End-on Honours course: YES
Broadening category A unit: NO
Complementary unit: NO
Elective unit: NO
Major sequence: NO
State Major(s):
End on Honours Course? Computer Science and Software Engineering
Complementary unit? YES, WILLING TO ADMIT TO CATEGORY B
Specify your other reason(s):
150 hours of workload? NO (EXPLAIN BELOW)
If NO, explain why: This unit constitutes the first part of the 600 hour (50% load) year-long honours-level research project.
Material from existing units?
If YES, provide details: CITS7201 CSSE Research Project Part 1. Existing unit will not be retained.
Select unit availability: STANDARD SEMESTERS ONLY
Semester 1: Y
Semester 2: Y
Summer: N
Non-standard application attached: N

Part A: Unit Rules
Pre-requisites: Completion of an undergraduate major in Computer Science or Applied Computing, or equivalent preparation.
Incompatible:
Co-Requisite: Enrolment in the Computer Science and Software Engineering honours programme.

Part B: Unit Academic Details (including Assessment)
Unit Content: Students undertake a major research project on a topic relevant to the computing discipline.
Teaching and Learning practices: Individual meetings between student and academic supervisor(s).
Technologies: Students gain experience in research methodologies and learn how to plan and execute a research investigation. They develop skills in problem formulation, in designing and analysing solutions and experiments, and in the presentation of research findings.
Assessments tailored for outcome: No assessment - this unit constitutes the first part of the year-long honours-level research project where all assessment occurs in the second part.
How will unit be assessed:
Explain reason, if not more than one means of assessment: No assessment - this unit constitutes the first part of the year-long honours-level research project where all assessment occurs in the second part.
Part C: Grading Schema for Unit

Ungraded pass or fail: NO
A. External Assessors: N
B. Group Activity: N
C. Specific skill-acquisition: N

Part D: Demand

Quota and constraint?
Estimated annual enrolments: 20
How was estimate arrived at? Historical enrolment - the unit is a replacement for an existing end-on honours unit.
Are students from other units likely to move to this unit?

Part E: Resource Related Matters

Unit cost from? SCHOOL
Other unit cancelled? YES
Staff members: All academic staff within the School.
Library Consultation form: NO
Central Teaching Facilities: N
Dedicated/specialist rooms: N
New space: N
Estimate of standard booking requirements? Academic staff offices for meetings with students.
Accommodation within existing venues (Specific details)? Yes - existing staff offices are adequate.
Ancillary student fees/charges? NO
Submitted to Dean? N

Part F: Collaborations and Consultations

Provide details of the consultations: Honours review meeting with academic staff in the School of Computer Science and Software Engineering.
Collaboration with another organisation? NO
If YES, state the organisation: 
Complement any major research activities and/or centres? YES
If YES, elaborate: Unit prepares students for undertaking research in one of the School's major research groups.
Does unit content overlap other disciplines? NO
If YES, what are those disciplines:
Duplication of existing unit: The unit is a replacement for an existing unit.

Part G: Publications and Marketing

Provide a paragraph (up to a maximum of 200 words):
Under the guidance of an academic supervisor, students undertake a major research project in the computing discipline. Through this process, students develop the skills necessary to conduct further independent research in this domain.

Part H: ESOS Compliance

Unit location(s): CRAWLEY ONLY
Albany: N
Geraldton: N
Hong Kong - Arts: N
Singapore - Business and Management: N
**Unit Proposal**

**TRIM Ref.**

TRIM Reference:

**Unit Administration Details**

Unit code: New Unit  
Unit Title: Computer Science and Software Engineering Research Project Part 2  
Unit level: 4  
Owning Organisational Unit: Computer Science & Software Engineering  
Coordinator ID: 19115376  
Enrolled Credit Points: 12

**Part A: Unit Administration Details**

Unit Alpha Prefix: CITS  
Major sequence: NO  
End-on Honours course: YES  
Broadening category A unit: NO  
Complementary unit: NO  
Elective unit: NO  
Major sequence: NO  
State Major(s):  
End on Honours Course? Computer Science and Software Engineering  
Complementary unit? YES, WILLING TO ADMIT TO CATEGORY B  
Specify your other reason(s):  
150 hours of workload? NO (EXPLAIN BELOW)  
If NO, explain why: This unit constitutes the second part of the 600 hour (50% load) year-long honours-level research project.  
Material from existing units? YES  
If YES, provide details: CITS7202 CSSE Research Project Part 2. Existing unit will not be retained.  
Select unit availability: STANDARD SEMESTERS ONLY  
Semester 1: Y  
Semester 2: Y  
Summer: N  
Non-standard application attached: 

**Part A: Unit Rules**

Pre-requisites: Completion of the Computer Science and Software Engineering Research Project Part 1 unit in the semester immediately prior to the semester in which this unit is being undertaken.  
Incompatible: Enrolment in the Computer Science and Software Engineering honours programme.  
Co-Requirement: 

**Part B: Unit Academic Details (including Assessment)**

Unit Content: Students undertake a major research project on a topic relevant to the computing discipline.  
Teaching and Learning practices: Individual meetings between student and academic supervisor(s).  
Technologies: 
Student learning outcomes: Students gain experience in research methodologies and learn how to plan and execute a research investigation. They develop skills in problem formulation, in designing and analysing solutions and experiments, and in the presentation of research findings.  
Assessments tailored for outcome: Assessment mechanisms evaluate a student’s ability to conduct research and present findings in the context most relevant to the computing discipline: reports, seminars, and research posters.  
How will unit be assessed: 85%: research dissertation. 10%: research seminar. 5%: research poster.  
Explain reason, if not more than one means of assessment: 

Attachment G5
Part C: Grading Schema for Unit

Ungraded pass or fail: NO
A. External Assessors: N
B. Group Activity: N
C. Specific skill-acquisition: N

Part D: Demand

Quota and constraint?
Estimated annual enrolments: 20

How was estimate arrived at?
Historical enrolment - the unit is a replacement for an existing end-on honours unit.

Are students from other units likely to move to this unit?

Part E: Resource Related Matters

Unit cost from? SCHOOL
Other unit cancelled? YES
Staff members: All academic staff within the School.
Library Consultation form: NO
Central Teaching Facilities: N
Dedicated/specialist rooms: N
New space: N
Estimate of standard booking requirements: Academic staff offices for meetings with students.
Accommodation within existing venues (Specific details)? Yes - existing staff offices are adequate.
Ancillary student fees/charges? NO
Submitted to Dean? N

Part F: Collaborations and Consultations

Provide details of the consultations:
Honours review meeting with academic staff in the School of Computer Science and Software Engineering.

Collaboration with another organisation? NO
If YES, state the organisation:
Complement any major research activities and/or centres? YES
If YES, elaborate: Unit prepares students for undertaking research in one of the School's major research groups.
Does unit content overlap other disciplines? NO
If YES, what are those disciplines: 
Duplication of existing unit: The unit is a replacement for an existing unit.

Part G: Publications and Marketing

Provide a paragraph (up to a maximum of 200 words):
Under the guidance of an academic supervisor, students undertake a major research project in the computing discipline. Through this process, students develop the skills necessary to conduct further independent research in this domain.

Part H: ESOS Compliance

Unit location(s): CRAWLEY ONLY
Albany: N
Geraldton: N
Hong Kong - Arts: N
### Bachelor of Science Overview of Unit Sequence - Engineering Science (ID610) - Single Major

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<tr>
<th>F29710</th>
<th>Unit sequence = 2 + 2 + 4</th>
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</table>

<table>
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<th>New or Existing</th>
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<th>Year / Level 3</th>
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<td>CORE</td>
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<td>Material Behaviour from Atoms to Bridges (ID338)</td>
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<tr>
<td></td>
<td></td>
<td>Introduction to Reaction Engineering (Stream D Chemical) (ID360)</td>
<td>N</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Heat and Mass Transfer (Stream D Chemical) (ID359)</td>
<td>N</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>Data Collection and Analysis (Stream D Resources and Environment) (ID362)</td>
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<td></td>
<td></td>
<td>Engineering Design and Management (Stream D Resources and Environment) (ID363)</td>
<td>N</td>
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</tr>
</tbody>
</table>

*Attachment H1*
# Master of Professional Engineering Pathways

## Level 3 Major Sequence Units

<table>
<thead>
<tr>
<th>Group</th>
<th>Level 3 Units</th>
<th>Professional Masters Programmes (Direct Entry)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Fluid Mechanics</td>
<td>Materials &amp; Manufacturing</td>
</tr>
<tr>
<td></td>
<td>Solid Mechanics</td>
<td>Mechanisms &amp; Machines</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Fluid Mechanics</td>
<td>Heat &amp; Mass Transfer</td>
</tr>
<tr>
<td></td>
<td>Mass &amp; Energy Balances</td>
<td>Intro to Reaction Engineering</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Geomechanics</td>
<td>Hydraulics</td>
</tr>
<tr>
<td></td>
<td>Solid Mechanics</td>
<td>Structural Analysis</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Geomechanics</td>
<td>Data Collection and Analysis</td>
</tr>
<tr>
<td></td>
<td>Solid Mechanics</td>
<td>Resource Extraction Technologies</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>Geomechanics</td>
<td>Hydraulics</td>
</tr>
<tr>
<td></td>
<td>Data Collection and Analysis</td>
<td>Environmental Systems</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Physical Electronics</td>
<td>Electric Machines</td>
</tr>
<tr>
<td></td>
<td>Signals &amp; Systems</td>
<td>Electric Circuits</td>
</tr>
<tr>
<td><strong>G</strong></td>
<td>Professional Computing</td>
<td>Algorithms, Agents and AI</td>
</tr>
<tr>
<td></td>
<td>Computer Networks</td>
<td>Graphics and Animation</td>
</tr>
</tbody>
</table>

**Notes**
The order in which units are listed does not imply semesterisation.
Fluid Mechanics and Hydraulics are to run in alternate semesters and share laboratories.
Only units that form part of the major sequence are shown. The Chemical masters requires two additional units (CHEM1002 and Process Design and Synthesis).
Pathways shown allow direct entry. Entry to alternative programmes may be achieved with bridging units.
<table>
<thead>
<tr>
<th>CAPS ID</th>
<th>New Group</th>
<th>New Unit Name</th>
<th>Old Group</th>
<th>Previous Name (where different)</th>
<th>Action</th>
<th>Documentation Attached</th>
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<tr>
<td>349</td>
<td>B</td>
<td>Mechanical Design</td>
<td>B</td>
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<tr>
<td>436</td>
<td>A</td>
<td>Mechanisms and Machines</td>
<td>B</td>
<td></td>
<td>minor content change</td>
<td>Additional information</td>
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<tr>
<td>437</td>
<td>B</td>
<td>Design of Machine Elements</td>
<td>B</td>
<td>Manufacturing Technology</td>
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<tr>
<td>438</td>
<td>A</td>
<td>Materials and Manufacturing</td>
<td>B</td>
<td>Manufacturing Technology</td>
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<td>Additional information</td>
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<td>967</td>
<td>A,C,D</td>
<td>Solid Mechanics</td>
<td>C</td>
<td>Statics and Solid Mechanics</td>
<td>name and content modified</td>
<td>Additional information</td>
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<tr>
<td>1767</td>
<td>A,B</td>
<td>Fluid Mechanics</td>
<td>C</td>
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<tr>
<td>880</td>
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<td>D</td>
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<tr>
<td>360</td>
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<td>Process Design and Synthesis</td>
<td>D</td>
<td>Process Design and Methods</td>
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<td>unattached elective</td>
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<tr>
<td>354</td>
<td>C,D,E</td>
<td>Geomechanics</td>
<td>C</td>
<td>Engineering Geology and Geomechanics</td>
<td>name and content modified</td>
<td>Additional information</td>
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<tr>
<td>1766</td>
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<td>Hydraulics</td>
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<td></td>
<td>new proposal</td>
<td>Form C</td>
</tr>
<tr>
<td>966</td>
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<td>Engineering Structures</td>
<td>name and content modified</td>
<td>Additional information</td>
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<tr>
<td>965</td>
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<td>Surveying and Visual Communications</td>
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<td>362</td>
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<td>Data Collection and Analysis</td>
<td>E</td>
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<td>361</td>
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<td>1762</td>
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<td>344</td>
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<td>345</td>
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<tr>
<td>346</td>
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<tr>
<td>348</td>
<td>F</td>
<td>Electric Circuits</td>
<td>A</td>
<td>Electric Circuits</td>
<td>no change</td>
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</table>
436 Mechanisms & Machines

Additional Information

Unit Description
This unit covers engineering dynamics and its application to common mechanical mechanisms and machines. Various case studies are presented to illustrate different methods of analysis and to familiarise students with the dynamic behaviour of these systems and also the language used to describe their motion. Laboratories (and perhaps a group design project) allow students to apply the theory in practice and appreciate the difference between modelled and actual performance.

Unit Structure
Lectures, tutorials, and labs **

** The group working on this unit are currently considering whether the Warman-Weir Minerals Design Competition or something similar could be included in this unit. If a design project is included, then the number of labs recommended below may need to be reduced, especially if the design project requires something to be built and tested.

Learning outcomes
Identify what students should be able to do, acquire and know after completing this unit
At the completion of this unit, students will:
- Understand the fundamental relationships between motion and force, including the Coriolis effect and gyroscopic behaviour
- Understand the physical properties that affect dynamic behaviour
- Be able to analyse the motion of a range of mechanisms and machines and calculate the forces required to produce this motion
- Be able to draw schematics, kinematic diagrams and free body diagrams
- Be aware that the dynamic behaviour of a machine leads to vibration of the machine and supporting structure
- Be aware that machine motion needs to be controlled and that this requires the implementation of control hardware & software
- Be aware of some of the human factors affecting group projects and team work

Assessment (tasks)
Identify the activities that will be used to assess unit content and the development of communication & other professional skills, e.g. teamwork projects, exam, oral presentations, etc. Give breakdown of weighting if available.
Weightings at this stage are indicative only
20% Laboratories (3 or 4)
  o Most of these will use existing lab equipment. The development of one new lab may be required.
30% 2 Group assignments**
  o These should be loosely based on lecture material but extend students’ understanding. Assessment could include an oral presentation as well as the submission of personal work diaries.
10% Mid-semester written test
40% Exam

**If a semester long design project is included, this will replace the 2 group assignments and perhaps one lab
438 Materials & Manufacturing (previous name: Manufacturing Technology)

Additional Information

Does this unit utilise any material from existing units?
Elements of this unit are taken from MATE1412, MATE2412 and MECH2402. These units will not be retained.

Unit Description
This unit covers manufacturing methods (casting, metalworking, machining, finishing, etc) for a range of materials (metals, polymers, composites, advanced ceramics). Material structure and properties (castability, formability, machinability, etc) related to manufacturing processes are discussed. Various relationships between material structure, manufacturing processes and material properties are highlighted. Health and safety issues in relation to manufacturing processes are also considered.

Unit Structure
Lectures, group work in tutorials and labs.

Learning outcomes
At the completion of this unit, students will:
• Understand the relationships between material structure, properties, and various manufacturing processes
• Understand a range of manufacturing processes and their application to particular materials and geometries
• Be able to communicate with manufacturing personnel through the creation of engineering drawings
• Be aware of health and safety issues in manufacturing

Assessment (tasks)
At least two manufacturing projects (e.g. casting, metalworking, machining) conducted in small teams. The design part of the projects will be discussed in the tutorials and the practical part will be done in laboratories.
967 Solid Mechanics (previous name: Statics and Solid Mechanics)

Additional Information

Overview
This unit will be offered as part of the Engineering Science Major. It will be a core unit for the Civil and Mechanical streams (pathways). Level of Unit: 3
Expected number of students annually completing this unit: 500-600 (estimate based on current enrolments)
Will this unit be offered as a Category B broadening unit: Yes

Does this unit utilise any material from existing units?
This unit is a modified version of CIVL2110 Statics & Solid Mechanics. The unit is being re-developed to suit both Mechanical and Civil Engineering requirements.

Unit Description
This unit focuses on the relationship between stress and strain in solid, deformable, load-carrying structural and mechanical elements. Various loading, such as tension, compression, bending, shear and torsion will be considered as well as common failure modes and models. Design of structural and mechanical elements to withstand defined static loads will also be covered.

Unit Structure
This unit will comprise lectures, tutorials, demonstrations, and group work.

Learning outcomes
- Understand equilibrium conditions as applied to the analysis of structural and mechanical elements
- Be able to calculate reaction forces on a loaded element and draw normal force, shear force, torque and bending moment diagrams.
- Understand the relationship between stress and strain (Generalised Hooke’s Law) in 2-D and 3-D
- Understand the relationship between Poisson’s ratio, Young’s modulus, shear modulus and bulk modulus
- Be able to calculate the normal stress and shear stress in structural elements induced by multi-directional loading
- Understand the effects of different boundary conditions on the stress distribution in a loaded element
- Be able to assess cross-sectional properties and their effect on structural response to loading
- Understand the stress/strain transformation, represent it using Mohr’s circle and apply it
- Understand (including the mathematical bases) the concept of principal stress/strain and determine principal stress/strain in simple components under various types of loading
- Understand the difference between ductile and brittle materials, and the choice of appropriate failure models
- Understand and apply ideal (Euler’s) column buckling model and stability criteria
- Apply the above to analyse the stress/strain state in simple mechanical components and interpret the results in terms of risk of the component failure
- Appreciate the compatibility condition to analyse statically indeterminate structures

Assessment (tasks)
- Individual written or on-line assignments: These will be designed as formative assessment and allow students to develop competency with the unit content and concepts.
- Group project: Students will work in teams of 4-5 to design and/or analyse a civil and/or mechanical structure. Assessment will be based on group and individual written submissions, and short oral progress reports. There may also be a build and test component to this activity.
- Mid-semester and end of semester written exams: The exams will be designed to measure each student’s level of understanding of the unit content and their ability to apply the analysis methods presented.

A breakdown of weighting for the assessment activities is not yet available

Initial Estimate of Resource Requirements
- The unit will be team taught with at least one lecturer from Civil and one from Mech.
- The unit will require a large lecture venue (seating ~600 students, see note* below), or repeat lectures in smaller venues, as well as:
• Tutorial rooms
• Appropriately trained tutors
• A venue for the students to meet and develop their group project
• Demonstration or lab equipment to illustrate principles covered in the lectures

* Although the Octagon can accommodate this number of students, it is not designed for lectures. There are no facilities (e.g. desks) available for students to write notes. This needs to be addressed.
Unit Proposal

**TRIM Ref.**

TRIM Reference:

**Unit Administration Details**

Unit code: New Unit  
Unit Title: Fluid Mechanics  
Unit level: 3  
Owning Organisational Unit: Mechanical Engineering  
Coordinator ID: 18225279  
Enrolled Credit Points: 6

**Part A: Unit Administration Details**

Unit Alpha Prefix: MECH  
Major sequence: YES  
End-on Honours course: NO  
Broadening category A unit: NO  
Complementary unit: NO  
Elective unit: YES  
Major sequence: YES  
State Major(s): Engineering Science  
End on Honours Course?  
Complementary unit? YES, WILLING TO ADMIT TO CATEGORY B  
Specify your other reason(s): YES  
150 hours of workload? IF NO, explain why:  
If NO, explain why: Material from existing YES units?  
If YES, provide details: CHPR2433 - unit will be cancelled  
Select unit availability: STANDARD SEMESTERS ONLY  
Semester 1: N  
Semester 2: N  
Summer: N  
Non-standard application attached:  

**Part A: Unit Rules**

Pre-requisites: Mathematical Methods 1  
Mathematical Methods 2  
Motion  
Energy  
Materials  
Incompatible: Hydraulics  
Co-Requisite:  

**Part B: Unit Academic Details (including Assessment)**

Unit Content: This unit introduces the principles of conservation and momentum transfer in the flow of fluids. Topics discussed include the fundamental properties of fluids, hydrostatics, the general equations of fluid motion, dimensional analysis, fluid friction, pumps, pipe systems, flow in porous media and compressible flow.

Teaching and Learning practices: Lectures/Labs  
Technologies:  

Attachment H8
Student learning outcomes:
1. An understanding of the fundamental properties of fluids
2. An understanding of the prediction and measurement of hydrostatic fluid phenomena
3. An understanding of the equations used to describe fluid flow
4. The ability to apply the general equations of motion to analyze simple laminar flows.
5. Recognition of the transition from laminar to turbulent flow.
6. The ability to estimate the forces exerted on solid bodies by flowing fluids
7. The ability to apply the principles of conservation of mass, momentum and energy to macroscopic fluid systems.
8. The ability to formulate dimensional analyses and evaluate dynamic similarity
9. Ability to compute pipework system curves and identify pump duty points
10. Ability to characterize flow through porous media
11. An understanding of compressible flow behaviour
12. Appreciate the application of fluid mechanics in practical engineering environments

Assessments tailored for outcome:

20% Labs
Group labs will be used to demonstrate the practical application of the conservation principles and the analysis of real systems using measurement tools available in industry. The labs will address outcomes: 1, 2, 6 - 9 and 12.

30% Assignments
Individual assignments will be used to develop competency in the fundamental principles and also target recently presented lecture material. The assignments will address outcomes 1 - 11.

10% Team project
The group design project will encourage enquiry-based learning and require students to develop and evaluate solutions to open-ended fluid mechanics problems. It will also assist in the development of their team working skills. The project will address outcomes 7, 9 and 12.

40% Exam
The individual exam will provide a summative assessment of the core competencies developed in this unit.

How will unit be assessed:

20% Labs
Group labs will be used to demonstrate the practical application of the conservation principles and the analysis of real systems using measurement tools available in industry. The labs will address outcomes: 1, 2, 6 - 9 and 12.

30% Assignments
Individual assignments will be used to develop competency in the fundamental principles and also target recently presented lecture material. The assignments will address outcomes 1 - 11.

10% Team project
The group design project will encourage enquiry-based learning and require students to develop and evaluate solutions to open-ended fluid mechanics problems. It will also assist in the development of their team working skills. The project will address outcomes 7, 9 and 12.

40% Exam
The individual exam will provide a summative assessment of the core competencies developed in this unit.

Part C: Grading Schema for Unit

Ungraded pass or fail: NO
A. External Assessors: N
B. Group Activity: N
C. Specific skill-acquisition: N

Part D: Demand
Quota and constraint? 90
Estimated annual enrolments?
How was estimate arrived at?
Are students from other units likely to move to this unit?
Chemical and Mechanical Students

Part E: Resource Related Matters
Unit cost from? SCHOOL
Other unit cancelled? YES
Staff members: Staff from Civil and Mechanical School

Part F: Collaborations and Consultations
Provide details of the consultations:
Chemical and Mechanical discipline meetings; Schools of Civil and Environmental Engineering

Part G: Publications and Marketing
Provide a paragraph (up to a maximum of 200 words):
This unit introduces the principles of conservation and momentum transfer in the flow of fluids. Topics discussed include the fundamental properties of fluids, hydrostatics, the general equations of fluid motion, dimensional analysis, fluid friction, pumps, pipe systems, flow in porous media and compressible flow.

Part H: ESOS Compliance
Unit location(s): CRAWLEY ONLY

Unit delivery mode: FACE2FACE
354 Geomechanics (previous name: Engineering Geology and Geomechanics)

Additional Information

Students are able to
1. Appreciate the dynamic and interactive nature of geological processes and their effects on soils, rocks and rock masses;
2. Make informed geological observations and appreciate their engineering significance;
3. Predict the response of soil to compression and shear; (4) apply the critical state framework for describing soil strength;
4. Understand the mechanics of water flow in soil.

Unit Outcomes

1. The interplay between geology and the mechanical characteristics of soil
2. The principle of effective stress;
3. The role of shear strength in geotechnical design;
4. The link between stiffness and strength of soil with stress level and density.

Threshold Concepts

The unit firstly presents an introduction to geology and geological processes as they affect civil and resource engineering projects. Topics include weathering; erosion; minerals and rock and soil types; the rock cycle, rock-forming processes and soil-forming processes. All topics are explained using well illustrated local and international examples. Full use is made of available video footage and demonstration models and students will gain hands-on experience of various soil and rock types. The importance of correctly assessing the reliability of information will be discussed in the context of geological models.

Teaching Approach

The unit then deals with concepts of effective stress; soil compression and consolidation; seepage; and the strength and deformation properties of soil. The underlying framework is that of critical state soil mechanics, which links the strength and stiffness of soil to the density and effective stress level. In-class tutorials will be an essential component of the teaching of this unit to ensure students gain supervised experience in the application of effective stress and critical state principles. Students observe and report on laboratory experiments designed to supplement understanding gained at lectures on the strength and compressibility of soils. Written reports will form a vital component of this assessment.

Assessment Proposals

This includes assessed written laboratory reports and in-class tutorials; a mid-semester multiple-choice examination and an end of semester final examination.
TRIM Ref.

TRIM Reference:

Unit Administration Details

Unit code: New Unit
Unit Title: Hydraulics
Unit level: 3
Owning Organisational Unit: Faculty of Engineering, Computing & Mathematics Office
Coordinator ID: 18330912
Enrolled Credit Points: 6

Part A: Unit Administration Details

Unit Alpha Prefix: GENG
Major sequence: YES
End-on Honours course: NO
Broadening category A unit: NO
Complementary unit: NO
Elective unit: YES
Major sequence: YES
State Major(s): Engineering Science
End on Honours Course?
Complementary unit?
Category B?
YES, WILLING TO ADMIT TO CATEGORY B
Specify your other reason(s):
150 hours of workload?
YES
If NO, explain why:
Material from existing units?
YES
If YES, provide details:
ENVE2602 and CIVL2130
Select unit availability:
STANDARD SEMESTERS ONLY
Semester 1: N
Semester 2: N
Summer: N
Non-standard application attached:

Part A: Unit Rules

Pre-requisites: Mathematical Methods 1
Mathematical Methods 2
Motion
Energy
Materials
Incompatible: Fluid Mechanics
Co-Requisite: 

Part B: Unit Academic Details (including Assessment)

Unit Content: The objective of this unit is for students to acquire fundamental knowledge of hydraulics, and to develop the generic ability to apply the knowledge of hydraulics to solve a wide range of engineering problems. In particular, students are expected to develop a good understanding of the fundamental principals in hydraulics and gain the ability to apply
these principals to solve engineering problems, and to develop self-learning skills. The topics covered include fluid properties, hydrostatics and stability of floating bodies, bulk equations of fluid motion, dimensional analysis and similarity laws, flow resistances and velocity distributions in pipes and pump/turbine and pipeline analysis.

Teaching and Learning practices:
- In-class lectures
- In-class Tutorials
- Labs and assignments (about 3 labs and 4-6 assignments)

Technologies:
- Student learning outcomes:

Unit Outcomes
On successful completion of this unit the students will be able to:
1. Appreciate the meaning and relevance of fluid properties.
2. Be able to analyse and quantify the hydrostatic forces on various objects encountered in civil and environmental engineering applications.
3. Be able to analyse the stability of floating bodies.
4. Understand the fundamental conservation laws (mass, momentum, and energy) of hydraulics and be able to apply them to analyse hydraulic problems related with civil engineering applications.
5. Write the equations that describe the fluid motion.
6. Understand the meaning of dimensionless numbers and the hydraulic similarity laws and their applications in civil and environmental engineering.
7. Design laboratory models whose hydraulic characteristics replicate those of the prototype.
8. Know the criteria for pump selection and the similarity laws for pumps.
9. Know how to find the flow resistance and the velocity distributions in closed conduit flows.
10. Gain the ability to plan projects through the laboratory activities themselves.

Assessments tailored for outcome:
1. To examine the extent the students understand the main contents of the unit, assignments will be conducted by solving 3-5 problems related with the contents covered in the previous week(s). Assignments corresponding to unit outcomes 2, 3, 4, 8, 9 will be used.
2. Three laboratories will be conducted to assist students’ understanding of the theories related to transition to turbulence (unit outcome 9), conservation of energy (outcome 4) and hydraulic similarity laws (outcomes 6 and 7) and laboratory reports will indicate the level of understanding of these outcomes.
3. Final exam (or a few in-semester tests) will be conducted to examine how well the students understand the main contents of this unit.

How will unit be assessed:
1. Continuing Assessments (30%) which consist of
   - Assignments (15%)
   - Lab reports (15%)
2. Tests and final exam (70%)

Explain reason, if not more than one means of assessment:

Part C: Grading Schema for Unit
Ungraded pass or fail: NO
A. External Assessors: N
B. Group Activity: N
C. Specific skill-acquisition: N

Part D: Demand
Quota and constraint?
Estimated annual enrolments: 200
How was estimate arrived at? Current enrolment ENVE2602/CIVL2130
Are students from other units likely to move to this unit?

Part E: Resource Related Matters
Unit cost from? SCHOOL
Other unit cancelled? YES
Staff members: Marco Ghisalberti, Tongming Zhou
Library NO
Consultation form: NO
Central Teaching Facilities: N
Dedicated/specialist N

Attachment H13
rooms:
New space: N
Estimate of standard booking requirements?
Lecture theatres with capacity of about 200 students
3 tutors with class rooms of 50-60 seats.
3 lab demonstrators and three lab facilities
Accommodation within existing venues (Specific details)?
Yes
Ancillary student fees/charges?
NO
Submitted to Dean?
N

Part F: Collaborations and Consultations
Provide details of the consultations:
Schools of Civil and Environmental Engineering; School of Mechanical and Chemical Engineering; cross disciplinary working groups
Collaboration with another organisation?
NO
Compelment any major research activities and/or centres?
NO
If YES, elaborate:
Does unit content overlap other disciplines?
YES, (DETAILS BELOW)
If YES, what are those disciplines:
Fluid Mechanics
Duplication of existing unit:
Modification of existing unit

Part G: Publications and Marketing
Provide a paragraph (up to a maximum of 200 words):
This unit provides an introduction to fluid statics and fluid dynamics. The topics covered include fluid properties, hydrostatics, bulk equations of motion, the Bernoulli equation, dimensional analysis, experimental design, pipe flow, pipe networks, the Navier-Stokes equations and plane flow. There is also an introduction to fundamental concepts of fluid mechanics such as turbulence, waves and drag.

Part H: ESOS Compliance
Unit location(s):
CRAWLEY ONLY
Albany: N
Geraldton: N
Hong Kong - Arts: N
Singapore - Business and Management: N
Singapore - Life and Physical Sciences: N
Unit delivery mode: FACE2FACE
966 Structural Analysis (previous name: Engineering Structures)

Additional Information

This unit provides an introduction to the analysis of two-dimensional determinate and indeterminate beam, truss and frame structures under the actions of external loading, thermal loading, and prescribed displacements, the force (flexibility) and displacement (stiffness) methods, and the matrix stiffness method. Focus is on the elastic behaviour of structures.

Unit Outcomes

1. Understand the role of analysis in the design process
2. Analyse statically determinate and indeterminate bars, trusses, beams and rigid jointed frames
3. Analyse beams and rigid jointed frames with internal hinges
4. Analyse trusses, beams and rigid jointed frames under the action of thermal loading
5. Include shear deformation in the analysis of beams and rigid jointed frames
6. Include prescribed displacements in the analysis of trusses, beams and rigid jointed frames
7. Communicate the results of an analysis by constructing bending moment, shear force and axial force diagrams
8. Understand how two-dimensional analysis procedures may be extended to three-dimensions

Threshold Concepts
The threshold concept for the unit is that there are four requirement for a perfect solution to a structural analysis problem these are

1. Equilibrium,
2. Compatibility,
3. Constitutive behaviour and
4. Boundary conditions.

Each of these 4 requirements may also be regarded as individual threshold concepts.

Teaching Approach
Teaching approach consists of lectures covering new course material supported by tutorials with examples questions and worked solutions. Weekly assignments closely related to material covered. Developing a co-operative relationship with peers will be emphasised through enabling group work on certain assignments.

Assessment Proposals
Assessment consists of compulsory weekly assignments, a mid-semester test and a final examination. The assignments provide continuous assessment and address the skills associated with gaining technical competence in the analysis of two-dimensional structures. The assignments, mid-semester test and final examination test students' knowledge of fundamentals and their ability to formulate and solve a range of problems in the analysis of structures.
<table>
<thead>
<tr>
<th>Part A: Unit Administration Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>This proposal is for offering a (relevant boxes):</td>
</tr>
<tr>
<td>☒ unit within a Major sequence</td>
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<tr>
<td>☐ unit of an End-on Honours course</td>
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<tr>
<td>☐ broadening category A unit</td>
</tr>
<tr>
<td>☐ complementary unit</td>
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<tr>
<td>☐ elective unit</td>
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</tbody>
</table>

**Note 1:** Broadening Category A comprises units that will “have as their main focus some aspects of the globalised and culturally diverse environment in which graduates will be living and working”.

**Note 2:** An elective means a unit which a student may choose freely from among the units available in the University subject to the rules which govern the structure of their course and to any unit rules.

<table>
<thead>
<tr>
<th>Is this a new or existing unit?</th>
<th>EXISTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>State the unit title</td>
<td>Resource Extraction Technologies</td>
</tr>
<tr>
<td>State unit code if it already exists</td>
<td>Policy on Unit Codes</td>
</tr>
</tbody>
</table>

| MINE1160 |

If the unit is part of a Major sequence state the name of the Major Engineering Science major

If the unit is part of an End-on Honours course state the name of the course

If the proposal is for offering a complementary unit,
- state the major(s) for which it will be prescribed
- explain why this is a necessary adjunct to the major

Are you willing to admit students into this as a Category B Broadening Unit? [“Note that Category B comprises potentially all units that faculties are willing to offer to students from across the University, subject to prerequisites being met. Accordingly units in this category will not need specific approval from the Board of Coursework Studies to qualify as “broadening”; nor need they be confined to level 1 or level 2. In principle it should be permissible for broadening units to be at any level (and even to include a major sequence – a second major from another degree), if the unit entry requirements are met. However, there may still be some units that are unavailable for broadening purposes on practical grounds. These would be specified by the relevant Interim Board of Studies on the recommendation of a faculty.”]

Yes

If No, this is because (relevant boxes):
- ☐ you anticipate that there are infrastructure (e.g. space) restrictions
- ☐ of other reason(s)? Specify your reason(s)

Additional comments, if any.

Does the proposed unit have a workload of 150 hrs? Yes

If no, explain why.

Does the unit utilise any material from existing units? Yes

If YES, provide details and state whether any such existing unit(s) will be retained? Based on MINE1160 which will be discontinued

Will the unit be offered within standard semester dates? Yes

If YES, select the semester in which the proposed unit will be offered Select....

Part B:  Unit Academic Details (including Assessment)

Provide a brief description of the proposed unit content including a succinct summary of the academic objectives of the unit

This is an introduction to the technologies used to extract minerals from the ground. An overview is given of typical operational processes and design considerations for surface and underground mining. A field trip is made to an operational mine near Perth. Objectives include gaining an understanding of the fundamental technologies employed in the development and operation of mining operations; the multidisciplinary nature of mining engineering; and the variety of roles of engineers within these operations.

Summarise the teaching and learning practices that will be used to realise the academic objectives (eg lectures, laboratory classes, field work)
Lectures, laboratories and a field trip(s)

Advise what technologies (if any) will be required to support the teaching and learning practices

Briefly describe the learning outcomes of the unit (i.e. what a student should be able to do, acquire and know after successfully completing it - skills, values and knowledge).

Students should have an understanding of the fundamental technologies employed in the development and operation of mining operations; the multidisciplinary nature of mining engineering; and the variety of roles of engineers within these operations.

Explain how the assessments will be explicitly tailored to the outcome.  Note: by resolution R23/08 the Academic Council endorsed the requirement that all new units should include a listing of intended student outcomes and that assessment should be explicitly tailored to such outcomes.
The assignment will assess students ability to collect, analyse and report data pertaining to all outcomes. The exam will test students knowledge and appreciation of all outcomes.

Describe how the unit will be assessed including a breakdown of the various assessment components and their respective weighting.  For all examinations specify the duration and when they will be held during a teaching period.
Note: By Academic Council resolution R16/94 the Examinations Office administers only standard examinations of 2 or 3 hours duration
3 hr 10min exam, one assignment worth 30%

If you do not propose to use more than one means of assessment for this unit (as recommended in the University’s Guidelines on assessment (http://www.secretariat.uwa.edu.au/home/policies/assessment) explain the reason for this.

Part C:  Grading Schema for Unit

Schools are required to ensure that final results¹ for units in courses at all levels are produced as both percentage marks and letter grades whenever possible. However, a number of categories of unit² are exempt from this requirement. The following exemption categories are pertinent for this checklist:

1. Units where the involvement of external assessors makes it difficult to compare students’ performance in an equitable manner and provide appropriately graded results for the units (for example, in-country units, cross-institutional enrolments and practicum units such as practical experience unit and work experience in industry)
2. Units involving group activity where the contribution of individual students cannot be distinguished (for example, participation in the University Chorale/Orchestra or compulsory field tours)
3. Specific skill-acquisition only units, which may be taken to be completed merely by attendance and participation (for example, use of medical equipment, legal skills such as negotiation and mediation

Indicate if it is intended that the result for the unit be recorded as an ungraded pass or ungraded fail only

If YES, indicate to which of the categories of exempt units listed above the unit belongs

¹ The final result for a unit in which a student has completed work for supplementary assessment is either passed supplementary (PS), in which case a mark equivalent to the minimum pass mark for a unit is recorded, or failed supplementary A(FS), in which case the original mark remains.
² Please see policy applying to ungraded passes and fails available at http://www.secretariat.uwa.edu.au/home/policies/courseunit
### Part D: Demand

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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</thead>
<tbody>
<tr>
<td>What is the proposed quota on intake to the unit, if any, and the nature of the constraint on intake?</td>
<td>200 based on lecture room size and time required to mark an assignment for that number of students</td>
</tr>
<tr>
<td>What is the expected number of students annually completing the unit?</td>
<td>100</td>
</tr>
<tr>
<td>How has this estimate been arrived at?</td>
<td>This estimate is based on the current growing enrolment in the Mining Engineering degrees. This unit will be a core unit in the Mining stream of the Engineering Science major.</td>
</tr>
<tr>
<td>From which other units (if any) are students likely to move into this one?</td>
<td></td>
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</tbody>
</table>

**Note:** Decisions on any quotas applicable to this unit will be made by the working party on the University’s Admissions and Quota Policy.
### Part E: Resource Related Matters

Advise whether all the cost of the unit (eg including, if appropriate, resources associated with teaching at the Albany Centre such as Library/computer software) will be met from Faculty / School funds or whether the proposal is the subject of application for other funding (eg University Initiatives Fund)

**School**

Indicate whether the school intends to cancel another unit to release resources for this one

| Yes |

Nominate a unit coordinator

<table>
<thead>
<tr>
<th><strong>Name</strong></th>
<th>Richard Durham</th>
</tr>
</thead>
</table>

Telephone  x3087

| Email | durham@mining.uwa.edu.au |

Name the staff member(s) who are able to teach the unit

| Richard Durham |

Confirm that you have attached a completed Library Consultation form

| Library Consultation form | NO |

Indicate the proposed unit’s likely accommodation requirements (lecture theatres, tutorial rooms, studios or laboratory space etc.) ( relevant boxes) :

- [X] existing spaces that would best service the classes from the Central Teaching Facilities;
- [X] existing spaces that would best service the classes from current dedicated/specialist rooms owned or controlled by Schools and Faculties; and/or
- new space not currently available at UWA.

Estimate what bookings would be required for each of these facilities across the standard teaching times, Monday to Friday 8am to 6pm, throughout the year.

Possibly 5 lectures of 45min each

Do you envisage that classes for this unit can be accommodated within existing venues? (Give specific details)

| Yes |

Will there be any ancillary student fees/charges associated with this unit?

| NO |

If YES, confirm that you have submitted details of these to the Dean


---

### Part F: Collaborations and Consultations

Provide details of consultations you have had with various groups and individuals during the development of this unit indicating whether or not any issues have been raised. Consultation may include the following:

- other schools of the University which may have an interest in the unit, including relevant academic staff;
- students and graduates;
- employers and/or employer groups, and professional bodies;
- International Centre

Is any part of the unit delivered by or taught in collaboration with another organisation?

| NO |

If YES, state the name of the organisation.

Does the proposed unit complement any major research activities and/or centres?

| NO |

If YES, elaborate

Does the content of this unit overlap with units taught in other disciplines at UWA?

| NO |

If YES, what are those disciplines? Have they been consulted?

What steps have you taken to ensure the contents of this unit are not duplicated by an existing unit?

Replaces an existing unit.
Part G: Publications & Marketing

Provide a paragraph (up to a maximum of 200 words) which:

- describes the nature of the unit and what opportunities it can lead to; and
- is suitable for publication

This unit covers the technologies used to extract minerals from the ground. An overview is given of typical operational processes and design considerations for surface and underground mining. A field trip is made to an operational mine(s) near Perth.

Part H: ESOS Compliance

Where will this unit be taught? Crawley

Are all the units within the proposed major taught face-to-face? YES

If NO, state the name of the unit(s) that will be taught by any kind of non face-to-face instruction. (Note: where a course is delivered less than 75% face-to-face (ie more than 25% by distance learning or similar), there may be implications for international student visas. Contact the International Centre for more information)

Note: Ensure that you consult with the International Centre about the suitability of the unit for International students, proposed fees and any conditions that may be required.

Part I: Contact Details

Provide contact details of staff submitting the proposal

<table>
<thead>
<tr>
<th>Name</th>
<th>Richard Durham</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>Civil and Resource Engineering</td>
</tr>
<tr>
<td>Faculty</td>
<td>Engineering, Computing and Mathematics</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:durham@mining.uwa.edu.au">durham@mining.uwa.edu.au</a></td>
</tr>
<tr>
<td>Phone</td>
<td>3087</td>
</tr>
<tr>
<td>Date of Submission</td>
<td>29/03/10</td>
</tr>
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</table>

Part J: Approval Closing Dates In CAPS (Callista Approval and Publishing System)

<table>
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<tr>
<th>If this form is used to propose</th>
<th>Approval levels</th>
<th>Cut-off Dates in CAPS</th>
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</thead>
<tbody>
<tr>
<td>Units as part of a Major sequence</td>
<td>School</td>
<td>19th April 2010</td>
</tr>
<tr>
<td></td>
<td>Faculty</td>
<td>3rd May 2010</td>
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<tr>
<td>Units as part of a end-on honours course</td>
<td>School</td>
<td>13th April 2010</td>
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<td></td>
<td>Faculty</td>
<td>27th April 2010</td>
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<tr>
<td>Broadening Category A unit / complementary unit / elective unit</td>
<td>School</td>
<td>13th April 2010</td>
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<tr>
<td></td>
<td>Faculty</td>
<td>27th April 2010</td>
</tr>
</tbody>
</table>
Unit Proposal

TRIM Ref.

TRIM Reference:

Unit Administration Details

Unit code: New Unit
Unit Title: Environmental Systems
Unit level: 3
Owning Organisational Unit: Environmental Systems Engineering
Organisational Unit: 19306363
Enrolled Credit Points: 6

Part A: Unit Administration Details

Unit Alpha Prefix: ENVE
Major sequence: YES
End-on Honours course: NO
Broadening category A unit: NO
Complementary unit: NO
Elective unit: YES
Major sequence: YES
State Major(s): Engineering Science
End on Honours Course? Category B?
Complementary unit?
Category B? YES, WILLING TO ADMIT TO CATEGORY B
Specify your other reason(s):
150 hours of workload? YES
If NO, explain why:
Material from existing units? YES
If YES, provide details:
Select unit availability:
Semester 1: N
Semester 2: N
Summer: N
Non-standard application attached:

Part A: Unit Rules

Pre-requisites: Engineering Challenges in a Global World, Materials from Atoms to Bridges, Motion, Energy, Maths Methods 1, Maths Methods 2
Incompatible: ENVE1601
Co-Requisite:

Part B: Unit Academic Details (including Assessment)

Unit Content: This unit provides an introduction to the functioning of the Earth's environment, the physical, hydrological, and ecological processes for environmental systems, and a holistic systems approach to how these processes respond to and interact with each other. The unit covers theories and quantitative techniques to understand interactions between water, air, and soil, and ecosystem's response to these interactions.
Teaching and Learning practices:
Team taught - Two people

Attachment H21
On completion of this unit, students should be able to:

1. Articulate the role of environmental engineers in our society;
2. Select appropriate control volumes and define environmental systems, to allow explorations of solutions to environmental engineering problems;
3. Formulate mass and energy balances for simple environmental engineering systems;
4. Use mass and energy balance closure to specify and quantify knowledge and data gaps;
5. Articulate the range of spatial and temporal scales over which environmental systems are forced;
6. Assimilate presented data and utilise it for problem solving.
7. Use knowledge of the transfer of energy and cycling of matter between biotic and abiotic systems to answer questions about important issues such as global warming and eutrophication.

Assignments develop and test students' abilities across the range of outcomes by highlighting their role in the context of concrete applications areas, such as: External force and energy supply; Hydrologic processes; Climate change, ocean dynamics and global carbon cycle; Transfer of energy and cycling of matter between biotic and abiotic systems; Ecological processes and ecosystem function. The final exam allows the synthesis of common methods and principles to be tested.

How will unit be assessed:
1. 8 assignments (60%)
2. Final exam (40%). (In order to pass the unit, students must pass the exam.)

Part C: Grading Schema for Unit
Ungraded pass or fail: NO
A. External Assessors: N
B. Group Activity: N
C. Specific skill-acquisition: N

Part D: Demand
Quota and constraint? 100
Estimated annual enrolments? Based on current numbers in the existing unit, plus an estimate of those in allied pathways taking it as an elective.

Part E: Resource Related Matters
Unit cost from? SCHOOL
Other unit cancelled? YES
Staff members: Team taught by staff members in the School of Environmental Systems Engineering
Library Consultation form: NO
Central Teaching Facilities: N
Dedicated/specialist rooms: N
New space: N
Estimate of standard booking requirements? Lectures, tutorials
Accommodation within existing venues(Specific details)? Yes
Ancillary student fees/charges? NO
Submitted to Dean? N
Provide details of the consultations:

This unit will be more advanced than the existing unit as it is able to build upon the material and skills learnt in the Engineering foundation units. There is on-going consultation with, and participation in, the foundation curriculum development teams.

Collaboration with another organisation?
NO

If YES, state the organisation:

Complement any major research activities and/or centres?
YES

If YES, elaborate:

Does unit content overlap other disciplines?
NO

If YES, what are those disciplines:

Duplication of existing unit:
Unit will replace existing unit

Part G: Publications and Marketing

Provide a paragraph (up to a maximum of 200 words):
This unit provides an introduction to the functioning of the Earth’s environment, the physical, hydrological, and ecological processes for environmental systems and an holistic systems approach to how these processes respond and interact with each other.

Part H: ESOS Compliance

Unit location(s):
CRAWLEY & OTHER LOCATION(S) BELOW
Albany: N
Geraldton: N
Hong Kong - Arts: N
Singapore - Business and Management: N
Singapore - Life and Physical Sciences: N
Unit delivery mode: FACE2FACE
<table>
<thead>
<tr>
<th>Rule</th>
<th>Year / Level 1</th>
<th>New or Existing</th>
<th>Year / Level 2</th>
<th>New or Existing</th>
<th>Pre Req</th>
<th>Year / Level 3</th>
<th>New or Existing</th>
<th>Pre Req</th>
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<tbody>
<tr>
<td>Take ALL Units</td>
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<tr>
<td></td>
<td>Object-oriented Programming and Software Engineering (CITS1200, CITS1220) (ID296)</td>
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<tr>
<td></td>
<td>Introductory Calculus * (ID484)</td>
<td>E</td>
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<td></td>
<td>Introduction to Professional Scientific Practice (ID1553)</td>
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<td>Discrete Structures (ID986)</td>
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<td></td>
<td>Databases (CITS2232) (ID301)</td>
<td>E</td>
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<td></td>
<td>Data Structures and Algorithms (CITS2200) (ID300)</td>
<td>E</td>
<td>OOP&amp;SE</td>
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<td></td>
<td>Professional Computing (CITS3200) (ID485)</td>
<td>E</td>
<td>OOP&amp;SE, Programming &amp; Systems, Databases</td>
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<td></td>
<td>Computer Networks (combining existing material) (ID302)</td>
<td>N</td>
<td>Programming &amp; Systems &amp; Programming, Data Structures and Algorithms</td>
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<td></td>
<td>Algorithms, Agents and Artificial Intelligence (ID726)</td>
<td>N</td>
<td>OOP&amp;SE, Data Structures</td>
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<td>Graphics and Animation (combining existing material) (ID303)</td>
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<td>Programming &amp; Systems</td>
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Notes: * Required by students who have completed only MAT2C/2D.
<table>
<thead>
<tr>
<th>Rule</th>
<th>Year / Level 1</th>
<th>Year / Level 2</th>
<th>Pre Req</th>
<th>Year / Level 3</th>
<th>Pre Req</th>
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<tbody>
<tr>
<td>Take ALL Units</td>
<td><strong>CORE</strong> Problem Solving and Programming (ID411)</td>
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<td><strong>Problem Solving and Programming</strong></td>
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<td>Statistics for Science (ID388)</td>
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<tr>
<td>Complementary units</td>
<td><strong>Introductory Calculus * (ID484)</strong></td>
<td></td>
<td><strong>E</strong></td>
<td><strong>Data Exploration &amp; Mining</strong></td>
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<td></td>
<td>Introduction to Professional Scientific Practice (ID1553)</td>
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<tr>
<td>Take ALL Units</td>
<td><strong>CORE</strong> Databases (CITS2232) (ID301)</td>
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<td><strong>E</strong></td>
<td><strong>Data Exploration &amp; Mining</strong></td>
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<tr>
<td></td>
<td>Computer Analysis and Visualisation (redevelopment of CITS1005) (ID343)</td>
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<td><strong>Professional Computing (CITS3200) (ID485)</strong></td>
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<td><strong>Problem Solving &amp; Programming, Comp Anal &amp; Vis, Databases</strong></td>
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<td><strong>Data Exploration &amp; Mining (including some material from CITS4243 Advanced Databases) (ID733)</strong></td>
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<td><strong>Problem Solving &amp; Programming, Comp Anal &amp; Vis, Databases</strong></td>
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<td><strong>Web and Internet Technologies (redeveloped from CITS1231 &amp; CITS4230) (ID413)</strong></td>
<td><strong>E</strong></td>
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<td><strong>Problem Solving &amp; Programming, Comp Anal &amp; Vis, Databases</strong></td>
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<td><strong>High Performance Computing (ID414)</strong></td>
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<td></td>
<td><strong>Problem Solving &amp; Programming, Comp Anal &amp; Vis, Databases</strong></td>
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</tr>
</tbody>
</table>

**Notes:**

* Required by students who have only MAT2C/2D or equivalent.

The four lower level units are designed to also be available as complementary units for other programmes or broadening units for students who wish to strengthen their course with some computing skills but are not able to take the full major.
Computer Science Major: Update to the mathematics complementary unit in line with changes in prerequisites

**Background**

When the Computer Science major was first proposed, it incorporated the minimum Science mathematics requirement of MAT2C/2D, with MAT3A/3B recommended, and those students who do not have the latter being required to take MATH1050 Introductory Calculus as a complementary unit. Subsequent discussions within the School concluded that this requirement was insufficient, and the minimum requirement should be set to Mathematics MAT3A/3B, with Mathematics MAT3C/3D recommended, and those students who do not have the latter being required to take MATH1045 Intermediate Calculus as a complementary unit. This change in prerequisite was approved Faculty Board last year R39/2010, however the change in complementary unit has yet to be submitted to the Interim Board of Studies.

There has been further discussion of the Mathematics unit, noting that the Faculty Board minutes for MATH1045 state:

*Students with Mathematics 3A/3B, Mathematics 3C/3D or Mathematics: Specialist 3A/3B who need to bring themselves up to the combined non-statistics concepts level of Mathematics 3C/3D and Mathematics: Specialist 3A/3B for their course.*

This means that students that come in with any of Mathematics MAT3A/3B, Mathematics: Specialist MAS3A/3B or Mathematics: Specialist MAS3A/3B can be brought to the same level by this unit, and ready to proceed into MATH1035 should they wish to pursue mathematics (for example if wanting to bridge into another Engineering discipline). It also means this level can be assured for accreditation purposes of the Software Engineering masters.

**Proposal**

That the complementary unit for Computer Science be changed to MATH1045 Intermediate Calculus, and that this unit must be taken by ALL students who do not have both Mathematics MAT3C/3D and Mathematics Specialist MAS3A/3B, to bring them to the same level.

This proposal was endorsed by ECM Faculty Board circular on 21st January.

Note. This unit does not ideally suit Computer Science, as the focus is primarily calculus, and computer science students would also benefit from the statistics and probability that are understood to be in the TEE units but not MATH1045 Intermediate Calculus, as well as matrices and linear algebra. There may be scope for revisiting this should the offerings by Mathematics and Statistics change, particularly in light of the on-going discussions with Science.
Computer Science and Applied Computing Majors: Change to communications complementary unit

Background

When the Computer Science and Applied Computing majors in New Courses 2012 were originally endorsed by the Board, the Science Communications unit Introduction to Scientific Practice was proposed, as part of the complementary units to the majors, as the dedicated communications unit.

Since that time the unit Engineering Challenges for a Global World has been developed (as a successor to Introduction to Professional Engineering) to provide communications skills for the Engineering Science major. The unit also includes topics such as project planning/design, creative problem solving and teamwork, social impact, ethics, risk and liability - all of which are mandated by the Australian Computing Society and Engineers Australia accreditation bodies. It also has a practical component involving a conceive (communicate) design (communicate) build cycle that reflects the software development lifecycle experienced by computing professionals. The mathematics prerequisites have also been set at a level that does not preclude Computer Science and Applied Computing students.

Proposal

There are a number of advantages to the Computer Science and Applied Computing students taking this unit. The primary one is that it will help considerably with accreditation of the programmes, and in particular, the challenging task of accrediting the Software Engineering masters with Engineers Australia.

It will also help with flexibility and delayed choice for students, for example with transferring between Engineering programmes, and with the possibility (or smaller gap) for Computer Science students to qualify for entry into Mechatronics. Finally, it is expected to improve the unit to have software students on the interdisciplinary teams - and help set the scene for more advanced level interdisciplinary projects in the masters.

It is therefore proposed that the complementary unit be changed to the unit Engineering Challenges for a Global World. This proposal was endorsed by ECM Faculty Board circular on 21st January.