Bachelor of Tech
Course Code: BI

This course is part of a two-year Bachelor of Technology and an Associate Diploma in Technology (Computing). The course is offered jointly with Homestead and Technical and Further Education. The HBeA Diploma courses have a common subject area and are offered entirely within the TAFE years of the degree programs and Frankston campuses of Chisholm Institute of Technology.
CHISHOLM COURSES

Associate Diplomas
Marketing B
Police Studies S
Secretarial Studies (Legal or Medical) B
Welfare Studies

Diplomas
Applied Science (Nursing) N
Teaching (Early Childhood) E
Teaching (Primary) E

Bachelor Degrees
Applied Science (Computing) T(c)
Applied Science (Digital Technology) T(d)
Applied Science (Multidiscipline) T(a)

Arts
Arts (Ceramic Design) A
Arts (Fine Art) A
Arts (Craft) A
Arts (Graphic Design) A
Arts (Police Studies) A
Arts/Business S
Business (Accounting) B
Business (Agribusiness) B
Business (Banking and Finance) B
Business (Business Administration) B
Business (Human Resource Management) B
Business (International Trade) B
Business (Management) B
Business (Manufacturing Management) B
Business (Marketing) B
Business (Office Administration) B
Education – Fourth Year of Study E
Engineering (Civil and Computing) T(e)
Engineering (Electrical and Computing) T(e)
Engineering (Industrial and Computing) T(e)
Engineering (Mechanical and Computing) T(e)
Technology T
Technology (Design) T

Graduate Diplomas
Accounting B
Accounting Information Systems B
Agribusiness B
Applied Polymer Science T(a)
Applied Psychology S
Banking and Finance B
Business Technology T(c)
Ceramic Design A
Computer Graphics T
Computing T(c)
Digital Communications T(d)
Educational Studies E
Fine Art A
Information Technology T(c)
International Business B
Logistics Management B
Marketing B
Multicultural Studies S
Municipal Engineering T(e)
Outdoor Education E
Project Management T(e)
Robotics T(d)
Structural Computations T(e)
Taxation B
Water Science T(a)
Welfare Administration S

Master’s Degrees
Applied Science T(a)
Applied Science T(d)
Applied Science – by Thesis T(c)
Arts S
Business (Marketing) – by Coursework B
Business – by Research B
Computing – by Coursework T(c)
Education E
Engineering T(e)

Code
A School of Art and Design
B Faculty of Business
E School of Education
N School of Nursing
S School of Social and Behavioural Studies
T Faculty of Technology

Volume
2
3
4
5
6
7

Where appropriate for courses in the Faculty of Technology, the School which administers the course is shown in brackets:
a School of Applied Science
b School of Computing and Information Systems
c School of Digital Technology
d School of Engineering


## CONTENTS

<table>
<thead>
<tr>
<th>Campus</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>How to use the Handbook</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>The Chisholm/Monash Merger</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Faculty of Technology Staff</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Faculty of Technology Undergraduate Courses</td>
</tr>
<tr>
<td></td>
<td>Admission Requirements</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Technology</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Technology (Design)</td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Faculty of Technology Graduate Course</td>
</tr>
<tr>
<td></td>
<td>Graduate Diploma in Computer Graphics</td>
</tr>
<tr>
<td><strong>9</strong></td>
<td>School of Applied Science Staff</td>
</tr>
<tr>
<td><strong>11</strong></td>
<td>School of Applied Science Undergraduate Course</td>
</tr>
<tr>
<td></td>
<td>Admission Requirements</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Applied Science (Multidiscipline)</td>
</tr>
<tr>
<td><strong>13</strong></td>
<td>School of Applied Science Graduate Courses</td>
</tr>
<tr>
<td></td>
<td>Graduate Diploma in Applied Polymer Science</td>
</tr>
<tr>
<td></td>
<td>Graduate Diploma in Water Science</td>
</tr>
<tr>
<td></td>
<td>Master of Applied Science</td>
</tr>
<tr>
<td><strong>14</strong></td>
<td>School of Computing and Information Systems Staff</td>
</tr>
<tr>
<td><strong>16</strong></td>
<td>School of Computing and Information Systems Undergraduate Courses</td>
</tr>
<tr>
<td></td>
<td>Admission Requirements</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Applied Science (Computing)</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Applied Science (Computing)/</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Business (Accounting)</td>
</tr>
<tr>
<td><strong>18</strong></td>
<td>School of Computing and Information Systems Graduate Courses</td>
</tr>
<tr>
<td></td>
<td>Graduate Diploma in Business Technology</td>
</tr>
<tr>
<td></td>
<td>Graduate Diploma in Computing</td>
</tr>
<tr>
<td></td>
<td>Masters Program in Computing</td>
</tr>
<tr>
<td></td>
<td>Graduate Diploma in Information Technology</td>
</tr>
<tr>
<td></td>
<td>Master of Computing – by Coursework</td>
</tr>
<tr>
<td></td>
<td>Master of Applied Science – by Thesis</td>
</tr>
<tr>
<td><strong>23</strong></td>
<td>School of Digital Technology Staff</td>
</tr>
<tr>
<td><strong>25</strong></td>
<td>School of Digital Technology Undergraduate Course</td>
</tr>
<tr>
<td></td>
<td>Admission Requirements</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Applied Science (Digital Technology)</td>
</tr>
<tr>
<td><strong>26</strong></td>
<td>School of Digital Technology Graduate Courses</td>
</tr>
<tr>
<td></td>
<td>Graduate Diploma in Digital Communications</td>
</tr>
<tr>
<td></td>
<td>Graduate Diploma in Robotics</td>
</tr>
<tr>
<td></td>
<td>Master and Doctoral Programs in Applied Science</td>
</tr>
</tbody>
</table>
School of Engineering UndergraduateCourses

Admission Requirements

Bachelor of Engineering (Civil and Computing) C
Bachelor of Engineering (Electrical and Computing) C
Bachelor of Engineering (Industrial and Computing) C
Bachelor of Engineering (Mechanical and Computing) C

School of Engineering Graduate Courses

Graduate Diploma in Municipal Engineering C
Graduate Diploma in Project Management C
Graduate Diploma in Structural Computations C
Master of Engineering C

Subject Synopses

C = conducted at Caulfield campus only
C & F = conducted at Caulfield and Frankston campuses
How to use the Handbook

This is one of seven volumes which make up the Chisholm Institute of Technology 1990 Handbook.

Volume One, the Student Manual, contains important dates and information on student administration matters, student services and the Institute's student regulations.

Volumes Two to Seven cover the courses and subjects offered by the Faculties and Schools of the Institute. These volumes contain staff lists, course descriptions for undergraduate and postgraduate courses, and subject synopses.

Where a course is offered by two Schools or Faculties, it is listed in both volumes, but the relevant subject synopses are generally contained in the volume of the School or Faculty which administers the course. Check the course list inside the front cover of this book to determine who administers each course.

Subject synopses are listed in order of subject code. They provide information on contact hours, prerequisites, aims and syllabus, and major reference books for each subject. Where no references or assessment are explicitly stated, these will be advised at the commencement of classes.

Maps of the Caulfield and Frankston campuses are printed inside the back cover of each volume.

Special Note on Course Titles

The title shown in bold at the start of each course is the official Chisholm title. Where these differ from the "generic" titles as defined by the Australian Council on Tertiary Awards, the ACTA title is shown in brackets.

For more information

Enrolment, Course Information: Admissions Office, level one, building A, Caulfield campus, (03) 573 2000.
Financial Assistance, Scholarships, Regulations: Student Administration, level one, building A, Caulfield campus, (03) 573 2115.

The Chisholm/Monash Merger

Chisholm Institute of Technology and Monash University have entered into an agreement through which they will merge to form an expanded Monash University.

The advantages for students will be:
• A diverse, unified and more equitable higher education system serving Melbourne's eastern and south-eastern regions.
• A major expansion of higher education opportunities within Monash University, with a greater range of available disciplines and awards.
• Improved flexibility of subject choice and better provisions for transfer of credit within and between disciplines.
• A broadening of student services and facilities for teaching and research.

Students will enrol under Chisholm regulations during early 1990. At the time of the merger on 1 July 1990, their status will change to that of enrolled students of Monash University. Similarly, Chisholm courses will become Monash courses and all students will have the right to complete the courses in which they are enrolled.

The merger agreement states:

"The merger of these two institutions will result in a significantly enlarged and changed Monash University capable of both maintaining the reputation of the academic programs currently offered by both institutions and enabling the development of important new academic initiatives that will benefit the community they serve. Such an association will be to the mutual advantage of both institutions by adding to the strengths of existing courses and extending the range of educational opportunities available to students.

"The association will recognise the record of excellence of both institutions and their ethos and orientation, especially the established relationships with the professions, industry, business and the community. The bringing together of these interests will generate opportunities for available resources to be used to advantage, providing a better basis of innovation and change."

1990 Handbook

Volume One – Student Manual
Volume Two – School of Art and Design
Volume Three – Faculty of Business
Volume Four – School of Education
Volume Five – School of Nursing
Volume Six – School of Social and Behavioural Studies
Volume Seven – Faculty of Technology

Information contained in the Handbook was correct at 1 August 1989. Please check specific details with the relevant School or Faculty, or with the Admissions Office, telephone (03) 573 2000. The Institute accepts no responsibility for changes to information contained in the Handbook.

Published by the Public Relations Office (03) 573 2099, Chisholm Institute of Technology, PO Box 197, Caulfield East, Victoria 3145.
FACULTY OF TECHNOLOGY STAFF

Dean
Roy Williams
BE, PhD(NSW), ASTC, FIEAust, FIProdE, FRSA

Personal Assistant to the Dean
Valerie J. Grinblat
AIPS

Assistant Registrar, Faculty of Technology
Kenneth Hobbs
BA(Deakin), MAITEA

Faculty Office Assistant
vacant

CHISHOLM DESIGN GROUP

Director
Leo Bonollo
BE(Hons), MEngSc(Melb), ARMTC(MechEng), ARMIT(ProdEng), TTC, MIEAust, MIPProdE

Administrative Officer
Janice Wasylenko

Senior Lecturer
Edward Kayser
DesRCA(IndDesEng), ARMIT(IndDes), FDIA

Lecturers
Arthur de Bono
DipArts(IndDes)(RMIT), LDIA
Mark Wilken
ARMIT(IndDes)

Senior Technical Officer
John Alley
Admission Requirements for Undergraduate Courses

Applicants with the following qualifications are eligible for consideration for admission into the Institute’s undergraduate courses:

1. Successful completion of a VCAB Year 12. This can include HSC Group One or Group Two subjects, TOP, T12 and Approved Study Structures;
2. Interstate or overseas qualifications certified by VCAB as equivalent to Year 12;
3. Any other qualification requirement approved by the Academic Board, e.g. Certificate of Business Studies; or
4. Qualifications or experience acceptable to the Chisholm Admissions Committee.

For information regarding course requirements, such as prerequisite and recommended subjects or special requirements, see the following course descriptions.

Prerequisite and recommended subjects may be drawn from any of the qualifications mentioned above as acceptable, except where otherwise stated.

Bachelor of Technology

(Bachelor of Applied Science in Technology)

Course Code: BI
Course Leaders: Caulfield – Ray Pugh
Frankston – Peter Torokfalvy

This course is part of a two-tier course comprising the Bachelor of Technology and an Associate Diploma in Technology (Computing). The two-tier program is run jointly with Holmesglen and Frankston Colleges of Technical and Further Education. The Degree and the Associate Diploma courses have a common first year which is conducted entirely within the TAFE colleges. The final two years of the degree program are conducted on the Caulfield and Frankston campuses of Chisholm.

Content

The course aims to produce technologists who are flexible in their thinking and so are able to respond to the changing needs of industry. Students study a common core of technological subjects as well as constructing a parallel coherent program to suit their individual interests and vocational aims.

Special Entry Requirements

Applications for entry to first year must be directed to the Admissions Officer at Holmesglen or Frankston Colleges of Technical and Further Education. See admission requirements above. Those applicants that are able to demonstrate social and/or educational disadvantage or who are mature age with prior experience will be favourably considered.

Prerequisites

There are no special prerequisites for this course and students with a non-science Year 12 are encouraged to apply for entry.

Selection of Students for Second Year

On successful completion of the common first year students are eligible to continue with the second year of the Associate Diploma at a TAFE college or to proceed to the second year of the degree at Chisholm. Selection for degree students will be based on examination performance and may be subject to quota. Students who complete the Associate Diploma may transfer to the Degree with additional credits i.e. they are not required to complete the electives described below.

Course Structure

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 2</strong></td>
<td>Semester</td>
</tr>
<tr>
<td>TEC211 Information Processing</td>
<td>3</td>
</tr>
<tr>
<td>TEC212 Technological Principles II</td>
<td>3</td>
</tr>
<tr>
<td>TEC213 Analytical Methods II</td>
<td>2</td>
</tr>
<tr>
<td>Approved Stream 1</td>
<td>8</td>
</tr>
<tr>
<td>Electives 2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Year 3</strong></td>
<td></td>
</tr>
<tr>
<td>TEC311 Management Principles</td>
<td>3</td>
</tr>
<tr>
<td>TEC312 Industrial Project</td>
<td>3</td>
</tr>
<tr>
<td>TEC313 Entrepreneurship</td>
<td>2</td>
</tr>
<tr>
<td>TEC314 Professional Presentation Methods</td>
<td>2</td>
</tr>
<tr>
<td>Approved Stream 3</td>
<td>8</td>
</tr>
<tr>
<td>Electives 2</td>
<td>4</td>
</tr>
</tbody>
</table>

1. Approved streams can be constructed from the material of any coherent group of existing subjects.
2. Electives can be any subject currently available at Chisholm which complements the Approved Stream.
3. The second level of an approved stream must be consistent with and build upon the first level of the stream.

All students must complete the core subjects and an approved stream of study that is composed of a coherent group of subjects, together with four hours per week of elective subjects approved by the Course Leader.

Two examples of coherent streams are:

1. **Computer Studies**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 2</strong></td>
<td>Semester</td>
</tr>
<tr>
<td>TEC215 Applications Programming</td>
<td>4</td>
</tr>
<tr>
<td>TEC216 Computer Science I, or</td>
<td>4</td>
</tr>
<tr>
<td>TEC217 Digital Signal Processing</td>
<td>4</td>
</tr>
<tr>
<td><strong>Year 3</strong></td>
<td></td>
</tr>
<tr>
<td>TEC315 Systems Development</td>
<td>4</td>
</tr>
<tr>
<td>TEC316 Computer Science II, or</td>
<td>4</td>
</tr>
<tr>
<td>TEC317 Digital Signal Processing II</td>
<td>4</td>
</tr>
</tbody>
</table>
2 Industrial Technology

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC205 Materials Technology</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>TEC206 Manufacturing Technology</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>TEC207 Graphics Communication</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>TEC207 Design Principles</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>TEC207 Safety &amp; Environmental Technology</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>TEC207 Industrial Systems Technology</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Bachelor of Technology (Design)

(Bachelor of Applied Science in Technology)

Course Code: ID
Course Leader: Leo Bonollo

Chisholm Design Group

The Chisholm Design Group has been established to provide an innovative degree specialisation in design with an associated design consultancy for industry. The development of the group and the academic program are joint initiatives of the Faculty of Technology and the School of Art and Design aimed at the promotion and development of those design skills essential to the success of an effective, innovative and export-oriented manufacturing industry.

Content

The full time course of study is to cover six academic semesters of fourteen weeks duration normally taken over two calendar years. The course may be taken part-time but only on a semester basis. Students undertaking this course in the part-time mode must be able to complete the semester of study along with the full-time students. Students will not be able to undertake part of a semester’s program unless appropriate exemptions or credits have been granted.

Course Rationale

This course is an innovative mix of Product Design and Business skills education. Graduates of the course will have the aesthetic, planning, technical, marketing and entrepreneurial capabilities needed to design products for manufacture in a highly competitive environment. This program has been developed as a response to a perceived industrial need and a conviction that Design courses should be as firmly based in the Technologies as in the Arts; that is, designers need to have a much stronger base in the modern technologies, including materials and computer aided design and manufacture, as well as the traditionally recognised qualities of aesthetic judgement and form development. At the same time the program seeks to instil entrepreneurial skills and attitudes and create the commercial awareness so necessary for designers to meet the challenges, both present and future, of industry.

Course Structure

The detailed structure of the course is shown on the following page. The Design Studio core subjects are the main operators which coordinate the curriculum as well as integrate artistic and technical information via appropriate project-based learning methods.

Assessment

1. An 80 per cent attendance record is required before a student may present for assessment in any subject. Exceptions will be subject to approval of the appropriate Head of Department or Group Director.
2. An 80 per cent submission record is required for assignment material set in any subject before a student may present for assessment. Major design project submissions are all compulsory; exceptions will be subject to approval of the appropriate Head of Department or Group Director.

Admission Requirements

Completion of an approved VCE Year 12 of study or its equivalent, with recommended subjects including Group 1 English and Mathematics A or its equivalent, Art or Graphic Communication and a branch of Science; or a qualification and/or experience acceptable to the Admissions Committee of Chisholm Institute of Technology; and satisfied an approved interview panel that he/she has the enthusiasm, commitment and motivation necessary to undertake the program and can demonstrate an ability to set personal priorities and to plan and utilise time.
# Detailed Structure of the Bachelor of Technology (Design) Course

## Year 1

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
<th>H</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>DES100 Creative Design Studio 1</td>
<td>DES102 Creative Design Studio 2</td>
<td>32</td>
<td>7</td>
</tr>
<tr>
<td>DES110 Principles of Design &amp; Drawing 1</td>
<td>DES112 Principles of Design &amp; Drawing 2</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>DES120 Design Communications 1</td>
<td>DES122 Design Communications 2</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>DES130 Technological Design Principles 1 (Mechanics)</td>
<td>DES132 Technological Design Principles 2 (Electronics)</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>DES140 Ergonomics for Designers</td>
<td>DES142 Design Presentation &amp; Marketing</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>DES150 Culture, Creativity &amp; Critique 1</td>
<td>DES152 Culture, Creativity &amp; Critique 2</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>DES160 Materials &amp; Manufacturing Technology 1</td>
<td>DES162 Materials &amp; Manufacturing Technology 2</td>
<td>100</td>
<td>24</td>
</tr>
</tbody>
</table>

**TOTAL**

## Year 2

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
<th>H</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>DES200 Creative Design Studio 3</td>
<td>DES202 Creative Design Studio 4</td>
<td>32</td>
<td>8</td>
</tr>
<tr>
<td>DES210 Advanced Drawing Techniques</td>
<td>DES212 Photographic Techniques</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>DES220 Design Communications 3</td>
<td>DES222 Computer Aided Drawing (Studio)</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>DES230 Technological Design Principles 3 (Mechanics)</td>
<td>DES232 Technological Design Principles 4 (Electronics)</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>DES240 3D Modelling &amp; Prototype Development 1</td>
<td>DES242 3D Modelling &amp; Prototype Development 2</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>DES250 Culture, Creativity &amp; Critique 3</td>
<td>DES252 Culture, Creativity &amp; Critique 4</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>DES260 Materials &amp; Manufacturing Technology 3 (CAD)</td>
<td>DES262 Materials &amp; Manufacturing Technology 4 (CAM)</td>
<td>100</td>
<td>24</td>
</tr>
</tbody>
</table>

**TOTAL**

## Year 3

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
<th>H</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>DES300 Creative Design Studio 5</td>
<td>DES302 Creative Design Studio 6</td>
<td>56</td>
<td>14</td>
</tr>
<tr>
<td>DES310 Culture, Creativity &amp; Critique 5</td>
<td>DES312 Entrepreneurial Strategies</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>DES320 Technological Design Principles 5 (Tool Design)</td>
<td>DES322 Technological Design Principles 6 (Electronics)</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>ACC330 Business &amp; Accounting Practices Professional Studios (Elective)*</td>
<td>MKT332 Marketing &amp; Product Innovation Professional Studios (Elective)*</td>
<td>12</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL**

* Select one from the list:
  - DES330 Transportation Studio 1
  - DES340 Advanced Computer Aided Design 1
  - DES350 Safety & Environmental Engineering 1
  - DES360 Architectural Products & Interior Space Design 1

1. $H = \text{Hours per week per semester}$
2. $U = \text{Units per year}$
GRADUATE COURSE

Graduate Diploma in Computer Graphics
(Graduate Diploma of Applied Science in Computer Graphics)
Course Code: GG1
Course Leader: Colin Herbert

Content
This two-year part-time course provides an opportunity for engineers, applied scientists, graphic designers, graphics consultants, computing professionals and technology marketing personnel to develop expertise in the implementation and use of advanced technology in computer graphics. The planned development of this expertise is by theoretical considerations in lectures, practical work on the Institute's equipment, and by project work in the second year of the course. The course has an intake every second year, the next intake being 1990 and is offered only on the Caulfield campus.

Admission Requirements
The normal entrance qualification is a recognised degree or diploma. Applicants lacking the normal entry requirements who have appropriate experience and are currently employed in relevant industries and who can demonstrate a capacity to successfully undertake and complete the course, will be considered. Decisions on the admission of such candidates would be referred to the Institute Admissions Committee.

Course Structure
In order to satisfy the course requirements each student must pass a total of 11 units including the Project. The only option in the course is the selection of Introduction to Design Studies or Introduction to Mathematics and Programming.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Year 1</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRA611 Introduction to Design Studies</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>or MAT619 Introduction to Mathematics and Programming</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>PHY611 A Thousand Words – A Million Pixels</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>MAT620 Mathematics and Programming</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>RDT711 Interactive Graphics &amp; Application Software</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>COT610 Graphics Data Base Structures</td>
<td>–</td>
<td>1.5</td>
</tr>
<tr>
<td>RDT712 Computational Geometry and Modelling</td>
<td>–</td>
<td>3</td>
</tr>
<tr>
<td>Year 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RDT713 Systems Implementation and Support</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>PHY612 Visual Realism</td>
<td>1.5</td>
<td>–</td>
</tr>
<tr>
<td>RDT715 Computer Graphics Project</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>PHY613 Image Generation and Processing</td>
<td>–</td>
<td>1.5</td>
</tr>
<tr>
<td>RDT714 Advanced Computer Graphics Topics</td>
<td>–</td>
<td>1.5</td>
</tr>
</tbody>
</table>
SCHOOL OF APPLIED SCIENCE STAFF

Head of School
D. Graeme Ross
BSc(Melb), PhD(Monash)

Secretary
Karen Bond

Assistant Registrar, School of Applied Science
Gotu Tamhane
BSc(Hons)(Bombay), MIPMA

DEPARTMENT OF CHEMISTRY AND BIOLOGY

Head of Department
David G. Hewitt
BSc(Hons), PhD(WA), DIC(Imperial College), FRACI

Secretary
To be appointed

Principal Lecturer
Barry T. Hart
DipAppChem(Bendigo), DipChemEng(Swinburne), BSc(Hons), PhD(Monash), FRACI

Senior Lecturers
Jayant B. Bapat
BSc(Hons)(Bombay), DipGerman, MSc(Baroda), MSc(EastAnglia), PhD(Monash), FRACI
Ronald Beckett
BSc(Hons), PhD(Melb), FRACI
Sydney J. Bone
BSc(Hons)(Punjab), PhD(Duineim), CChem, FRIC, FRACI
Ian C. Campbell
BSc, MSc, PhD(Monash), MIBiol
Kevin R. Chynoweth
BSc(Melb), MSc(LaTrobe), TSTC, ARACI

Thomas H. Davies
DipAppChem(SydneyTechColl), DipManagement, BSc(NSW), MAPpsc(Chisholm), ARMIT, ARACI
Cornelius G. Duyvestyn
BSc, BEd(Melb), MEnvSc(Monash)

Lecturers
Ralph Arwas
PhD(LaTrobe)
Paul Bailey
BSc(Hons)(ANU), PhD(Adelaide)
Kerry Dickson
BSc(Hons)(WA), MSc(Monash)
Patricia Geraghty
BSc(Hons), BScEd(Melb), BA, MEnvSc(Monash)

Ian D. McKelvie
DipAppChem(CIT), MAappSc(VIC), ARACI
Wayne Sturrock
BSc(Hons), PhD(Melb)

Laboratory Manager
Peter Moulder
BSc(Hons)(Adelaide)

Laboratory Staff
Kay Burdett
Robert McGregor
DipAppChem(RMIT), BA(LaTrobe)
Andre Oliver
Sandra Sdraulig
BSc(LaTrobe)
Reshi Sharma
David Speller
Con Stauroopoulos
Naga Suresh
BSc(MaduraiKamarajUniversity)
Danny Vertessy

DEPARTMENT OF MATHEMATICAL SCIENCES

Head of Department
Ronald G.W. Adlem
BSc(Hons)(London), MEd(Monash), GradDipAppStats(RMIT)

Secretary
Barbara Hardie

Senior Lecturers
Geoffrey D.C. Bruton
BSc(Monash), MSc(Melb)
Lindsay H. Evans
BSc(Melb), DipElecComp(CIT), MSc(Leeds), TSTC, MASLE
Paul B. Lochert
BSc, DipEd(Adelaide), MSc(Monash)
Kenneth J. Mann
BSc(WA), MSc, PhD(Monash), TC, FRLMetS, FIMA
Alan L. McLean
BSc(Melb), BSc(Tas), MSc(Carleton), MAdm(Monash), DipEd(Tas)
W. Peter Wright
BSc(Melb), PhD(Monash), TSTC

Lecturers
Greg Coldicutt
BSc(Hons), DipEd(Monash)
Richard Farmer
BSc(Hons), MSc(Melb) PhD(Tas)
Peter A. Grossman  
BSc(Hons), PhD(Monash)

John W. Hille  
BSc, BEd(Melb), MSc(Monash)

John S. Jeavons  
BSc(Hons)(Melb), MSc(Monash)

Daisy Keung  
BBusAdmin(Univ of Texas Arlington), MSc(Texas A&M), MIS

Ian M. Kirkwood  
BSc(Hons), DipEd, PhD(Monash), GradDipDP(CIT)

Manfred J. Krautschneider  
BA, BSc(Hons), MSc, PhD(Monash)

Graham R. Leary  
BSc, DipEd(Melb), GradDipDP(CIT), AFIMA

Clive G. McCann  
BSc(Melb)

Pamela M. Norton  
BSc(Hons)(Sydney), PhD(Warwick), DipEd(WA), GradDipComp(Curtin)

Roman Sandler  
BSc(Hons)(Vilnius), PhD(Moscow)

C. Roy Stather  
BSc, GradDipEd, PhD(LaTrobe)

Bruce W. Stephens  
BSc, GradDipEd, MStats(UNSW)

Antonius P. van Oosterwijck  
BSc, DipEd(Melb), MAdmin(Monash)

Principal Tutor  
Keith M. Anker  
BA(Melb), GradDipDP(Chisholm)

Senior Tutor  
David Bull  
BSc(Hons)(Lancs Polytechnic), MSc(Victoria University Manchester), GradCertEd(Leeds)

Technical Staff  
Sothy Chea  
BSc(Victoria Wellington)

CENTRE FOR APPLIED MATHEMATICAL MODELLING

Executive Director  
D. Graeme Ross  
BSc(Melb), PhD(Monash), FRMetS

Senior Researcher  
Graeme Lorimer  
BSc, PhD(Monash)

Research Assistant  
Andrew Lewis

POLYMER RESEARCH CENTRE

Executive Director  
David G. Hewitt  
BSc(Hons), PhD(WA), DIC(Imperial College), FRACI

Associate Director  
Kevin J. Chynoweth,  
BSc(Melb), MSc(LaTrobe), TSTC, ARACI

WATER STUDIES CENTRE/ CENTRE FOR STREAM ECOLOGY

Executive Director  
B. T. Hart  
DipAppChem(Bendigo), DipChemEng(Swinburne), BSc(Hons), PhD(Monash), FRACI

Administrative Officer  
Pam Dickinson  
BSc, DipEd(Melb)

Secretary  
Therese Gibbons

Research Fellow  
R. T. Edwards  
PhD( Univ of Georgia)

Consultant  
M. Amos
UNDERGRADUATE COURSE

Admission Requirements for Undergraduate Courses

Applicants with the following qualifications are eligible for consideration for admission into the Institute's undergraduate courses:

1. Successful completion of a VCAB Year 12. This can include VCE Group One or Group Two subjects, TOP, T12 and Approved Study Structures;
2. Interstate or overseas qualifications certified by VCAB as equivalent to Year 12;
3. Any other qualification requirement approved by the Academic Board, e.g. Certificate of Business Studies; or
4. Qualifications or experience acceptable to the Chisholm Admissions Committee.

For information regarding course requirements, such as prerequisite and recommended subjects or special requirements, see the following course descriptions.

Prerequisite and recommended subjects may be drawn from any of the qualifications mentioned above as acceptable, except where otherwise stated.

Bachelor of Applied Science (Multidiscipline)

Course Code: BS
Course Leader: P.B. Lochert

Content

This course combines studies in Applied Physics, Chemistry, Biology, Statistics, Mathematics and Computer Science. Students can major in one or more areas, as listed in the following tables, and wide alternatives are provided to enable the student to tailor the course to suit individual needs.

Recommended

Preferences will be given to students who have passed in English, Mathematics (preferably Mathematics A and Mathematics B) plus two other Science subjects (preferably Physics, Chemistry or Computer Science).

Careers

The primary aim of the Bachelor of Applied Science is to train graduates for careers in science, however, the training they receive, combined with elective options available from schools within Chisholm allows them to enter an even wider range of careers. Further advice on appropriate subject selection and career opportunities should be sought from the Assistant Registrar, School of Applied Science.

Exemptions

There are no standard exemptions for any subject in the course. Students may apply for exemptions when enrolling if they believe they are eligible.

Diploma to Degree Conversion

Diplomates wishing to convert to a degree must complete at least the equivalent of a full-time final year of study for the degree course, subject to the approval of the Dean.

Course Structure

First Year

The first year comprises four subjects from the table below. Students must undertake the compulsory MAT106 Mathematics and Scientific Computing plus three other subjects. Advice should be sought from the Assistant Registrar as to appropriate subject selections suitable for various career options (see Careers section above).

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td></td>
</tr>
<tr>
<td>MAT106* Mathematics and Scientific Computing</td>
<td>7 7</td>
</tr>
<tr>
<td>CHE111 Chemistry</td>
<td>7 7</td>
</tr>
<tr>
<td>CHE181 Biology</td>
<td>5 5</td>
</tr>
<tr>
<td>PHY120 Physics</td>
<td>7 7</td>
</tr>
<tr>
<td>PHY130 Computer Science</td>
<td>5 5</td>
</tr>
<tr>
<td>* compulsory subject</td>
<td></td>
</tr>
</tbody>
</table>

Second and Third Years

To successfully complete a degree, a student must undertake either a double major (a major being defined as a study to, and including, third year), or a single major supported by two minors (a minor being defined as a study to, and including, second year). In addition, a student must complete two points of electives, from either the Electives table below, or from the list of minor and major studies, or subjects from other schools as approved by the course leader. Normally one point of electives is undertaken in each of second and third year. (See examples of alternative course structures below).

Minor Studies

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2</td>
<td></td>
</tr>
<tr>
<td>CHE225 Basic Chemistry</td>
<td>8 8</td>
</tr>
<tr>
<td>CHE229 Applied Chemistry</td>
<td>8 8</td>
</tr>
<tr>
<td>CHE292 Aquatic Science I</td>
<td>8 8</td>
</tr>
<tr>
<td>PHY255 Physics</td>
<td>10 10</td>
</tr>
<tr>
<td>PHY256 Computer Vision</td>
<td>8 8</td>
</tr>
<tr>
<td>MAT201 Applied Mathematics</td>
<td>6 6</td>
</tr>
<tr>
<td>MAT202 Statistics &amp; Operations Research</td>
<td>6 6</td>
</tr>
<tr>
<td>MAT204 Computational Mathematics</td>
<td>6 6</td>
</tr>
<tr>
<td>RDT281 Computer Science</td>
<td>6 6</td>
</tr>
</tbody>
</table>

### Major Studies

<table>
<thead>
<tr>
<th>Year 3</th>
<th>Hrs per wk</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE335 Basic Chemistry</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>CHE339 Applied Chemistry</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>CHE392 Aquatic Science II</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>PHY350 Physics</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>MAT301 Applied Mathematics</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>MAT302 Statistics &amp; Operations</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>RDT381 Computer Science</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

### Alternative Course Structures

**First Alternative (Two major studies and two points of electives)**

**Year 1**
- Four subjects

**Year 2**
- Minor
- Minor
- Elective (one credit point or two half credit points)

**Year 3**
- Major
- Major
- Elective (one credit point or two half credit points)

**Second Alternative (One major study, two minor studies and two electives)**

**Year 1**
- Four subjects

**Year 2**
- Minor
- Minor
- Elective (one credit point or two half credit points)

**Year 3**
- Major
- Minor
- Elective (one credit point or two half credit points)

### Elective Subjects

Electives may be taken from the list below, or subjects can be taken from other schools, subject to the approval of the course leader.

Elective values are calculated on the basis of one credit point equals a minimum of five hours per week for a full year subject or the equivalent of at least twelve hours per week of one-semester subjects, while 0.5 of a credit point equals a minimum of three hours per week for a full year subject or the equivalent of at least six hours per week of one-semester subjects.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any subject in the list of major and minor studies.</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>PHY336 Advanced Computer Imaging</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>CHE333/PHY333/MAT333/RDT333 Applied Science Thesis Project</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>CHE280 Biology (Principals and Applications)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>CHE334 Chemical Technology</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PHY236 Computer Imaging</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>MAT205 Mathematical Methods</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>MAT305 Mathematical Methods</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PHY226 Physical Astronomy</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PHY235 Scientific Photography</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PHY250 Physics (Basic)</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>PHY260 Physics (Instrumentation)</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>COT290 Information Storage</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>&amp; Retrieval</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT216 Fortran Programming</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>MAT217 Numerical Computing</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>RDT282 Artificial Intelligence</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>RDT283 C Programming UNIX</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>RDT284 Intro. to Computer Communications</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>RDT285 Intro. to Instrumentation</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>RDT330 Real Time Systems &amp; Programming</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>RDT351 Computer Graphics</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>RDT353 Robotics</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>SFT290 COBOL Programming</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>SYS290 Systems Analysis &amp; Design</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
GRADUATE COURSES

Graduate Diploma in Applied Polymer Science

(Graduate Diploma of Applied Science in Applied Polymer Science)
Course Code: PL1
Course Leader: Kevin R. Chynoweth

Content
This is a two-year part-time course which provides a scientific basis for understanding the unique properties and behaviour of polymers, both during processing and in use. Students therefore pursue studies in the disciplines of polymer physics, chemistry, engineering and technology.

The course comprises lectures, laboratory work, plant visits and project work. Lectures and seminars make up approximately 50 per cent of the course, laboratory and project work approximately 45 per cent and plant visits approximately five per cent.

The course is directed mainly at scientists and engineers employed in the polymer and supporting industries, however, it is particularly suitable for recent graduates seeking to improve their career opportunities.

Admission Requirements
Applicants will be considered only if they fall into one of the following categories:
1. Having a degree or diploma in science or engineering;
2. Having significant practical experience and/or training in a polymer or polymer-related industry for at least three years.

Rank Order
Applicants will be short-listed by rank order which will be decided by:
1. Motivation and likelihood of completing the course;
2. Work history – length and nature of relevant work experience;
3. Suitability of the tertiary qualification as a basis for the successful completion of the course.

Course Structure
Eight hours per week are devoted to formal lectures, practical work and field trips.

Subject Hrs per wk
Semester 1
CHE611 Polymer Science 1 8
CHE612 Polymer Science 2 8
Semester 2
CHE613 Polymer Science 3 8
Semester 3
CHE614 Polymer Science 4 8

Graduate Diploma in Water Science

(Graduate Diploma of Applied Science in Water Science)
Course Code: PK1
Course Leader: Tom Davies

Content
This interdisciplinary course employs the resources of the various departments within the Faculty of Technology as well as other schools within the Institute. It provides specialist training in fields concerned with the maintenance of the quality of fresh, estuarine and marine water resources.

Admission Requirements
A degree or diploma in science or engineering.

Course Structure
This part-time course requires two years of attendance on two evenings per week.

Ten hours per week are devoted to formal lectures, discussion groups, practical work and field trips.

Subject Hrs per wk
Semester 1
CHE630 Aquatic Systems I 4
CHE631 Supporting Concepts I 6
Semester 2
CHE632 Supporting Concepts II 2
CHE633 Aquatic Systems IIA 4
CHE634 Aquatic Systems IIB 4
Semester 3
CHE635 Pollution Ecology 3
CHE636 Pollution Control Technology 3
CHE605 Water Science Project 4
Semester 4
CHE604 Water Management 6
CHE605 Water Science Project 4

Master of Applied Science

Course Code: MS1
The Faculty of Technology offers a Master of Applied Science program by research thesis. Enquiries should be directed in the first instance to the Assistant Registrar, Applied Science.

Areas of Master’s research within this School include:
Chemistry: water sciences, aquatic biology, applied electrochemistry, manufacture of synthetic drugs, polymer chemistry and surface chemistry.
Mathematics: mathematical modelling of physical systems; air quality modelling; complex analysis; business forecasting; applied robust statistics.
SCHOOL OF COMPUTING AND INFORMATION SYSTEMS STAFF

Head of School
Jack Greig
BSc, DipEd(Melb), GradDipDP(CIT), MACS

Secretaries
Mary Dalpethado
Kerri Jewell
Judy Steele (Frankston)

Acting Assistant Registrar, School of Computing and Information Systems
Jen Sullivan

Administrative Officers
Cheryl Ely
Ann McDowell
Kim Williams

DEPARTMENT OF COMPUTER TECHNOLOGY

Head of Department
John Daly
BSc(Sydney), GradDipDP(CIT), MACS

Secretary
Kerri Jewell

Principal Lecturer
E. Pearl Levin
CertEDP, BAppSc(CIT), MACS, MACM

Senior Lecturer
Chris Avram
BSc(Hons)(Monash), MACS
Geoff Martin
BSc(Hons), MSc, PhD(Melb), MACS, MIEEE, MACM

Lecturers
Noel Craske
BSc(Hons)(Flinders), GradDipCompStud(CCAE), MSc(ANU), MACS, ACGA
Michael Du'Jardin
DipIllustrativePhotography, DipAppSc(Comp)(Victoria)
David Foott
BA(JCUNQ), MLit(UNE), ALAA
Stephen Giles
Peter Granville
BSc(Monash), GradDipIT(Chisholm)
Ewen McPherson
BSc(Monash), GradDipDP(Chisholm), TPTC
Robert Redpath
BSc, DipEd(LaTrobe), GradDipDP(CIT)
Bob Sier
BAppSc(CIT), MACS

Max Warlond
GradDipC&IS(Chisholm)

Senior Tutors
Eli Fryher
BAppSc(VIC), GradDipDP(CIT), TTTC
Rodney Simpson
MCIT

Technical Officers
Doukas Fonias
Louis Kourtidis
See Hung Ngieng

DEPARTMENT OF INFORMATION SYSTEMS

Head of Department
David Arnott
BSc(Hons)(Newcastle), MACS, MACM

Administrative Officer
Ann McDowell

Senior Lecturers
Gail Bourne
GradDipC&IS(Chisholm)
Dan Eaves
GradDipIT(Chisholm)
Sharman Lichtenstein
BSc(Hons), MSc(Melb), MACS
John Moore
GradDipC&IS, MAppSc(Chisholm)
Graeme Shanks
BSc, DipEd(Monash), GradDipC&IS, MAppSc(Chisholm), MACS, MAAAI
Peter Torokfalvy
BSc(Melb), GradDipDP(CIT), MACS, MASOR
Jan Warracke, Arthur Young Senior Lecturer,
BBus(Victoria), GradDipDigComm(Chisholm), MACS, MACM

Lecturers
Raymond Canning
DipEE, BAppSc(VIC), MBA(Melb)
Peta Darke
BA(Hons)(Monash)
Robert Dorling
BA(Melb), TSTC, GradDipComp(Chisholm)
Ilona Jagielska
MSc(Copernicus)
Henry Linger
BE(Swinburne), GradDipDP(Chisholm)
Chris Rodrigues
BAppSc(Chisholm)
Helen Smith
BSc(Melb), DipEd(Monash), AACS
Senior Tutor
Nyorie Lindner
BA(Flinders)

DEPARTMENT OF
SOFTWARE DEVELOPMENT

Head of Department
Phillip Steele
  DipBusStud, BAppSc(VIC), GradDiplIT(Chisholm), MACS, MACM

Secretary
vacant

Senior Lecturers
Maurie Fabrikant
  PostDipCertMechEng, DipMechEng(CIT), BAppSc(VIC), MACS
Robert Hagan
  BSc(Hons), MSc(Monash), MACS
Gerald Middleton, Computer Power Education Senior Lecturer
  BAppSc(Chisholm), ASSA, MACS

Lecturers
Des Casey
  BA(Macquarie), BEd, MEd(Monash), GradDipComp(Deakin), AACs
John Boutland
  ThL(Hons)(ACT), GradDipDP(CIT), MACS
Andrew Blucher
  GradDipIT(Chisholm)
Ainslie Ellis
  BAppSc(VIC)
Dianne Hagan
  BSc(Monash)
Peter McKenzie
Ann McMillan
  BA(Melb), GradDipDP(CIT)
Jan Miller
  DipBusStud(DP), BAppSc(Chisholm)
Sita Ramakrishnan
  BSc(Hons)(Bombay), GradDipDP(NSWIT), GradDipEd(SydneyCAE)
Patsy Segall
  BA, MEd(Melb)

Senior Tutors
Robyn Polan
  BAppSc(Chisholm)
Judith Sheard
  BSc(Monash), GradDipDP(CIT)
Sylvia Tucker
  BA, DipEd(Qld)

PEARCEY CENTRE FOR COMPUTING

Executive Director
Douglas G. Burns
  BAppSc(VIC), MACS

Secretaries/Administrators
Gayle Barnes
Le Cameron
Elenni Loukopoulos

Project Officer
Chris Freeman
  BAppSc(CIT)
UNDERGRADUATE COURSES

Admission Requirements for Undergraduate Courses

Applicants with the following qualifications are eligible for consideration for admission into the Institute’s undergraduate courses:

1. Successful completion of a VCAB Year 12. This can include HSC Group One or Group Two subjects, TOP, T12 and Approved Study Structures;
2. Interstate or overseas qualifications certified by VCAB as equivalent to Year 12;
3. Any other qualification requirement approved by the Academic Board, e.g. Certificate of Business Studies; or
4. Qualifications or experience acceptable to the Chisholm Admissions Committee.

For information regarding course requirements, such as prerequisite and recommended subjects or special requirements, see the following course descriptions.

Prerequisite and recommended subjects may be drawn from any of the qualifications mentioned above as acceptable, except where otherwise stated.

Bachelor of Applied Science (Computing)

Course Code: BP
Course Leader: Dr P. Nash

Intending students are advised that micro computers are used in a wide range of courses within the School of Computing and Information Systems.

In particular, they are used heavily in SFT111 and students are STRONGLY advised to either purchase, or have high quality access to an IBM compatible microcomputer. Students intending to purchase a microcomputer should consult the School before purchase.

Content

This course is designed to produce graduates who satisfy the computing needs of industry, government and commerce. Upon completion of the course, graduates should be well suited to employment in the fields of computer programming, systems analysis and design and related areas.

Exemptions

There are no standard exemptions for any subject in the course. Students may apply for exemptions when enrolling if they believe they are eligible.

Part-time

Subjects are normally available in the evening at Caulfield. Students should note that blocks of hours are provided during the day where possible to facilitate day release.

Course Structure

To qualify for the degree a student must pass a total of 29 subjects – ten from first year, ten from second year and nine from third year.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
<td></td>
</tr>
<tr>
<td>SFT111 Software Development 1</td>
<td>4</td>
</tr>
<tr>
<td>SFT112 Software Development 2</td>
<td>–</td>
</tr>
<tr>
<td>COT113 Computer Technology 1</td>
<td>4</td>
</tr>
<tr>
<td>COT114 Computer Technology 2</td>
<td>–</td>
</tr>
<tr>
<td>SYS115 Information Systems 1</td>
<td>4</td>
</tr>
<tr>
<td>SYS116 Information Systems 2</td>
<td>–</td>
</tr>
<tr>
<td>MAT123 Mathematics for Computing</td>
<td>4</td>
</tr>
<tr>
<td>PSY192 Applied Social and Behavioural Studies</td>
<td>–</td>
</tr>
<tr>
<td>ADM115 Introduction to Business</td>
<td>4</td>
</tr>
<tr>
<td>ADM190 Business Communication for Computing</td>
<td>–</td>
</tr>
<tr>
<td>Elective 1</td>
<td>4</td>
</tr>
<tr>
<td>Elective 2</td>
<td>–</td>
</tr>
<tr>
<td>Elective 3</td>
<td>–</td>
</tr>
<tr>
<td><strong>Year 2</strong></td>
<td></td>
</tr>
<tr>
<td>SFT211 Software Development 3</td>
<td>4</td>
</tr>
<tr>
<td>SFT212 Software Development 4</td>
<td>–</td>
</tr>
<tr>
<td>COT213 Computer Technology 3</td>
<td>4</td>
</tr>
<tr>
<td>COT214 Computer Technology 4</td>
<td>–</td>
</tr>
<tr>
<td>SYS215 Information Systems 3</td>
<td>4</td>
</tr>
<tr>
<td>SYS216 Information Systems 4</td>
<td>–</td>
</tr>
<tr>
<td>ACC296 Accounting Systems and Procedures</td>
<td>4</td>
</tr>
<tr>
<td>Elective 1</td>
<td>4</td>
</tr>
<tr>
<td>Elective 2</td>
<td>–</td>
</tr>
<tr>
<td>Elective 3</td>
<td>–</td>
</tr>
<tr>
<td><strong>Year 3</strong></td>
<td></td>
</tr>
<tr>
<td>SFT303 Industrial Project</td>
<td>2</td>
</tr>
<tr>
<td>SFT311 Software Development 5</td>
<td>4</td>
</tr>
<tr>
<td>SFT312 Software Development 6</td>
<td>–</td>
</tr>
<tr>
<td>COT313 Computer Technology 5</td>
<td>4</td>
</tr>
<tr>
<td>COT314 Computer Technology 6</td>
<td>–</td>
</tr>
<tr>
<td>SYS315 Information Systems 5</td>
<td>4</td>
</tr>
<tr>
<td>SYS316 Information Systems 6</td>
<td>–</td>
</tr>
<tr>
<td>Elective 4</td>
<td>4</td>
</tr>
<tr>
<td>Elective 5</td>
<td>–</td>
</tr>
</tbody>
</table>

Students may take any electives from any of the following areas or any other four hour, undergraduate, single semester subject as long as these are approved by the course leader: Accounting, Administrative Studies, Communication Studies, Economics, Electronics, Marketing, Mathematics (especially MAT223 to MAT226), Psychology, Sociology, Banking and Finance.
Bachelor of Applied Science (Computing)/Bachelor of Business (Accounting)

Course Code: BJ
Course Leaders: Paul Nash (Computing) John Rice (Accounting)

The Course
This course is a combination of two degree programs. It aims to provide a sound Accounting and Data Processing basis that will enable graduates to deal with any form of accounting and business activity, particularly the application of computerised business systems.

Awards
Students completing this course qualify for two degree awards:
- Bachelor of Business (Accounting), and
- Bachelor of Applied Science (Computing).

Recognition
Students will meet the academic requirements for entry to the professional year of the Australian Society of Accountants and the Institute of Chartered Accountants in Australia, and satisfy the knowledge requirements of the Australian Computer Society for admission to corporate membership to the grade of member.

Venue
Day and evening classes are offered at Caulfield and day classes only are offered at Frankston.

Admission Requirements
For a general statement regarding admission requirements for undergraduate courses, see beginning of Undergraduate Courses section on page seven.

Recommended Year 12 Subjects
- Accounting, Economics, Legal Studies and Mathematics (at least to Year 11).

Credit Transfer
Applicants who have undertaken studies at tertiary level may apply for credit in equivalent subjects in the course. When applying, prospective students must provide full documentary evidence of prior tertiary studies including a copy of academic record and subject synopses from the handbooks of the years in which the subjects were passed. This information enables credits to be processed by the David Syme Business Schools Credit Transfer Committee and the Admissions Committee for the School of Computing and Information Systems. Applicants should obtain from the Admissions Office, (telephone 573 2000), a copy of the application form, Application for Credit Transfer (SR6), to facilitate this process. In all cases at least sixteen equivalent semester subjects must be completed at Chisholm before a student is eligible for the award. Specific subjects are required to be completed at Chisholm. Details are available from the Course Leader or the School's Student Services Officer.

The following credit transfers have been standardised by the Academic Board:
- Members of the Institute of Chartered Secretaries and Administrators will be granted credit for three subjects. Holders of a recognised Certificate of Business Studies are eligible for credit for up to a maximum of four subjects in the course, to be determined by the Course Leader.
- Students who are members of a professional accounting body approved by the Academic Board of Chisholm will be admitted to the equivalent of year two of the course. A list of approved professional bodies is available from the David Syme Business Schools Administration Offices.

Assessment
Where subjects are partly or wholly assessed on a cumulative basis, students may not qualify for a pass unless attendance is satisfactory and all prescribed assignments are submitted.

Private Study
Students are expected to devote at least as much time per week per subject in private study as they do to attending classes.

Calculator
Students are required to possess a calculator with the following facilities: financial mathematical functions, statistical functions for frequency distribution; two variable statistical functions (correlation and regression).

Course Structure
In order to qualify for the awards of this Double Degree, a student will normally complete the equivalent of 38 half-year subjects over four years equivalent full-time study.

This course is administered by the David Syme Business Schools.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Year 1, Semester 1</th>
<th>Semester 2</th>
<th>Year 2, Semester 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>COT113</td>
<td>Computer Technology 1</td>
<td>4</td>
<td>COT114</td>
</tr>
<tr>
<td>SFT111</td>
<td>Software Development 1</td>
<td>4</td>
<td>SFT112</td>
</tr>
<tr>
<td>MAT123</td>
<td>Mathematics for Computing</td>
<td>4</td>
<td>MAT164</td>
</tr>
<tr>
<td>FIN111</td>
<td>Contract Law</td>
<td>4</td>
<td>ACC105</td>
</tr>
<tr>
<td>ACC103</td>
<td>Accounting and Financial Decision Making, or</td>
<td>4</td>
<td>FIN171</td>
</tr>
<tr>
<td>ACC104</td>
<td>Accounting Systems &amp; Procedures</td>
<td>4</td>
<td>SYS115</td>
</tr>
<tr>
<td>ACC242</td>
<td>Productive Systems and Accounting</td>
<td>4</td>
<td>MKT112</td>
</tr>
<tr>
<td>FIN115</td>
<td>Law of Business Organisations</td>
<td>4</td>
<td>ADM130</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Name</td>
<td>Hrs</td>
<td>Semester</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------</td>
<td>-----</td>
<td>----------</td>
</tr>
<tr>
<td>SYS116</td>
<td>Information Systems 2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>ACC249</td>
<td>Company Reporting</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>ACC243</td>
<td>Management Accounting</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>FIN217</td>
<td>Business Statistics and Forecasting</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>FIN271</td>
<td>Microeconomics</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>SYS215</td>
<td>Information Systems 3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>ACC263</td>
<td>Financial Management</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>ACC349</td>
<td>Financial Accounting Issues</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>SFT211</td>
<td>Software Development 3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>COT213</td>
<td>Computer Technology 3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>SYS705</td>
<td>Analysis Techniques for Business Systems</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>FIN933</td>
<td>Taxation Law</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>ACC363</td>
<td>Auditing</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>SYS716</td>
<td>Advanced Management Accounting</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>COT313</td>
<td>Computer Technology 5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>SYS315</td>
<td>Information Systems 5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>ACC352</td>
<td>Advanced Management Accounting</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>SY716</td>
<td>Software Development 6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>SFT312</td>
<td>Software Development 6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>SYS316</td>
<td>Information Systems 6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>SFT303</td>
<td>Industrial Project</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>COT214</td>
<td>Computer Technology 4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>FIN933</td>
<td>Taxation Law</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>ACC363</td>
<td>Auditing</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Year 4, Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFT311</td>
<td>Software Development 5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>COT313</td>
<td>Computer Technology 5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>SYS315</td>
<td>Information Systems 5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>ACC352</td>
<td>Advanced Management Accounting</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>SYS716</td>
<td>Analysis Techniques for Business Systems</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

**GRADUATE COURSES**

**Graduate Diploma in Business Technology**

*(Graduate Diploma of Applied Science in Business Technology)*

**Course Code:** PO  
**Course Leader:** Pearl Levin

**Content**

Business Technology is the use of integrated computer and communication systems to support administrative procedures and management decision making in a business environment.

The aim of this course is to provide the opportunity for people such as business managers, professional office workers, computing professionals, business consultants, technology sales personnel and business systems analysts to develop expertise in the introduction and management of advanced technology into business organisations.

**Admission Requirements**

A recognised degree or diploma or equivalent as approved by the Institute Admissions Committee.

**Course Structure**

Students are required to successfully complete eight subjects. The subjects are designated as foundation, core and elective subjects.

The course is organised into three separate streams to cater for students with differing backgrounds. Each stream consists of different combinations of foundation, core and elective subjects. The streams of study are:

- **General Entry Stream:** for students with little or no background in either business or computing.
- **Business Entry Stream:** for students with a background in business.
- **Technical Entry Stream:** for students with a background in computing.

The following subjects are core subjects:

- SYS716 Analysis Techniques for Business Systems
- ADM720 Social and Behavioural Aspects of Business Technology
- COT718 Principles of Data Base
- COT717 Data Communications and Converging Technologies
- FIN750 Legal Implications of Business Technology

The following are foundation subjects:

- SYS705 Introduction to Business Computing
- ACC705 Business and Financial Control Systems
- ADM730 Management of Business Technology and Personnel

**Students with prior qualification in Computing or Business will be required to complete:**

- 5 Core Subjects
- 2 Foundation Subjects
- 1 Elective Subject
- 8 Subjects in Total

**Students with prior qualification NOT Computing or Business will be required to complete:**

- 5 Core Subjects
- 3 Foundation Subjects
- 8 Subjects in Total

**Students with prior qualifications in computing:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td></td>
<td>Semester</td>
</tr>
<tr>
<td>ACC705</td>
<td>Business &amp; Financial Control</td>
<td>4</td>
</tr>
<tr>
<td>SYS716</td>
<td>Analysis Techniques for Business Systems</td>
<td>4</td>
</tr>
</tbody>
</table>

18
Graduate Diploma in Computing
(Graduate Diploma of Applied Science in Computing)
Course Code: PPI
Course Leader: Chris Avram

Intending students are advised that micro computers are used in a wide range of courses within the Division of Information Technology.

Students intending to purchase a micro computer should consult the Division before purchase to ensure compatibility with Chisholm facilities.

Content
The Graduate Diploma in Computing is designed for those with a tertiary qualification in any discipline wishing to gain a first qualification in the computing field.

The aims of the course are:
1. To provide appropriately trained professionals in the field of commercial computing.
2. To provide a conceptual framework for students to keep pace with developments in this area.
3. To provide students with a practical knowledge of computer hardware and software which can be used to immediate use.
4. To develop a professional approach to computing and an awareness of social implications.

The course is offered both full-time and part-time. The duration of the full-time course is one year (two semesters) with an average of 16 hours per week of class contact.

The duration of the part-time course is two years (four semesters) with eight hours per week of class contact.

Admission Requirements
A recognised degree or diploma or equivalent as approved by the Institute Admissions Committee.

Those who do not have the formal prerequisites for entry to the course may be able to gain special entry if they satisfy the following criteria:
1. Academic qualifications, at least two years in total, of tertiary level courses and/or industry courses assessed as being at tertiary level.
2. At least two years relevant work experience.

Course Structure
The course consists of eight subjects which are designed to provide students with a broad knowledge of information technology. To successfully complete the course, a student must demonstrate ability in both practical work and theory in each subject.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYS750 Information Systems I</td>
<td>4</td>
</tr>
<tr>
<td>SYS751 Information Systems II</td>
<td>4</td>
</tr>
<tr>
<td>SFT760 Software Development I</td>
<td>4</td>
</tr>
<tr>
<td>SFT764 Software Development II</td>
<td>4</td>
</tr>
<tr>
<td>COT770 Computer Technology I</td>
<td>4</td>
</tr>
<tr>
<td>COT771 Computer Technology II</td>
<td>4</td>
</tr>
<tr>
<td>COT766 Case Study</td>
<td>4</td>
</tr>
<tr>
<td>COT776 Computer Technology III</td>
<td>4</td>
</tr>
</tbody>
</table>

The following specific Graduate Diploma in Business Technology electives will be offered:

- SFT719 Structured Programming
- ACC706 Relevant Costing and Financial Management
- SYS720 Expert Systems
- COT710 Application Project (in consultation with both course leaders),

OR
Students may also select appropriate electives from other Computing or Business Graduate Diploma Courses in consultation with the Course Leader.
Masters Program in Computing

Introduction
The Masters Program in Computing may be considered an umbrella title to two courses – the Graduate Diploma in Information Technology and the Master of Applied Science (Computing).

The program is offered over two years full-time or four years part-time and is open to individuals with a three year degree or diploma in computing, or extensive industrial experience.

The two full-time years may be thought of as a fourth and fifth year of academic study. This means the Graduate Diploma in Information Technology is an Honours or Masters preliminary year. In most cases, the first year of the Master of Applied Science serves the same function as the Graduate Diploma in Information Technology.

Where an individual lacks formal academic qualifications but has extensive industrial experience (normally defined as at least seven years in the industry, and currently holding a senior position), they would normally enrol in the Graduate Diploma in Information Technology. Completion of this course at a high standard qualifies such students for entry to the second year of the Master of Applied Science.

Progress in the Program
Graduate Diploma in Information Technology students may shift to the Masters (assuming they do well), Masters students cannot receive the Graduate Diploma in Information Technology qualification. On the other hand Masters students who decide not to continue with the second stage of the Masters may elect to receive the Graduate Diploma in Information Technology. Students whose progress in the first stage of the Masters is marginal, and who have a slight chance of succeeding at the second stage, will be encouraged to take out the Graduate Diploma in Information Technology.

Subjects Offered
All fourth year subjects codes contain a 4 as the first numeral. Fifth year subjects codes contain a 5 as the first numeral. Some fourth year subjects may (with the approval of the Course Leader) be taken by fifth year students.

Only on rare occasions will approval be given for fourth year students to take fifth year subjects. Current subject offerings can be found in the course descriptions for the Graduate Diploma in Information Technology and the Master of Applied Science (Computing).

Graduate Diploma in Information Technology
(Graduate Diploma of Applied Science in Information Technology)
Course Code: PCI
Course Leader: Gail Bourne

Content
This course is offered to those who have an existing tertiary qualification in computing and/or data processing or equivalent work experience, and who are interested in furthering their knowledge in computing at a postgraduate level. Completion of this course may be counted as Year One of the Masters program.

This course aims to present the state of the art in commerical computing and pursue specialised areas in depth by both coursework and thesis.

On completion of the course, graduates should be able to contribute at a higher level to the work in their place of employment and benefit of their profession. They should also be prepared for further advanced study and research in the field.

The course is offered as a two year part-time course conducted over four consecutive academic semesters with eight hours per week class contact, or as a one year full-time course conducted over two consecutive academic semesters with 16 hours per week class contact.

Admission Requirements
The minimum entry standard is a recognised degree or graduate qualification in computing and/or data processing, or equivalent.

Consideration may be given to an applicant who has a relevant diploma plus work experience, or who has relevant professional qualifications and experience, and is occupying a higher level position in computing.

Course Structure
A student will be required to take eight semester subjects. Each subject involves four hours class contact per week for one semester.

The research project is equivalent to two semester subjects.

One subject from an equivalent graduate diploma course may be taken in place of one of these subjects, with the approval of the Course Leader.


A student may either major in a particular area by choice of similar subjects, or can obtain a general knowledge of advanced computing.

Subject

<table>
<thead>
<tr>
<th>Subjects without prerequisites:</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFT408 Fundamentals of Programming</td>
<td>4</td>
</tr>
<tr>
<td>SFT409 Advanced Programming Tools</td>
<td>4</td>
</tr>
<tr>
<td>SFT449 Programming for Artificial Intelligence</td>
<td>4</td>
</tr>
<tr>
<td>SYS421 Decision Support Systems</td>
<td>4</td>
</tr>
<tr>
<td>SYS422 Systems Analysis</td>
<td>4</td>
</tr>
<tr>
<td>COT423 Fundamentals of Database</td>
<td>4</td>
</tr>
<tr>
<td>COT435 Distributed Systems</td>
<td>4</td>
</tr>
</tbody>
</table>

Subjects with prerequisites:

<table>
<thead>
<tr>
<th>Subjects without prerequisites:</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFT409 Software Development</td>
<td></td>
</tr>
<tr>
<td>SFT416 Decision Support Systems Technology</td>
<td></td>
</tr>
<tr>
<td>SFT483 The Logical Foundations of Artificial Intelligence</td>
<td>4</td>
</tr>
<tr>
<td>SYS425 Systems Theory</td>
<td>4</td>
</tr>
<tr>
<td>SYS426 Systems Theory</td>
<td>4</td>
</tr>
</tbody>
</table>
SYS427 Systems Design and Implementation 4
COT430 Information Retrieval and Query Languages 4
COT431 Data Management 4
COT439 Advanced Data Communications 4
COT443 Advanced Database Concepts 4
SYS436 Project and Organisation Management Issues 4
SYS444 Machine Intelligence 4
SYS447 Intelligent Man-Machine Systems Project 4
SYS445 Preliminary Thesis 1 4
SYS446 Preliminary Thesis 2 4

Stream Summaries
A summary of the intent of each of the major streams is presented below:

1. System Development Stream (SYS421, SYS422, SYS427, SYS436, SYS446): the overall emphasis of this stream is on the application systems development process. The major topic areas are: the conceptual framework of the systems development process and a study of two different but typical approaches currently used that fit within this framework; the use of information systems to support managerial decision making, especially the design of decision support systems; the management of the system development project including a study of some packaged methodologies, the organisational issues concerned with the management of information technology.

2. Information Storage and Retrieval Stream (COT423, COT430, COT431, COT443): this stream studies the storage and retrieval of information with particular emphasis on database. The major topic areas are: the structuring of data, data models and database architecture, with emphasis on relational DBMS and CODASYL DBMS; end user facilities including database query languages; database administration including the role of data dictionary/directory systems and distributed database; future directions of data models and database architecture and facilities.

3. Software Development Stream (SFT408, SFT409, SFT449): the aim of this stream is to present the state-of-the-art in the programming area. The major topic areas are: a review of the latest programming techniques with emphasis on using advanced abstraction concepts, current trends, such as logic programming; functional programming, object-oriented programming, syntax-directed programming, rule-based programming; techniques used to control large software development.

4. Systems Theory Stream (SYS425, SYS426): the major aim of this stream is to develop an understanding of complex systems. The potential of the computer as an aid to understanding and control of organisations will be studied. The major topic areas are: consideration of organisational structures from a systems perspective; the use of modelling to study complex systems. Both financial and system dynamics modelling will be studied (note: no special accounting or mathematical knowledge is assumed); an investigation of systems concepts in different disciplines; a study of control theory as applied to business organisations; consideration of the effect of systems thinking on the system development task.

5. Intelligent Systems (SYS444, SYS447, SFT449, SFT483): the major aim of this stream is to develop an understanding of current developments in man-machine systems and machine intelligence. The major topic areas are: natural language; knowledge, rule, frame based systems; intelligent computer assisted learning; cognitive aspects.

6. Distributed Systems (COT435, COT439): the major aim of this stream is to develop an understanding of the impact of data communication, and distributed systems on systems design. The major topics areas are: packet-switching, digital data, local area networks; communication protocols; distributed systems.

Master of Computing — by Coursework
Course Code: MCI & MC2
Course Leader: Gail Bourne

Introduction
The Master of Computing is a two year full-time or four year part-time degree by coursework with an emphasis on the industrial relevance of high technology. The aims of the course are:

1. To provide the conceptual and theoretical framework within which the student can appreciate and integrate the rapidly changing and increasingly sophisticated technologies (software, hardware and methodological) such that they can be used by the graduate to develop solutions within an information technology context to the complex problems facing our society.

2. To advance the depth of theoretical knowledge of students in specific areas of interest to a level appropriate to a higher degree such that students will have the intellectual and conceptual foundation to play a leading role in the development of the information technology industry.

Admission Requirements

Stage 1
Applicants are required to hold:
1. A Bachelor of Applied Science (Computing) of Chisholm Institute of Technology; or
2. A Graduate Diploma in Computing of Chisholm Institute of Technology; or
3. A Bachelor degree or Graduate Diploma that is considered equivalent to 1 and 2.

Stage 2
Applicants are required to hold:
1. An Honours degree in Computing which is equivalent to a fourth academic year of study in computing; or
2. A Bachelor Degree in Computing and a postgraduate award in a similar area.

Only applicants of high academic ability, as shown by their performance in prior studies, will be admitted to the course.
Bridging Studies
Because of the highly specialised nature of the course, students may be required to take particular units from one of the post-graduate diploma courses offered by the Faculty before commencing particular subjects in the Masters course. Bridging Studies do not count as assessable subjects in the course structure.

Duration of the Course
It is expected that the student will complete the course in the minimum time. Students will be expected to complete the course within the minimum time of two years full-time, four years part-time, except where exceptional circumstances exist.

Course Structure
The course consists of twelve subjects each requiring four hours class contact per week for one semester, plus a minor thesis. The minor thesis is considered to be the equivalent in workload to two subjects and will require the attendance and participation of the student in a seminar program.

Each student should study two subjects each semester. Due to the dynamic nature of this field of study, new subjects will be introduced as is deemed appropriate. Not all subjects will run in any year.

Students will be required to discuss their subject selections with course and subject leaders prior to enrolment to ensure the subject is appropriate to their objectives.

The currently approved subjects are:
- SFT408 Foundations of Programming
- SFT409 Advanced Programming Tools
- SFT416 Decision Support Systems Technology
- SYS421 Decision Support Systems
- SYS422 System Analysis
- COT423 Fundamentals of Database
- SYS425 Systems Theory
- SYS426 Cybernetics
- SYS427 System and Design Implementation
- COT430 Information Retrieval & Query Languages
- COT431 Data Management
- COT435 Distributed Systems
- SYS436 Project and Organisational Management Issues
- COT439 Advanced Data Communications
- COT443 Advanced Database Concepts
- SYS444 Machine Intelligence
- SYS445 Preliminary Thesis 1
- SYS446 Preliminary Thesis 2
- SYS447 Intelligent Man-Machine Systems
- SFT449 Programming for Artificial Intelligence
- SFT483 The Logical Foundations of Artificial Intelligence
- COT519 Advanced Computer Communications
- COT520 Distributed Processing
- SFT518 Models of Programming
- SYS510 Minor Thesis
- SYS511 Advanced Topics in Artificial Intelligence
- SYS512 Advanced System Development
- SYS513 Technological Forecasting and Strategic Planning
- SYS514 Information Modelling
- SYS515 Advanced Topics in Decision Support
- SYS516 Decision Support System Technology
- SFT518 Software Engineering
- SYS526 History of Computing Thought
- SYS527 Current Topics in Cognitive Science
- SYS528 Advanced Topics in Knowledge Engineering

Students may negotiate to undertake the study of up to two subjects of equivalent standard and content offered by another tertiary institution.

Master of Applied Science — by Thesis
Course Code: MSI
Course Leader: Dan Eaves
The Faculty of Technology offers a Master of Applied Science program by research thesis. Enquiries should be directed in the first instance to the Assistant Registrar, Computing and Information Systems.

Areas for Master’s research within this school include system analysis and design methodologies, knowledge based systems, computer assisted software engineering, programming languages, decision support systems and information storage and retrieval.
SCHOOL OF DIGITAL TECHNOLOGY STAFF

Head of School
Raymond F. Pugh
BSc, BEd(Melb), MEnvSc(Monash), FMTC, TTTC, MAIP, MSTLE, MAAPT

Secretary
Elizabeth Lithgow

Assistant Registrar, School of Digital Technology
Barbara Harkin
BCom(Melb)

TECHNICAL STAFF

Laboratory Manager
Milton Richardson

Technical Officers
Nino Benci
CertTech-Elec(Holmesglen), GradDipDigComm(Chisholm)
Alison Hall
CertElectEng(Holmesglen)
Ross Harrop
CertMechTech, CertAeroInstMaker(RMIT)
Peter Oliver
CertElecTechComp, CertCompFieldService(RMIT)
Ron Van Schyndel
BAppSc(CIT)
Ross Williamson

Laboratory Technicians
Ian Herbert
FMTC, TTTC, MIEAust, MIEEE
Maria Ozadovsky
Gopi Sriskandakumar
CertMicroComputing(City&GuildsLondon)

DEPARTMENT OF APPLIED PHYSICS

Head of Department
Raymond F. Pugh
BSc, BEd(Melb), MEnvSc(Monash), FMTC, TTTC, MAIP, MSTLE, MAAPT

Secretary
Elizabeth Lithgow

Principal Lecturer
Charles G. Don
MSc, DipEd(Melb), PhD(Monash), ARMIT, MAIP

Senior Lecturers
John Davis
DipEEng(Ballarat), BSc(Hons), PhD(Monash)
Michael J. Morgan
BSc(Hons), PhD(Monash), MAIP

Peter D. Norman
BSc, BEd(Melb), PhD(Monash)

Charles F. Osborne
BA(Hons), BSc(Melb), PhD(Monash), BA(CIT), GradDipAppPsych(Chisholm), FAIP, MAPsS

Imants Svalbe
BSc(Hons), PhD, DipEd(Melb), MAIP, MIEEE

Graham G. Swenson
MSc, BEdStud(Qld), PhD(Sydney), DipTertEd(UNE)

Peter Wells
BSc(Hons), PhD, DipEd(Monash), MAIP

LECTURER

Fred E. Robilliard
BSc(Hons), MSc(LaTrobe), ARMIT

Senior Tutors
Andrew Cramond
BAppSc(VIC), MAppSc(Chisholm), PhD(Salford)
Greg Jakovidis
BSc(Hons), PhD(La Trobe)
Ian McLeod
BSc(Hons), MSc(Melb)
Reg J. Roberts
BSc(Melb), MSc(Shffield)

Tutors
Andrew Rowsell
BAppSc(Chisholm)
Pamela Shadbolt
BAppSc(Chisholm)

DEPARTMENT OF ROBOTICS AND DIGITAL TECHNOLOGY

Head of Department
James Breen
BSc, MBA(Melb), MACS, MACM, MIEEE

Secretary
Maureen Richardson

Principal Lecturer
John Dann
FRMTC, BAppSc(RMIT), MIEAust, AFIMA, MACS

Senior Lecturers
Simon Hill
BEng(Chisholm), MSc, PhD(Rhodesland), MIEEE, SMRI/SME
Willem Lindemans
BSc(Hons), DipEd, PhD(Adelaide), MAIP
Anthony McGregor
BSc(Hons), MSc(Massey), MACM
Lecturers
Colin Herbert
BEng(Elec)(Monash), DipCommEng(RMIT), TTTC(TTC)
Andrew P. Paplinski
MSc(Eng), PhD(Warsaw)
John Robinson
DipMechEng(Yallourn), BSc, MSc(Monash), TTTC(TTC)

Projects Officer
Peter J. Atkinson
BSc(Hons), PhD(Monash)

Senior Tutors
Charles M. Greif
BSc(Monash)
vacant
Admission Requirements for Undergraduate Courses

Applicants with the following qualifications are eligible for consideration for admission into the Institute's undergraduate courses:
1. Successful completion of a VCAB Year 12. This can include VCE Group One or Group Two subjects, TOP, T12 and Approved Study Structures;
2. Interstate or overseas qualifications certified by VCAB as equivalent to Year 12;
3. Any other qualification requirement approved by the Academic Board, e.g. Certificate of Business Studies; or
4. Qualifications or experience acceptable to the Chisholm Admissions Committee.

For information regarding course requirements, such as prerequisite and recommended subjects or special requirements, see the following course descriptions.

Prerequisite and recommended subjects may be drawn from any of the qualifications mentioned above as acceptable, except where otherwise stated.

Bachelor of Applied Science (Digital Technology)

Course Code: BR
Course Leader: Dr W. Lindemans

Content

This course aims to provide appropriately trained professionals in the field of digital technology. The course has been developed to incorporate relevant aspects of Computer Science, Electronic Engineering and Physical Science, in an integrated and interrelated manner, thereby providing bridges between these distinct disciplines.

Students of this course should acquire in-depth knowledge and skills in areas of computer hardware and software, as well as instrumentation, interface technology, and digital systems applications.

The course content provides for both intellectual and practical training. This training ensures that graduates have skills which should make them readily employable. It will also enable them to keep up to date and adapt readily to rapid changes in these areas of technology.

Prerequisite

A pass in VCE (HSC) Mathematics A or its equivalent, and a pass in at least Year 11 Physics.

Recommended

Year 12 passes in both Mathematics A and B, and Physics provide a valuable background for this course. Year 12 Computer Science may also be of benefit.

Course Structure

The Bachelor of Applied Science (Digital Technology) is a three-year, full-time course in Computers and related technologies (both software and hardware).


All second year subjects are compulsory, and include Operating Systems, Software Development, Digital Electronics and Design, Microprocessor Applications, Signals and Systems, Mathematics and Instrumentation Physics.

During the final year of the course all students will carry out a major project involving both Software and Hardware. They will study Real-time Programming, Microchip Design, and Signal Processing. In addition, they will select four electives from Robotics, Computer Graphics, Artificial Intelligence, Image Processing, Computer Networking, VLSI Project, or other approved electives.

Recognition

Graduates of the course are eligible for Level One membership of the Australian Computer Society.

Course Code: BRI

<table>
<thead>
<tr>
<th>Year</th>
<th>Subject</th>
<th>Hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RDT130</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>RDT140</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>RDT132</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>RDT142</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>ELE103</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ELE130</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>MAT124</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>MAT125</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PHY190</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>COM170</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Electives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOC194</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PSY194</td>
<td>2</td>
</tr>
</tbody>
</table>

1 Mathematics IB may be omitted by students with good results in two Mathematics subjects at Year 12 level.

2 Students must select ONE of these electives for study in Semester 2.
GRADUATE COURSES

Graduate Diploma in Digital Communications

(Graduate Diploma of Applied Science in Digital Communications)

Course Code: PX1
Course Leader: A. McGregor

Note: This course was the subject of a major review at the time of going to press in order to update and further improve the content. Prospective students should check with the Course Leader or the Assistant Registrar, Digital Technology for the latest information on changes to the curriculum.

Content

The Graduate Diploma in Digital Communications is intended for professionals in either Computing or Communications who wish to undertake studies in Computer Communications and related interdisciplinary areas. Its aims are:

1. To provide a thorough understanding of the central subject of the course, Computer Communications;
2. To consolidate students’ skills in the underlying foundation disciplines of Computing, Digital Technology and Communications;
3. To provide the opportunity to study in a range of areas relevant to a career in Computer Communications, e.g. Data Processing, Business Studies, Mathematics and Social Studies.

The course currently draws students from a wide range of employment including engineering, programming, management, marketing and training.

This course is available part-time only and takes a minimum of two years, with eight hours per week of class contact.

Admission Requirements

The normal entry requirement is at least a three-year degree or diploma level qualification in a discipline which provides a suitable basis for the course, e.g. Computer Science, Data Processing or Electrical, Electronic or Communications Engineering.

Applicants with a degree or diploma in a subject not directly related to the course may be considered if they have relevant work experience in Computers or Communications.
Applicants without degree or diploma qualifications may be admitted on the basis of work-experience subject to the approval of the Institute’s Admissions Committee. The level of work experience required would be at least four years in a position carrying significant technical responsibility in an area relevant to the course. Applicants should also be able to demonstrate an ability to study at a tertiary level.

Course Structure
In order to complete the course, a student must pass a total of twelve units and a project. Each unit involves one two-hour class per week for one semester. Students are advised to take four units in each of their first two semesters, and then take two units plus the project in each of the second two semesters. The selection of units is subject to the approval of the course leader. The units are grouped as follows:

Bridging Units
These units cover the basic principles of the three underlying foundation subjects: Computing, Digital Technology and Communications.

The units are introductory in level and students should take units in any areas for which they have no prior qualifications or work experience; later units of the course assume that students have at least this level of knowledge of the foundation subjects.

A maximum of two bridging units may be counted towards the total of twelve required for completion. The Bridging Units are:

- RDT651 Computer Principles I
- RDT652 Computer Principles II
- RDT653 Digital Electronics Principles
- ELE635 Communications Principles I

Core Units
These units represent the heart of the course and all involve the area of Computer Communications. All core units are compulsory. The Core Units are:

- RDT654 Computer Networks I
- RDT655 Computer Networks II
- RDT656 Network Analysis and Design
- RDT657 Terminal-Based Systems
- RDT658 Communications Practical

Elective Units
Students may select elective units freely in accordance with individual interests in order to bring their total number of units up to 12. The Elective Units are:

- RDT661 Computer Networks III
- RDT662 Proprietary Network Architectures
- RDT663 Local Communications
- RDT664 Public Telecommunication Networks
- RDT665 Computer Communications Components
- RDT666 Real Time Software Design
- RDT667 Real Time Programming
- RDT668 Distributed Processing
- RDT669 Information Security
- RDT670 System Programming
- RDT671 Microprocessor Systems
- ADM605 Entrepreneurship and Small Enterprises
- COT615 Systems Selection and Procurement
- SYS616 Computer Project Management
- COT617 Computer Operations Management
- SYS618 Systems Analysis and Implementation
- COT619 Database Systems
- ELE636 Communications Principles II
- MKT681 Digital Communications Marketing

Particular electives will be offered subject to demand and the availability of resources.

The Project
RDT601 Communications Project

Graduate Diploma in Robotics
(Graduate Diploma of Applied Science in Robotics)
Course Code: P11
Course Leader: Dr. Simon Hill

Contents
This course is designed as a part-time course to be completed in a minimum of two years. This normally involves four academic semesters of study with eight hours per week of class contact.

The course provides specialised training in robotics for engineers, programmers, technical specialists, and managers interested in the application of robotics to industrial processes.

Subject offerings enable students with specific experience in either computer science, electrical engineering, or mechanical engineering to acquire the multi-discipline expertise that provides a clear appreciation of industrial robot operation and application.

Graduates from the course will have an in-depth understanding, through theoretical material and practical exercises, of the issues that need to be addressed in engineering a functional industrial-robot work-cell.

Admission Requirements
The normal entry requirement is at least a three year degree or diploma in a course which provides a relevant foundation for studies in robotics, or an equivalent qualification approved by the Chisholm Admissions Committee. For example, a degree in Engineering, Science or Data Processing would be acceptable. Applicants may be required to undertake bridging units to attain a uniform standard.

Applicants who do not have an appropriate degree or diploma qualification will be considered only if their training and experience are judged to be of high quality and provide a suitable alternative to the normal entry requirement. These applicants will be required to undertake bridging units to attain the necessary standards. In all cases of special entry, employer support and endorsement will be highly valued.

Course Structure
In order to complete successfully the Graduate Diploma, a student is to pass the equivalent of 16 units comprising Core Units, Bridging Units (where applicable) and Elective Units. A Unit typically has a content of two weekly contact hours for a semester.
<table>
<thead>
<tr>
<th>Subjects</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDT630 Robotics I</td>
<td>2</td>
</tr>
<tr>
<td>RDT631 Robotics II</td>
<td>2</td>
</tr>
<tr>
<td>RDT632 Robotics III</td>
<td>2</td>
</tr>
<tr>
<td>RDT633 Robotics Practical I</td>
<td>2</td>
</tr>
<tr>
<td>RDT634 Robotics Practical II</td>
<td>2</td>
</tr>
<tr>
<td>RDT628 Assembly Automation</td>
<td>2</td>
</tr>
<tr>
<td>RDT629 Advanced Robot Programming</td>
<td>2</td>
</tr>
<tr>
<td>RDT635 Project A, or</td>
<td>4</td>
</tr>
<tr>
<td>RDT643 Project B</td>
<td>8</td>
</tr>
</tbody>
</table>

The first seven of the above are compulsory. Either Project A or Project B must be completed.

**Bridging Units**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDT636 Computing Systems &amp; Software</td>
<td>2</td>
</tr>
<tr>
<td>RDT637 Control Systems</td>
<td>2</td>
</tr>
<tr>
<td>RDT638 Digital Electronics</td>
<td>2</td>
</tr>
<tr>
<td>RDT639 Physical Instrumentation</td>
<td>2</td>
</tr>
<tr>
<td>MAT671 Mathematics for Robotics</td>
<td>2</td>
</tr>
<tr>
<td>MEC621 Principles of Mechanics of Machines</td>
<td>2</td>
</tr>
</tbody>
</table>

A maximum of two units may be prescribed where necessary, to be taken during the first or second semester.

**Electives**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDT640 Production Planning &amp; Management</td>
<td>2</td>
</tr>
<tr>
<td>RDT641 Software Development</td>
<td>2</td>
</tr>
<tr>
<td>RDT642 Industrial Systems &amp; Human Factors</td>
<td>2</td>
</tr>
<tr>
<td>RDT644 Computer Aided Design with Graphics</td>
<td>2</td>
</tr>
<tr>
<td>RDT645 Robot Communication &amp; Control</td>
<td>2</td>
</tr>
<tr>
<td>RDT646 Microelectronic Technology &amp; Design</td>
<td>2</td>
</tr>
<tr>
<td>RDT647 Artificial Intelligence</td>
<td>2</td>
</tr>
<tr>
<td>RDT648 Sensory Instrumentation</td>
<td>2</td>
</tr>
<tr>
<td>RDT649 Introduction to Computer Integrated Manufacture</td>
<td>2</td>
</tr>
<tr>
<td>RDT650 Advanced Microprocessor Systems</td>
<td>2</td>
</tr>
<tr>
<td>PHY691 Industrial Machine Vision Systems</td>
<td>2</td>
</tr>
<tr>
<td>MEC622 Machines and Mechanisms</td>
<td>2</td>
</tr>
<tr>
<td>MKT601 Marketing High Technology Products</td>
<td>2</td>
</tr>
<tr>
<td>ADM601 Human Resource Management and Industrial Relations</td>
<td>2</td>
</tr>
<tr>
<td>ADM605 Entrepreneurship and Small Enterprises</td>
<td>2</td>
</tr>
</tbody>
</table>

* Not all electives or bridging units will run in any one semester. Elective units are expected to run on a semester basis. Elective units may be selected freely, subject to the unit running in any one semester. Sufficient electives must be undertaken to bring the total of units to sixteen. In the selection of electives, all candidates are to have prior approval of the Course Leader. Other suitable electives from existing graduate courses may be added to the list as deemed suitable.

---

**Master and Doctoral Programs in Applied Science**

**Course Code: MS5**

The Faculty of Technology offers both a Master of Applied Science program by research, and a PhD program by research.

Enquiries should be directed in the first instance to the Assistant Registrar, Digital Technology. Areas for research within this Division include:

**Applied Physics:** acoustics, particularly propagation of impulsive noise; materials, structure and detection of faults in materials by computerised tomography and other techniques; computer image processing applied to shape analysis, texture aspects of surfaces and monitoring and control.

**Computer Technology:** compiler design and development, design of operating systems, microelectronic circuit design, digital systems design, real-time applications.

**Digital Communications:** communications hardware design, protocol specification and development, network design, signal processing.

**Robotics:** hardware and software control, digital control, servo-systems, robot trajectory planning and simulation, industrial machine vision, tactile sensing, assembly automation, screw theory as applied to robot analysis.
SCHOOL OF ENGINEERING STAFF

DEPARTMENT OF CIVIL ENGINEERING
Head of Department (Acting)
Geoffrey W. Smith
BE, MEngSc(Melb), DipCE(RMIT), MIEAust
Secretary
Giat Chu (Susan) Lim

Senior Lecturers
Adrian S. Power
BSc(Melb), MAppSc(UNSW)
Robin T. Underwood
ME, BCE, DipT&RP(Melb), CHT(Yale), CE,
DipCE, DipMechE, DipEE(GIT), FIEAust, FCIT,
FIHT, FITE, FRAPI

Lecturers
Tony Ho
DipLandSurveying(RMIT), LS, MISA
Quy Le
BE(Auckland), GradDipComp(Chisholm), MIEAust
Keith H. McKenny
BE, MEngSc(Melb), MIEAust
Murray A. Muspratt
BE(Qld), ME(UNSW), MACE, AIMM, MCIT,
FASCE, MIEAust, MACS
Jagoda Madej-Williams
BSc, MSc(Warsaw), PhD(IPPT), MASCE
M.B. Bill Wong
BSc(Eng)(London), CEng, PhD(UNSW), MICE
Richard M. Wooton
BE(Melb), MEngSc(Monash), DipCE(CIT), TTTC

Laboratory Manager
Walter G. Richter

Technical Staff
Carl A. Bakes
Kim T. Begelhole
Christopher Lockwood

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
Head of Department
Jeffrey R. Hanson
BEE, MEngSc(Melb), MIEAust
Acting Secretary
Angela Dionysopoulos

Senior Lecturers
Barrie T. Harding
BE(Melb), GradDipMktg(Chisholm), MIEAust,
MIEEE
Stewart C. Jenvey
DipElecEng, DipElectronicEng(Chisholm),
BE(Elec), BAppSc(VIC), MEng(Chisholm),
MIEEE, MIEAust
Alex R. Ormond
BSc(Durham), MSc(Nottingham), PhD(Newcastle-
upon-Tyne), CEng, MIEEE
Max L. Telfer
DipEE(FIT), BE(Elec), MEngSc(Melb), TTTC,
MIEAust, MIEEE, MACS
Paul Voumard
DipEd(Switzerland), DipEE(RMIT), BEE(Melb),
BD(MCD), MEng(RMIT)

Lecturers
Ismat Hijazin
BSc(EE), MSc(EE)(Bradley)
Les Kobylinski
Dip(EE), MSc(ElecEng)(Gdansk)
Robin P. Lisner
BE(Elec)(Monash), MIEAust
Brian Lithgow
BSc, BE(Elec), MEngSc(Melb)
Malcolm A. Reid
BSc(Glasgow), PhD(Edinburgh)
Roger H. Riordan
BE(Melb), SMIEEE
John D. Zakis
ME(Melb), SMIEEE
Ahmed Zahedi
BSc, DipEng, PhD(Rhur)

Laboratory Manager
Harold E. Ford
GradDipDP(CIT), ONC(CroydonTC),
MEnvSc(Monash)

Technical Staff
Ronald C. Bollaart
Raymond Chapman
Eric Lim
Nick Mimmo
Annie Sio
DEPARTMENT OF MECHANICAL
AND INDUSTRIAL ENGINEERING

Head of Department
Brian W. Jenney
BA(Hons)(Manchester),
PhD(EngProd)(Birmingham), CEng, FIEAust,
FIMechE, MIProdE, FIIE, MBIM, FIQA, FMS, FIS, FSS

Acting Secretary
Yvonne McCormack

Senior Lecturers
Bevis W. Barnard
B MechE(Melb), M EngSc(Monash), MIMH,
GradDipMechE, MIEAust
John W. Burt
DipMechEng(CIT), B MechEng, M EngSc(Melb),
GradDipDP(CIT), CEng, M IMechE
Kenneth O. Deutscher
DipMechEng(CTC), B MechEng, M EngSc(Melb),
TTTC
Nicolo Di Toro
DipMechEng(CIT), B Eng(VIC), MIEAust, MSE
R. Damian Kennedy
BE(RMIT), MSc(NorthWestern),
GradDipMgt(RMIT), M IEEE, MII E
Arvind K. Shrivastava
BE(Hons)(Japalpur), ME(IndianInst.ofScience),
M EngSc(Monash)
Maung Thit
BS MetE(Lehigh), M ES(Melb)
R. Paul Wellington
BS( Hons)(Adelaide), Dip Ed, M Ed(Monash),
ARAC I

Lecturers
Latif Al-Hakim
Peter Gregory
MA(Cantab), MBA(Melb)
Halit Okyar
BEMech(Istanbul)
Daniel Phelan
DipMet(RMIT), BSc(Hons)(Melb), TTTC
Donald Scutt
DipMet(RMIT), TTTC, MIM
Kees Sietsma
BEng(Elec)(Sydney)

Laboratory Manager
Ivor G. Little
DipMechEng(CIT)

Technical Staff
Jack Craig
Ian Dent
Dragan Markovic
Arthur Turnock

CENTRE FOR INDUSTRIAL TRIBOLOGY

Executive Director
Nick Di Toro
DipMechEng(CIT), B Eng(VIC), MIEAust, MSE

CHISHOLM INSTITUTE OF TECHNOLOGY
ENGINEERING RESEARCH AND
ADVISORY CENTRE

Executive Director
H. Robert Milner
BE, M EngSc(Qld), PhD(Lond), DIC, FIEAust, MII E

CHISHOLM TIMBER ENGINEERING
TECHNOLOGY CENTRE

Executive Director
H. Robert Milner
BE, M EngSc(Qld), PhD(Lond), DIC, FIEAust, MII E
UNDERGRADUATE COURSES

Admission Requirements for Undergraduate Courses

Applicants with the following qualifications are eligible for consideration for admission into the Institute’s undergraduate courses:

1. Successful completion of a VCAB Year 12. This can include HSC Group One or Group Two subjects, TOP, T12 and Approved Study Structures;
2. Interstate or overseas qualifications certified by VCAB as equivalent to Year 12;
3. Any other qualification requirement approved by the Academic Board, e.g. Certificate of Business Studies; or
4. Qualifications or experience acceptable to the Chisholm Admissions Committee.

For information regarding course requirements, such as prerequisite and recommended subjects or special requirements, see the following course descriptions.

Prerequisite and recommended subjects may be drawn from any of the qualifications mentioned above as acceptable, except where otherwise stated.

Bachelor of Engineering

All Bachelor of Engineering courses have recently been extensively restructured and the content revised to reflect changes in professional engineering practice and in the technology available to and utilised by engineers. The words “and Computing” have been added to the title of each of the engineering streams to reflect these changes. The new structure provides for a core of subjects to be taken in common by all students with specialisation beginning to develop in the second year of the four year course.

Bachelor of Engineering (Civil and Computing)

Course Code: BV

Content

The course provides for a broad training in the profession of Civil Engineering and covers the large integrated range of subjects which are required in civil engineering practice.

The course provides a sound knowledge of the principles and applications of computing necessary to operate effectively as a professional engineer working in industry. Students will also be expected to attend a one week Engineering Field Camp during the later years of the course.

Recognition of Course

This course is recognised for the purpose of admission to membership of the Institution of Engineers, Australia and the Australian Computer Society.

Prerequisites

A science background which includes Physics and at least one Mathematics subject at Year 12 level.

Recommended

English, Mathematics A and B, Physics and Chemistry at Year 12 level are the ideal preparation.

Progression Through the Course

Full-time students must pass the year as a whole before being allowed to study any subject from the following year. To pass a year of a course a student must:

1. obtain a pass mark at the annual assessment in each subject of the year; or
2. be passed by the Academic Board in the year as a whole. In awarding such a pass the Board shall take into account the student’s performance in all subjects in accordance with principles which it shall from time to time determine. A student passed by the Board in the year as a whole and who has not passed at the annual assessment in any particular subject shall not be recorded as having passed in that subject but shall be allowed to proceed with subjects in a later year of the course for which a pass in that subject is a prerequisite.

A student who fails to pass a year of the course in accordance with 1 or 2 above must repeat the whole of that year as a full-time student or repeat the failed subjects only as a part-time student.

Assessment

1. An 80 per cent attendance record is required before a student may present for assessment in any subject. Exceptions will be subject to approval of the appropriate Head of Department.
2. An 80 per cent submission record is required for assignment material set in any subject before a student may present for assessment in any subject. Exceptions will be subject to approval of the appropriate Head of Department.

Industrial Experience

All full-time students are required to obtain a minimum of 12 weeks approved industrial experience during their course.

Course Structure

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MAT112 Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>PHY150 Physics</td>
<td>2</td>
</tr>
<tr>
<td>ENG101 Electrical Technology</td>
<td>3</td>
</tr>
<tr>
<td>ENG102 Applied Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>ENG103 Engineering Communications</td>
<td>4</td>
</tr>
<tr>
<td>ENG104 Computer Science</td>
<td>4</td>
</tr>
<tr>
<td>ENG105 Computer Applications I</td>
<td>4</td>
</tr>
<tr>
<td>ENG204 Engineering Material Science</td>
<td>4</td>
</tr>
<tr>
<td>ENG205 Computer Applications II</td>
<td>4</td>
</tr>
<tr>
<td>ENG206 Engineering Management I</td>
<td>2</td>
</tr>
</tbody>
</table>
MAT212 Mathematics II  4 4  
CIV211 Engineering Surveying  4 4  
CIV225 Structural Engineering I  4 4  
MEC202 Fluid Mechanics I  2 2  

**Year 3**  
ENG305 Computer Applications III  4 4  
ENG306 Engineering Management II  3 3  
ENG307 Industrial Project I  2 2  
CIV324 Geotechnics I  5 5  
CIV325 Structural Engineering II  5 5  
CIV326 Water Engineering  5 5  

**Year 4**  
ENG405 Computer Applications IV  4 4  
ENG406 Engineering Management III  3 3  
ENG407 Industrial Project II  2 2  
CIV428 Civil Engineering Design  5 5  
CIV429 Structural Engineering III  3 3  
CIV430 Civil Engineering  5 5  
CIV431 Project Management, or  2 2  
CIV432 Geotechnics II  2 2  

**Bachelor of Engineering (Electrical and Computing)**  

**Course Code: BE**  

**Content**  
This is a four year full-time course providing a broad training in the profession of Electrical Engineering. Students may specialise in Electrical Power or Communication Engineering in the final year.  
The course also provides a sound knowledge of the principles and applications of computing necessary to operate as a professional engineer working in industry.  

**Recognition of Course**  
This course is recognised for the purpose of admission to membership of the Institution of Engineers, Australia and the Australian Computer Society.  

**Prerequisites**  
A science background which includes Physics and at least one Mathematics subject at Year 12 level.  

**Recommended**  
English, Mathematics A and B, Physics and Chemistry at Year 12 level are the ideal preparation.  

**Progression Through the Course**  
Full-time students must pass the year as a whole before being allowed to study any subject from the following year.  
To pass a year of a course a student must:  
1.  obtain a pass mark at the annual assessment in each subject of the year; or  
2.  be passed by the Academic Board in the year as a whole. In awarding such a pass the Board shall take into account the student's performance in all subjects in accordance with principles which it shall from time to time determine. A student passed by the Board in the year as a whole and who has not passed at the annual assessment in any particular subject shall not be recorded as having passed in that subject but shall be allowed to proceed with subjects in a later year of the course for which a pass in that subject is a prerequisite.  
A student who fails to pass a year of the course in accordance with 1 or 2 above must repeat the whole of that year as a full-time student or repeat the failed subjects only as a part-time student.  

**Assessment**  
1. An 80 per cent attendance record is required before a student may present for assessment in any subject. Exceptions will be subject to approval of the appropriate Head of Department.  
2. An 80 per cent submission record is required for assignment material set in any subject before a student may present for assessment in any subject. Exceptions will be subject to approval of the appropriate Head of Department.  

**Industrial Experience**  
All full-time students are required to obtain a minimum of 12 weeks approved industrial experience during their course.  

**Laboratory and Assignment Work**  
The above must be satisfactorily completed before a candidate may sit for written examinations.  

**Course Structure**  

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT112 Mathematics</td>
<td>4 4</td>
<td>1 2</td>
</tr>
<tr>
<td>PHY150 Physics</td>
<td>2 2</td>
<td></td>
</tr>
<tr>
<td>ENGL1 Electrical Technology</td>
<td>3 3</td>
<td></td>
</tr>
<tr>
<td>ENGL02 Applied Mechanics</td>
<td>3 3</td>
<td></td>
</tr>
<tr>
<td>ENGL03 Engineering Communications</td>
<td>4 4</td>
<td></td>
</tr>
<tr>
<td>ENGL04 Computer Science</td>
<td>4 4</td>
<td></td>
</tr>
<tr>
<td>ENGL05 Computer Applications I</td>
<td>4 4</td>
<td></td>
</tr>
<tr>
<td><strong>Year 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL04 Engineering Material Science</td>
<td>4 4</td>
<td></td>
</tr>
<tr>
<td>ENGL05 Computer Applications II</td>
<td>4 4</td>
<td></td>
</tr>
<tr>
<td>ENGL06 Engineering Management I</td>
<td>2 2</td>
<td></td>
</tr>
<tr>
<td>MAT212 Mathematics II</td>
<td>4 4</td>
<td></td>
</tr>
<tr>
<td>ELE204 Networks &amp; Energy Conversion</td>
<td>4 4</td>
<td></td>
</tr>
<tr>
<td>ELE212 Design I</td>
<td>3 3</td>
<td></td>
</tr>
<tr>
<td>ELE236 Electronics I</td>
<td>3 3</td>
<td></td>
</tr>
<tr>
<td><strong>Year 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL305 Computer Applications III</td>
<td>4 4</td>
<td></td>
</tr>
<tr>
<td>ENGL306 Engineering Management II</td>
<td>3 3</td>
<td></td>
</tr>
<tr>
<td>ENGL307 Industrial Project I</td>
<td>2 2</td>
<td></td>
</tr>
<tr>
<td>ELE325 Electrical Machines</td>
<td>3 3</td>
<td></td>
</tr>
<tr>
<td>ELE330 Electronics II</td>
<td>3 3</td>
<td></td>
</tr>
<tr>
<td>ELE340 Control Systems</td>
<td>3 3</td>
<td></td>
</tr>
<tr>
<td>ELE365 Electronic Communications</td>
<td>4 4</td>
<td></td>
</tr>
<tr>
<td>ELE380 Power Systems I</td>
<td>2 2</td>
<td></td>
</tr>
<tr>
<td><strong>Year 4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL405 Computer Applications IV</td>
<td>4 4</td>
<td></td>
</tr>
<tr>
<td>ENGL406 Engineering Management III</td>
<td>3 3</td>
<td></td>
</tr>
<tr>
<td>ENGL407 Industrial Project II</td>
<td>2 2</td>
<td></td>
</tr>
<tr>
<td>ELE411 Design II</td>
<td>3 3</td>
<td></td>
</tr>
</tbody>
</table>
Select 3 of:
ELE401 Signal Processing & Filters 4 4
ELE425 Power Electronics & Machine Control 4 4
ELE446 Computer Control 4 4
ELE447 Computer Communications 4 4
ELE465 Communication Systems 4 4
ELE480 Power Systems II 4 4

Bachelor of Engineering (Industrial and Computing)
Course Code: BL
Course Leader: Damian Kennedy

Content
A course for students seeking careers in the branch of engineering which is concerned with the integration of technological, financial, human and other resources to form efficient productive systems.

Recognition of Course
This course is recognised for the purpose of admission to membership of the Institution of Engineers, Australia and the Australian Computer Society.

Prerequisites
A science background which includes Physics and at least one Mathematics subject at Year 12 level.

Recommended
English, Mathematics A and B, Physics and Chemistry at Year 12 level are the ideal preparation.
Intending applicants who possess qualifications other than the above may still apply for admission and are referred to “Part 3 – Admissions” in Volume One of the Handbook.

Progression Through the Course
Full-time students must pass the year as a whole before being allowed to study any subject from the following year. To pass a year of a course a student must:
1. Obtain a pass mark at the annual assessment in each subject of the year; or
2. Be passed by the Academic Board in the year as a whole. In awarding such a pass the Board shall take into account the student’s performance in all subjects in accordance with principles which it shall from time to time determine. A student passed by the Board in the year as a whole and who has not passed the annual assessment in any particular subject shall not be recorded as having passed in that subject but shall be allowed to proceed with subjects in a later year of the course in which a pass in that subject is a prerequisite.
A student who fails to pass a year of the course in accordance with 1 or 2 above must repeat the whole of that year as a full-time student or repeat the failed subjects only as a part-time student.

Assessment
1. An 80 per cent attendance record is required before a student may present for assessment in any subject. Excep-

Industrial Experience
All full-time students are required to obtain a minimum of 12 weeks approved industrial experience during the course.

Course Structure

<table>
<thead>
<tr>
<th>Subject</th>
<th>Year</th>
<th>Hours per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>MAT112 Mathematics</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>PHY150 Physics</td>
<td>2 2</td>
</tr>
<tr>
<td></td>
<td>ENG101 Electrical Technology</td>
<td>3 3</td>
</tr>
<tr>
<td></td>
<td>ENG102 Applied Mechanics</td>
<td>3 3</td>
</tr>
<tr>
<td></td>
<td>ENG103 Engineering Communications</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>ENG104 Computer Science</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>ENG105 Computer Applications I</td>
<td>4 4</td>
</tr>
<tr>
<td>Year 2</td>
<td>ENG204 Engineering Material Science</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>ENG205 Computer Applications II</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>ENG206 Engineering Management I</td>
<td>2 2</td>
</tr>
<tr>
<td></td>
<td>MAT212 Mathematics II</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>MEC207 Workshop Practice</td>
<td>1 Week</td>
</tr>
<tr>
<td></td>
<td>IND255 Methods Engineering</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>IND256 Theory of Manufacturing Processes</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>ELE237 Electronics</td>
<td>2 2</td>
</tr>
<tr>
<td>Year 3</td>
<td>ENG305 Computer Applications III</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>ENG306 Engineering Management II</td>
<td>3 3</td>
</tr>
<tr>
<td></td>
<td>ENG307 Industrial Project I</td>
<td>2 2</td>
</tr>
<tr>
<td></td>
<td>MEC356 Thermo-fluids</td>
<td>2 2</td>
</tr>
<tr>
<td></td>
<td>ELE337 Electronic Systems</td>
<td>3 3</td>
</tr>
<tr>
<td></td>
<td>IND354 Design for Production</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>IND355 Design of Productive Systems I</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>ACC310 Engineering Accounting I</td>
<td>2 2</td>
</tr>
<tr>
<td>Year 4</td>
<td>ENG405 Computer Applications IV</td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td>ENG406 Engineering Management III</td>
<td>3 3</td>
</tr>
<tr>
<td></td>
<td>ENG407 Industrial Project II</td>
<td>2 2</td>
</tr>
<tr>
<td></td>
<td>ACC311 Engineering Accounting II</td>
<td>2 2</td>
</tr>
<tr>
<td></td>
<td>IND454 Safety &amp; Environmental Engineering</td>
<td>2 2</td>
</tr>
<tr>
<td></td>
<td>IND453 Operations Research</td>
<td>3 3</td>
</tr>
<tr>
<td></td>
<td>IND455 Design of Productive Systems II</td>
<td>4 4</td>
</tr>
</tbody>
</table>

Select 2 of:
ADM310 Personnel Administration & Industrial Law 2 2
IND456 Systems Reliability 2 2
MEC409 Automation: Mechanisms & Control 2 2
Bachelor of Engineering (Mechanical and Computing)

Course Code: BH
Course Leader: Ken Deutscher

Content
A course for students who aim to reach a professional level in mechanical engineering. It includes study in the major disciplines: Mechanics of Solids, Fluids and Machines, Thermodynamics, Materials, Design Management and Computing Studies.

Recognition of Course
This course is recognised for the purpose of admission to membership of the Institution of Engineers, Australia and the Australian Computer Society.

Prerequisites
A science background which includes Physics and at least one Mathematics subject at Year 12 level.

Recommended
English, Mathematics A and B, Physics and Chemistry at Year 12 level are the ideal preparation.

Progression Through the Course
Full-time students must pass the year as a whole before being allowed to study any subject from the following year. To pass a year of a student must:
1. obtain a pass mark at the annual assessment in each subject of that year; or
2. be passed by the Academic Board in the year as a whole. In awarding such a pass the Board shall take into account the student's performance in all subjects in accordance with principles which it shall from time to time determine. A student passed by the Board in the year as a whole and who has not passed at the annual assessment in any particular subject shall not be recorded as having passed in that subject but shall be allowed to proceed with subjects in a later year of the course for which a pass is a prerequisite.

A student who fails to pass a year of the course in accordance with 1 or 2 above must repeat the whole of that year as a full-time student or repeat the failed subjects only as a part-time student.

Assessment
1. An 80 per cent attendance record is required before a student may present for assessment in any subject. Exceptions will be subject to approval of the appropriate Head of Department.
2. An 80 per cent, submission record is required for assignment material set in any subject before a student may present for assessment in any subject. Exceptions will be subject to approval of the appropriate Head of Department.

Industrial Experience
All full-time students are required to obtain a minimum of 12 weeks approved industrial experience during their course.

Course Structure

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td></td>
</tr>
<tr>
<td>MAT112</td>
<td>4</td>
</tr>
<tr>
<td>PHY150</td>
<td>2</td>
</tr>
<tr>
<td>ENG101</td>
<td>3</td>
</tr>
<tr>
<td>ENG102</td>
<td>3</td>
</tr>
<tr>
<td>ENG103</td>
<td>4</td>
</tr>
<tr>
<td>ENG104</td>
<td>4</td>
</tr>
<tr>
<td>ENG105</td>
<td>4</td>
</tr>
<tr>
<td>Year 2</td>
<td></td>
</tr>
<tr>
<td>ENG204</td>
<td>4</td>
</tr>
<tr>
<td>ENG205</td>
<td>4</td>
</tr>
<tr>
<td>ENG206</td>
<td>2</td>
</tr>
<tr>
<td>MAT212</td>
<td>4</td>
</tr>
<tr>
<td>MEC202</td>
<td>2</td>
</tr>
<tr>
<td>MEC204</td>
<td>4</td>
</tr>
<tr>
<td>MEC207</td>
<td>1 Week</td>
</tr>
<tr>
<td>MEC211</td>
<td>4</td>
</tr>
<tr>
<td>Year 3</td>
<td></td>
</tr>
<tr>
<td>ENG305</td>
<td>4</td>
</tr>
<tr>
<td>ENG306</td>
<td>3</td>
</tr>
<tr>
<td>ENG307</td>
<td>2</td>
</tr>
<tr>
<td>MEC301</td>
<td>2</td>
</tr>
<tr>
<td>MEC304</td>
<td>3</td>
</tr>
<tr>
<td>MEC308</td>
<td>2</td>
</tr>
<tr>
<td>MEC309</td>
<td>4</td>
</tr>
<tr>
<td>MEC311</td>
<td>4</td>
</tr>
<tr>
<td>Year 4</td>
<td></td>
</tr>
<tr>
<td>ENG405</td>
<td>4</td>
</tr>
<tr>
<td>ENG406</td>
<td>3</td>
</tr>
<tr>
<td>ENG407</td>
<td>2</td>
</tr>
<tr>
<td>MEC401</td>
<td>5</td>
</tr>
<tr>
<td>MEC411</td>
<td>4</td>
</tr>
<tr>
<td>MEC412</td>
<td>4</td>
</tr>
<tr>
<td>Select 1 of:</td>
<td></td>
</tr>
<tr>
<td>MEC408</td>
<td>2</td>
</tr>
<tr>
<td>MEC409</td>
<td>2</td>
</tr>
<tr>
<td>IND456</td>
<td>2</td>
</tr>
</tbody>
</table>
GRADUATE COURSES

Graduate Diploma in Municipal Engineering
(Graduate Diploma of Engineering in Municipal Engineering)
Course Code: GP
Course Leader: Robin T. Underwood

Content
This two-year part-time course provides up-to-date knowledge, training and skills in the full range of technical services and management activities normally undertaken by Municipal Councils and associated groups and organizations. Appropriately qualified persons who satisfactorily complete the course will satisfy the examination requirements for the award of a Municipal Engineer's Certificate issued by the Municipal Engineers Board, subject to the Board's normal accreditation procedures.

Admission Requirements
A recognised degree or diploma in Civil Engineering or in an associated discipline.

Applicants who lack the necessary qualifications, but with substantial relevant experience, will be considered. In addition, a limited number of persons may be permitted to enrol for single subjects.

Course Structure

<table>
<thead>
<tr>
<th>Subject</th>
<th>No of Hrs per sem's</th>
<th>wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIV610</td>
<td>Road and Traffic Engineering</td>
<td>2</td>
</tr>
<tr>
<td>CIV611</td>
<td>Local Government Management</td>
<td>1</td>
</tr>
<tr>
<td>CIV612</td>
<td>Legislation and its Application</td>
<td>3</td>
</tr>
<tr>
<td>CIV613</td>
<td>Statutory Planning</td>
<td>1</td>
</tr>
<tr>
<td>CIV614</td>
<td>Strategic Planning</td>
<td>1</td>
</tr>
<tr>
<td>CIV615</td>
<td>Environmental Engineering</td>
<td>1</td>
</tr>
<tr>
<td>CIV616</td>
<td>Advanced Management</td>
<td>1</td>
</tr>
<tr>
<td>CIV617</td>
<td>Management Studies, or Management Oriented Project</td>
<td>2</td>
</tr>
</tbody>
</table>

Graduate Diploma in Project Management
(Graduate Diploma of Engineering in Project Management)
Course Code: PH
Course Leader: Kees Sietsma

Content
A two year part-time course to introduce the graduates to the fundamental management concepts and techniques as applied to project management, and to develop an understanding of the interaction of financial, time, engineering and management aspects of projects management.

Admission Requirements
A recognised degree or diploma in Engineering or an associated discipline.

Course Structure

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td></td>
</tr>
<tr>
<td>COT640</td>
<td>Computer Programming</td>
</tr>
<tr>
<td>COT641</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>CIV603</td>
<td>Skeletal Frame Analysis</td>
</tr>
<tr>
<td>CIV604</td>
<td>Computer Application I</td>
</tr>
<tr>
<td>Year 2</td>
<td></td>
</tr>
<tr>
<td>COT642</td>
<td>Digital Computer Equipment</td>
</tr>
<tr>
<td>CIV606</td>
<td>Finite Element Analysis</td>
</tr>
<tr>
<td>CIV607</td>
<td>Numerical Analysis</td>
</tr>
<tr>
<td>CIV608</td>
<td>Computer Application II (Project)</td>
</tr>
</tbody>
</table>
Master of Engineering

Course Code: ME

The Faculty of Technology offers a Master of Engineering program by research thesis.

Areas for Master’s research within this Division include:

Civil: transportation economics; traffic flow; road safety; design of steel structures; finite elements in fluids and structures; limit state design of highway bridges; soil rock engineering; public health.

Electrical and Electronic: communication; electric power; electronics; control systems.

Mechanical: the mechanics of fluids, machine, materials and solids, and thermodynamics.

Industrial: methods engineering; operations research; work place layout; ergonomics.

Enquiries should, in the first instance, be directed to Mr Jürgen Annuss, Assistant Registrar, Engineering.
ACC296  Accounting Systems
Contact: Four hours per week for one semester.
Prerequisite: ADM115.
Syllabus: The aim of this subject is to develop an accounting framework for financial reporting through the process of collecting, analysing, classifying and presenting financial information, profit measurement under accrual accounting and accounting for fixed assets and inventories.

ACC310  Engineering Accounting I
Contact: Two hours per week for two semester.
Prerequisite: As prescribed under Progression through the Course.
Syllabus: Introduction to accounting, accounting terminology, accounting measurement systems.

ACC311  Engineering Accounting II
Contact: Two hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.
Syllabus: Segmented reporting: fixed costs, direct and common costs, breakdown of sales, inventory evaluation, contribution approach. Profit planning: budgeting, budget period, human relations, sales forecasting, sales budget, production budget, materials budget, administration budget, cash budget, zero-based and program budgeting, Flexible budgets and overhead analysis. Control of decentralised operations: information flow, investment profit, management performance, rate of return, transfer pricing, opportunity costs. Capital budgeting and investment decisions. Analysis and evaluation of projects.

ACC330  Business and Accounting Practices
Contact: One semester, 28 hours.
Prerequisites: DES202.
Syllabus: To provide an introduction to principles and practices of management with special reference to small business organisations including design studios and workshops. Students should become capable of understanding the basic legal, organisational and financial requirements of setting up and operating a small business; preparing plans and cost estimates for the establishment of a design studio/manufacturing business; appreciating the management aspects of small business including the practical, bookkeeping and daily operational problems associated with a particular discipline. Topics: Law relevant to small businesses, principles of contract, partnership and company law; copyright and legal aspects of employment; legal responsibilities of employers. Human organisational variables including individual personality, group dynamics, motivation and change, designers as employers, improving human relations. Finance and accounting including selection of strategies for design-industry situations; accounting and decision-making; definitions; using accounting information; stages in financial decision-making; investment principles and decisions; measurement of cash flow; analysis of costs. Basic financial interpretations of balance sheets and profit and loss statements; costing methods for studio establishment and development; small business budget management; the management and operation of a small business; bookkeeping methods; sales tax law; contracts as marketing safeguards; sources of funds and venture capital.
Assessment: Progressive assessment of assignments: 50 per cent End of semester test: 50 per cent

ACC612  Management Accounting
Contact: Three hours per week of evening study for one semester.
Prerequisites: Nil.
Syllabus: Accounting principles and methods, relationship of accounting function to project management, cost centres, discounted cash flow techniques.

ACC705  Business and Financial Control Systems
Contact: Four hours per week in one semester.
Prerequisites: Nil.
Syllabus: Subject content aims to make participants aware of the financial implications of business actions and strategies. Hence students will be introduced to accounting terms on concepts and methodology and will explore a range of accounting techniques available to plan and control business strategies. Emphasis will be placed on the usefulness of accounting information for business decision making.
ACC706 Relevant Costing and Financial Management

Contact: One semester at two hours per week or one half semester at four hours per week.

Prerequisites: ACC705.

Syllabus: This subject will develop a student’s ability to critically analyse, evaluate and use managerial accounting data for decision making purposes. Students will be able to choose data relevant for a specific purpose from a data bank and apply appropriate techniques to derive relevant information for managerial financial decisions. Topics include relevant costing, contribution margin approaches, departmental and product costing.

ADM115 Introduction to Business

Contact: Four hours per week for one semester.

Prerequisite: Nil.

Syllabus: Students will gain an understanding of: the theory and practice of business; practical business operations; current issues in Australian business. This will be achieved by a combination of classwork, group entrepreneurial projects and discussion of current material in the business press. Projects will operate as real business, subject to the constraints and opportunities existing in the real business environment.

ENGLISH, J., How to Organise and Operate a Small Business in Australia, George Allen and Unwin, 1981.


ADM190 Business Communication for Computing

Contact: Four hours per week for one semester.

Prerequisite: Nil.

Syllabus: An introductory course in business communication integrating keyboarding, formatting and word processing skills so that relevant business letters and reports can be produced using either a word processor or personal computer. Effective oral communication techniques are also discussed, such as telephone techniques and meetings procedure.

Assessment: Class tests and assignments in business communication techniques, report presentation and application of keyboarding and word processing techniques.

ADM310 Personnel Administration and Industrial Law

Contact: Two hours per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.


ADM601 Human Resource Management and Industrial Relations

Contact: Two hours per week for one semester.

Syllabus: Organisations and typologies: systems theory, the social and socio-economic subsystems. Progress of technological development, technical subsystems and socio-technical subsystems. The impact of technology on organisation structures, on local, national and international economic systems. Types of industry, their relationship. Rates of change imposed by economic use of technology. Resistance to change. The work force within industries; the work function, working conditions, enrolment, satisfaction. Productivity. The place of the worker organisations, unions and management. Attitudes to technological change. Sources and techniques of management for high productivity. Worker-management participation.


ADM605 Entrepreneurship and Small Enterprises

Contact: Two hours per week in a lecture seminar format. (Participants will be expected to work in their own time on assignment work and on the development of a business plan).

Prerequisite: Nil.

Syllabus: To assist participants to understand the elements of the entrepreneurial function. To provide opportunity for participants to examine the management process as it relates to the new business venture and to small business. To provide opportunity for participants to experience the process of developing a business plan for a new business venture.


ADM720 Social and Behavioural Aspects of Business Technology

Contact: Four hours per week for one semester.
Prerequisite: Nil.

Syllabus: Introduction to social and behavioural aspects of technology, and what is technology and its relationship with other organisational subsystems. Current and emerging social issues facing the planning and management of business technology in Australia. Behavioural variables and managerial issues affecting performance outcomes from individual/group effort in an information society. A model for evaluating the management of technological change. Effective management of individual and group performance management process, employee motivation and morale issues. Different approaches to introducing technological change. A wide range of different approaches to setting up and managing business technology systems will be critically examined. Program evaluation issues and techniques for increasing social acceptance of new systems and procedures.


ADM730 Management of Business Technology and Personnel

Contact: Four hours per week for one semester.
Prerequisites: ACC705, SYS705.

Syllabus: Contingency management in the office and its development from classical, traditional and scientific management approaches. Converging technologies in the office. Organising procedures, ergonomics, standards, conducting interviews, planning and delivering training sessions, and conducting meetings.

CHORAFAS, D.N., Office Automation - The Productivity Challenge, Prentice Hall.
KREVOLIN, N., Communications Systems & Procedures for the Modern Office, PHA.

CHE111 Chemistry

Contact: Three hours of theory and four hours of practical work for two semesters.
Prerequisite: HSC Chemistry or equivalent.

Syllabus: Data interpretation (three hours): a brief introduction to proper interpretation of experimental results. Molecular bonding and structure (seven hours): atomic structure, electronic energy levels, shape of atomic orbitals, covalent bonding, Lewis electron pair approach, Sidgwick-Powell theory. Bond energies and bond lengths, covalent radii, electronegativity, intermolecular bonding and its effect on properties. Equilibria (seven hours): Equilibrium constants, activities, acid-base equilibria, hydrolysis, solubility products, coordination compounds, formation constants, stability constants, multi-ligand equilibria. Thermodynamics (seven hours): reversible processes, internal energy, heat, pressure-volume work, First Law, enthalpy, heat of reaction, enthalpy of formation, Hess’s Law, Kirchhoff’s equation, Gibb’s free energy, entropy, criteria for spontaneity. Kinetics (seven hours): rate laws, order of reaction, activation theory, mechanism and determination of mechanism. Spectroscopy (eight hours): electromagnetic radiation, Beer-Lambert Law, molecular energy levels, infra-red spectra, identification using characteristic group frequencies, nuclear magnetic resonance spectroscopy. Electrochemistry (six hours): electronic and electrolytic conductors, Faraday’s Laws. Electrochemical cells, half cell reactions and potentials, Nernst equation, the hydrogen scale of electrode potential, activity, measurement of emf, ion selective electrodes, measurement of pH, redox titrations. Phase equilibria (seven hours): phase changes, Gibb’s phase rule, one-component systems, heating and cooling curves, Clausius-Clapeyron equation, pressure-temperature and pressure-volume phase diagrams, critical point. Two-component systems, temperature-composition and pressure-composition phase diagrams, eutectics and azotropes. Colligative properties, molecular weight determination. Organic chemistry (21 hours): the major classes of organic compounds - alkanes, alkenes, alkynes, alcohols, alkyl halides, amines, carbonyl compounds, carboxylic acids and their derivatives, aromatic compounds. Inorganic chemistry (seven hours): groups of the periodic table, metals and non-metals, coordination compounds, radio chemistry, some contemporary problems in inorganic chemistry. Special topics (eight hours): these will be taken as either two or four hour lectures by staff with special expertise in the area. Topics which have been covered include aquatic chemistry, drugs, the origin of life on earth, cosmetics, fuels and polymers. Practical work (four hours per week).


CHE181 First Year Biology

Contact: Four hours theory per week (three one-hour lectures and one one-hour tutorial). Two hours practical work per two weeks. One field trip.

Prerequisite: Year 11 or Year 12 Biology would be an advantage but not essential.


**CHE190 Environmental Ecology**

Contact: Four hours per week of lectures and tutorials for one semester plus field trip of five days.

Prerequisite: Nil.

Syllabus: This course deals with current environmental issues. After a short introduction on the history of human impact on the earth, topics dealt with include issues such as growth of human populations, energy consumption, resource depletion, forestry and forest resources, pollution, nature conservation and uranium mining.

Assessment: By written assignment, tutorial papers and participation.

**CHE225 Basic Chemistry II**

Contact: Four hours of lectures and four hours of practical work per week.

Prerequisite: CHE111.


Methods of Molecular and Atomic Spectroscopy (21 hours): Molecular spectroscopy (seven hours): techniques and methods of UV-visible and IR spectroscopy, sample preparation, quantitative methods, analytical applications. Qualitative organic spectroscopy (seven hours): identification of organic compounds using IR, UV, NMR and mass spectrometry. Atom Spectroscopy: (seven hours): atomic emission, analytical emission spectroscopy, arc and spark excitation, instrumentation, direct reading spectrometry, inductively coupled plasma. Atomic absorptions, theory, instrumentation, atomisation systems.


**CHE229 Thermodynamics Notes**

**CHE229/339 Applied Chemistry II/III**

The syllabuses of the Applied Chemistry subjects CHE229 and CHE339 are made up from the following list of topics. Students studying CHE229 are required to take eight units and students of CHE339 take ten units. A full major study of CHE229 and CHE339 therefore requires eighteen units of study. All the topics comprise fourteen hours of lectures and are supported by an equal time of appropriate practical work. Students are able to select their own topics, but not all topics are offered every year and more may be added from time to time.

Contact: CHE229 Four hours per week of lectures and four hours per week of practical work. CHE339 Five hours per week of lectures and five hours per week of practical work.

Prerequisites: The prerequisite for CHE229 is CHE111. Some of the subjects in CHE339 require appropriate units from CHE229.

Corequisite: CHE225 or CHE335.


**CHE280  Biology II**

Contact: Three hours per week for two semesters. Prerequisite: CHE181.


**CHE292  Aquatic Science I**

Contact: Four hours of theory per week and four hours of practical work per week for two semesters.

Prerequisites: CHE181 and CHE111.

Syllabus: Physical and Chemical Limnology: Hydrologic Cycle, Geomorphology of lakes, rivers and estuaries; Light and thermal phenomena in aquatic science; Sediments: Major ions; Dissolved gases; Dissolved Carbon Dioxide and pH; Nutrients. Aquatic Biology Ia: Introduction to the science of ecology; Population ecology, distribution and abundance; Community Ecology; Ecosystem interactions; Behavioural and Evolutionary Ecology. Aquatic Biology Ib: Evolution and adaptations of freshwater biota; Biological and ecological processes in Lentic ecosystems; Biological and ecological processes in Lotic ecosystems; Biota and ecology of Estuaries; Biota and ecology of Inland Salt Lakes. Aquatic Chemistry I: Thermodynamics; Acid-Base Equilibria; Redox Equilibria; Diffusion and advection. Aquatic Ecosystems: Interaction of Physico-chemical and Biological components in Aquatic Ecosystems; Systems concepts as applied to Aquatic Ecosystems. Science Communication: Importance of communication in science; Oral communication; Written communication.

**CHE333/PHY/RDT/MAT  Applied Science Thesis Project**

Contact: The equivalent of three hours per week for two semesters.

Prerequisite or Corequisite: One of the appropriate majors: PHY350, RDT381, MAT301, MAT302, CHE335, CHE339.

Syllabus: There is no formal syllabus. Students make an agreement with an academic staff member working in an
area of mutual interest and who will perform the role of supervisor.

**CHE334 Chemical Technology**

Contact: Three hours per week for two semesters. Approximately half the time is devoted to formal lectures and the other half to industrial visits and project work.

Prerequisite: CHE111.
Corequisite: CHE225.

Syllabus: Chemical engineering unit processes. Pollution control technology; study of the technology used in the control of water, air and noise pollution, energy usage, resource recovery. Industrial processes: a study of the processes of such industries as petroleum refining, organic coatings, dye stuffs, paper making, food processing, resin and polymer production, paint production, chemical manufacture and brewing.


**CHE335 Basic Chemistry III**

Contact: Four hours of theory and six hours of laboratory work per week for two semesters.

Prerequisite: CHE225.


**CHE392 Aquatic Science II**

Contact: Four hours of theory per week and four hours of practical/fieldwork per week.

Prerequisites: CHE292 of both CHE290 and CHE291.

Syllabus: Experimental Design and Data Interpretation: Scientific Method; Delineation of research; Design of research; Basic experimental design; Experimental manipulation; Data collection and analysis; Interpretation of results and presentation. Aquatic Chemistry: Kinetics; Complexation; Photochemistry; Surface and Colloid Chemistry; Organic Geochemistry; Sediments. Aquatic Biology II: Comparison of Australian and other aquatic systems; Biology of Temporary and Perennial water bodies; Tropical stream biology. Pollution Ecology: Natural and Human-induced changes to aquatic systems; Acid Rain; Eutrophication; Heavy Metals; Organic Contaminants; Introduction of Exotic species; Biological monitoring. Analytical Chemistry: Spectroscopy; Chromatography; Electrochemistry; Automated Analysis; Sampling; Preservation and Digestion techniques. Water and Waste-water Treatment: Freshwaters; Wastewaters. Environmental Issues and Resource Management: Resources, resource use, conflicts; Principles of Resource Management, Evaluation and assessment of resources; Resource policies (national, state, regional); The planning process, environmental impact assessment, public participation.

**CHE491 Advanced Studies in Environmental Studies 1**

Contact: Four hours per week for one semester.

Prerequisite: Nil.

Syllabus: This subject will incorporate studies in environmental sciences, law, economics and politics. Topics studied will be examined from a diversity of perspectives in order to develop a greater understanding of decisions made by various sectors of the community when dealing with environmental questions. Environmental issues considered will range from those relevant to the individual in terms of health, such as cancer, to global considerations of issues, such as populations and energy.

Assessment: Two from Group D. (See Assessment Policy).
CHE492 Advanced Studies in Environmental Studies 2
Contact: Four hours per week for one semester.
Prerequisite: CHE491.
Syllabus: Students will carry out, as members of a team, an investigation of a specific environmental issue. During this investigation students will be expected to identify the various disciplines relevant to the selected issue and to gather appropriate information. Data collected by individuals will be analysed, interpreted and integrated with information obtained by other members of the team in the production of an integrated group report.
Assessment: Two from Group D. (See Assessment Policy).

CHE604 Water Management
Contact: Six hours per week for one semester.
Prerequisites: CHE635, CHE636.

CHE605 Water Science Project
Contact: Four hours per week for two semesters.
Prerequisite: CHE633, CHE634.
Syllabus: This subject is intended to provide experience in team approaches to problem solving in a multidisciplinary situation. Students will be trained in research methodology, in the organisation of a coherent report, and in the presentation of the results and conclusions of their project.

CHE611 Polymer Science 1
Contact: Four hours of lectures and four hours practical work each week for one semester.
Syllabus: Classification of polymers; an introduction to polymer types on the basis of methods of synthesis; reaction to heat; amorphous or crystalline polymers; plastics, fibres, and elastomers. Structure and morphology of polymers. Amorphous and semicrystalline polymers. Tacticity. Transitions and relaxations; glass transition and melting temperatures. Structural influences. Methods of measurement. Other transitions. Crystallinity, polymer design. Chain growth polymerisation; mechanisms and kinetics; initiators; transfer agents. Comparison with other types of polymers. Ionic and stereospecific polymerisation; anionic and cationic mechanisms. Limitations. Coordination polymerisation; specific examples. Polymerisation techniques; bulk, solution, and emulsion polymerisation. Mechanisms of emulsion polymerisation. Suitable experiments are chosen from the following: Kinetics of free radical polymerisation; kinetics of esterification; emulsion polymerisation; anionic polymerisation; cationic polymerisation; supported polymerisation; synthesis of a uracil-formaldehyde resin; determination of Tf and Tg by dilatometry; crystallisation kinetics by dilatometry; nucleation and growth rates by optical microscopy.


CHE612 Polymer Science 2
Contact: Four hours of lectures and four hours practical work each week for one semester.
Prerequisite: CHE611.
Syllabus: Molecular weight and its measurement; molecular weight average distributions. Experimental methods of measurement including osmometry, light scattering, ultracentrifugation, viscosity, SEC. Copolymerisation; random block, graft copolymers. Reactivity ratios. Synthetic techniques. Effect on properties.
tional moulding. Materials selection (six hours): Case studies of principles of selection and design of materials for specific applications. Suitable experiments are chosen from the following: Radical copolymerisation and IR analysis. Determination of MW averages by SEC; Reactions of cellulose and derivatives; Determination of network parameter of a vulcanised elastomer; Tensile properties of polymers; Tensile properties of elastomers; Impact behaviour of polymers; Analysis of extruder screw performance (RMIT); Flow characterisation of polymer melts by Melt Flow Index and Brabender Extrusiograph (RMIT); Brookfield viscometer.


CHE613  Polymer Science 3

Contact: Four hours of lectures and four hours of practical work per week for one semester.

Syllabus: Physical methods of polymer andadditive analysis (six hours): Use of XRD for identification of polymers and fillers and determination of degree of crystallinity. Thermal analytical methods DSC, DTA, TG, TMA. Dynamic methods DMA. Chemical analysis of polymers and additives (six hours): Chemical reactions of polymers. IR and NMR analysis. Chromatographic methods GLC, HPLC, head space analysis by GC, pyrolysis GC. Surface properties (six hours): Friction and abrasion. Lubrication. Thermal and electrical properties. Optical properties. Chemical resistance. Thermal and photooxidation (six hours): Thermal, photolytic, mechanical, radiative and oxidative degradation. Biological and environmental effects. Degradation products. Polymer stabilisation (six hours): Heat stabilizers, light absorbers, metal deactivators. Stabilisation methods during manufacture and use. Compounding and additives (six hours): Formulation principles applied to elastomers, thermosets, thermoplastics, cellular polymers, surface coatings, films, sheet, pipes. Mixing, calandering. Elective units (six hours): Three units are chosen from the list of elective units on the basis of availability and demand. Adhesives, surface coatings and vulcanised rubber have been popular units in the past. Suitable experiments are chosen from the following: Determination of crystallinity in various PE grades by XRD; Identification of fillers by XRD; DSC studies of semicrystalline polymers (if available); Sequence distribution in PMMA by NMR spectroscopy; IR studies on polystyrene; Analysis of PVC additives; Antioxidant analysis by HPLC; Qualitative analysis of unknown polymers; Analysis of vulcanised rubbers; Accelerated degradation studies.


CHE614  Polymer Science 4

Contact: Four hours of lectures and tutorials and four hours of practical work per week for one semester.

Syllabus: Students will select six units from the list of elective units. The units presented will depend on availability and demand. These will generally be presented by experts from industry. Alternative study programs originating outside the Department of Chemistry and Biology which may be approved could include selected topics from the following Graduate Diplomas: Digital Communications, Robotics, Business Technology, Communication and Information Studies, Digital Communication, Marketing and Project Management, depending on availability. Students use all of their laboratory time undertaking a project on a topic related to their employment. The project focuses on the relevant principles of polymer science discussed throughout the course to a point where the employer will benefit from both the nature of the project and the development of their employees.

CHE630  Aquatic Systems 1

Contact: Four hours per week for one semester.


CHE631  Supporting Concepts 1

Contact: Two hours per week for one semester.

Syllabus: Unit 1: Social Issues. Methodological and ethical issues for the social scientist engaged in measuring
public opinion and perceptions of environmental questions; data collection and analysis for social surveys; value judgements and their place in decision making; resolution of conflict. Group processes; interest and pressure groups, mass meetings, social movements. Relations between social institutions: political system (legislative and administrative bodies at local, state and national levels); legal system (courts, tribunals and judiciary boards); industrial system (exploitative use of the environment). Unit 2: Mathematical Principles. Basic statistical concepts: probability, sample measures, sampling distributions, fitting of distributions to empirical data; estimation and hypothesis testing; analysis of variance; design of experiments: replication, randomisation, experimental error, precision and efficiency; linear regression analysis and correlation; intuitive approach to step-wise multiple regression procedure and use of pre-written computer solution. Unit 3: Basic Hydrology and Geology. Geology: basic mineralogy; weathering; petrology: igneous, sedimentary and metamorphic rocks; sediments: grain size analysis, transportation, erosion and deposition processes, sedimentary environments; geological maps, interpretation of aerial photographs. Hydrology: hydrologic cycle; hydrologic and geomorphic processes association, stream and valley formation; weather and climate; evaporation and transpiration, runoff; streamflow volume, temporal variation, hydrograph separation, unit hydrograph, models; streamflow routing; channel storage, reservoir routing, derivation of basin outflow; frequency and duration of hydrological phenomena; groundwater. Unit 1: SCHUMACHER, Small is Beautiful, Abacus, London, 1984.


Unit 3: CLARK, I.F. & COOK, B.J. (Eds.), Perspectives of the Earth, Australian Academy of Science, 1983.


CHE632 Supporting Concepts 2

Contact: One hour per week for one semester. Syllabus: Unit 1: Modelling of Aquatic Systems. Prerequisite: CHE631. Introduction to modelling; equations of motion: 1D and 2D approximations; analytical solutions; conservation equations for heat and salinity; stratified flow; numerical methods - use of computer packages for lake, river and estuarine systems; case studies. Unit 2: Coastal Geomorphology. Coastal and sea evolution: changes in sea level, emerging and submerging shorelines; cliffed coasts; beaches, spits and barriers, coastal dunes; estuaries and lagoons; deltas; classification of coastal landforms; effects of man on stability of the coastal zone. Unit 1: THOMANN, R.V., Systems Analysis and Water Quality Management, McGraw-Hill, NY, 1974.


CHE633 Aquatic Systems 2A


Australian Journal of Marine and Freshwater Research, CSIRO, melbourne.


CHE634 Aquatic Systems 2B

Contact: Four hours per week for one semester. Prerequisite: CHE630. Syllabus: Unit 1: Freshwater biology (20 hours). Biota of lakes, plankton, nekton, benthos, seasonal changes in lake communities, factors controlling lake communities. The biota of streams, stream benthos, factors controlling stream benthos, adaptations of benthic organisms, longitudinal changes in stream communities. Unit 2: Marine Biology (20 hours). Biota of estuaries, plankton, benthos, influence of physical and chemical factors of estuarine communities. Marine plankton, factors controlling marine plankton, marine benthos, littoral communities, influence
of physical and chemical factors of littoral communities.


CHE635 Pollution Ecology
Contact: Three hours per week for one semester.
Syllabus: Sources and types of pollutants; pollution as a stressor of aquatic communities: impact of inert pollutants, short and long-lived toxicants, biostimulants and heat; community response as an indicator of pollution; indicator species methods, diversity methods, community structure and function methods; biological monitoring programs: ambient monitoring, effluent monitoring, toxicity testing, continuous methods.

CHE636 Pollution Control Technology
Contact: Three hours per week for one semester.
Syllabus: Unit processes for water and wastewater treatment: physical, chemical and biological processes; advanced wastewater treatment: packaged treatment plants, phosphorus and nitrogen removal, water reclamation, Lake Tahoe, Winhoeck; process modification: case studies of process modifications to reduce or remove an effluent problem; public health and ecological considerations; case studies: design of waste treatment plants for particular wastewaters. Plant visits: MMBW, South Eastern Waste Water Purification Plant, Carrum; CSIRO, Division of Chemical Technology – Waste Water Treatment Research Facility, Lower Plenty.

CIV211 Engineering Surveying
Contact: A course of four hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.
WILSON, R.S.P., Land Surveying, McDonald & Evans, 1971.
CHISHOLM, Exercises in Computations, 1989.

CIV225 Structural Engineering I
Contact: A course of four hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.
CIV324 Geotechnics I

Contact: Five hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.


POTTER, A.W.R. et al., Geology, McDonald & Evans, 1975.
CHISHOLM INSTITUTE OF TECHNOLOGY, Geological Maps and Laboratory Notes, 1989.

CIV325 Structural Engineering II

Contact: Five hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.


CIV326 Water Engineering

Contact: Five hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.


CIV428 Civil Engineering Design

Contact: Five hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.

Syllabus: The students are required to complete at least four engineering designs working individually or as a member of a team. Designs will be selected which require students to use tools such as computers, research papers, library resources and standard codes of practice. The designs include topics selected from public health engineering, structural engineering, geotechnical area, water engineering, highway and municipal engineering, and construction. Typical designs are: design of a structure incorporating use of both structural steel and concrete; the forward planning of a city water reticulation system using packaged programs and including economic analysis; the design of a section of rural highway working to RCA standards; feasibility study for the establishment of a rock quarry including operational schedules and equipment selection. In addition students will be required to participate in a series of design oriented seminars covering such issues as conceptual design, project planning, construction methods and equipment and technological impact.

CIV429 Structural Engineering III

Contact: Three hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.

Syllabus: The design of structural steel members, connections and commercial and industrial structures. Structural steel: materials, properties. Overall design: stability, portal frames, trusses, bracing, purlins. Analysis:


LAY, M.G., Source Book for the Australian Steel Structures Code AS1250.


TRAHAIR, N.S., The Behaviour and Design of Steel Structures, Methuen, Australia, 1977.


CIV 430 Civil Engineering

Contact: Five hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.


NATIONAL ASSOCIATION OF AUSTRALIAN STATE ROAD AUTHORITIES, Various Guides to Practice, NAASRA.

STATE OF VICTORIA, Relevant Local Government, Town Planning and Environmental Acts and Regulations.

CIV 431 Project Management

Contact: Two hours per week for two semesters.
Prerequisites: As prescribed under Progression Though the Course.

Syllabus: Organisation: Types, formal, line, line and staff, matrix, project management matrix. Client's obligations: project brief, finance, site, time frame, budget, government controls, public relations. Project manager's responsibility: defining client's requirements, conceptual design and planning, budgeting and cost control, project organisation. Staff management: authority, responsibility, resources, training, unions. Equipment and techniques in civil engineering projects. Construction techniques used for building, bridges, mineral access, offshore and underground.


CIV 432 Geotechnics II

Contact: Two hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.


**CIV608 Computer Application II (Project)**

An industrially based project involving an application relevant to finite element analysis.

**CIV610 Road and Traffic Engineering**

Contact: Three hours per week for two semesters.
Prerequisites: Nil.

Syllabus: Road planning; principles, road classification and hierarchy, layout of roads, relationship with other modes of transport, and with land use, access control. Road design: standards, economic, environmental and safety considerations, procedures and practices including computer applications. Traffic management: traffic characteristics and surveys, accident studies, signing and marking, intersection treatment, street lighting, parking, bicycles, pedestrians, local area traffic management. Road construction: pre-construction activities, plant and equipment, site preparation and clearing, drainage, earthworks, flexible and rigid pavements, stabilisation, bituminous surfacing, quality and cost control. Road maintenance: principles and practices, pavement management systems, street cleaning, maintenance of medians, verges, footpaths and bicycle paths.


NAASRA, Various guides and manuals to be specified.

ROADS CORPORATION, Various publications to be specified.


**CIV611 Local Government Management**

Contact: Two hours per week for one semester
Prerequisites: Nil.


CIV612 Legislation and Its Application
Contact: Three hours per week for three semesters
Prerequisites: Nil.
Syllabus: A review of the Local Government Act, and a detailed study of those parts of it that relate directly to the work of the Municipal Engineer. Consideration of the relevant parts of town planning, environment, traffic, transport, building, water supply, health and other Acts and regulations that relate to the work of the Municipal Engineer.
Other relevant Acts and regulations to be specified.

CIV613 Statutory Planning
Contact: Three hours per week for one semester.
Prerequisites: Nil.
Syllabus: Planning authorities: State, regional, local, role, organisation, responsibilities. Principles and practice of urban and regional planning: development, basic surveys,zonings, reservations, open space, recreational facilities, land use — transport interaction, hierarchy of roads, provision for parking. Planning schemes: preparation, amendment, ordinances, appeals procedures. Study of selected existing planning schemes in urban and rural areas. The role of the Municipal Engineer in statutory planning.
MINISTRY FOR PLANNING AND ENVIRONMENT, Relevant Guidelines and Instructions. Selected Planning Scheme Documents to be specified.

CIV614 Strategic Planning
Contact: Two hours per week for one semester.
Prerequisites: Nil.

CIV615 Environmental Engineering
Contact: Three hours per week for one semester.
Prerequisites: Nil.
DEPARTMENT OF ENVIRONMENT, (UK), Calculation of Road Traffic Noise, 1975.

CIV616 Advanced Management
Contact: Three hours per week for one semester.
Prerequisites: Nil.

CIV617 Management Studies or Management Oriented Project
Contact: Two hours per week for two semesters.
Prerequisites: Nil.
Syllabus: Students may undertake studies in various aspects of management to be selected from existing Graduate Diploma subjects in areas such as computing, information technology, banking and finance, business technology and project management. Alternatively, they may undertake a substantial project which is directly related to some aspects of local government management. The project topic will require the specific approval of the Head of the Department in each case.

COM170 Communications Skills
Contact: Two hours per week of lectures, tutorials and workshops for one semester.
Prerequisite: Nil.
Syllabus: Structure of the English language: Grammar, spelling rules and punctuation; sentences, passages and style; argumentation. Reading and Listening: Reading speed, listening, cues; comprehension, interpretation; note taking. Writing skills: Summaries and precis, reports, essays. Speech: Confidence; reporting, public speaking, interviews, non-verbal communication.
Assessment: Class exercises, presentations and written reports.
C0T113  Computer Technology 1

Contact: Four hours per week for one semester.
Prerequisite: Nil.
Syllabus: Computer equipment: history of computing; major components; CPU architecture; data representation; the role of the operating system; assembly level programming; peripheral devices; communications devices. File organisation and storage: secondary storage devices; serial and sequential files; random and relative files; indexed files.

C0T114  Computer Technology 2

Contact: Four hours per week for one semester.
Prerequisites: C0T113, SFT111.
Syllabus: Basic operating system concepts: files and directories; access control and security; resource allocation; range of operating system functions; multi-programming interrupt handling; timesharing. Operating system syntax: in a variety of operating systems, e.g. Unix, MS-DOS, PRIMOS, AOS; command syntax; macros. Advanced operating system concepts: concurrent programming; file control subsystems; access to shared data, locks, semaphores; cooperating concurrent processes; scheduling schemes; memory management.
Manufacturers’ reference manuals as indicated.

C0T131  Computer Studies 1

Contact: Four hours per week for one semester
Prerequisite: Nil.
Syllabus: Development of a conceptual model of a computer system. Mode of operation of a computer; number systems; computer arithmetic; data representation and coding formats. Modes of processing. Relationships between hardware and software. Operating systems and common utilities. The management of data. Data storage and access techniques. Data retrieval using a data base query language. Decision making concepts and the software support techniques.
CHISHOLM INSTITUTE OF TECHNOLOGY, C0T131 Lecture Notes and Exercises.

C0T213  Computer Technology 3

Contact: Four hours per week for one semester.
Prerequisite: C0T114.
Syllabus: Structures and techniques underlying database: file organisations, data structures, index structures.

C0T214  Computer Technology 4

Contact: Four hours per week for one semester.
Prerequisite: C0T213.
Syllabus: CODASYL DBMS concepts. Physical database design: conversion of logical data model to physical database design, indexing, clustering, hashing. Design considerations, for relational DBMS implementation, for CODASYL DBMS implementation. CODASYL DBMS implementation Data Definition Language, Data Manipulation Language, Database Query Language. Database end user facilities: query languages, query by example, natural language. Database administration and utilities to support this function. Data dictionary, directory systems. Distributed database. Trends in database architecture and standardisation.

C0T290  Information Storage and Retrieval

Contact: Four hours per week for one semester.
Prerequisite: PHY130.
Syllabus: Information explosion; information requirements and sources; information management; the composite office document (data, image and video); storage techniques; structured and non-structured information; digital and non-digital forms; indexing techniques; retrieval strategies, retrieval evaluation and refinement; strategies for archiving information; information services available; future trends, storage technologies, software developments, expert systems, information services.
Assessment: Examination and assignments.

C0T313  Computer Technology 5

Contact: Four hours per week for one semester.
Prerequisite: C0T214.
Syllabus: Data communications concepts and facilities: Remote I/O devices and networks; Data communication codes; Data communications hardware; Telephone and Telex networks; Packet-switched networks; Digital data networks; Local area networks; Protocols and Open
System Interconnection; Australian telecommunications facilities. Types of systems: centralised, de-centralised and distributed. Processing distribution, data distribution, horizontal, hierarchical, advantages and disadvantages. Network architectures and layered protocols. The move to Open Systems Interconnection; ISO initiatives and manufacturers products. Response time in real-time and/or distributed systems: factors influencing response time. Components of response time. Introductory queuing theory: Using the results of classical queuing theory to examine the ability of systems to react to uniform and peak loads. The dynamic nature of (real-time) distributed systems. The need for transaction logging and fall-back procedures for the entire range of possible failures, hardware software, overload etc. Some typical distributed systems, and their complexity with respect to the need for real-time file updating. Implementing the Data Model in distributed systems. Partitioning and replication theories. Analysing the data model for distributing purposes. Reliability, security, recovery and testing in a distributed environment.


COT332 Computer Studies 6
Contact: Hours per week for one semester
Prerequisites: COT214.
Syllabus: Graphics: introduction to computer graphics, graphics primitives, interactive computer graphics, coordinate systems and menus, graphics transforms, computer animation, microcomputer graphics hardware, graphics languages, graphics packages, solid modelling techniques. Contemporary developments: A selection of contemporary developments in hardware and software.


COT423 Information Storage and Retrieval
Contact: Hours per week for one semester
Prerequisite: Nil.
Syllabus: The database concept, data modelling and normalisation, relational database/relational algebra and calculus, introduction to an SQL DBMS syntax for database implementation, retrieval commands, CODASYL concepts, CODASYL DDL and DML, comparison of CODASYL and SQL, developments in database architecture.


Relevant research papers and manuals.

COT430 Information Storage and Retrieval
Contact: Four hours per week for one semester.
Prerequisite: COT423.
Syllabus: M-machine dialog, BCS, query language recommendations, Use of VISTA query languages; natural language query systems—on-line English; deductive database systems; storage and retrieval of text; parsing and indexing techniques; commercial document retrieval systems: Dialog, Austnet, Lexis etc; videotex database systems; commercial videotex systems: Prestel, Telidol; standards of videotex systems; image database systems; stage and retrieval for office automation.
MARTIN, J., Application Development Without Programmers, Savant Institute, 1981.
WINSTON, P.H., Artificial Intelligence.
Selected reference manuals and research papers.

COT431 Information Storage and Retrieval
Contact: Four hours for one semester.
Prerequisite: COT423.
Syllabus: Data Dictionary/directory concepts, Typical facilities and features provided in DD/DS, BCS recommendations for DD/DS, Study of commercial dictionaries and how these products are being used. Different approaches and tools for the database design process DBDA, automated database design DBPOTYPEII, Design and optimisation of physical storage structures: hashing, indexing and other organisations; Database administration, roles and responsibilities, data administration.
CLARK, J.D., Data Base Selection, Design and Administration, Praeger, 1980.
MARTIN, J., Managing the Database Environment, Savant Institute, 1981.
ROSS, R.G., Data Dictionaries and Data Administration, AMACOM, 1978.
Selected reference manuals and research papers.

COT435 Distributed Systems
Contact: Four hours per week for one semester.
Prerequisite: Nil.

COT439 Distributed Systems
Contact: Four hours of class contact per week for one semester.
Prerequisite: COT435.
Syllabus: Networks and their characteristics: long-haul networks, local area networks, integrated voice and data networks. Layered protocols. Design choices: distributed analysis of events, volumes, locations, response times; candidates for real-time and batch development; partitioning the data model and the processing, design calculations, hardware considerations, common carrier offerings, network software, file and database design, security and recovery. Implementation: Testing a distributed system, control and coordination, performance data collection and analysis, the Communications Manager.
BLACK, D., Data Communications Networks and Distributed Processing, Reston, 1983.
MARTIN, J., Computer Networks and Distributed Processing.

COT443 Information Storage and Retrieval
Contact: Four hours per week for one semester.
Prerequisites: COT431 and COT435.
Syllabus: Database Integrity: integrity control mechanisms, types of integrity constraints; data models and integrity. Database Concurrency: Locking mechanisms and timestamping. Database recovery and restart, transactions and types of failures, undo and redo logic. Database


COT519 Advanced Computer Communications

Prerequisites: COT435 from the Graduate Diploma in Information Technology, RDT605 from the Graduate Diploma in Digital Communications or equivalent.

Syllabus: Review of the classes of problems to be solved in computer communications: establishment and release of links, synchronisation, addressing, error control, encryption, flow control and congestion avoidance, routing and multiplexing. The principle of layered structuring of communications functions. Protocols as mechanisms for communication within layers. Examples of protocol mechanisms for solving the above problems. Formal models for specifying and verifying communication protocols. The theoretical model of the ISO Reference Model. The functions of the layers within the ISO Reference Model. Examples of some protocols implementing layers within the ISO Reference Model. Examination of some alternative structures for communications systems, e.g. local area networks, proprietary network architectures, SWIFT. Review of the problems involved in network design, i.e. achieving required levels of performance, achieving desired levels of reliability and minimising cost. Topological methods for deciding on the placement of concentrators or switching nodes. Methods for assessing the vulnerability of networks to failures and for evaluating the most effective ways of adding redundancy to improve reliability. Methods of assessing throughput and delay characteristics of networks by means of analytic queuing theory and simulation.

COT520 Distributed Processing

Prerequisites: COT435 and COT423 from the Graduate Diploma in Information Technology. RDT605 and COT611 from the Graduate Diploma in Digital Communications or equivalent.

Syllabus: The range of system configurations for distributed systems, e.g., tightly coupled multiprocessors, shared memory-loosely coupled systems, systems linked by high bandwidth connections and by low bandwidth connections. Issues involved in shared memory systems, e.g., mutual exclusion and synchronisation. Specific mechanisms such as semaphores and monitors. Communication in non-shared memory systems, e.g., message passing and remote procedure calling mechanisms. Languages which support concurrent processing, e.g., Ada. Issues in distributed operating systems, e.g., naming, error control, resource management, security and deadlock control. Issues in distributed data bases, e.g., concurrency control and methods of synchronization. Methods of developing software for the distributed environment. Role of the host and its relationship to issues such as auditability. Criteria for assessing the degree of distribution suitable for an application. Methods for partitioning databases and applications software. Methods for the detailed analysis and design of distributed systems. The operation aspects of distributed systems. Case studies of distributed systems.

COT610 Graphics Data Base Structures

Contact: Three hours per week for seven weeks.

Prerequisite: Normal progress through the Computer Graphics Graduate Diploma.

Syllabus: Aims and objectives of data base technology, data independence, storage, security, integrity. Data models, network, hierarchical, inverted list. Structure and normalisation of data. Linked lists for graphics, applications to system and user defined primitives. Data base organisation to represent images. Primitive graphic attributes, line style, width, colour. Character attributes, font, size, orientation, spacing, sheur, trend, quality. Segments and segment attributes, retained and non-retained segments, visibility, highlighting, detectability, transformation. Symbol tables and instance parameters. Comparisons of some commonly used graphics data structures. Storage and access methods, entry point access methods, hashing, indexing, bit maps, navigational access methods, cord rings, pointer arrays.

Assessment: Class test, assignments.


COT615 Systems Selection and Procurement

Contact: Two hours per week for one semester.

Prerequisite: RDT651, or equivalent knowledge.

Corequisites: RDT652, or equivalent knowledge.

Aim: This unit is for those concerned with the management of computer installations. It covers the process of selecting and purchasing a computer system with a significant communications component.


COT617 Computer Operations Management

Contact: Two hours per week for one semester.

Prerequisite: RDT651, or equivalent knowledge.

Corequisite: RDT652, or equivalent knowledge.

Aim: This unit is for those concerned with the management of computer installations. The purpose is to give students a thorough grounding in the process of managing
a computer system with a significant communications component.


COT619 Database Systems
Contact: Two hours per week for one semester.
Prerequisite: RDT651, or equivalent knowledge. Corequisite: RDT652, or equivalent knowledge.
Syllabus: The functions of a database system; the role of data and database systems in communications-based computer systems; typical models for data structures; examples of database management systems; data dictionaries; database administration issues.

COT620 Computer Systems
Contact: Four hours per week for one semester.
Prerequisite: Nil.
Syllabus: Microcomputer hardware and software: CPU operations, peripherals, CPUs and support chips, microcomputer operating systems (CP/M and MS-DOS), Common software: word processors, spreadsheets, graphics etc. Computer Architecture: Von Neumann machines, microprogramming multiple CPU systems, distributed systems, new architectures. Fifth generation machines. Electronic Office concepts: the office environment, technology; word processing, communications networks, applications, implementation, management workstations, management issues.
GALITZ, W., Human Factors in Office Automation, LOMA, 1980.
Manufacturer's Manuals.
Related journals, research papers and conference proceedings.

COT640 Computer Programming
Contact: One hour per week for two semesters.
Prerequisites: Nil.
Syllabus: Introduction to Programming: Problem definition and solution using algorithms defined by logic diagrams such as flowcharts, structure diagrams and decision tables; the benefits of modular and structured programming methods. Programming Techniques: the need for adequate program documentation and techniques to achieve this; "forced self-documentation" possibilities; introduction to secondary storage data structures and file processing; division of a program into logically separate and hierarchically structured modules which are either "manager" or "worker" oriented; test data selection use of trace facilities and general debugging techniques. Programming Languages: BASIC, ANSI FORTRAN IV.
Manufacturers' Programming Reference Manuals to be decided.

COT641 Computer Systems
Contact: One hour per week for two semesters.
Prerequisite: Nil.
Syllabus: Operating Systems: definition of operating systems; the evolution from simple, batch orientation through developmental stages to complex batch-streaming and/or multiple-access, on-line orientation; the objectives of a typical modern operating system, its functions and its constituent components; the study of a typical modern operating system job control language; an overview of the facilities offered by a typical modern operating system. Computing Systems: investigation of criteria for selecting of hardware and software. Specification of requirements for purchasing purposes.
Manufacturers’ Operating Systems Reference Manuals.

COT642 Digital Computer Equipment
Contact: A course of lectures and tutorial work of one hour per week.
Syllabus: Microprocessors: hardware and software, interfacing standards and techniques, applications, graphics.

COT664 Case Study
Contact: Four hours per week for 14 weeks.
Prerequisite: SYST51.
Syllabus: The case study will involve a realistic business problem. Students will be required to undertake the analysis, design, documentation and implementation of an appropriate data processing system.
DE MARCO, T., Controlling Software Projects, Yourdon Press, 1982.

COT710 Application Project
Contact: Four hours per week for one semester.
Prerequisite: The completion of at least four subjects in the course.
Syllabus: At the conclusion of this subject students should be able to understand a substantial applied research
project; document the findings of the project; and show an understanding of the relevant technologies used in business.


CHISHOLM INSTITUTE OF TECHNOLOGY – DIVISION OF INFORMATION TECHNOLOGY, The Citation of References, Chisholm Printing Services, 1985.

COT770 Computer Technology I

Contact: Four hours per week for one semester.

Syllabus: Equipment: The major components of computer hardware: The CPU; Secondary storage devices; Input and output units; Number system and code sets. Operating Systems: Historical development of operating systems; The need for, and function of, a typical, modern, multi-user operating system; input-output handling; protection and security; memory management; resource scheduling; range of utilities. Using operating systems: features of standard terminals; command language; single commands and macros; text editors; language processors. Data communications: Remote I/O devices and networks; Codes; Hardware; Telephone networks; Packet-switched networks; Digital data networks; Local area networks; Protocols; Open Systems Interconnection; Australian telecommunications facilities.


REYNOLDS, G.W., Introduction to Business Telecommunications, Merrill, Ohio, USA, 1984.


CHISHOLM INSTITUTE OF TECHNOLOGY, Computer Centre Handbook.

Relevant manufacturer’s manuals.

COT771 Computer Technology II

Contact: Four hours per week for one semester.

Prerequisites: SYS751, COT770.


Relevant manufacturer’s manuals.
COT776  Computer Technology III

Contact: Four hours per week for one semester.
Prerequisites: SFT760, COT777.


Relevant Manufacturer's Manuals.

DES102  Creative Design Studio 2

Contact: One semester, 98 hours.
Prerequisites: DES100

Syllabus: To develop skills in product design evaluation and improvement techniques. To guide students through realistic design projects which require coordination of artistic, technical and design expertise to achieve creative results. Students should become capable of identifying specific quality of design and value criteria; understanding input/output analysis; applying subjective analysis techniques to improve existing products; re-designing technically simple products; planning for and efficiently completing briefs for original design problems which can also serve as learning models for more advanced work in DES300; applying verbal and visual communication skills to support project submissions; further self-development in problem solving skills. Topics: Overview of the field of industrial design (continued); typical consumer products and design opportunities; quality criteria for 'use' and 'esteem' functions; 'use' and 'esteem' values; specific criteria (eg., safety, ergonomics, aesthetics, technical parameters, etc.); product design analysis and value analysis (introductory); design comparison and re-design exercises. Further studies on design methodology; practice in design processes/operations including problem formulation and information search; generation of ideas, evaluation and detailed design and presentation of selected concepts (expressed through appropriate sketches, scale drawings and mock-ups/elementary models). The holistic approach to solving design problems will stress original interpretations of common materials and standard manufacturing processes. Creative design exercises (learning models) will include at least one design project undertaken on a group basis for a nominated client located in the social design (non-profit making) area. Design reports and portfolios to conform to specified formats and standards of quality.
Assessment: Design assignments and projects: 60 per cent
Design tests: 40 per cent


DES110 Principles of Design and Drawing 1

Contact: One semester, 42 hours.
Prerequisites: Course entrance requirements apply.
Syllabus: To introduce the basic drawing techniques required to generate design concepts and to develop the principles of two and three dimensional design. Students should become capable of competence in handling a variety of basic drawing mediums and equipment; an understanding of freehand sketching and the ability to compose subject matter in a presentable format for communicating to others; analysing design problems and representing visual ideas clearly for studio projects; interrelating principles of design including aesthetic and visual factors; utilising design elements including line, shape, mass, space, texture and colour; developing an understanding of basic geometry, perspective, linework, light sources, grids, textured surfaces and shading; understanding the terminology and convention skills in the presentation of drawings; emphasising presentation, precision and cleanliness in drawing in addition to creative design values. Topics: Introduction to the elements and principles of design; two and three dimensional fields and space frames, spatial forces, colour theory and three dimensional modelling of geometric and organic forms. Overview of drawing methods and mediums; presentation of examples relating to the work being undertaken by students in the studio. Areas to be covered in the studio include: Freehand drawing; life drawing; nature drawing; memory drawing; geometric drawing — with emphasis placed on balance, rhythm, proportion, harmony, unity, movement and dominance. Presentation of new methods for enhancing drawings by introducing line work, freehand perspective, shading, light source, and texture.

Assessment: Progressive evaluation with assessment of folio at the end of semester: 100 per cent


DES112 Principles of Design and Drawing 2

Contact: One semester, 42 hours.
Prerequisites: DES110
Syllabus: To further enhance drawing abilities, by introducing the more formal, technical expertise required to develop finished artwork. Students should become capable of introducing one, two and three point freehand perspective and procedures of orthographic projection using scaled drawings (product, architectural and organic) on layouts and renderings; introducing colour to drawings with due regard to true tones, intensity, chroma, light source and using the mediums Gouache, Watercolour, Inks, Marker Pens, relating these aspects to particular paper types required for their application; correct mounting techniques required for the varying drawing mediums; improving presentation and composition; knowing which of those mediums are best suited to product applications.
Topics: Slide presentation with discussions of different techniques and situations where these are best used. Demonstrations and student practice of rendering in the following mediums: pencils, watercolour wash, poster colour, marker pen, air-brush, pastel and other graphic materials. Class exercises based on combining rendering techniques with the most suitable views and features to be illustrated (highlights, reflections, etc.) At least one 'client' project from DES102 to be undertaken incorporating the best methods suitable for presenting that concept.

Assessment: Progressive evaluation with assessment of folio at the end of semester: 100 per cent


DES120 Design Communications 1

Contact: One semester, 56 hours.
Prerequisites: Course entrance requirements apply.
Syllabus: To establish the principles of formal drawing communications through descriptive geometry and technical drawing methods. To provide an introduction to the dimensional analysis of product designs. Students should become capable of interpreting the geometrical characteristics of product forms in the context of descriptive geometry; modelling design concepts by means of technical drawings; undertaking dimensional analyses of simple product assemblies. Perceptions of design and design, modelled properties, the receiver, drawing codes and techniques; types of drawings; principles of plane and solid geometry. Formal drawing to the AS1100 series of Standards; orthographic projection (first and third angle); exercises in orthographic projection; production of technical drawings of design concepts. Pictorial drawings including isometric and oblique parallel projection; planometric and dimetric views; introduction to constructed perspective drawings. Introduction to design analyses (geometrical); principles of interchangeability and standardization; tolerances, allowances, limits and fits to suit different func-
tional requirements; selective assembly; inspection and gauging principles; dimensional analysis of length dimensions; practice in preparing working drawings (detail and assembly) of product designs.

Assessment: Drawing assignments: 70 per cent Set problems and tests: 30 per cent


DES122 Design Communications 2

Contact: One semester, 56 hours.

Prerequisites: DES120

Syllabus: To study the geometry of the development and intersections of solids through the medium of drawing. To continue studies in the dimensional analysis of product design elements and assemblies. To enhance technical drawing skills through practice in support of design project work. Students should become capable of understanding and applying geometrical techniques relevant to the development and intersections of solids for a variety of cases; preparing finished drawings of these intersections; carrying out dimensional analyses of complex geometrical forms such as cones, keyways, screw threads, splines, sprockets and simple gears; more advanced work in the dimensional analysis of product assemblies; preparing high quality finished technical drawings in support of design project work. Topics: Development of prisms and pyramids; lines of intersection - cylinders and cones; development of cylinders, T pieces and Y pieces; development of oblique cylindrical connectors; development of cones; practice in three-dimensional interpenetrations in card and plastics; development of three-dimensional product forms. Dimensional analysis of complex forms including SAA and ISO specifications for cones, keyways, UNC and ISO screw thread forms; geometrical analysis of sprockets, splines and gears; further work on the tolerancing of length dimensions in product assemblies. Further work in producing technical drawings for product design details and assemblies; principles of drawing classification and control; practice in drawing reproduction methods.

Assessment: Drawing assignments: 70 per cent Set problems and tests: 30 per cent


DES130 Technological Design Principles 1 (Mechanics)

Contact: One semester, 28 hours.

Prerequisites: Course entrance requirements.

Syllabus: To develop an appreciation of structural form and a basic understanding of effects of force on structures. To appreciate the contributions of engineering designers to the product design process. Students should become capable of understanding significant aspects of applied mechanics/theory of structures as relevant to product design; applying simple stress analysis techniques to component design and performing routine calculations of stresses and deflections in typical product (machine) elements; applying analytical techniques to design problems as a basis for communicating with engineering designers. Structural form: beams, trusses, plates, shells, membranes, pressure vessels. Motion: displacement, velocity, acceleration, rectilinear and curvilinear motion, Newtons Laws. Force: relation to motion and acceleration, free body diagrams, resultant, reactions, components, equilibrium equations. Stability of Solid Objects: centre of gravity, moment of force, overturning and restoring moments. Friction: coefficient and angle of friction, inclined planes. Forces in simple beams and trusses: axial, bending, shear and torsion; relationship to load. Theories of Failure: failure modes, factor of safety, load factor, consequence of failure, fatigue.

Assessment: Problems and assignments: 50 per cent Class tests: 50 per cent


DES132 Technological Design Principles 2 (Electronics)

Contact: One semester, 28 hours.

Prerequisites: DES130

Syllabus: To review the range of current electrical and electronic products and to develop a working knowledge of basic electrical theory and its application to typical design problems. Students should become capable of gaining an appreciation of the breadth of application of electrical systems in modern products; utilizing a basic working knowledge of electricity, fields and electrical circuits; gaining an appreciation of the potential hazards associated with electricity; utilizing electrical knowledge to broaden their ability in handling design projects. Topics: Survey the various voltage levels and frequency ranges in which electricity is used in a variety of current electrical products. Nature and sources of electricity. Electrical units - voltage, current, frequency, power, energy and their measurement. Circuit analysis with resistive, capacitive and inductive components for dc and ac circuits. Introduction to electric and magnetic fields and their utilization. Introduction to electronic passive and active devices. Electrical safety and regulations. Equipment rating, current and voltage limitations.

Assessment: Course work: 50 per cent Class tests: 50 per cent


DES140  Ergonomics for Designers

Contact: One semester, 28 hours
Prerequisites: Course entrance requirements apply.

Syllabus: To study ergonomic variables and criteria in terms of their application to design situations. To demonstrate how to locate, select and validate anthropometric data in support of product design. Students should become capable of developing a theoretical and working knowledge of ergonomics in design; sourcing and applying anthropometric data as required in specific projects; compiling appropriate data files on ergonomic and anthropometric case studies and design projects. Topics: Biomechanics: anatomy and structure of the human body for adults and children; classification of perceptual motor skills; characteristics of body movements and the application of forces; sources of stress and fatigue, vigilance decrement effects; posture and anatomy variables in the design of objects and workplaces; static and dynamic effects; interactions between people, systems, colour, thermal conditions, noise, lighting and other environment factors. Decision making: factors to be considered when designing for human intervention and decision-making; psychological considerations in training and selecting human operators for task situations; elements of task analysis.

Safety requirements: legal, ethical and economic considerations in designing safe products and environments; Australian and international standards; occupational health and safety Acts, environmental protection legislation, overview of product liability considerations.

Assessment: Progress assessment of assignments: 60 per cent End-of-semester test: 40 per cent


DES142  Design Presentation and Marketing

Contact: One semester, 28 hours.
Prerequisites: DES140
Syllabus: To promote an understanding of methods of information transfer and to develop skills in organising and conducting professional presentations.

Students should become capable of setting their personal objectives and providing a structure that is relevant for those objectives; planning the presentation so that it meets time constraints; presenting folios and relative material in a manner acceptable to a professional business environment, answering questions competently and evaluating personal performance. Objectives setting, planning and structure: the variation necessary for different messages. Non-verbal messages and their impact on communication. Understanding audience needs; tailoring the material to the audience. Personal presentation relating the impact of dress, diction and speaking style on the audience. Some time will need to be devoted to the theoretical information; however, this is essentially a skills course, therefore skills associated with successful presentation can only be learned through practice, then feedback, followed by further practice. Students will spend most of the time in this course in practical sessions, i.e., actually speaking about and presenting folios of their work done in DES100 and DES102. Video recordings will be taken of student presentations, providing a tangible record of progress during the semester. The students will record in a diary those areas in which deficiencies are noted, and the degree of improvement required. At the end of the semester students will be assessed on how much their presentation techniques have improved.

Assessment: Two presentations: 80 per cent critique; 20 per cent

DES150  Culture, Creativity and Critique 1

Contact: One semester, 42 hours.
Prerequisites: Course entrance requirements apply.
Syllabus: To develop an understanding of what is meant by Culture, what is meant by Creativity, and what is meant by Critique for the purposes of a five semester study addressing theoretical issues of relevance to the creative designer in contemporary society. To undertake a variety of projects designed to elucidate the terms Culture, Creativity, Critique and Design, and to provide opportunities for discourse involving the use of these terms. Students should have become comfortable with the use of the terms and be aware of their interrelationship, i.e., of how a given culture is defined by the creativity of its constitutents and the roles that design and critique play in the quality of life enjoyed in that culture; have experienced -- through research tasks, debate, written analyses and other appropriate means -- the application of these terms in situations which describe, compare and define the status of design in a given place at a given time. Topics: Selected class exercises leading to definition of terms; application of terms independently within case study situations; application of terms in conjunction with each other; use of terms in comparative situations, e.g., cross-cultural analysis; practice in the use of terms by critical analysis of selected design products and projects, films, videos, readings pertaining to the aims of the subject; participation in selected field trips and cultural experiences proposed for their relevance to the aims of the subject.

Assessment: Progressive assessment of assignments and projects: 100 per cent

Selected materials to be distributed and selected references to be advised as appropriate.

DES152  Culture, Creativity and Critique 2

Contact: One semester, 42 hours.
Prerequisites: DES150
Syllabus: To introduce aspects of history of design by the study of creativity and innovation within selected pre-industrial (i.e., Industrial Revolution) cultures, in Aboriginal culture, and in colonial Australian culture. To contrast creative design achievements subject to the necessities of improvisation and resourcefulness and constrained by difficulties such as religious or cultural taboos, geographical isolation, lack of materials, resources, etc., with the dynamism of high technological advancement in contemporary society. To introduce 'slices' of design history
related to the impact of the distribution and use of particular materials in selected pre-industrial cultures, eg., stone, clay, metal, wood, glass, etc. Students should have developed the ability to comprehend and understand the dimensions and limitations of creativity within selected pre-industrial societies; have begun to develop a critical/comparative perspective on the dynamism of invention, innovation and high technological advancement in contemporary society, and the role of creative design within it, by virtue of comparison with pre-industrial cultural conditions; have researched in considerable depth, and reported on, one particular 'slice' of pre-industrial design history by focusing on the creative use of one naturally occurring material in one specific culture. Topics: A series of introductory lectures will focus on exceptional design and production in architectural elements, furniture, jewellery and costume, tools and weapons, vessels and utensils, mechanical devices, vehicles, etc., in selected pre-industrial cultures. Contemporary methods of critical analysis will be applied throughout - developing notions of form, function and aesthetic excellence. Further lectures will concentrate on the parameters of creative achievement within selected cultures - and the conditions which impose such parameters. Individual research topics, selected by each student according to his/her particular interests and project work within Creative Design Studio 2 will be used for investigation of the creative design use of a particular naturally occurring material within a specific culture. Research will be used to define the limitations to creativity and production experienced within a certain culture and describe how invention and innovative design conceptualization has extended these parameters. Results of this research to be presented in seminars so that findings may be shared and debated.

Assessment: Assignment based on lectures: 50 per cent Research project/seminar paper: 50 per cent

DES160 Materials and Manufacturing Technology I

Contact: 1 semester, 42 hours
Prerequisites: Course entrance requirements apply.
Syllabus: To develop knowledge of the atomic, molecular and morphological structure of important materials; to acquire an understanding of the physical properties of materials and their fundamental structure. Students should become capable of understanding basic atomic and molecular concepts and applying these to differentiate between the structures of metals, polymers, glasses and clay based ceramics; understanding the concept of crystallinity, chain structures, and explaining simple properties in such terms; understanding the cell structure of timbers and particulate structure of ceramics and concrete; explaining concepts such as strength, shrinkage and porosity in terms of morphological structure; identifying different causes of failure (fatigue, creep, brittle fracture) and ways to minimize them; studies of corrosion, weathering, chemical, environmental and biological attack, and ways to minimize them. Topics: Atomic structure - the periodic table, atomic size, covalent, ionic and metallic bonding. Crystallinity - body centred cubic and face centred cubic structures. Metals. Phase diagram - copper/nickel, lead/tin, iron/carbon, plain carbon steels and non ferrous metals, alloys of industrial importance. Strengthening mechanisms - work hardening, solid solution strengthening, heat treatment, annealing and normalising. Failure and testing of metals. Polymers - chain structures, thermoplastics, thermostats, glass transition, elastomers. Crystallinity, stress and strain behaviour. Glasses - different types of glasses. Viscosity temperature relationships. Clay based ceramics - chemical and particulate structure. Effects of particle size and distribution on shrinkage and strength. Drying and firing processes. Timber - cell structure, growth, behaviour, anisotropy in strength and shrinkage. Concrete - cement, cement/water reactions, role of aggregates. Paper - types of fibre, fibre processing, effects of orientation.
Assessment: Course work: 50 per cent Tests: 50 per cent


DES162 Materials and Manufacturing Technology 2

Contact: One semester, 42 hours
Prerequisites: DES160
Syllabus: To develop a broad understanding of manufacturing processes suitable for mass production and to gain a feel for the relative merits and areas of application of these processes. Students should become capable of understanding design for mass production methods so as to optimise productivity and component integrity; gaining an understanding of the relevance of the scale of production and the possibilities and economies of alternative processes; acquiring a knowledge of the effect of material substitution. Topics: Casting processes; mechanical forming; hot and cold working; powder metallurgy; welding and allied processes; surface hardening; decorative coatings; machining processes and their economics with regard to cutting performance, and the use of CAM relative to more traditional machining processes; process capability studies and quality control techniques; manufacturing processes for plastics, rubbers and ceramics.
Assessment: Course work: 50 per cent Tests: 50 per cent


DES200 Creative Design Studio 3

Contact: One semester, 98 hours
Prerequisites: DES102
Syllabus: To develop guided scholarship in the theory and practice of product design at an advanced level. To undertake studies of design processes with emphasis on art/ craft production methods and batch type manufacturing system. To provide design experience relevant to market situations which require novel interpretations of materials and technology in order to realise new products. Students should become capable of employing systematic methods in design including qualitative and quantitative techniques.
of analysis evaluation and synthesis; planning design strategies for high quality, limited edition (batch production) products; making professional source contacts; conducting information and market reviews and searches; locating and utilising information on materials and manufacturing processes in the development of new product designs. Topics: Advanced design methods and techniques; form, function and fashion rationales; classifications of Australian and American product designs; further assignments on improving the design of existing products including objective rating methods; extended work on design literacy including features of European and Asian design; quality criteria for limited edition and batch production methods of manufacture; design projects on designing in timber, aluminium, concrete, marble, ceramics and glass, etc.; group projects related to small manufacturers and art-industry firms; advanced project presentation techniques. 

Assessment: Design projects and assignments: 65 per cent Design tests: 35 per cent


DES202  Creative Design Studio 4

Contact: 1 semester, 98 hours.
Prerequisites: DES200

Syllabus: To develop design capabilities to the stage where creative ideas may be validated in social, aesthetic and technical and economic terms. To provide guided and self-directed, project based learning experiences, at an advanced level, aimed at identifying and developing new design opportunities for quality products. Students should become capable of project planning at an advanced level, mindful of the cooperation required from other disciplines; assessing the general characteristics of potential new markets for design; undertaking complex design tasks in both solo and group situations; refining personal creative problem-solving skills; developing productive relationships with industry contacts and design mentors; advancing the quality of personal communications skills. Topics: International industrial design product classifications (IDC) and Australian Standard Industry Code (ASIC); classes and features of contemporary products including appliances, housewares and tools, home electronics and entertainment, lighting, contract and residential furnishings, design for the handicapped, business and medical equipment, industrial equipment and transportation, recreational and sports equipment, etc.; advanced design methodology studies. Design projects employing novel interpretations of materials and technology in areas which include plastics, cold-formed metals, aluminium and zinc die casting, glass technology and art/craft production methods; design experiments to generate high quality products including limited edition prices as personal statements. Learning experiences will include at least one substantial 'real' project supervised by an external 'client' or 'design mentor' (an industry-based professional with design related interests). Mentors will be nominated by academic staff. Project submissions for external clients will normally include folios of conceptual sketches, renderings, technical drawings, technical reports (e.g., files on ergonomic and technical data) and appropriate models/prototypes.

Assessment: Design assignments and projects: 70 per cent Design tests: 30 per cent


DES210  Advanced Drawing Techniques

Contact: One semester, 28 hours.
Prerequisites: DES112

Syllabus: Improve competence and drawing abilities so that a higher level in executing final concept renderings is achieved for presentation. Students should be capable of producing quick concept sketches for client review in different media; appreciating the function of rendering as an important part of the design process; utilising new techniques in presenting renderings to show the product to its fullest advantage. Slide presentations and discussions showing examples from rendering texts on specialised techniques in drawing presentation. Demonstrations and student practice of rendering in the following mediums: Petroleum Based Products, Non-Mixing Media, Coloured Papers, combinations with mediums used in DES112. Experiments with different views and exaggerating shape, tone and perspective. At least one 'client' project from DES200 to be undertaken using the advanced techniques demonstrated.

Assessment: Progressive evaluation with assessment of folio at the end of semester. 100 per cent


DES212  Photographic Techniques

Contact: 1 semester, 28 hours.
Prerequisites: DES200

Syllabus: To introduce photographic skills as a support medium for design recording purposes, and to develop an appreciation of photography as part of the design process. Students should become capable of competently using 35 mm black/white and colour film, for recording two dimensional and three dimensional work in daylight and artificial light; understanding the basic principles of studio photography; developing a basic understanding of practical photography related to the needs of Design. Topics: Introduction to studio photography, including studio set-up, lighting, back-drop, camera settings and the light meter. Areas
to be covered in the studio include: the camera, film types, processing film, printing; darkroom procedures and the results that can be obtained from different films. The types of cameras and films, etc. necessary to take an assignment and be able to complete it satisfactorily.

Assessment: Progressive evaluation with assessment of folio at end of semester: 100 per cent

LANGFORD, M (1983) 35 mm ...adbook, Nelson, Melbourne.

ILFORD Modern Darkroom Technique Black and White, (film suppliers manual).

DES220  Design Communications 3

Contact: One semester, 42 hours.
Prerequisites: DES122
Syllabus: To further develop the theory and practice of technical drawing with emphasis on formal perspective drawing methods. To apply constructed, pictorial drawing communications in support of on-going project work. Students should become capable of understanding the theoretical and practical applications of axonometric and oblique paraline projection methods; constructing complex, exploded views of product design elements; preparing appropriate, constructed perspective drawings in support of on-going design project work. Topics: Revision of multiview and paraline projections including axonometric, oblique and transparaline drawings; architectural paralines including exploded-view paralines; practice in constructing exploded-view drawings. Vocabulary for perspective drawing (station point, centre of vision, field of vision, pyramid of vision, picture frame, picture plane, measuring line, line of sight, ground line, horizon line and vanishing point). Practice in perspective drawing methods including two-point common method, one-point (central) common method, interior two-point common method, one-point magic method, one-point complex perspective and two-point magic method; reflections and shadows. Advanced perspective methods including three-point and spherical perspective techniques; geometrical features in perspective (circle and sphere, rounded forms, helices, arches and vaults, etc).

Assessment: Progressive assessment of assignments: 100 per cent


DES222  Computer Aided Drawing (Studio)

Contact: One semester, 42 hours
Prerequisites: DES200
Syllabus: To provide an introduction to computer systems and software packages as support tools for design projects. Students should become capable of competently using CAD workstations in two dimensional formats concurrently with design projects in DES400; developing an understanding of word processing, Desk Top publishing, spreadsheets and database computing capabilities. Topics: Introduction to specific computer systems, outlining their capabilities and methods of use by designers, including AutoCAD, AutoSketch, Lotus, VP-Planner, MS Word, etc. Demonstrations and student participation in utilizing the capabilities of different systems with the various project requirements.

Assessment: Progressive evaluation with major assessment of studio work at the end of the semester: 100 per cent
Selected references including: AutoCAD Manuals, LOTUS Manuals, VP Planner Manuals, MS Word Manuals.

DES230  Technological Design Principles 3 (Mechanics)

Contact: One semester, 42 hours.
Prerequisites: DES130
Syllabus: To extend a basic knowledge of mechanics so as to be able to predict the deformation of objects due to load. To gain a basic understanding of the properties of fluids at rest and in motion. Students should become capable of understanding the relationship between load and deformation for a range of materials used in manufacturing processes; calculating the deflections of beams and other objects due to load; understanding the principles of motion of linked mechanisms; appreciating the behaviour of fluids at rest and in motion and have a rudimentary understanding of pneumatic and hydraulic systems. Topics: Stress Analysis: tensile and compressive, uniform and non-uniform stress, strain, Hookes Law, modulus of elasticity, Poissons ratio, stresses in thin walled vessels. Bending Stress: stress distribution, bending moments and shear force, second moment of area, prediction of deflections due to bending. Torsion: stress and shear strain, torque, stress and deformation. Linked mechanisms: levers, ratios of force and motion, pulleys, block and tackle, compound linked mechanisms. Fluid mechanics: pressure, variation with depth, pressure and force, suction, pipe friction, force of a jet, pneumatic and hydraulic devices.

Assessment: Problems and assignments: 50 per cent
Class tests: 50 per cent

DES232  Technological Design Principles 4 (Electronics)

Contact: One semester, 42 hours
Prerequisites: DES230
Syllabus: To review the spectrum of electronics applications and develop a basic working knowledge of typical electronic circuits and systems.

Students should become capable of gaining an appreciation of the wide range of applications of electronic systems in modern products; utilizing a basic working knowledge of electronic systems; developing an understanding of the special requirements imposed on the designer by electronic equipment. Topics: The characteristics and frequency range of analogue and digital electronic signals. Semiconductors and electronic components: diodes, thyristors, transistors, and integrated circuits. Circuits and characteristics of typical: analogue electronic circuits - amplifiers, power supplies, integrated circuits,
DES240  3D Modelling and Prototype Development 1

Contact: One semester, 42 hours
Prerequisites: DES102

Syllabus: To promote occupational health requirements and safe working practices relevant to design modelling/manufacturing environments. To further develop cognitive and modelling (perceptual motor) skills appropriate to the construction of models and prototypes which support design concepts. Students should become capable of appreciating the occupational health and safety requirements of design modelling and workshop situations; developing theoretical and practical workshop skills suitable for interpreting a variety of materials including metals, ceramics, glass, plastics, timber and composites; acquiring three-dimensional modelling skills in support of design projects. Topics: Occupational health and safety requirements; safety clothing and apparatus; safety rules; emergency procedures, basic first aid. Characteristics of model-making tools and equipment; basic measuring techniques; use of hand tools and practice in manual operations including squaring, shaping, finishing and painting. Advanced practice with power tools and machines including drilling, turning, sawing, milling and shaping; sheet metal and forming operations; some welding, soldering and brazing and also metal casting and finishing practices. Practical experience in: plaster and clay modelling; glass blowing and moulding; forming clay and slip casting; ceramics production; shaping and casting plastics, including vacuum forming.

Assessment: Progressive assessment of practical assignments: 100 per cent


DES242  3D Modelling and Prototype Development 2

Contact: One semester, 42 hours
Prerequisites: DES240

Syllabus: To further develop design modelling skills through creative model-making assignments. To study cost-effective methods of constructing models and simple prototypes in support of on-going project work. Students should become capable of planning and implementing design modelling techniques to cost-effectively predict and communicate design characteristics of products, objects, environments and phenomena; establishing source contacts in the relevant materials and processes area; knowing how to produce 2D and 3D models and simple prototypes efficiently and to a high standard of quality and aesthetic excellence. Topics: Creative modelling and prototype construction assignments selected from areas such as architecture, interiors, jewellery, contemporary products including limited edition pieces and biomedical instruments - in keeping with concurrent and future project interests; study of related cost estimating and control methods. Considerations: innovative use of alternative materials, recycled parts, found objects and standard components; novel uses of manufacturing processes and fabrication techniques; simulation of all surface finishes, colours and textures; finding new methods and materials to gain effects; working from photo reference, sketches and scale drawings; providing manufacturing sequence sheets and supporting rendered technical drawings.

Assessment: Progressive assessment of assignments and finished models/prototypes: 100 per cent


DES250  Culture, Creativity and Critique 3

Contact: One semester, 42 hours
Prerequisites: DES152

Syllabus: To extend the understanding of creativity within the cultural context - and critical analysis of it - by examining the operation of these concepts in selected aspects of the design history of the modern world and the contemporary era. To introduce aspects of the history of design by the study of creativity and innovation in the post-Industrial Revolution cultures of Europe, the Americas and Asia with an emphasis on facilitating factors such as: global social and economic change; the impact of film, photography, the electronic media and mass communications networks; advances in materials sciences and high technology. Students should achieve an extended understanding of the operation of creativity within given cultural contexts; become conversant with the major design initiatives of post-Industrial Revolution, Modernist and Post-Modern cultures of the later 19th century and 20th century and able to sufficiently understand the rapidly changing world-wide conditions - social, economic, technological - that have determined the parameters of success and the opportunities for the realisation of design excellence through creativity; have knowledge of notable and influential design triumphs of the modern world and an understanding of the specific circumstances of these successes - as well as an ability to engage in appropriate critical analysis of them. Topics: A series of introductory lectures will focus on exceptionally innovative and creative aspects of the design and production of architectural environments, city-scapes and public spaces, costume and jewellery, manufacturer products, vehicles, machinery and high technology items within the cultural contexts experienced in Europe, the Americas and Asia in the latter half of the 19th century and the 20th century - with an emphasis on the past four decades. Individual research topics will be selected by each student according to his/her particular interests and, where possible, related to project work undertaken within Creative Design Studio 3. These topics will investigate a particular design triumph of the modern world, focusing on the
creative initiative within the context in which it has oc-
curred, the reception of the initiative and a critical analysis
of it according to at least one contemporary mode of critical
appraisal; results of this research to be presented in semi-
nars as research papers.

Assessment: Assignment based on lectures: 50 per cent
Research project/seminar paper: 50 per cent

DES252  Culture, Creativity and Critique 4
Contact: One semester, 42 hours
Prerequisites: DES250
Syllabus: To attempt an assessment of some essential
characteristics of Australian culture – with an emphasis on
the present. To focus on levels and types of creative activity
within this culture – particularly as these activities present
opportunities for design. To gain an overview of aspects of
the Australian economy and its constituent elements in-
cluding the roles of the arts, manufacturing, commerce, the
environment (natural and built), tourism and export trade.
To examine the history of design processes in post-colonial
Australia and to focus on achievements. To indicate how
design interacts with the visual arts and other areas of
intellectual expertise to shape the taste and values of the
Australian population. To predict, on the basis of present
indications, likely areas of design opportunity in the next
decade. Students should be conversant with the history of
design in Australia as it presently stands and cognizant of
its major achievements; be sufficiently aware of the char-
acteristics of present-day Australian culture including its
arts, manufactures and commerce – to make predictions of
future design potentialities; be knowledgeable about the
“arts industry” within Australia’s economy and confident
of an ability to contribute creatively to it; be informed about
ways in which Australian design differs from that which
occurs elsewhere – areas of limitation and opportunity;
have studied, in depth, a chosen aspect or historic instance
of the design process in Australia and applied critical
judgement to it; have developed a range of attitudes to
design in the local context based on expert knowledge
gleaned from field trips and visiting speakers. Topics: A
series of introductory lectures will focus on the history of
creativity and innovation within Australian post-colonial
culture – particularly emphasising the role of the arts,
crafts, design, manufacturing and commerce. The lectures
will attempt an overview of particular characteristics of
Australian life and attitudes which shape the parameters
and potentialities of the design process here. A series of
field trips to selected architectural sites, environments,
museums, galleries, studios and manufacturing establish-
ments will be used to develop observational knowledge of
the interaction of public taste, the arts/crafts/design,
manufacturing modes, the workforce and the market place;
critical analysis will be applied.

Assessment: Assignment based on field trip and apply-
ing critical analysis: 50 per cent
Research project/seminar paper: 50 per cent

DES260  Materials and Manufacturing Technology 3 (CAD)
Contact: One semester, 42 hours
Prerequisites: DES162, DES102
Syllabus: To develop skills in the use of Computer Aided Design technology and to create 2D wire frame
designs and engineering drawings using commercially
available packages. To guide students through the new
concepts and philosophy related to the creation of drawings
using computers. Students should become capable of se-
lecting hardware and software for CAD applications; using
the menus of various input devices; employing drawing aids;
editing facilities, dimensioning, scaling and plotting
facilities of a CAD package; creating professional and
presentation standards in 2D and elementary 3D wire
frame drawings; extracting data from attributes to the
spread sheets to prepare list of materials and components
used and to estimate associated costs. Topics: Introduction
to CAD/CAM; various techniques used to define objects
using computers, eg., wire-frame modelling, surface
modelling and solid modelling; overview of CAD tech-
nology used for wire-frame modelling; menu structure
and on-line help; basic drawing entities; geometric construc-
tion aids; editing; creation of drawing layout environment;
dimensioning; attributes and data extraction; drawing
output. Various concepts of the CAD technology will be
used in conjunction with programmed exercises to master
a PC-based CAD package.

Assessment: Assignments: 70 per cent Class tests: 30
per cent.
RAKER, D and RICE, H (1988) Inside AutoCAD, New
Riders Publishing.
SHRIVASTAVA, A (1989) Introduction to AutoCAD,
Chisholm Institute of Technology.
CADKEY INC. (1988) CADKEY User Reference Guide,
Cadkey Inc.

DES262  Materials and Manufacturing Technology 4
Contact: One semester, 42 hours
Prerequisites: DES260
Syllabus: To develop an understanding of structure-
property relationships of advanced materials and manufactur-
ing processes; to develop the skills to design meaningful
product tests; to establish methods of selecting appropri-
ate materials, processing techniques and surface finishes for
product design; to study the application of computer aided
manufacturing techniques. Students should become capa-
cable of understanding the dependence of composite prop-
erties on fibre and matrix structure; evaluating the vari-
able of each composite design property; understanding the
process of adhesive bonding and developing optimum joint
design (with due regard to adhesive type and surface prepa-
ration); selecting appropriate materials and processes, including
CAM methods, for specific products mindful of quantity,
accuracy, aesthetics and functional reliability considera-
tions; understanding the factors influencing the selection
and specification of surface finishes. Topics: Structure and
properties of glass, ceramics and carbon fibres; effects on
composite properties of type of fibre, orientation length
and resin ratio; composites manufacturing techniques and
design of composites. Adhesives and adhesion; surface
preparation, adhesive selection and design of adhesive
bonded joints. Testing procedures, role of testing in mate-
rials selection, product development and quality control; the materials selection process, checklists and databases. Advanced work in programming and computer aided manufacturing techniques with respect to product design components; applications of CAM languages including NC and CNC (ISO, MAZAK and APT). Process selection, effects of product shape, dimensional accuracy, function, details and production quantities; surface finishing including polishing, embossing, printing, painting and anodizing; effects of processing on material properties.

Assessment: Course work: 40 per cent Tests: 50 per cent Oral presentations: 10 per cent


DES300 Creative Design Studio 5

Contact: One semester, 196 hours.
Prerequisites: DES202

Syllabus: To promote self-motivated scholarship in the theory and practice of product design at a near-professional level. To facilitate studies of design opportunities and processes in the context of national and international markets. To further develop project based learning experiences in design which refine capabilities to standards of competence consistent with the expectations of industry and commerce. Students should become capable of identifying conditions, including consumer factors, affecting the development of innovative, contemporary products suitable for local and export markets; compiling design strategies for creative design in an entrepreneurial environment; proposing and validating solutions to entrepreneurial design situations; near-professional levels of competence in the practice of design under real client/designer/manu-
facturer conditions with multivariable characteristics. Topics: Safety and environmental variables; product liability law; reliability and quality assurance, characteristics of quality control systems; advanced materials and processes selection criteria, design databases. Operational and budgetary factors for investigational/entrepreneurial design work; design economics and cost estimating techniques; tooling costs; production/industrial engineering information sources. Self motivated and supervised goal-orientated project work, personal statements, limited edition and fashion products (e.g., in categories suggested by Edwards 1987). At least one design project will be supervised by industry based mentors nominated by academic staff.

Assessment: Design projects and assignments: 70 per cent Design tests: 30 per cent


DES302 Creative Design Studio 6

Contact: One semester, 196 hours
Prerequisites: DES300

Syllabus: To promote and reinforce design capabilities to the stage where creative design concepts may be objectively validated and specified for production feasibility. To facilitate self-motivated and self-directed learning experiences in design which will lead to professional levels of expertise as preparation for employment and/or progression to postgraduate studies. Students should become capable of understanding the significant aspects of multi-variable design problems; coordinating inputs to design processes from various disciplines; arriving at systematic formulations of design concepts to the point of forecasting physically viable and economic products and possible innovations; adding to their design skills repertoire; providing fully detailed design proposals at a level of quality consistent with that expected from entry level professionals. Topics: Features of the design profession; experiential and management approaches to design; participant observation of multi-disciplinary inputs to design processes; strategies for promoting quality of design; professional bodies and source contacts; information dissemination and promotion of design graduate skills to community and industry groups. Student centred learning experiences related to high quality design in the social and commercial contexts; counselled solo and team projects in keeping with market opportunities, student interests and individual skills; joint design projects with other Chisholm groups engaged in promoting innovation and quality design; preparation of personal profiles and professional design portfolios.

Assessment: Design studies and projects: 80 per cent Design tests: 20 per cent


DES310 Culture, Creativity and Critique 5

Contact: One semester, 28 hours.
Prerequisites: DES252

Syllabus: To further develop skills in critical analysis by the introduction of a variety of specialised approaches to the study of aesthetics. To apply such critical analysis to selected manufacturing design initiatives; collaborative ventures between artists, architects and designers; urban environmental projects employing designers, architects, artists and engineers and other like ventures. To extend the frontiers of design creativity by conceptualising and documenting a hypothetical 'model project' and predicting its outcomes from the points of view of aesthetic excellence, social impact and economic advantages. Students should have developed a range of approaches to the critical analy-
sis of design through knowledge of a variety of writings in aesthetics and culture critique; have the ability to apply this knowledge in verbal discourse and written expression; have further developed the ability to think creatively and to apply imaginative processes to innovative design projects which will have a bearing on improvements in manufactured products and other design enhanced activities, thereby enhancing the success of trade and commerce and the quality of the urban and domestic environments, public spaces and design collaborations with artists, crafts-people, architects and the community. Topics: A series of introductory lectures will be based on relevant aspects of aesthetics drawn from writings, reviews and utterances of significant aestheticians and critics. Lectures will focus on 'modes' of criticism and apply them to specific case studies, thus indicating appropriate processes for selecting and applying different critical frameworks. An attempt will be made to differentiate between the application of 'traditional' aesthetics and 'Post-Modern' critical attitudes – and the implications of these for contemporary designers in contemporary social and cultural contexts. A major segment of the course will be the conceptual development of 'model projects' by individuals or groups of students and aimed at extending the imagination to the limits of 'ideal' design for contemporary manufacturing, commerce or the environment; followed by appropriate critical analysis of the design concept. 

Assessment: Model project and critique; 100 per cent

DES312 Entrepreneurial Strategies

Contact: One semester, 28 hours
Prerequisites: DES300

Syllabus: To develop an understanding of the elements of entrepreneurial behaviour and the processes by which new ventures are developed. Students should become capable of assessing their own entrepreneurial characteristics and modify these as necessary; understanding the processes required to conduct feasibility studies and to develop business plans for new business ventures; utilising the skills necessary to launch new ventures. Topics: Identification of the elements of entrepreneurship, and personal characteristics of successful entrepreneurs. Research opportunities for new venture creation, conducting business plans, feasibility studies, researching the market and sourcing information and methods of collection. Linking business ideas with consumer needs; developing marketing strategies; financial planning and sources of finance for new ventures. Selling business ideas to large corporations and preparing business plan presentations.

Appropriate legal and taxation structures for new ventures.

Assessment: Literature search and survey; 40 per cent Business plan development for new venture; 60 per cent


DES320 Technological Design Principles 5 (Tool Design)

Contact: One semester, 42 hours
Prerequisites: DES302

Syllabus: To develop an appreciation of the scope, nature and economic characteristics of tool design. To apply the principles of geometrical analysis of product elements to the systematic design of selected production tools. Students should become capable of appreciating the general characteristics of the field of tool design; understanding the main economic and quality parameters in tool design; developing insights into product design/tool design interrelationships by developing creative solutions to a number of simple tool design problems. Topics: Overview of the field of tool design; interactions with product design; quality considerations; tool design procedures; types of production tooling equipment including gauges, cutting tools, jigs, fixtures and dies (eg., injection and compression moulding dies); economic variables and tooling for economic production; principles of economic analysis and cost estimating. Determining the operations of a process; the terminal points; specifying the sequence of operations; predicting the characteristics of the tools required; requirements in terms of location, clamping and machining workpieces. Practice in tool design analysis; review of geometric reference frames and spatial degrees of freedom for product elements; principles of location, clamping and presenting the work to the cutter in machining operations; datum for location and clamping; preparation of tool drawings for simple drilling jigs and moulding dies.

Assessment: Progressive assessment of assignments; 100 per cent


DES322 Technological Design Principles 6 (Electronics)

Contact: One semester, 42 hours.
Prerequisites: DES320

Syllabus: To develop a working knowledge of the principles and characteristics of electrical motors. To review the designer's task in electronic equipment packaging. Students should become capable of applying a working knowledge of the applications of the various types of electrical motors; gaining an appreciation of the broad array of design factors in electronic equipment packaging. Topics: Electric Motors Review of operating principles and characteristics of electric motors; Electronic equipment packaging Review the conflicting electronic requirements imposed on the package which holds the electronic circuitry, protects it from the environment and governs the user's opinion of the system. 1. Construction techniques: circuit boards, soldering, surface mounting devices, modules, card frames and interconnections. 2. Physical con-
Constraints: robustness, noise, heat dissipation, external connections, insulation, RFI, EMC, shielding; safety requirements, standards, SEC regulations and approvals. 3. Manufacturing requirements: mounting methods, ease of assembly, circuit protection, access for servicing and minimising costs. 4. Human interface: input and output devices, stylistic requirements, functionality, ease of use and appearance.

Assessment: Course work: 50 per cent Class test: 50 per cent

**DES330 Transportation Studio 1**

Contact: One semester, 42 hours
Prerequisites: DES202

Syllabus: To introduce the subject of transportation design using the appropriate drawing and rendering techniques to present transportation concepts. Students should be capable of sketching their preliminary transportation concepts quickly utilising all the drawing techniques previously learnt; analysing design problems of current transportation systems and detailing concepts or solutions; an understanding of automotive styling terms; understanding the types of materials and advances in engineering that have recently occurred in the automotive/transport industries. Topics: Review of the field; slide presentations and discussions showing published examples on transportation drawings and presentation techniques. Demonstrations and student practice of rendering incorporating the specialised techniques in presenting concepts including: reflections, ground shadows, background illustration, light source and views. At least one transportation project (interior/exterior) to be undertaken, developing preliminary concepts to final concept stage for formal presentation.

Assessment: Progressive evaluation with major assessment of project at end of semester: 100 per cent

**DES332 Transportation Studio 2**

Contact: One semester, 42 hours
Prerequisites: DES330

Syllabus: To further enhance and develop of transportation concepts leading to the required levels of expertise generally expected by industry. Students should be capable of understanding design and manufacturing limitations relating to design proposals; presenting concepts at a more advanced level of drawing expertise; the ability to present finely-tuned concepts in a format that engineers and draughtsmen can interpret; understanding aerodynamic principles (the wind tunnel) as a major requirement of transportation design. Topics: Individual and group discussions outlining separate project procedures, stages involved, formulating strategies and determining approximate deadlines. One major transportation project to be undertaken (interior or exterior) either an extension of that undertaken in EL501 or a new project. The emphasis will be on a self-motivated and self-directed approach, allowing the freedom of decision making relating to requirements and needs for the project/projects undertaken. Staff to advise when obvious design problems arise and to offer on-going counsel as required.

Assessment: Progressive evaluation with major assessment of project at end of semester: 100 per cent

**DES340 Advanced Computer Aided Design 1**

Contact: One semester, 42 hours
Prerequisites: DES260; DES262

Syllabus: To develop skills in the use of Computer Aided Design technology and to create 3D wire frame figures to represent models and product design drawings using commercially available packages. To guide students through the applications of new concepts and philosophy related to the creation of 3D wire frame models, using commercially available packages. To develop skills to customise CAD packages to improve productivity. Students should become capable of creating and editing simple and complex 3D wire frame models to assist them with the innovative and final stages of product design; customising the design package for specific requirements and environment for improved productivity. Topics: Introduction to 3D wire frame modelling; data entry format for lines, arcs, circles, poly lines, planes; 3D polygon meshes using general polygon meshes, ruled surfaces, tabulated surfaces, surfaces of revolution and edge defined surface patches; 3D editing. Introduction to customisation: introduction to a programming language used for customisation. System organisation: operating system, CAD system, scaling and grouped entities. Basics tools for customisation: menu macros, script files. Customising support libraries, fonts, hatches and line-types; introduction to parametric design.

Assessment: Assignments: 70 per cent Class tests: 30 per cent


**DES342 Advanced Computer Aided Design 2**

Contact: One semester, 42 hours
Prerequisites: DES340

Syllabus: To develop skills in the use of Computer Aided Design technology and commercial packages with respect to creating 3D surface and solid models for representing designed products. To guide students through the applications of new concepts and philosophy related to the creation of 3D objects. To develop introductory-level skills for animation of 3D objects created by using commercially available packages. Students should become capable of creating 3D surfaces using 3D wire frame models and planes; rendering shaded surfaces using the light and camera facilities available in shading packages; using the above techniques to create slides depicting sequences for producing animation effects; creating 3D solid models using drawing primitives from a solid modelling package. Topics: Introduction to shading; rendering; animation — creating movies and interactive movies. Primary concepts of solid modelling: primitive solids; Boolean operations, eg., union, difference, intersection; group
operations; library parts; mass and inertia properties of solids; shading and rendering of solids; editing operations.

Assessment: Assignments: 70 per cent Class tests: 30 per cent

AUTODESK INC. AutoSolid, Autodesk Inc.

DES350 Safety and Environmental Engineering 1

Contact: One semester, 28 hours
Prerequisites: DES202

Syllabus: To outline approaches to safety and engineering and current issues of environmental problems. Students should become capable of developing an understanding of the principles and practices required for safe working conditions and environments; introductory studies of the major environmental issues current in society.

Topics: Introduction: current experience and future projections, the moral, legal and economical impetus for change, the need for a systems concept. Principles of Accident Prevention: the methodology of safety, strategies for protection (illustrated by case studies), comparison with classical methods of accident prevention and safety design concepts (safe life and fail safe), system redundancy and diversity, the systematic identification of effective safety strategies in the areas of design, organisation and human and social factors. Safety Programs: the epidemiological approach to accident prevention, the choice and use of descriptive and analytical accident statistics and rates, criteria for the selection of accident statistics, the role of multidimensional statistics in practical accident prevention, assessing priorities in safety strategies, the use of epidemiological and statistical data with causal analysis, experience and prognosis, the design of practical programs. The topics will be amply illustrated with pertinent case studies.

Assessment: Course work: 30 per cent Examination: 70 per cent


DES352 Safety and Environmental Engineering 2

Contact: One semester, 28 hours
Prerequisites: DES350

Syllabus: To outline, at an advanced level, approaches to safety and engineering and current issues of environmental problems. Students should become capable of communicating a thorough knowledge of the major environmental issues current in society; acquiring an appreciation of the regulatory legislation related to safety and environmental matters. Topics: Introduction: brief review of the principles of accident prevent and safety programs.

Major environmental problems of industry: Land – solid and liquid waste disposal, landfill, land use; Water – thermal pollution, waste loads to water and sewage; Air – thermal and toxic emissions to air; Noise and radiation; Resources – changing resource patterns, change affine characteristics; Health effects to the community; Common methods of monitoring and analysis associated with waste disposal to land, water, air, noise, radiation and health. Various legislative and administrative approaches to pollution control: various methods for licensing waste loads, eg., licensing to meet a predetermined load (Victoria); licensing and waste load in relation to production (Tasmania); various State, Federal Acts and Statutory Regulations related to waste disposal, Environmental Protection Authority Act, Health Act; the role of various agencies and tribunals, eg., Environmental Protection Authority, Environmental Protection Authority Appeals Board, National Health and Medical Research Council; setting of various pollution standards. The topics will be amply illustrated with pertinent case studies.

Assessment: Course work: 30 per cent Examination: 70 per cent


DES360 Architectural Products and Interior Space Design 1

Contact: One semester, 42 hours
Prerequisites: DES202

Syllabus: To develop an appreciation of the product design requirements of architectural and interior spaces in the built environment – domestic, public and corporate. Students should become capable of conducting market surveys and information searches of the architectural products area including design for tourism; developing design proposals for high quality products in the furnishings and related areas of design; design for interior spaces and external surfaces. Topics: Investigate and survey market requirements relating to such fields as furniture design, office equipment, lighting and the new materials available for related manufacturing. The design of a particular architectural product or environment for the tourism industry, for a public body, or a corporation, with consideration given to its market, ergonomics, function, aesthetics, production, etc., requirements. Preparation of concepts and final proposals will utilise relevant drawing and photographic techniques as well as mock-ups, models or prototypes for presentation.

Assessment: Progressive evaluation with major assessment of folio at the end of semester: 100 per cent

DES362 Architectural Products and Interior Space Design 2

Contact: One semester, 42 hours
Prerequisites: DES360

Syllabus: To further enhance design appreciation and design skills related to architectural and interior spaces in
the built environment. Students should become capable of understanding specific market requirements of the commercial environment; developing design proposals for high quality products in the furnishings and related areas of design. Topics: The design of a particular product or architectural proposal for the commercial environment with consideration given to market forces, ergonomic factors, function, aesthetics, production requirements, etc., or the continuation of projects initiated in EL504. Investigate and survey market requirements relating to products or environments in the commercial sector, for example, offices, factories, airports, retail and service industries. Preparation of concepts and final proposals will utilise relevant drawing and photographic techniques as well as mock-ups, models or prototypes for presentation.

Assessment: Progressive evaluation with major assessment of folio at the end of semester: 100 per cent

ELE103 Electrical Networks
Contact: Two hours lecture and two hours laboratory/tutorial per week for one semester.
Prerequisite: As prescribed under Admission Requirements to First Year for Bachelor of Applied Science (Digital Technology).


ELE130 Electronics I
Contact: Two hours lecture and two hours laboratory/tutorial per week for one semester.
Prerequisite: ELE103.

Syllabus: Electrical properties of semiconductors, diodes, transistors; transistor models, single stage amplifiers, introduction to operational amplifiers, transistors as switching device.


ELE204 Networks and Energy Conversion
Contact: Two hours of lectures and two hours of laboratory and tutorial classes per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


ELE212 Design I
Contact: Three hours of lectures and design tutorials for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


ELE236 Electronics I
Contact: Three hours of lectures and laboratory/tutorial work per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


ELE237  Electronics

Contact: Two hours of lectures and laboratory/tutorial work per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.


ELE325  Electrical Machines

Contact: Three hours of lectures and laboratory/tutorial work per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.


ELE330  Electronics II

Contact: Three hours of lectures and laboratory/tutorials per week for two semesters.

Prerequisite: As prescribed under Progression through the course.

Syllabus: Application of the hybrid-II equivalent circuit in the analysis of multistage amplifiers. Circuit techniques used in wide band small signal amplifiers. Feedback techniques as applied to wide band amplifiers to obtain specified and optimised designs. Design of operational amplifiers and their usage as general purpose functional blocks. Single and double tuned small signals RF amplifiers. LC Oscillators and class C operation. Automatic gain control in oscillators and RF amplifiers. Quartz crystals and their application to oscillators. Bipolar and MOS transistors as switching devices. Their application to logic circuits and also to high power switching. Switched mode power supplied.


ELE337  Electronic Systems

Contact: Three hours of lectures and practice per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.

Syllabus: This subject introduces a range of electronic systems and the corresponding signals encountered in monitoring, control and supervisory application. Signals are considered in terms of spectrum, convolution and correlation properties, coding and modulation/demodulation are examined. Examples of transmission media and practices are studied. Principles of open loop and closed loop control, analog and sampled systems are examined. Components and techniques used in industrial electronics are studied.


OGATA, K., Modern Control Engineering, Prentice-Hall, 1970.


ELE340  Control Systems

Contact: Three hours of lectures and laboratory/tutorial work per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.

Syllabus: The control system: open loop, closed loop, block diagram and signal flow representation, continuous and discrete time systems. Analysis of continuous time systems, s-plane, second order response, transfer function and state equations of physical systems, concepts of controllability and errors. Stability, linearity, Routh, root locus, frequency response. Compensation, three term controllers, state variable compensation, control criteria.
Non-linear systems. Analysis of discrete time systems, transforms, time response, stability.

**ELE365  Electronic Communications**

Contact: Four hours per week of lectures, laboratory and tutorials for two semesters.

Prerequisite: As prescribed under Progression Through the Course.


**ELE380  Power Systems I**

Contact: Two hours of lectures, laboratory and tutorial classes per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.


**ELE401  Signal Processing and Filters**

Contact: Two hours of lectures per week and two hours of laboratory/tutorials for two semesters.

Prerequisite: As prescribed under Progression Through the Course.


**ELE411  Design II**

Contact: Three hours of lectures and design tutorials and laboratory sessions for two semesters.

Prerequisite: As prescribed under Progression Through the Course.

Elective Units: This subject allows the student a choice of either Electrical Power Equipment Design or Radio Frequency Design in Semester One. All students take Integrated Circuit Design in Semester Two.

Syllabus: Electrical power equipment design. A study of the economics and methodology of design as applied to electric power equipment. Introduction to power electronics, contract, AAAC assessment and price adjustment procedures. Standard specifications. Design of transformers and CAD packages covering cores, magnetic circuit, windings, insulation and complete units. Design of electrical services in buildings including protection and safety systems. Principles of illumination and lighting design using computer packages. Radio frequency design. A study of components and their performance with frequency, S parameters and flow graph analysis, design of small signal and power amplifiers, oscillators, matching techniques, microstrip, radio receivers, transmitters, mixers and detectors. Integrated circuit design. A study of the fundamentals of digital integrated circuit design, including a brief consideration of the fabrication processors and the relevant device theory.


Relevant journals and printed notes.

**ELE425  Power Electronics and Machine Control**

Contact: Two hours of lectures and two hours laboratory/tutorial work per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.

Syllabus: Theory, ratings and characteristics of pnpn devices, including firing circuits, control and trigger arrangements. Principles of phase control and zero voltage switching, AC voltage controllers, AC line commutated...


ELE446 Computer Control
Contact: Two hours of lectures and two hours of laboratory/tutorial work and plant visits per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.
SKINSKEY, F.G., Controlling Multivariable Processes, ISA, 1981.

ELE447 Computer Communications
Contact: Four hours per week of lectures, tutorials and laboratory classes for two semesters.
Prerequisites: As prescribed under Progression Through the Course.

ELE465 Communication Systems
Contact: Four hours of lectures, tutorials and laboratory work per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.
Syllabus: An introduction to the system design concepts of telecommunication networks. The course discusses the teletraffic characteristics of networks and the application of advanced technologies towards an integration of the communication services in the digital network. The topics include studies of digital and analogue transmission techniques applicable to guided and radio media. The public switched telephone network, cellular radio, digital radio concentrator system (DRCS), broadcast radio and television, satellite communications.
BRILEY, B.E., Telephone Switching, Addison-Wesley, 1983.

ELE480 Power Systems II
Contact: Four hours of lectures, laboratory and tutorial classes per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


ELE635 Communications Principles I
Contact: Two hours per week for one semester.
Prerequisite: Nil.
Aims: This unit is for students with no qualifications or experience in electrical and telecommunications engineering. It aims to give students sufficient background in communications principles and the associated applied mathematics to act as a foundation for later units.
YOUNG, P., Electronic Communication Techniques, Merrill.

ELE636 Communications Principles II
Contact: Two hours per week for one semester.
Prerequisite: ELE635, or equivalent knowledge.
Aims: This unit is for those concerned with the technical aspects of the communication process. It covers the techniques used to propagate signals over various media, the range of transmission systems available, and their relative advantages and disadvantages.
HALSALL, F., Introduction to Data Communications and Computer Networks, Addison Wesley.
YOUNG, P., Electronic Communication Techniques, Merrill.

ELE682 Digital Computer Equipment I
Contact: Four hours per week for seven weeks.
Prerequisite: EDP653.
Syllabus: Boolean algebra, De Morgan's Laws, Karnaugh Map representations, synchronous and asynchronous logic, MSI and LSI devices, multiplexors, demultiplexors, latches, counters, display devices.

ELE683 Digital Computer Equipment II
Prerequisite: ELE682.
Syllabus: Microprocessor types, machine codes, instruction types, addressing modes, instruction execution and timing, interrupt handling, direct memory access, communications protocol, emulation and simulation, microcomputer algorithms and programming techniques.


ENG101 Electrical Technology
Contact: Three hours per week for two semesters.
Prerequisite: As prescribed under Admission Requirements to First Year.
Syllabus: Introduction to circuit analysis electric and magnetic fields. Study of the main principles and concepts relating to transformers, rotating machines, electric power systems, lighting and electrical safety. Introduction to electrical measurements.


ENG102 Applied Mechanics
Contact: Three hours per week for two semesters.
Prerequisite: As prescribed under Admission Requirements to First Year.
Syllabus: Statics, definition of force and moment; vector addition, resultants, units. Equilibrium; concurrent planar forces, reactions, free body diagrams. Determinate structures; load and support notation, reactions using equations for equilibrium and condition. Trusses; requirements for structural sufficiency, method of joints and sections. One-dimensional stress; definition of stress and strain, elastic modulus, elongation, Poisson's ratio effects with one-dimensional stress fields. Compatibility; axial stiffness, deflection of linked members, series and parallel systems. Force diagrams; equilibrium with external loads, bending moment, shear force and axial load at a point, bending moment, shear force and axial load diagrams. Beam Stress; stresses due to bending in symmetric sections, neutral axes, centroid, first and second moment of area, section modulus, extreme fibre stress. Dynamics: definition of kinematics and kinetics, units. Kinetics of particles; Newton's second law, concept of dynamic equilibrium (D'Alembert's principle) free body diagrams, friction force, non uniform acceleration. Kinematics of particles; rectilinear and curvilinear motion. Dynamics of rigid bodies; moment of inertia, linear and angular momentum, impulse and impact. Energy, work and power. Kinematic and kinetic analysis of simple mechanisms.


ENG103 Engineering Communications
Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Admission Requirements to First Year.

BONDY, A.W., Engineering Drawing, 2nd ed.

ENG104 Computer Science
Contact: Two hours of lectures and two hours of laboratory/tutorial work per week for two semesters.
Prerequisite: As prescribed under Admission Requirements to First Year.
Syllabus: Computer concepts: the historical development of the stored program computer, digital and analog systems, impact of the computer on society. Overview of the development of scientific languages. Fundamentals of microcomputers and introduction to assembly language programming, architecture, memory (RAM, ROM, disks, disk sectoring etc.), instruction sets, register operations, address modes, interrupts. Digital logic: binary logic, truth tables, basic gates and their equivalent forms, Boolean algebra and theorems, forms of specifications of logic requirements including use of minterms and maxterms, Karnaugh maps in design and minimisation, two-level logic forms, logical procedures. Data representation: analog and digital data, number systems, conversions, codes, use of parity, signed number systems, arithmetic, manipulation of numbers. Logic packages: logic families and their characteristics, standard packages, use of data handbooks. Concepts of SSI, MSI, LSI etc. Implementation of logic requirements using standard packages such as multipliers, ROM, PLA and adders etc. Interfaces and communications: basic communication concepts, synchronous and asynchronous communications, concept of a protocol, serial and parallel interfaces with examples. Transducers, A-D and D-A converters, shaft encoders.


ENG105 Computer Applications I
Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Admission Requirements to First Year.
Syllabus: Keyboard skills: use of peripheral equipment: introduction to operating systems: files, directories, commands, editing. Programming skills: algorithmic solution to a problem, structured programming, program development, documentation and specification. Programming languages: modern programming languages: comparisons between BASIC and Pascal. Restrictions of computation; finite word length, speed, memory. Use of Packages: use of packages, word processing, spread sheets, simple data bases.


ENG204 Engineering Materials Science
Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


Basic Guide to Concrete Construction, Cement and Concrete Associations of Australia.

Chisholm printed notes.

ENG205 Computer Applications II

Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.

Syllabus: Multi-user operating systems: Unix, vi editor, shell programming. Introduction to C, data types, control, input/output, files, pointers, list processing. Elements of assembler programming and communications, subset of instructions, input/output, RS232 specification, cables, serial port configuration. Advanced assembler language programming or packages.


ENG206 Engineering Management I

Contact: Two hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


ENG305 Computer Applications III

Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.

Syllabus: Software engineering, elements of structured analysis and structured design. Communications, ISO-OSI, study of layers one and two. Computer aided drafting, drawing interchange protocol, digitizers, plotters, graphics workstation video modes. Departmental topics selected from computer hardware, software, analysis of structures, statistics and hydrology, spreadsheet applications, database applications, engineering packages, analysis and design.


ENG306 Engineering Management II

Contact: Three hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.

Syllabus: Basic statistics. Probability modelling; properties of common distributions, fitting distributions to data, methods of assessing fit - graphical and analytic. Statistical inference, point and interval estimation, hypothesis tests on the mean for 1 and 2 populations, both parametric and non-parametric tolerance limits. Sampling and quality improvements. Sampling fundamentals, sample size, goodness and confidence. attributes sampling, O.C., curve, binomial monogram and use of AS1199-AS1057 and AS2490. Use of variables in control charting, process capability and acceptance testing.


ENG307 Industrial Project I

Contact: Two hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.

Syllabus: In a nominal two hour/week to undertake an investigation into an industrial problem related to a student's particular field of interest. The investigation may be either Institute or industry based and where possible, be developed on data generated by industry. The investigation
may be supported by laboratory work, field studies or literature searches as appropriate. Students will work singly or in groups depending upon the complexity of the project undertaken. Assessment: Based on the examination of a typewritten report submitted at the end of the year along with a public defence of the report, 90 per cent of marks will be allocated for the project report assessment and 10 per cent for an oral defence. Assessment may be carried out in conjunction with an industrial supervisor where this is appropriate.

**ENG405 Computer Applications IV**

Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.

Syllabus: Core studies: all students will attempt units CA4-1 and CA4-2. Unit CA4-1 Computer Systems: organisation, processor classification, memory systems, parallel processing, pipeline design techniques, vector processing, coprocessors, security. Unit CA4-2 contemporary software issues and implementation: Application of expert systems to engineering overview and evaluation of object orientated languages. A range of exercises designed to provide experience in implementing contemporary engineering software. Departmental specialisations: Unit CA4-E1 Principles of Measurement (Electrical); transducers, industrial controls, signal conditioners and amplifiers, state machines, PLCs, data loggers. Unit CA4-E2 Advanced Digital Electronics (Electrical); microprocessor based instruments, PLAs, EPLDs, single chip controllers. Unit CA4-C1 Computer Aided Drawing and Design: An introduction to the use of drafting packages. Unit CA4-C2 Computer Analysis of General Structures (Civil). Review of the direct stiffness method. Use of computer packages for general structural analysis. Introduction to finite element method; linear elasticity; plane stress and plane strain; derivation of stiffness matrix for bar element, linear element, triangular element and rectangular element. Unit CA4-11 Industrial Systems (Industrial). CNC applications to manufacturing. Problem solving for industrial and non-industrial systems by modelling using discrete simulation software. Unit CA4-12 Computer Integrated Manufacture (Industrial). Benefits and applicability of Flexible Manufacturing Systems (FMS) and Computer Integrated Manufacturing (CIM). On-line data collection, MAP/TOP communication protocols. Unit CA4-M1 Manufacturing Systems. Introduction to CNC and flexible manufacturing systems; use of packages for finite element applications, dynamic mechanism modelling. Digital simulation of mechanical systems, air conditioning loads. Unit CA4-M2 Thermal Systems (Mechanical). Modelling of thermal systems, heat transfer, solar; dynamic properties and flow. COMES, M.C. et. al., *Structural Analysis*, 2nd ed., Van Nostrand Reinhold Co. Ltd, 1980.

**ENG406 Engineering Management III**

Contact: Three hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


**ENG407 Industrial Project II**

Contact: Two hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.

Syllabus: In a nominal two hours/week to undertake an investigation into an industry problem related to a student’s particular field of interest. It is intended that, where possible, the investigation be industry based or if this is not possible, that it will be based on data generated by industry. The investigation may be supported by laboratory work, field studies or literature searches as is appropriate. Students may work singly or in groups depending upon the complexity of the project undertaken. It is generally expected that this project will require greater engineering knowledge than the project undertaken in Industrial Project I.

Assessment: Based on the examination of a typewritten report submitted at the end of the year along with a public defence of the report, 90 per cent of marks will be allocated for the project report assessment and 10 per cent for an oral defence. Assessment may be carried out in conjunction with an industrial supervisor where this is appropriate.
FIN750 Legal Implications of Business Technology
Prerequisite: Nil.

Current journal articles.

GRA611 An Introduction to Design Studies
Contact: Three hours per week for seven weeks.
Prerequisite: Entry requirements into Computer Graphics Graduate Diploma.
Syllabus: This subject examines two cultures with regard to commonalities and differences in what is meant by knowledge, theory, standards and criticism. Historical and modern concepts of aesthetics. Design to the artist and to the technologist. Design from the graphic artists viewpoint. Basic organisation of visual elements, introduction to the design of letterform and typography.
Assessment: Major essay.

IND255 Methods Engineering
Contact: Four hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.
Syllabus: Overview of productive systems: productivity and performance measures. Contributions to productivity; labour, technological change, methods improvement. Work measurement: setting standards, time studies, predetermined motion time systems; work factor, MODAPTS plus, MTM, FAST; sampling-work sampling. Computerised time standards, maintenance and use. Work method analysis and design: macro level process, activity, machine, flow process charts. Principles of motion economy. Micro level micromotion analysis, simo charts and theribling analysis. Office and organisation: the office as part of the function, overhead costs, effect of the office on business success. Organisational structure and behaviour, work to be done, work tracking, communications, role of computers, reporting requirements. Function and design of forms. Information gathering and analysis: problem solving, what, where and how to get the information, data dictionaries, ER diagram, functional diagrams. Structuring the new system: from the current to the proposed, transforming data into information, types of processing, documenting the design. Design and implementation: getting the information to the user, design and implementation of a computerised system using microcomputers. Implementation of new systems in a business environment, training organisational impact.


IND256 Theory of Manufacturing Processes
Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.
Australian Standards AS1250, AS1403, AS1131 and AS1163.

IND354 Design for Production
Contact: Four hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.
Syllabus: The design process; defining the problem. Model formulation and application of theory to the design of real components to specification of design by means of assembly and detail drawings. Principles of equilibrium.


**IND453 Safety and Environmental Engineering**

Contact: Two hours per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.

**SYLLABUS**


**IND454 Operations Research**

Contact: A course of three hours per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.

**SYLLABUS**

Optimisation: integer programming, goal programming, general non-linear programming. The simulation process and business complexity, simulation models, pseudo-random generation. Monte Carlo simulation, validating the model. Use of simulation languages and computers. Statistical modelling: multiple linear regres-

COCHRAN, G.W. et al, Experimental Designs, Wiley 1986


IND455 Design of Productive Systems II

Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


IND456 Systems Reliability

Contact: Two hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.

Syllabus: The economics of reliability: cost/benefit analysis and life cycle costing, catastrophic failure. Configuration improvement: fault tree analysis, failure mode and effect analysis, reliability mathematics as the basis of the design function. The physics of failure approach; failure mechanisms, environmental engineering and life testing. Contractual reliability; planning, organising and controlling a program through its definition, design and development, production and operational states. Testing for reliability; prediction, apportionment and statistical inference with constant and variable time schedules. Maintenance, monitoring and maintainability: data retrieval, data banks and further reliability improvement via the use of engineering statistics.


MAT106 Mathematics and Scientific Computing

Contact: Seven hours per week for two semesters.
Prerequisite: Mathematics A or equivalent.

Syllabus: Mathematical methods: vectors, matrices, functions, complex numbers, series, partial differentiation, integration, differential equations, applications. Statistical methods: data analysis, distribution theory, estimation, confidence intervals, inference, hypothesis tests, model testing, regression, correlation, statistical packages. Scientific computing: overview of computer software, operating systems, file systems, languages, access and use of Prime facilities, use of micro computer, Pascal, introduction to Fortran and BASIC.

Assessment: By tests, assignments and examinations.


MAT112 Mathematics

Contact: Four hours per week for two semesters.
Prerequisite: VCE Mathematics A or equivalent. Mathematics B (recommended).


Assessment: By tests, and formal examination at the end of each semester.


MAT123 Mathematics for Computing

Contact: Four hours per week for one semester.
Prerequisite: Year 11 Mathematics or equivalent.
Syllabus: Number systems: N, Z, Q, R, positional notation, conversion to and from other bases, number


MAT124 Mathematics IA
Contact: Four hours per week for two semesters.
Prerequisite: Mathematics A and Mathematics B at Year 12 (or equivalent), or Mathematics A at Year 12 (or equivalent) if MAT125 is taken concurrently.

Assessment: By class tests, assignments and formal examination each semester.


MAT125 Mathematics IB
Contact: Two hours per week for two semesters.
Prerequisite: Mathematics A at Year 12 (or equivalent).
Corequisite: MAT124.

Syllabus: Matrix algebra: inverse of order $3 \times 3$. Complex algebra: Cartesian and polar form; De Moivre’s theorem; the Fundamental theorem of algebra. Vector algebra: resolves in three dimensions; scalar products; applications in kinematics. Calculus: limits and continuity; derivatives and integrals of rational algebraic, circular and exponential functions; change of variable in integration; areas between curves; volumes of revolution; curve sketching; optimisation problems. Differential equations and applications in kinematics. Analytic geometry: cartesian equations of simple curves (including conics); parametric specifications; tangents, normals; simple locus problems.
Assessment: By class tests, assignments and formal examination each semester.


MAT201 Applied Mathematics
Contact: Six hours per week for two semesters.
Prerequisite: MAT106.

Syllabus: Four compulsory units and two elective units are taken. Compulsory units: vector calculus: Gradient, divergence, curl, and line and surface integrals; Theorems of Green, Stokes and Gauss. Differential equations: analytical techniques for first and higher order differential equations; series solutions; method of Frobenius; partial differential equations; Fourier series solution. Introduction to fluid dynamics: physical properties of fluids; fluid flow kinematics; Lagrangian and Eulerian description; Euler and Bernoulli equations; viscous fluids; Navier-Stokes equation. Numerical Methods I: solution to non-linear equations; Euler, modified Euler and Runge-Kutta methods; boundary value problems; polynomial approximations to functions; numerical integration. Elective units: Transform theory: Laplace transforms, solution of differential equations; Fourier transforms. Complex variable: complex functions, complex integration, Taylor and Laurent series, conformal mappings, applications. Mathematical Modelling I: formulation of governing equations and boundary conditions, dimensional analysis, approximate solutions, case studies. Differential equations II: Phase plane, equilibrium points, Bessel and Legendre equations.

MAT202 Statistics and Operations Research
Contact: Six hours per week for two semesters.
Prerequisite: MAT106.

Syllabus: Four compulsory units and two elective units are taken. Compulsory units: Experimental design I: factors, randomisation, replication, models; one way Anova, randomised block design, Latin square designs, factorial designs; two way factorial Anova, Yates method. Regression analysis: single variable and general linear regression models, testing model assumptions, residual analysis, trans-
formations, validation. Stochastic processes and queueing theory: Markov chains, absorbing and regular chains; Poisson processes, testing data for Poisson processes; queueing theory, single queue and multichannel models. Linear programming: graphical solutions; simplex algorithm, sensitivity analysis, duality, transport, assignment and network problems. Elective units: non-parametric methods: binomial test, sign test, box and Stuart tests, chi square tests, Mann-Whitney test, Kruskal-Wallis test; Kendall’s tau, Spearman’s rho; order-statistics. Quality assurance and sample surveys: random sampling, stratified cluster and systematic sampling; control charts, cusum charts, acceptance sampling. Data analysis: exploratory data analysis; probability plots, bivariate plots, two-way coded tables, median polish; time series data, rootograms, fitted counts. Introduction to statistical packages: data analysis and basic statistical analysis via packages including BMDP, SPSSx, Microstat.

MAT204 Computational Mathematics
Contact: Six hours per week for two semester.
Prerequisite: MAT106.
Syllabus: Four compulsory and two elective units are taken. Compulsory Units: Numerical Methods 1: Solution to non-linear equations; Euler, modified Euler and Runge-Kutta methods; boundary value problems; polynomial approximations to functions; numerical integration. Numerical Methods 2: Systems of Linear Equations; eigenvalues and eigenvectors; spline approximations; Chebycher polynomials and application to minimax approximations. Computational Linear Algebra: Errors; elimination, iterative and relaxation methods; eigenvalues and eigenvectors; Gaussian elimination, Gauss-Seidel iteration; special methods. Scientific Databases: Relations; relational algebra; relational database model; relational calculus; applications in scientific area.
Elective units: Two units are to be chosen from the available elective units.

MAT205 Mathematical Methods
Contact: An average of three hours per week for two semesters.
Prerequisite: MAT106.
Syllabus: Any suitable choice of three units may be taken from MAT201, MAT202, MAT204, MAT301 or MAT302 subject to prerequisites.

MAT212 Mathematics
Contact: Four hours per week for two semesters.
Prerequisite: MAT112, or equivalent.
Syllabus: Laplace Transforms: definition, use of standard list, theorems involving derivatives and translation, inverse Laplace transforms including Heaviside theorems, unit step functions, solution of differential equations. Fourier analysis; odd and even functions, Euler formulæ for trigonometric Fourier series, half-range expansions, complex exponential series. Introduction to Fourier transforms. Partial differential equations: solution by direct integration, solution by separation of variables including application to wave and heat equations. Coordinate geometry; plane polar coordinates and simple curve sketching, cylindrical and spherical polar coordinates, transformations from one system to another. Multiple integration: double integrals using cartesian or polar coordinates, triple integrals. Matrices: eigenvalues and eigenvectors, diagonalisation, application to engineering problems. Vector calculus: unit tangent vector, gradient, directional derivative, divergence and curl, line integrals, surface integrals, Green’s theorem, divergence theorem, Stokes theorem. Computational mathematics: errors, zeros of non-linear functions, simultaneous equations, polynomial approximations, numerical integration, differential equations. Probability and statistics: rules of probability, organisation and presentation of data, use of program packages, random variable and probability distributions, expected values, special discrete and continuous distributions.

MAT216 Fortran Programming
Contact: Three hours per week for one semester.
Prerequisite: MAT106
Syllabus: Fortran 77 in depth, including comparisons with Fortran 66, Fortran programming including structured, modular design, testing, program structure, brief comparisons with other languages.
Assessment: Examination and assignments.
Text: COLDICUTT, G., Fortran Notes, CIT Publications.

MAT217 Numerical Computing
Contact: Three hours per week for one semester.
Prerequisite: MAT216.
Syllabus: Applications of numerical and graphical computing including selections from polynomial evaluation, roots, division, least squares fit; solution of simultaneous linear and non-linear equations (direct and iterative methods); integration; ordinary and partial differential equations; sorting; searching; function and contour plotting using characters and pixels.
Assessment: Examination and assignments.

MAT220 Mathematics
Contact: An average of two hours per week for two semesters.
Prerequisite: MAT106 of TEC213.
Syllabus: Any two units from a mathematics minor or major in the Bachelor of Applied Science (MD) course subject to prerequisites.

MAT223 Quantitative Management and Planning Techniques
Contact: Four hours per week for one semester.
Prerequisite: MAT123, or equivalent.
Syllabus: Modelling techniques within a computer environment: concepts in modelling, problem solving, an overview of common techniques. Linear programming: model construction, solution techniques, including use of computer algorithms, post optimality analysis. Assignment problem. Transportation problem. Critical path analysis: structure and analysis of a network, cost and resource
analysis, solution by computer package. Dynamic programming: multi-stage decision process, deterministic and stochastic models.


MAT224 System Simulation

Contact: Four hours per week for one semester.
Prerequisite: MAT123, or equivalent.


MAT225 System Measurement and Evaluation

Contact: Four hours per week for one semester.
Prerequisite: MAT123, or equivalent.


MAT226 Forecasting and Inventory Control

Contact: Four hours per week for one semester.
Prerequisite: MAT123, or equivalent.

Syllabus: Basic concepts of forecasting; use of LOTUS 1-2-3 and VP-Planner; smoothing methods; classical decomposition; short-term forecasting methods; global and local methods; random walk, moving average and autoregressive models. Basic concepts of inventory control; EOQ models, multi-product models, single period models.


MAT228 Mathematics II

Contact: Two hours per week for two semesters.
Prerequisite: MAT124.
Corequisite: MAT229.


Assessment: By class tests, assignments and formal examination each semester.


MAT229 Numerical Methods

Contact: Two hours per week for two semesters.
Prerequisite: MAT124.
Corequisite: MAT228.


Assessment: By assignments and formal examination each semester.


MAT301 Applied Mathematics

Contact: Six hours per week for two semesters.
Prerequisite: MAT201.

Syllabus: Four compulsory units and two elective units are taken. Compulsory units: partial differential equations; first order, linear, semilinear, quasilinear; second order, D'Alembert's solution, initial boundary value problem, diffusion equation, elliptic boundary value problem, numerical solutions. Viscous flow and boundary layers: Helmholtz vorticity equation, Rayleigh's problem, Kelvin's circulation theorem, continuity equations; boundary layer problems, Blasius solution, slow viscous flow; Stokes equation. Mathematical Modelling II: Role of modelling in air and water resource management; advection-diffusion equation; air pollution, dispersion relations, concentration fields; USEPA and Victorian EPA models. Numerical Methods II: Systems of linear equations; partial differential equations, finite difference methods, stability analysis; curve fitting and data smoothing, splines. Elective units:
Continuum Mechanics: Cartesian tensors, transformation laws, operations, isotropic tensors; Analysis of stress, body and surface forces, equilibrium, principal stresses, pure shear; analysis of strain, Lagrangian and Eulerian descriptions, extension and dilation. Optimisation: Functions of one variable, Newton’s method, search method, polynomial approximation methods; functions of several variables, Newton type of methods, linear constraints and linearisation of non-linear constraints. Electromagnetic Theory I: Physical laws, Maxwell’s equations, electrostatics, magnetostatics, motion of charged particles, electromagnetic waves. Electromagnetic Theory II: Plasmas, electrodynamic and magneto dynamic models; electrohydrodynamics; magnetohydrodynamics; solar winds; electromagnetic induction; waves, antennas, waveguides. Variational Methods: Functionals, extrema and variations of functions; transversality conditions; inequality constraints; geodesics, Lagrange’s equations. Discrete Mathematics: Propositional logic, application to program design; Boolean algebra, switching networks; mathematical induction; graph theory, algorithms.

MAT302 Statistics and Operations Research

Contact: Six hours per week for two semesters.
Prerequisite: MAT202.
Syllabus: Four compulsory and two elective units are to be taken. Compulsory units: Distribution Theory: Joint distributions, marginal and conditional distributions, independence; expectations; special discrete and continuous distributions; transformations; moment generating functions. Simulation: Deterministic and stochastic models; simulation procedures, analysis of performance; random number generation; queueing models; GPSS package. Statistical Inference: Estimation, properties of estimation; distribution of estimators; Hypothesis testing; errors, power, Neyman-Pearson Lemmma; minimum variance unbiased estimation. Experimental Design II: Factorial designs, fixed and random effects determination of E(Ms) values; nested designs; repeated measures designs; split-plot designs; confounding, fractional factorial designs, aliases; ANOVA; Statistical packages. Elective units: Forecasting: Regression methods; time series, moving averages, exponential smoothing, seasonal models; Box-Jenkins models. Inventory Theory: EOQ models, discounts; multi product EOQ models, constrained optimisation; probabilistic models, single and two period models; dynamic modelling; replacement models. Decision Theory: Pay-off tables; game theory; criteria for choice of action; utility theory, application of decision theory to sampling, optimal sampling plans; Bayesian estimation. Multivariate Data Analysis: Principal component analysis; Factor analysis, orthogonal and oblique rotations; alternative estimation procedures; multidimensional scaling, cluster analysis, discriminant analysis.

MAT305 Mathematics

Contact: An average of three hours per week for two semesters.
Syllabus: Any three units from MAT201, MAT202, MAT214, MAT301, MAT301 subject to prerequisites.

MAT330 Mathematics

Content: An average of two hours per week for two semesters.
Prerequisite: MAT106 or TEC213
Syllabus: Any two units from a mathematics minor or major in the Bachelor of Applied Science (MID) course subject to prerequisites.

MAT619 Introduction to Mathematics and Programming

Contact: Three hours per week for seven weeks.
Prerequisite: Entry requirements into the Computer Graphics Graduate Diploma.
Syllabus: The subject is designed for students who do not have a science/engineering background to provide a quick introduction to computer concepts and apply these to some elementary mathematics as appropriate to computer graphics. Interpretive and compiled high level languages. The operating system. Trigonometry and circular functions. Cartesian and parametric form of two dimensional conic sections. Two dimensional vectors (Cartesian and polar), conversions, operations, 3D Cartesian, geometric interpretations of vectors and vector processes. Programming, development and documentation principles, program design and modularity.
Assessment: Software assignments, class tests.

MAT620 Mathematics and Programming

Contact: Three hours per week for 14 weeks.
Prerequisite: Entry requirements into the Computer Graphics Graduate Diploma.
Syllabus: Vectors in three dimensions, sealer and vector products, direction cosines, projections and components. Matrix algebra, matrices applied to graphic object representation and transformation. Pascal programming, program design concepts, error trapping and recovery, testing. Modular design, use of data transfer by value and by reference. The Pascal record, data structures and design. Fortran 77 programming, data and control structures, type declarations, module mixing, call by value and by reference, Fortran 66 and Fortran 77 compatibility problems.
Assessment: Programming assignments, class tests.
MAT631 Advanced Statistics
Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus: Probabilistic model building using engineering based data; statistical inference, parameter estimation and significance tests; quality assurance, control charts and acceptance sampling; simulation, monte-carlo methods, random variate generation; regression analysis, linear and non-linear models; experimental design and analysis of variance; estimation of extreme values.

MAT671 Mathematics for Robotics
Contact: Two hours of lectures and tutorials per week for one semester.
Prerequisites: Nil.
Syllabus: Revision of trigonometric (sin, cos, tan) and circular functions, reduction to first/fourth quadrant, radians, inverse circular and calculator equation. Elementary vector analysis as applied to displacement and velocity. Solid geometry: three dimensional geometry of points, lines and planes. Matrices, determinants, inverse matrices, rank, linear independence. Numerical methods, errors, fixed and floating point operations, polynomial approximations, look-up tables, interpolation.
Assessment: Written tests and assignments.

MEC202 Fluid Mechanics I
Contact: Two hours per week for two semesters.

MEC204 Machine Design and Manufacture
Contact: Four hours per week for two semesters.
Syllabus: Casting processes. Cold working and hot working of metal. Power metallurgy: compacting and sintering and applications. Welding and applied processes - welding metallurgy, heat affected zone, weld cracking. Surface finishing - electroplating principles, electro-machining, hot dipping, anodizing processes, decorative coating. Manufacturing processes for plastics, rubber and ceramics. Machining processes: shaping, planing, drilling, turning, boring, milling and broaching; thread and gear cutting. Metrology: principles of basic measurement and gauging, sources of error, surface texture measurement. The relevance of the scale of production and the economics of alternate processes. Machine Design: stock machine elements and components, bearings, flexible and rigid couplings, gears, splices, belt and chain drives, lubricating devices, fluid power units, lifting tackle. Engineering drawing: surface texture symbols, size tolerancing, geometric tolerancing. Functional and spatial design through the use of layouts and assembly drawings. The "design cycle" of a product from the initial need through design, manufacture, use and disposal; introduction to creative design. Influences of manufacturing processes on design. Force analysis, mathematical models, selection of materials and working stresses, shock loads, secondary design problems. Analysis and design of components, e.g. beams, shafts, keys, bolted and welded joints with central and eccentric loading. Simple boundary-lubricated bearings: materials, allowable bearing pressures, PV. Design to resist fatigue failure, Goodman diagram, application to components such as shafts and pre-loaded bolted joint. Selection of stock power-transmission units.

MEC207 Workshop Practice
Contact: Thirty-five hours.
Prerequisite: As prescribed under Progression Through the Course.
use of hand tools, metrology, milling, drilling, tapping, hand forging and simple heat treatment.

MEC211 Mechanics of Solids and Machines
Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


MEC301 Mechanical Engineering Design I
Contact: Two hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.

Syllabus: Preliminary design decisions, optimisation in design, design for reliability and noise control, design of dynamic systems, design against wear and corrosion. Introduction to tribology, rolling-element bearings, journal bearings and lubrication. Detailed design of spur gears, selection of fluid power units, detailed design of structures, lifting equipment and pressure vessels in accordance with Australian Standard Codes.


STANDARDS ASSOCIATION OF AUSTRALIA: AS 1250 Steel Structures Code; AS 1403 Shafts for Power Transmission; AS 1418 Crane Code; AS 1210 Unfired Pressure Vessel Code.

MEC304 Engineering Materials
Contact: Three hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


MEC308 Process Control
Contact: Two hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


MEC309 Thermofluid Dynamics

Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


MEC311 Mechanics of Solids and Machines II

Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


MEC356 Thermo-Fluids

Contact: Two hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.

Syllabus: Properties of fluids: thermodynamic properties of simple compressible substances, thermodynamic property tables, ideal and perfect gas approximations. Psychrometry: thermodynamic properties of air-water vapour mixtures, psychrometric chart, application to air-conditioning, comfort considerations. Control volume analysis: applications of the continuity, momentum and first law of thermodynamics equations to control volumes involving compressible and incompressible flows. Heat transfer: fundamentals of heat transfer by conduction, convection and radiation, application to heat exchanger design. Dimensional analysis: principles of similarity and dimensional analysis. Applications to internal and external...
flows, rotodynamic machinery and convective heat transfer. Instrumentation: measurement of pressure, temperature, flow and power.


**MEC401 Mechanical Engineering Design II**

Contact: Five hours per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.

Syllabus: A major design project involving a complex engineering system, under the auspices of an industrial organisation and Chisholm. Layout planning, specification for plant and selection of thermal or fluid equipment will be involved, as well as detailed investigation of selected design problems. Lectures will cover some of these topics plus advanced design organisation, noise control, environmental issues, advanced computer modelling and selection of proprietary items of plant such as pumps.

**MEC408 Lubrication and Wear**

Contact: Two hours per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.


CAMERON, Basic Lubrication Theory, Ellis Norwood, 1981.


**MEC409 Automation: Mechanisms and Control**

Contact: Two hours per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.

Syllabus: Algebraic and coordinate transformation methods; differential relationships; motion trajectories joint and cartesion; Lagrangian mechanics; dynamic equations. Control theory: an overview of hydraulic, pneumatic, electrical elements; actuators; step motors, modelling, drive and control; sensors and digital sampling, position servo control, force feedback control and adaptive control models. Forces; forces and torques in various coordinate frames and joint forces and torques. Compliance; force, touch, vision and position feed-back related to homogenous transformations. Computers; control strategies and programing languages.


**MEC411 Mechanics of Solids & Machines III**

Contact: Four hours per week for two semesters.

Prerequisites: As prescribed under Progression Through the Course.


MEC412 Thermodynamics, Heat and Mass Transfer

Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.


MEC421 Principles of Mechanics of Machines

Contact: Two hours per week for one semester.
Prerequisite: Nil.

Syllabus: Elementary kinematics and kinetics of particles in rectilinear and curvilinear motion. Motion of rigid body. Components of machines and mechanisms. Displacement, velocity, acceleration and simple force transmission in planar linkages and other mechanisms. Vibrations in simple mechanical systems, damping, forcing and excitation.


MEC622 Machines and Mechanisms

Contact: Two hours per week for one semester.
Prerequisites: MEC621, or equivalent.


MEC631 Project Management I

Contact: Three hours per week for one semester.
Prerequisite: Nil.

Syllabus: Project management as a specific branch of management. The project cycle, requirement, viability study, budget preparation, submission, appraisal, planning the project as a means to control and achieve objectives, execution and commissioning. Projects as a control mechanisms: measurement and control techniques, design and role of information systems. Critical path networking: arrow, node, precedence, PERT, objectives, role, function and limitations of networking. Development of control reports and management reports, use of information systems for planning, motivation, control and reporting. Case studies.

HARRISON, F.L., Advanced Project Management, 1985
HAJEK, G, Management of Engineering Projects, 1984
LOCK, D (Ed), Project Management Handbook, 1987
STALLWORTHY, E.A. Total Project Management: From Concept to Completion, 1983.

MEC632 Project Management II

Contact: Three hours per week of study for one semester.
Prerequisite: ACC612

Syllabus: Factors influencing project cost; design considerations, planning for cost control, overhead costs, purchasing policies, the effect of schedule delays on project costs. Management information and control systems. Communication; systems concepts, nature of information. Cost fundamentals; production costs, variable and semi-variable costs, breakeven analysis, budgets and budgetary control. Owner-capital finance for projects, cash flows, design costs, estimating, expenditure forecasting. Network analysis as a basis for cost control, risk sharing. Contractor capital financing, profitability, cost controls. Performance control; performance guarantees, turn-key by comparison.
with in-house designs, design verification. The cost/sched-
ule control system, ACWP, BCWP, BCWS, areas of appli-
cation, value and limitation.

BERRY, A D and DUHIG, T, (ed). Integrated Project

CLELAND, I. Systems Analysis and Project Management,
1983.

KHARBANDA, O P & STALLWORT, E A, Project
Control in Action, 1983.


MEC633 Project Management III

Contact: Three hours per week for one semester.

Prerequisite: MEC631.

Syllabus: Project management and the managerial process. Environmental and structural influences on project management in Australia; environment complexity, socio-technical change, types of organisational structure, coordination and control mechanisms. Networks in information management and the role of project manager as coordinator and innovator. Management styles, motivational techniques, resolution of conflict, leadership. Committee management, team building, negotiations. Organisational change and development resistance to change, organisational objectives of 1990's, human resource management.


DeBONO, E, Lateral Thinking for Management: A Hand-


MEC634 Project Management IV

Contact: Three hours per week for one semester.

Prerequisite: Nil.


Australian Standards as appropriate.

MEC639 Project Evaluation

Contact: Three hours per week for one semester.

Prerequisite: MEC632


MEC640 Project Management Case Studies

Contact: Three hours per week for one semester.

Prerequisites: MEC631, MEC632, ACC612 and MEC639.

Syllabus: A study of a range of real and hypothetical project management exercises drawn from industry. Emphasis will be placed on the interpersonal aspects of the managerial role. A variety of presentation methods including films, role playing and analysis of video replay. Reading assignments and tutorials.

MEC641 Industrial Project

Contact: Three hours per week for one semester.

Prerequisite: MEC640.

Syllabus: Preparation of a project planning and control schedule demonstrating the major features of project management as presented in the course and in the reference literature. Students will be encouraged to base their project within a familiar framework such as their current working environment. There will be tutorials and individual supervision of the work.

MKT332 Marketing and Product Innovation

Contact: One semester, 28 hours

Prerequisites: DES300

Syllabus: To provide a basic understanding of the principles of marketing and of the application of marketing techniques in the business environment. To develop an appreciation of the skills necessary to market and sell technological products. Students should become capable of explaining the role of marketing in business; understanding the use of segmentation and market research techniques; identifying product life cycles for design products; understanding the components of a marketing mix; explaining the role of selling as a marketing strategy; demonstrating presentation techniques and explaining the importance of communication in presentation and selling skills.

Topics: Introduction to marketing, the product and consumers; market definition-segmentation, buyer behav-
Product mix, life cycle, diffusion of technology, new product development; the marketing mix-price decisions, advertising and promotion, elements of the marketing mix. Selling as a marketing strategy: product knowledge; presentation and communication techniques; basic salesman-ship; selling technology and concepts.

Assessment: Assignments and presentations: 50 per cent Tests: 50 per cent


MKT681 Digital Communications Marketing (incorporates MKT601 Robotics Marketing)

Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus: The analysis of marketing problems: finding out about customers, competitors, resources supplies, regulations, pressure groups, the economy, organisational contraints and opportunities. Solving marketing problems: the use of product/market policy and tactical tools, particularly pricing, advertising, direct mail, sales literature, exhibitions, personal selling, distribution and after sales service.


PHY120 Physics

Contact: Three hours theory, three hours laboratory work, and one hour tutorial per week for two semesters.
Prerequisite: VCE Physics (recommended).
Syllabus: Electrical measurement, energy and fields, waves and optics, AC and electronics and modern physics.
Texts: The First Year Laboratory Manual must be purchased from the Bookshop.

GIANCOLI, D.C., Physics for Scientists and Engineers with Modern Physics, Prentice Hall 1988.


PHY130 Computer Science

Contact: Five hours per week including lectures and laboratory work.
Prerequisite: VCE Mathematics A. Physics and/or Computer Science (recommended).
Syllabus: Introduction to digital logic including number systems, codes, adders, decoders, code converters, multiplexers, comparators, flip-flops, registers and counters. Introduction to computer organisation and architecture including memory, buses, processor unit, control logic, micro-operatons, instruction codes. Introduction to microcomputers - the IBM PC and its operating system. Structured programming and data structures in the Pascal Language including arrays, records, pointers, files, list structures, trees and recursion.

The First Year Laboratory Manual must be purchased from the Bookshop.


PHY150 Physics

Contact: Two hours per week for two semesters.
Prerequisite: Nil.
Syllabus: Waves and Optics: SHM, energetics of SHM, waves and wave propagation, superposition principle, Doppler effect, standing waves, interference and diffraction. Physics of Measurement: The stathmology loop, transducers, first and second order linear systems, Fourier series and spectral analysis, noise and signal filtering. Modern physics: Photoelectric effect, Compton scattering, x-rays, the Bragg law, de Broglie's hypothesis, the Schro- dinger equation, electronic configuration of atoms, semi-conductors, nuclear physics, lasers and holography.


CHISHOLM INSTITUTE OF TECHNOLOGY, PHY150 The Physics of Measurement (Course Notes), Department of Applied Physics, 1989.

PHY190 Physics 1

Contact: Two hours lecture and two hours practical work per week for two semesters.
Prerequisites: Nil.
Syllabus: Applied Mechanics: Newton's law of motion: conservation of energy and momentum; oscillatory motion; resonance. Wave types: Doppler effect; beats and modulation. Ray optics; image formation and optical systems; optical fibres. Wave optics; interference; diffraction and polarisation of light and its applications. Electromagnetism: electric fields; Gauss's law; magnetic fields; Ampere's law; electromagnetic induction and Faraday's law; the electromagnetic wave equation. Mechanical properties of solids, liquids and gases. Thermal, electric and magnetic properties of materials. Quantum physics: photoelectric effect; Compton scattering; de Broglie's hypothesis; hydrogenic atoms; the Schrodinger equation; quantum number; band theory of solids; semiconductors; lasers.

The PHY190 Laboratory Manual must be purchased.

PHY226 Physical Astronomy

Contact: Three hours per week for two semesters.
Prerequisite: To have attempted the first year of the Applied Science multi-discipline course. This subject is a
half point elective of interest to all science students and especially to prospective teachers. It is available to multidiscipline degree students. The course includes the use of telescopes, the planetarium and excursions to astronomical observatories.

**Syllabus:** Basic concepts of astronomy, including use of star charts and catalogues; theory of space, time, matter and gravitation; measurement techniques; telescopes, detectors, instrumentation; the space program; Earth and the solar system; solar and stellar astronomy including stellar evolution, galactic collapse, novae, pulsars, black holes; galaxies; quasars; cosmology.

**FRIEDLANDER, A., Astronomy, from Stonehenge to Quasars, Prentice-Hall, 1985.**

**PHY228 Milestones in Contemporary Science**

**Contact:** Four hours per week for one semester, or two hours per week for two semesters.

**Prerequisite:** Nil

**Syllabus:** An overview of the process of science via readings in some milestones in contemporary science, e.g. the Nobel Awards. An examination of the social and economic implications of science on contemporary society and vice versa. Scientists as human beings and debates on the social responsibilities of scientists. The course is to be learner-orientated rather than instructor orientated. Students will be allowed a reasonable amount of freedom in the choice of topics for assignment work.

**Assessment:** Written assignments, oral presentation and class participation.

**PHY235 Scientific Photography**

**Contact:** Two hours theory per week and two hours per fortnight of laboratory work for two semesters.

**Syllabus:** Basic Principles: camera, lenses, filters, systems. Physics and chemistry of photography, black and white, colour. Information density. Resolution. Special forms: infrared, ultraviolet, X-ray, Polaroid, Xerox. Applications: Use of conventional, high speed, time lapse, holographic, Schlieren and special forms of photography in areas such as biology, ecological studies, physics, chemistry and engineering; e.g. microscopy, crack detection, shock wave analysis, densitometry, thermography.

**PHY236 Computer Imaging**

**Contact:** A course of two hours theory and two hours of laboratory work per week for two semesters.

**Prerequisite:** PHY130.

**Syllabus:** Image Formation: Visual perception, TV signals, cameras, sampling and digitisation, other input devices, computer memory requirements, basic computer graphics. Data Manipulation: Thresholding and contrast operations, averaging and filtering, image enhancement and noise reduction. One and two dimensional Fourier transforms. Applications: Pattern recognition, segmentation, radiography, tomography, speech analysis and computer vision.

**BALLARD, D.H. & BROWN, C.M., Computer Vision, Prentice Hall, 1982.**

**CASTLEMAN, K., Digital Image Processing, Prentice-Hall, NJ, 1979.**

**PHY250 Physics**

**Contact:** Three hours theory and two hours laboratory work per week for two semesters.

**Prerequisite:** PHY120.

**Syllabus:** AC and network theory, electromagnetism, quantum physics, nuclear physics, optics, and materials physics.

**EISBERG, R. & RESNICK, R., Quantum Physics, Wiley, 1984.**

**FRANKL, D.R., Electromagnetic Theory, Prentice-Hall, 1986.**

**HECHT, A. & ZAJAC, J., Optics, Addison-Wesley, 1987.**

**KITTEL, C., Introduction to Solid State Physics, Wiley, 1976.**

The Second Year Laboratory Manual must be purchased from the Bookshop.

**PHY255 Physics**

**Contact:** Five hours theory and five hours laboratory per week for two semesters.

An equivalent standing to this Minor, PHY255, may be gained by successfully completing both the electives PHY250 and PHY260.

**Prerequisite:** PHY120.

**Syllabus:** AC and network theory, electromagnetism, quantum physics, nuclear physics, optics, materials physics, instrumentation, acoustics, analogue and digital electronics and introduction to microprocessors.

**EISBERG, R. and RESNICK, R., Quantum Physics, Wiley, 1984.**

**FRANKL, D.R., Electromagnetic Theory, Prentice-Hall, 1986.**

**HECHT, A. & ZAJAC, J., Optics, Addison-Wesley, 1987.**

**KITTEL, C., Introduction to Solid State Physics, Wiley, 1976.**

**GREENFIELD, J.T. and WRAY, W.C., Using Microprocessors and the 6800 Family, Wiley, 1981.**


The PHY255 laboratory manual must be purchased.

**PHY256 Computer Vision**

**Contact:** Four hours theory and four hours laboratory per week for two semesters. An equivalent standing to this Minor, PHY256, may be gained by successfully completing both the electives PHY236 and PHY336.

**Prerequisite:** PHY130.

**Syllabus:** Video signals and standards, digital image formation, image filtering, transformation of images, automated inspection, texture analysis, data compression, pattern recognition and medical and geological applications of image analysis. Laboratory work complements the theory course.
PHY260  Physics
Contact: Two hours theory and three hours laboratory work per week for two semesters.
Prerequisite: PHY120.
Syllabus: Instrumentation, acoustics, digital electronics, analogue electronics. Introduction to microprocessors.
The Second Year Laboratory Manual must be purchased from the Bookshop.

PHY291  Instrumentation Physics
Contact: Two hours lecture, and one hour laboratory work per week for two semesters.
Prerequisite: PHY190.
The PHY291 Laboratory Manual must be purchased from the Bookshop.

PHY333  Applied Science Thesis/Project
Contact: Three hours per week for two semesters.
Prerequisites: A student must be completing the final year of his/her degree, including PHY350 Physics 3.
Syllabus: There is no formal syllabus. Students make a contact with a member of the Applied Physics Department to work in an area of mutual interest. Currently these areas are acoustics, computer imaging, instrumentation, materials, tomography and x-ray analysis.

PHY336  Advanced Computer Imaging
Contact: Two hours theory plus two hours laboratory work per week.
Prerequisites: PHY236 and at least one of PHY255, PHY260, RDT281.
Syllabus: Imaging optics: hardware and software requirements. Transforms in imaging: a thorough discussion of point, spatial and statistical transforms in 1D and 2D imaging, especially filtering, compression and enhancement of visual images. Representations of images: an analysis of 2D and 3D representations of images. Shape description and feature extraction. Pattern recognition, artificial intelligence, data compression techniques, texture analysis. Problems of imaging in geological, medical, industrial and art environments. This section will consist of case studies taken from the above fields.

PHY350  Physics
Contact: Four hours theory, one hour tutorial and five hours laboratory per week. This subject is taken by students doing the Bachelor of Applied Science course.
Prerequisite: PHY255.
Syllabus: Instrumentation, electromagnetism, materials, acoustics, computer interfacing, nuclear physics, optics, advanced instrumentation and signal processing.
The Third Year Laboratory Manual must be purchased from the Bookshop.

PHY390  Computer Image Processing
Contact: Four hours per week for one semester.
Prerequisites: MAT228, MAT229, RDT246.
Syllabus: Review of computer imaging, point and spatial operations, statistical operations, edge detection, encoding of images, segmentation and feature extraction, transformations of images. Applications: some of the following topics will be considered in detail: data compression; pattern recognition; gauging; blob analysis.

PHY611  A Thousand Words – A Million Pixels
Contact: Three hours per week for seven weeks.
Prerequisite: Entry requirements into the Computer Graphics Graduate Diploma.
Assessment: Practical work, assignments, examination (mandatory pass).
DEKEN, J., Computer Images, Thames and Hudson, 1983.

PHY612  Visual Realism
Contact: Three hours per week for seven weeks.
Prerequisite: Normal progress through the Computer Graphics Graduate Diploma.
Syllabus: Two dimensional objects, principles drawn from psychology and art and design practice governing the perception of images in two dimensional displays. Three dimensional objects, difficulties of representing three dimensional objects in two dimensions. Techniques for improving realism, removal of hidden lines and surfaces, shading, texture, colour, use of dynamic images stereopsis. Application of principles to computer displays used in design, simulation, entertainment and advertising. Laser disc, holograms.

Assessment: Practical work, assignments, examination (mandatory pass).


Recent articles in *IEEE Computer Graphics and Applications*.

**PHY613 Image Generation and Processing**

Contact: Three hours per week for seven weeks.

Prerequisite: Normal progress through the Computer Graphics Graduate Diploma.

Syllabus: The place of imaging and image processing in graphics. Image acquisition and display systems. Problems of image correction and restoration. Mapping—intensity and spatial transformations. Motion detection and deblurring. Applications to modern image processing systems in technology and medicine.

Assessment: Practical work, assignments, examination (mandatory pass).


**PHY691 Industrial Machine Vision Systems**

Contact: Two hours per week for one semester.

Prerequisites: RDT636 and RDT639.


Assessment: Written tests and assignments.


**PSY192 Applied Social and Behavioural Studies**

Contact: Four hours per week by one semester.

Prerequisite: Nil.

Syllabus: Sociology: Participant observation and ethnography, egalitarianism, democracy and capitalism: an analysis and exploration of these basic terms. A critical perspective on social life and development, what major visions of the past shape our present, and what current strategies for the re-ordering of our future constrain our present, will be examined. Psychology: perception, learning and memory; social perception and social learning; motivation; basic concepts of personality; group dynamics and behaviour; leadership; environment and behaviour.


**PSY194 Applied Psychology**

Contact: Two hours lecture/tutorial per week for one semester.

Prerequisite: Nil.

Syllabus: Human mechanisms for information processing, perceptual abilities, learning and memory, skills and work, ergonomics, stress.

**RDT130 Software Development I**

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.

Prerequisite: Nil.

Syllabus: An introduction to computer resources, computing techniques, and the Pascal programming language. Structured programming, data types, data flow, functions and procedures. Students may qualify in this subject at an early stage by passing a challenge exam.

**RDT132 Digital Design I**

Contact: Two hours lectures, two hours practical, one hour tutorial work per week for one semester.

Prerequisite: Nil.

Syllabus: Binary number system, binary codes, Boolean algebra. Combinational and sequential logic, logic families and implementations. Digital design techniques and applications.


**RDT140 Software Development II**

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.

Prerequisite: RDT130.

Syllabus: Program design and data structures, operating systems, compilers, libraries, linkers, loaders, editors. Topdown development, testing and debugging strategies.

**RDT142 Microprocessor Applications I**

Contact: Two hours lectures, two hours practical, one hour tutorial work per week for one semester.
Prerequisites: RDT130, RDT132.

RDT230 Software Development III
Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: RDT140.
Syllabus: Unix operating system user interface. System programming languages, e.g. C. Advanced programming techniques: state driven, data driven programs.

RDT231 Systems Software
Contact: Two hours lectures or tutorials per week for one semester.
Prerequisite: RDT140.
Syllabus: Modes of computer operation: dedicated, batch, RJE, timesharing, transaction processing, large-scale real time. Operating system control, command languages, job flow, spooling. Secondary storage, data and programs, control and access. File organization, DBMS.

RDT232 Digital Design II
Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: RDT142.

RDT233 Digital Electronics I
Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisites: RDT132, ELE130.

RDT234 Electronics II
Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: ELE130.

RDT240 Software Engineering
Contact: One hour lecture, two hours tutorial work per week for one semester.
Prerequisite: RDT230.

RDT241 Operating Systems
Contact: Two hours lectures, one hour tutorial work per week for one semester.
Prerequisite: RDT230.

RDT242 Microprocessor Applications II
Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: RDT232.

RDT243 Digital Electronics II
Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisites: RDT233, RDT234.

RDT246 Signals and Systems
Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisites: MAT124.
Corequisites: MAT228, MAT229.
Syllabus: Signal representation, properties of systems; time and frequency domain analysis; Laplace, Z, Fourier transforms; sampling theorem. Analog–digital modulation and detection, noise, coding, communication, error detec-
tion/correction. System stability, time response, steady state and dynamic control.

RDT281 Computer Science II

Contact: Six hours of classes per week for two semesters.
Prerequisites: PHY130.
Syllabus: This subject is divided into a number of compulsory and optional units.

Compulsory Units

Microprocessor architecture and programming: (four hours per week for one semester). Architecture of the 68000 microprocessor, hardware configurations, assembler programming, interrupt management, algorithm design techniques. Systems software: (two hours per week for one semester). Modes of operating computers, job flow, storage and file management, compilers, linkers, loaders, debugging systems. Operating systems: (two hours per week for one semester) multiprogramming, memory management, input/output mechanisms, concurrent processors, deadlocks. Optional units: to complete the subject at least four semester hours (i.e. four hours in one semester, or two hours in each of two semesters) of optional units must be taken. A list of subjects which may be taken to provide the optional units is below. Students are strongly advised to take one or more computer science elective subjects in addition to this subject.

Optional Units

The following subjects can be used either to accumulate semester hours to complete the Computer Science minor and major subjects (RDT281 and 381), or as free standing electives. See the individual subjects for syllabus details: Artificial Intelligence (RDT282), C Programming & Unix (RDT283), Computer Graphics (RDT351), COBOL Programming (SFT290), Fortran Programming (MAT216), Information Storage and Retrieval (COT290), Introduction to Data Communications (RDT284), Introduction to Instrumentation (RDT285), Numerical Computing (MAT217), Real Time Systems & Programming (RDT330), Robotics (RDT353), Systems Analysis & Design (SYS290).
Assessment: Practical work and examinations.

RDT282 Artificial Intelligence

Contact: Two hours per week for one semester.
Prerequisite: RDT281
Assessment: Examination, Assignments and Practical Work.

RDT283 C Programming and Unix

Contact: Four hours per week for one semester.
Prerequisite: PHY130
Syllabus: Unix operating system, user interface, System programming language, C. Advanced programming techniques e.g. state driven programs, data driven programs.
Assessment: Examination, Assignments and practicals.

RDT284 Introduction to Computer Communications

Contact: Two hours per week for one semester.
Prerequisite: PHY130
Assessment: Examination and Assignments.

RDT285 Introduction to Instrumentation

Contact: Two hours per week for one semester.
Prerequisite: PHY130
Syllabus: Transducer principles for conversion of important physical variables into electrical analogue signals, sensor characteristics and application. Practical considerations, linearization, signal conditioning, filtering, measurement techniques in noisy environments. Analogue to digital conversion techniques, interfacing with digital computer for signal processing.
Assessment: Assignment work and Written test.

RDT330 Real Time Systems and Programming

Contact: Two hours lectures, one hour tutorial work per week for one semester.
Prerequisite: RDT241, or RDT281 + RDT284
Syllabus: Applications for real-time systems, problems of implementation, basic principles of real-time programming, tasking and processor scheduling, synchronisation, interprocess communication, multiprocessor systems, reliability, design methodologies, concurrent high level languages.

RDT332 Digital Design III

Contact: Two hours lectures, two hours practical work per week for one semester.
Prerequisites: RDT232, RDT243.
Syllabus: Circuit product design techniques, design rules, CAD packages, optimisation criteria, manufacturing technologies. Complex bus structures: protocols and interfacing, S100, GPIB, VME, Multibus II. Designing with intelligent digital devices: controllers, signal processors, communication devices. Computer architectures: micros to super computers, multiprocessor systems, bit slices, RISC.

RDT334 Microchip Design I

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: RDT243.
Syllabus: MOS devices and circuits, integrated system fabrication, data and control flow, structural design methodology for LSI and VLSI implementation of integrated system designs.

RDT335 Signal Processing

Contact: Two hours lectures, two hours practical/tutorial work per week for two semesters.
Prerequisites: MAT228, MAT229, RDT246.
Syllabus: Periodic and aperiodic signals, time and frequency domain descriptions, Fourier and Laplace transforms, network response, analog filters, sampled data, Z transforms, FFTs, spectral analysis, applications of digital signal processing to speech, audio and image processing.

RDT336 Project

Contact: Six hours per week for two semesters, including tutorials, seminars and interviews.
Prerequisites: All second year subjects.
Syllabus: Project selection: to involve both digital hardware and software; Specification: scheduling, costing, material sourcing, justification; personal task management; reporting of progress; testing and evaluation; report writing.
References: Journals, manufacturers' literature.

RDT340 Software Systems Implementation

Contact: One hour lecture, two hours tutorial work per week for one semester.
Prerequisite: RDT330.
Syllabus: Detailed examination of a major item of systems software, e.g. a communications driver. Implementation of representative items of software.

RDT350 Intelligent Systems

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: RDT240.
Syllabus: Artificial Intelligence and its role in robotics, information, data, language and communication. Lisp and its use in AI. Data stream analysis, feature extraction, knowledge representation and processing, pattern recognition, levels of understanding, problem solving, expert systems.

RDT351 Computer Graphics

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisites: MAT228, MAT229, or RDT281 + MAT201

RDT352 Computer Communication and Networks

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: RDT246.
Syllabus: Survey of applications of data communications and computer networks, the layer model for communication processes, asynchronous and synchronous communication, line control protocols. Bit-oriented protocols, packet switching, HDLC and X25 interface. Telecom data services, proprietary network architectures, ISO model for Open Systems Interconnection. Data security and encryption, local area networks.

RDT353 Robotics

Contact: Two hours lectures, two hours practical/tutorial per week for one semester.
Prerequisites: RDT243, RDT246, MAT228, or RDT281 + MAT201.
Syllabus: Introduction and history of robotics, architecture, geometry and kinematics, actuators, and effectors, sensors, control, programming industrial robots, applications.

RDT354 Microchip Design II

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: RDT334.
HURST, S.C., Custom Specific ICs, Marcel Dekker, 1985. CAD Tool Manuals.

RDT381 Computer Science III

Contact: Six hours of classes per week for two semesters.
Prerequisite: RDT281
Syllabus: This subject consists of a compulsory project, Software Engineering unit, and a number of optional units. Project: A major software project in a language studied in the course. If appropriate, some hardware development may be included. Lecture/tutorial sessions in project definition, planning, scheduling and evaluation. Soft-
ware Engineering: (one hour per week for two semesters). Requirements definition, software specification and design, software tools and programming methodology, program portability. Testing and debugging, quality assurance. Documentation and maintenance. Software management, scheduling and cost estimation. Chief programmer teams, team dynamics. The psychology of managing programmers. To complete the subject at least eight semester hours (an average of four hours contact in each of the two semesters) of optional units must be taken. See under RDT281 for descriptions of the optional units. Students are strongly advised to take one or more Computer Science Elective subjects in addition to this subject.

Assessment: Practical work and examinations.

RDT601 Communications Project
Contact: This project is completed over two semesters. No formal contact hours are prescribed, but students are expected to spend an average of at least four hours per week on their project.

Prerequisites: Students may start their project when sufficient units have been completed to form a suitable basis for the work proposed. This will normally be approximately half way through the course.

Aims: To consolidate and extend the student’s knowledge of communications by application to a practical problem. To complete the assessment process; students must demonstrate that they have not just acquired theoretical knowledge but that they can apply that knowledge to real-life situations. To develop the student’s project management skills in such areas as planning, goal setting, progress monitoring and report writing.

Syllabus: Project topics are individually chosen in conjunction with the course leader and will normally involve an area of particular interest or importance to the student. The project may be related to the student’s employment or personal activities or it may involve work of use to Chisholm Institute of Technology. The project will involve practical work and the submission of a report of between 8,000 and 15,000 words.

RDT628 Assembly Automation
Contact: Two hours per week for one semester.
Prerequisite: RDT632.
Syllabus: Assembly procedures including mechanical and electronic industrial assembly, SCARA robots, external sensing requirements, compliance in wrists, control loops for assembly programming, high-level programming language requirements, gripper design, preconditioning of production parts, material handling, methods of parts delivery, interfacing to industrial equipment, product design for assembly, work station layouts, flexible manufacturing system, economics of automated assembly.

Assessment: 20 per cent by assignment, 80 per cent by written test.


RDT629 Advanced Robot Programming
Contact: Two hours per week for one semester.
Prerequisite: RDT632.
Syllabus: Off-line robot control languages, an overview: AML(IBM), RAIL, Automatix, ARCL and VAL II etc., assembly programming requirements, vision control principles, vision and sensor-based programming, vision for measurement, VAL II programming, file handling, I/O and external interrupts.

Assessment: 50 per cent by assignment, 50 per cent written test.


RDT630 Robotics I
Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus: Overview of robotics; current and future applications of robotics; elements of a modern robotic device: drive, feedback control, programming methods, sensors. End effectors; design considerations, operational constraints. Introduction to the kinematics of robots. Introduction to path and trajectory control. Robot based manufacturing systems; concepts and practical considerations. Social financial implications of robotic installations.

Assessment: Written test and assignments.


RDT631 Robotics II
Contact: Two hours per week for one semester.
Prerequisite: RDT630.
Syllabus: Robot geometry and kinematics: matrix transforms leading to kinematic equations; inverse kinematic solutions to joint angles. Formulation of manipulator Jacobians. Motion trajectories; planning aspects, joint coordinated and interpolated motion. Control: servoloops, electronic hardware, techniques of servocontrol, role of the microprocessor. Programming: interfacing to computers; programming languages of industrial robots. Sensing devices; tactile sensing; vision, speech.

Assessment: Written tests and assignments.


Selected journal articles and research papers, lecture notes.
RDT632  Robotics III
Contact: Two hours per week for one semester.
Prerequisites: RDT630, RDT631.
Syllabus: Application case studies including consideration of financial and social issues. Economic analyses of installations. Safety issues (the Australian Standard). Processes suited to robotics applications; system approach to robotics in manufacturing. Task planning; group technology; flexible manufacturing systems. Selection testing procedures; research and development trends in robotics; artificial intelligence and robotics. General robotics.
Assessment: Written tests and assignments.


Lecture notes.

RDT633  Robotics Practical I
Contact: Two hours per week for one semester.
Corequisite: RDT630.
Syllabus: Laboratory work and exercises to acquaint the student with the structure, geometry and programming of typical robots.
Assessment: Laboratory work, assignments and reports.
References: Selected robot manuals and journal articles.

RDT634  Robotics Practical II
Contact: Two hours per week for one semester.
Prerequisite: RDT633.
Syllabus: This unit consists of a set of experiments on robot applications such as material handling and arc-welding. Case studies of current applications of robots (plant visits) will be undertaken.
Assessment: Laboratory work, assignments and reports.
References: Manufacturers’ manuals and journal articles.

RDT635  Robotics Project A
Contact: Two hours per week for two semesters.
Prerequisites: RDT631 and RDT634.
Syllabus: Projects may be of an investigational, research or constructional nature in relation to the applications of robotics.
Assessment: Practical work, written reports and oral presentation.

RDT636  Computing Systems and Software
Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus: The digital computer: architecture, control, manipulation and storage of data as binary code. Relationship between hardware and software. Operating systems, compilation, assembly, linking, loading and execution of programs. User friendly systems and man-machine interface.


RDT637  Control Systems
Contact: Two hours per week for one semester.
Prerequisites: Nil.
Assessment: Written tests and assignment work.


RDT638  Digital Electronics
Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus: Number systems, logical functions and gates, combinational logic, sequential logic and their applications. LSI devices: ROM, RAM, PLA and microprocessors. The structure and operation of commonly used microprocessors and addressing modes, program and interrupt control, input/output devices.

RDT639  Physical Instrumentation
Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus: Introduction to transducers, signal interfacing, amplification, linearisation, noise. Analog and digital instrument parameters and limit sensing. Concept of accuracy, precision, dynamic range, resolution, errors and repeatability.
Assessment: Written tests, laboratory work and assignments.


RDT640  Production Planning and Management
Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus: Introduction to elementary accounting and financial decision making. Production system fundamentals; work flow analysis; group technology. Production management; man-machine and the work place; industrial and employee relations; wages and awards.
Assessment: Written tests and assignments.
RD T641  Software Development

Contact: Two hours per week for one semester.
Prerequisites: RDT636; RDT638, or equivalent.

Syllabus: Algorithmic processors, structural languages and the design of structural processes. Real-time processes and programming, concurrent languages. Software development tools, hardware/software integration and trade-offs. In-circuit emulation, real-time prototype analysis.

Assessment: Written tests, laboratory work and assignment.


Manufacturers' manuals.

RD T642  Industrial Systems and Human Factors

Contact: Two hours per week for one semester.
Prerequisite: Nil.


Selected papers and articles.

RD T643  Robotics Project B

Contact: Four hours per week for two semesters.
Prerequisites: RDT631 and RDT634.

Syllabus: Projects may be of an investigational, research or constructional nature in relation to the applications of robotics.

Assessment: Practical work, written reports and oral presentation.

RD T644  Computer Aided Design with Graphics

Contact: Two hours per week for one semester.
Prerequisite: RDT636, or equivalent.


RD T645  Robot Communication and Control

Contact: Two hours per week for one semester.
Prerequisites: Nil.

Syllabus: Computer network architecture. The flexible manufacturing system as a partial data-driven automation system. Application of real-time systems in robot communication and control.

Assessment: Written tests and assignment work.

RD T646  Microelectronic Technology and Design

Contact: Two hours per week for one semester.
Prerequisite: RDT638, or equivalent.

Syllabus: Introduction to present fabrication technology for microelectronic devices. Design rules for existing processing technique. Design tools commonly used in VLSI design.


RD T647  Artificial Intelligence

Contact: Two hours per week for one semester.
Prerequisite: RDT636, or equivalent.

Syllabus: The role of artificial intelligence in robotics with emphasis in processes like pattern recognition, natural language understanding and multidimensional presentation. Simple problem solving algorithms. Programming languages for artificial intelligence systems.

Assessment: Written tests and assignment work.

RD T648  Sensory Instrumentation

Contact: Two hours per week for one semester.
Prerequisite: Nil.


Assessment: Written tests, laboratory and assignment work.

RDT649 Introduction to Computer Integrated Manufacture
Contact: Two hours per week for one semester.
Prerequisite: RDT630.
Syllabus: The effect of CAD/CAM on the product cycle and automation. Design analysis, storage and retrieval; automatic drafting and part coding. NC machines, computer assisted process planning, NC part programming, material requirement planning, shop floor control and product scheduling. Computer assisted inspection and quality testing.
Assessment: Written tests and assignments.
Selected journal articles.

RDT650 Advanced Micro-processor Systems
Contact: Two hours per week for one semester.
Prerequisite: RDT638, or equivalent.
Syllabus: Microprocessor architectures, addressing modes and their applications, instruction sets, their relation with high level languages. Interrupt handling, parameter passing, modes of operations; Assembler level programming, typical bus systems, simple interfacing.
Assessment: By written tests and assignments.
STONE, H.S., Microprocessor Interfacing, Addison Wesley, 1982.
Selected articles and manufacturers’ manuals.

RDT651 Computer Principles I
Contact: Two hours per week for one semester.
Prerequisite: Nil.
Aim: This unit is for students with no previous experience with computers. It covers the principles of operation of stored-program computers and the basic principles of programming.
Syllabus: Digital representation of information. Principles of the stored program computer. Basic programming concepts. Introduction to high level languages for programming. The program development process.

RDT652 Computer Principles II
Contact: Two hours per week for one semester.
Prerequisite: RDT651, or equivalent knowledge.
Aim: This unit is for students with some experience of programming, who have had limited experience of computer systems and their applications. It covers the major software components of computer systems and the variety of ways in which typical systems are used. The major emphasis is on the principles of operating systems.
Syllabus: Varieties of uses of computers; different modes of operation. Purpose and principles of operating systems; process and memory management, command languages and job scheduling. Input/output operations; file concepts and data structures; introduction to database management.

RDT653 Digital Electronics Principles
Contact: Two hours per week for one semester.
Prerequisite: Nil.
Aim: This unit is for students with little or no experience of digital logic. It covers the operation of digital logic and how it can be used in computing and telecommunications equipment. It also introduces the principles of semiconductor integrated circuit manufacture and the economic importance of this technology.
Syllabus: Simple Boolean algebra. Combinational circuits, e.g. and, or, not, nand, nor. Complex combinational functions, sequential circuits and memory elements. Common logic families, e.g. TTL, ECL, MOS, CMOS. Introduction to semiconductor technology.

RDT654 Computer Networks I
Contact: Two hours per week for one semester.
Prerequisite: RDT651, or equivalent knowledge.
Corequisite: ELE635 Communications Principles I, or equivalent knowledge.
Aim: This unit is fundamental to the course. It covers the method of operation of typical, current computer communications networks and provides a basis for later units on the more advanced aspects of computer communication.
Syllabus: Simple asynchronous communications. Modems and modem interfaces, e.g. V24/RS232C. Synchronous communications. Principles of communications protocols; examples of protocols, e.g. bisync and HDLC. Introduction to advanced communications, e.g. packet switching, computer network architectures and local area networks.

RDT655 Computer Networks II
Contact: Two hours per week for one semester.
Prerequisite: RDT654.
Aim: This unit is fundamental to the course. It covers recent developments in two areas: the development of standards for open systems interconnection, particularly at the lower levels of communication; and the use of satellites and local networks as alternative mechanisms for data communications.

RDT656 Network Analysis and Design
Contact: Two hours per week for one semester.
Prerequisite: RDT654.
Aim: This unit is fundamental to the course. It covers the issues involved in analysing and designing a computer communications network.
Syllabus: User requirements; throughout considerations; queuing delays; circuit switched network design; errors and reliability; network topology; performance characteristics of complete systems.
**RDT657 Terminal-Based Systems**
Contact: Two hours per week for one semester.
Prerequisite: RDT651, or equivalent knowledge.
Corequisite: RDT652, or equivalent knowledge.
Aim: This unit is fundamental to the course. It covers the type of computer applications in which computer communications are used, and of the structure of software used for computer communications.

**RDT658 Communications Practical**
Contact: Two hours per week for one semester.
Corequisite: RDT654.
Aim: This unit is fundamental to the course. It is laboratory based and is intended to give students direct experience of using simple communications equipment. Students with extensive practical experience may claim exemption from this unit.
Syllabus: A set of laboratory classes involving terminals, modems, cabling, microprocessors, oscilloscopes, break-out boxes and other test equipment.

**RDT661 Computer Networks III**
Contact: Two hours per week for one semester.
Prerequisite: RDT654.
Aim: It covers recent developments in standards for the higher levels of communications.

**RDT662 Proprietary Network Architectures**
Contact: Two hours per week for one semester.
Prerequisite: RDT654.
Aim: This unit covers proprietary communications standards widely used in industry.
Syllabus: Early industry standards, e.g. binary synchronous. IBM5s System Network Architecture. Other representative proprietary network architectures. Proprietary network architectures implemented to ISO standards.

**RDT663 Local Communications**
Contact: Two hours per week for one semester.
Prerequisites: RDT653, ELE635, or equivalent knowledge.
Corequisite: RDT654.
Aim: This unit is for those involved in designing or implementing local connections. It covers techniques for computer communication over short distances, not involving Telecom services. The emphasis is on the hardware and physical-level aspects of local connections; higher level aspects are covered in RDT655 Computer Networks II.
Syllabus: Choices of media, e.g. cable, optic fibre, free space propagation. Fundamental issues, e.g. information representation, noise, error control. Existing standards, e.g. RS232C, RS422, RD423, IEEE488. Local area networks. Combined analog and digital signalling, e.g. PABX.

**RDT664 Public Telecommunication Networks**
Contact: Two hours per week for one semester.
Prerequisite: ELE635, or equivalent knowledge.
Aim: This unit is for those with an interest in the mechanisms of communications or who may be concerned with Telecom services. It covers the method of operation of the public switched telephone service and its likely future development.

**RDT665 Computer Communications Components**
Contact: Two hours per week for one semester.
Prerequisite: RDT654.
Aim: This unit is for those who may be involved in the selection or design of computer communications equipment. It covers the purpose and method of operation of available data communications components, with the emphasis on the pragmatic aspects of the subject.
Syllabus: Communications interfaces. Modems and related equipment. Multiplexors and concentrators. Other communications equipment, e.g. protocol converters, encryption units. Communications test equipment.

**RDT666 Real Time Software Design**
Contact: Two hours per week for one semester.
Prerequisite: RDT651, or equivalent knowledge.
Corequisite: RDT652, or equivalent knowledge.
Aim: This unit is for those involved in software implementation. It covers methodologies for the design and implementation of real-time systems, especially transaction processing and other message-oriented systems.
Syllabus: The software life cycle. Data structuring. Modelling tools, e.g. finite state machines, decision tables.

**RDT667 Real Time Programming**
Contact: Two hours per week for one semester.
Prerequisites: RDT651 & RDT652, or equivalent knowledge.
Aim: This unit is for those involved in software implementation. It covers the problems involved in real time systems and programming techniques used to solve those problems. It also covers programming languages with real time features and their uses.
Syllabus: Classes of real time systems. Concurrency in real time systems; synchronisation and communication. Real time operating systems. Real time programming languages.

**RDT668 Distributed Processing**
Contact: Two hours per week for one semester.
Prerequisites: RDT657, RDT654, COT619, or equivalent knowledge.
Aim: This unit is for those involved in system design and implementation. It covers specific problems arising in the distributed data-processing environment and mechanisms which can be used for the solution of these problems.

Syllabus: Varieties of distributed system. User requirements. Distributed operating systems. Distributed databases. Methods of implementing and maintaining distributed systems.

RDT669 Information Security
Contact: Two hours per week for one semester.
Prerequisites: RDT651 & RDT652, or equivalent knowledge.
Corequisite: RDT654.
Aim: This unit is of general interest. It covers the range of threats to security in a communications-based computer system and the counter-measures available.
Syllabus: The variety of threats to computer systems. Legal issues, Disaster control and counter-measures. Cryptography.

RDT670 System Programming
Contact: Two hours per week for one semester.
Prerequisites: RDT651 & RDT652, or equivalent knowledge.
Aim: This unit is for those who have had some experience of application programming but not of system programming. It covers: use of a modern timesharing system; writing programs interfacing directly to an operating system and exercising operating system functions; using a powerful system programming language. Currently the operating system used in Unix and the programming language is C.
Syllabus: The user's interface to the Unix operating system. The C programming language. System programming under Unix.

RDT671 Microprocessor Systems
Contact: Two hours per week for one semester.
Prerequisites: RDT651, RDT653, or equivalent knowledge.
Aim: This unit is for people with some experience of computing, but with little or no previous contact with microprocessors. The aim is to give an understanding of the capabilities of eight- and 16-bit microprocessors. Currently, the Motorola 6801 and 68000 systems are used.
Syllabus: The general characteristics of microprocessors. Programming microprocessors in both assembler and Pascal. Simple microprocessor interfacing.

RDT711 Interactive Graphics and Application Software
Contact: Three hours per week for seven weeks.
Prerequisite: Entry requirements into the Computer Graphics Graduate Diploma.
Syllabus: Historical review of the development of computer graphics. Principal application areas of computer graphics. Interactive devices for input, methods of generating graphic input data, hard copy devices. The Graphics marketplace. Introduction to standardisation in computer graphics, with emphasis on GKS, CORE and PHIGS.

Assessment: Software assignments, library research, unit test.

Australian Standard 2880, ISO GKS.

RDT712 Computational Geometry and Object Modelling
Contact: Three hours a week for 14 weeks.
Prerequisite: Normal progress through the Computer Graphics Graduate Diploma.

Assessment: Assignments, class tests, examination.


RDT713 Systems Implementation and Support
Contact: Three hours per week for seven weeks.
Prerequisite: Normal progress through the Computer Graphics Graduate Diploma.

Assessment: Assignments, class tests, examination.


ACM, SIGGRAPH (special issue on GKS), February 1984.
RDT714 Advanced Computer Graphics Topics

Contact: Three hours per week for seven weeks.
Prerequisite: Normal progress through the Computer Graphics Graduate Diploma.

Syllabus: This will be determined and announced to students at the beginning of the course. Such topics could typically be chosen from: pictorial aspects of data communications, the place of graphics in the ISO OSI protocols, ray tracing, advanced in form generation, security and legal aspects of graphics, copyright on graphics software and graphics productions, graphics on silicon, fractal surfaces, real time graphics processing, graphics in robotics and artificial intelligence, procedural modelling, advances in medical diagnostic imaging, graphic prosthetics, social implications of graphics advances, animation, graphics in the manufacturing automation protocol (MAP), impact of object-oriented methods in computer graphics.

Assessment: Assignments, examination (mandatory pass).

RDT715 Computer Graphics Project

Contact: Four hours a week for two semesters (28 weeks).
Prerequisite: Normal progress through the Computer Graphics Graduate Diploma.

Syllabus: The project takes a nominal four hours per week, students undertake an investigation into an industry problem related to their particular field of interest. Where possible, projects will be of direct service to an industrial customer, if not, then they should be based on data generated from industry. The investigation may be supported by laboratory work, field studies or literature searches as appropriate. Students may undertake approved projects of their own. In most cases there will be a clear practical outcome from the project.

Assessment: Typewritten report at the end of the year, an oral defence. Assessment may be carried out in conjunction with an industrial supervisor where this is appropriate.

SFT111 Software Development 1

Contact: Four hours per week for one semester.
Prerequisite: Nil.


SFT112 Software Development 2

Contact: Four hours per week for one semester.
Prerequisites: SFT111, COT113.

Syllabus: Design tools: structure chart and pseudocode. Design heuristics: coupling and cohesion; factoring; module size and complexity; fan-in and fan-out; span of control; scope of control and scope of effect. Structured data types represented by constructors, selectors and predicates. Relative file processing, Sequential file processing. Comparison of chosen implementation language to other available languages.


SFT132 Computer Studies 2
Prerequisites: Nil.
Contact: Four hours per week for one semester.
Syllabus: A definition of programming. Files; records; fields; characters. Algorithm development and an introduction to programming in BASIC. Structured programming; modular programming; top-down programming. Data structures—arrays, list, queues, stacks, trees and network structures.
Assessment: End of semester examination: Practical exercises.

SFT211 Software Development 3
Contact: Four hours per week for one semester.
Prerequisite: SFT112.
Syllabus: Interactive programs; comparison with batch programs; reliance on terminals for user input/output; terminal types for specific applications; reliance on random-access files for data storage and retrieval; need for systems that maximise probability of correct entry of data; screen types: menu (processing choice), data entry (data retrieval); screen layouts; screen handling modes: field, block; screen fields: data only, control only, data plus control; need for data validation; forms of data: entered format, confirmation format, internal format; logic for data entry operations: multiple fields, single field; logic for enquiry operations: single record, multiple records; single screen, multiple screens, paging forward, paging backward, record selection; hierarchy of menus, movement between menus; help facilities: field level, screen level; software development aids: provision of screen-handling subroutines, enhancement of the source language. Transaction-driven systems; differences between interactive systems and transaction driven systems; concepts of a transaction; transaction types: single-shot, conversational, system generated; program types: delayed start, immediate start; an ideal real-time monitor; problems of several users simultaneously accessing shared files and records; locks: shared, exclusive; deadlock; transaction victimisation; transaction logging; rollback; rollforward.

SFT212 Software Development 4
Contact: Four hours per week for one semester.
Prerequisite: SFT112, COT114.
Syllabus: Introduction: History; concepts; style; structure and basic syntax of C. Basic language features—variables, operators; data types; preprocessor; basic I/O; arrays; strings and data structures; control structures; functions; variable scope; pointers and dynamic memory usage. Abstract data structures—linked lists; queues and stacks; binary trees. Other language features—bitwise operators; preprocessor macros.

SFT231 Computer Studies 3
Prerequisites: COT131 & SFT132
Contact: Four hours per week for one semester.
Syllabus: Interactive vs batch processing. Screen handling modes, screen types, screen design issues. Differences between interactive and batch systems, Menus: hierarchy of menus, movement between menus (up and down the hierarchy). Built-in help and error messages. Validation of data entered. The structure of indexed sequential files: indexes and buckets; fixed and variable length records; file arrangements, inverted files.
Assessment: End of semester examination and Practical exercises.

**SFT290  COBOL Programming**

Contact: Four hours per week for one semester.
Prerequisite: PHY130

Syllabus: Commercial computer programming, program design, development, documentation, testing and debugging. The COBOL language — four Divisions, purpose of each. File, record, field definition, group and elementary items, Picture clauses, condition names. Procedural statements, verb, comments. Programming for change, qualities of good programs, coupling and cohesion. Simple file handling, multiple record types. Sequential updating. Validation. File processing — sequential, relative and indexed. Array processing. Use of COPY concepts, subprogramming including parameter passing and mixed language processing. Internal data representation and efficiency considerations.

Assessment: Examination, assignments and practical work.

**SFT303  Industrial Project**

Contact: Two hours practical work per week for two semesters.
Prerequisites: SFT212, COT214, SYS216.

Syllabus: Students work in project groups (usually four people) on system development tasks for a client who may be either internal or external to Chisholm. In general, projects involve all aspects of the system development life cycle. Project management aspects of system development are stressed. A student in part-time or full-time employment in the computer industry may, with the agreement of all the affected parties, introduce appropriate materials from said employment as part of the assessment for this subject.


**SFT311  Software Development 5**

Contact: Four hours per week for one semester.
Prerequisite: SFT211, SFT212.


Examples will be drawn from Unix, PC-DOS, XINU, VAX VMS and OMT. The programming language required for practical work will be C which must be available on both the PCs and Unix (on the Pyramid). Any assembler level programming required will be based on the 8088/86 architecture (IBM PC).


**SFT312  Software Development 6**

Contact: Four hours per week for one semester.
Prerequisites: SFT211, SFT212.

Syllabus: Programming support tools: cross-referencers; source program restructuring utilities; source code control systems and version controls; source and object library management and data hiding techniques. Integrated support environments: language-sensitive editors; symbolic debug and trace facilities; interpreter-based development environments; integrated edit and compile environments; the Ada program manages support environment. Quality assurance: test data generators; test harnesses, documentation and control; computer assisted flow charts and design diagrams; WP for system documentation; WP and help systems for user documentation; office automation for project communication; computer assisted project control.
4GLs: End-user software development: query languages. Implications for 4GLs: the impact of application tools on prototyping; the relationship between software tools and methodological approaches; data driven design versus procedural design; areas of application for 3GLs and 4GLs; hybrid systems; application development using a 4GL; interfacing 3GL and 4GL components.

Supplier's Reference Manuals.

**SFT408  Foundations of Programming**

Contact: Four hours per week for one semester.
Prerequisite: Nil.

Syllabus: Introduction: Short history of Lisp and Scheme. Procedural abstraction: naming and the environ-
ment; interaction versus recursion; higher order procedures. Data abstraction: abstraction barriers; hierarchical data; representation of abstract data; systems with generic operators. Functional programming versus the assignment operator. Evaluation models. Modelling with mutable data. Streams. Metalinguistic abstraction.


SFT409 Advanced Programming Tools

Contact: Four hours per week for one semester.
Prerequisite: Nil.
Syllabus: Re-usability; Inheritance; Generalization; Formal Specification Methods; The Vienna Development Method (VDM); Concurrency; Communication Sequential Processes (CSP); LOTOS.


SFT449 Programming Language Paradigms

Contact: Four hours per week for one semester.
Prerequisite: Nil.
Syllabus: Logic programming. PROLOG as an approximation to logic programming; the declarative model versus the procedural model. PROLOG programming techniques. Object-oriented programming. Abstract data types; information hiding; message passing; generic objects and their instantiation; methods of inheritance; the concept of software IC’s; Object-oriented languages (ACTOR, Smalltalk, etc.)


SFT518 Software Engineering

Contact: Four hours per week for one semester.
Prerequisites: SFT449.


SFT583 Foundations of Artificial Intelligence

Contact: Four hours per week for one semester
Prerequisite: SYS444.
Syllabus: Set Theory: An introduction to axiomatic set theory as an example of a formal system, to provide an opportunity to use the language of predicate logic. An introduction to proof techniques for a formal language will be included. Propositional: An introduction to the language of propositional logic (a simple language with no variables or functions). A distinction is drawn between truth of a statement relative to a model (or declarative knowledge) and its provability from a set of axioms. Predicate: An introduction to the language of first order predicate logic. Declarative Knowledge, Models, Satisfiability. Inference, Formal proofs and provability. Resolution: An introduction to the language of clauses (Prolog). Translating predicate logic sentences to clause form. Unification, Resolution, Soundness and Completeness. Advanced Topics: Resolution Strategies, Multiple Valued Logics, Probabilistic Reasoning, etc.


SFT760 Software Development I

Contact: Four hours per week for one semester.
Prerequisites: Nil
Syllabus: Introduction – what computers can and can’t do. Introduction to data and files, programming languages, editors and compilers, ways of expressing ideas logically. Some simple computer programs examined. How to write a small computer program – a few simple instructions the computer can obey; memory in programs – both constant and variable; communicating with the outside world –
getting data into and out of the program; sequences of instructions - building small programs; making and finding mistakes in programs; procedures; (COBOL paragraphs) - procedures as invented instructions; planning and writing programs using procedures; structured instructions - ways of introducing repetition and choice into programs - limited repetition; choice, unlimited repetition. Working with existing data files - sequential access to data, producing a simple printed report from a data file, creating your own sequential data files - validation of the data, creating the file. Procedures with parameter (COBOL subprograms) - procedures as abstract data structures. How to deal with simple tables or arrays of data-arrays with built-in data, loading data into an array from a file, accessing array data, non-sequential file access, creating, reading and modifying an indexed file. More about arrays - maintenance of sorted and unsorted arrays - finding, inserting and deleting array entries, arrays of more than one dimension. Building larger programs - incremental program development. Proving the correctness of programs.


SFT764 Software Development II
Contact: Four hours per week, for one semester
Prerequisites: COT770, SFT760
Syllabus: Interactive programs; comparison with batch programs; reliance on terminals for user input/output; terminal types for specific applications; reliance on random-access files for data storage and retrieval; need for systems that maximize possibility of correct entry of data; different types of screens menu (processing choice) data entry (data storage/alteration) enquiry (data retrieval); logic for data entry operations; logic for enquiry operations; problems of several users accessing same file simultaneously; introduction to real-time monitors. Programming techniques: table processing, table loading, table searching, table updating, multi-dimensional tables; sequential file processing, control-break processing, file updating; maximising programmer productivity, use of library copy books, separately compiled reusable modules, mixed-language possibilities, concepts of data-driven programming.


SOC194 Applied Sociology
Contact: Two hours per week for one semester.
Intended primarily for Digital Technology students.
Prerequisite: Nil.
Syllabus: This subject is intended to broaden student perspectives on society. It will provide a better understanding of society and general issues of technology, and social and technological change. The subject focuses on the social structure and organisation of Australian society. Topics included are specifically chosen to encourage Digital Technology students to develop a critical perspective on Australian history, patterns of employment and cultural life.
Assessment: Cumulative, based on class participation, assignments and a test.

SYS115 Information Systems I
Contact: Four hours per week for one semester.
Prerequisites: Nil.
Syllabus: Basic business systems; system theory; terminology; typical systems, e.g. debters, creditors, stock control; typical documents used in business systems, e.g. invoices, orders. Computerised business systems: mainframe, mini and micro; reasons for using each type; data storage techniques; centralised versus distributed systems; real-time, on-line, and batch systems. Basic design and implementation considerations: operating systems and equipment; design of screens, reports, file access and organisation, including user access requirements; initial file creation; backup and security; system installation.
Penguin Dictionary of Commerce.
PROVERBS, B. Business Practice in Australia, Pitman, 1981.
SYS116  Information Systems 2

Contact: Four hours per week for one semester.
Prerequisite: Nil.

Syllabus: Introduction to the systems development life cycle; organisational structures for computing; computer professionals; skill requirements; job functions; analysis/user interface. Planning and control of projects: task identification; resource and time estimating; tools for project control; team dynamics; project leadership; quality assurance. Information gathering and presentation; determining user requirements; user responsibilities; types of information required; information gathering tools, e.g. interviewing and questionnaires; report writing; presentation to users. Documentation: data flow diagramming; deliverables; user and operational documentation; standards; technical reviews.


SYS216  Information Systems 4

Contact: Four hours per week for one semester.
Prerequisites: SYS215, SFT112, COT114.

Syllabus: Software ergonomics: the need for user friendly software, screen design, report design, security controls. Detailed design: the need for good system design including quality assurance techniques, coupling and cohesion, structure charts, design heuristics, module size, program size, considerations, copy libraries. Prototyping: what is a prototype, what happens when you prototype, prototyping without specifications, prototyping and system design techniques. Implementation: design of security and backup, conversion, file creation, parallel running, system testing, user and acceptance, post-implementation actions, reviews, efficiency, tuning and maintenance, documentation which needs to be maintained during design and implementation, user documentation and training, standards, PRIDE, SDM70 etc.


SYS215  Information Systems 3

Contact: Four hours per week for one semester.
Prerequisite: SYS116.

Syllabus: Overview: the nature of analysis, the system development life cycle, and their relationship to strategic planning; different systems development tools and methodologies. Data centred analysis: the data centred approach to analysis, including entity relationship modelling, normalisation, functional modelling and procedure modelling. Process centred analysis: the techniques, tools and stages of the procedure centred approach to analysis, including dataflow diagrams. Evaluation of analysis tools and methods: evaluation, analysis and comparison of methodologies, tools and techniques; the need for quality assurance during system development, e.g. reviews, standards.


SYS276  Data Processing

Contact: Four hours per week for one semester.
Prerequisite: COT172 or COT173 or equivalent.

Aim: To enable the student to understand the role of the systems analyst/designer in the commercial environment; participate as an active (user-orientated) member of a system development team.

Syllabus: Concepts of on-line, batch, real-time, database, systems analysis techniques; systems design techniques; system implementation including file creation, user training, system testing, cutover, system maintenance, post-implementation review.
SYS290  Systems Analysis and Design
Contact: Four hours per week for one semester.
Prerequisite: PHY130.
Syllabus: Introduction to information systems: introduction to system development; new skill requirements for the new roles for systems analysts; traditional systems development cycle; alternate systems development cycle; human aspects of analysis; project management; estimating costs and benefits. Structured analysis techniques: tools for structured analysis; stages of structured analysis; levelling of functions to reduce complexity; development of a logical model of a business operation. The office environment: can structured techniques be used for analysis of office systems? Data modelling techniques: the Entity-Relationship (E-R) model of an organisation; functional modelling; levelling of E-R model using functions; detailed data design; procedure modelling.
Assessment: Examination and assignments.

SYS315  Information Systems 5
Contact: Four hours per week for one semester.
Prerequisite: SYS216.
Syllabus: Information services management: role of computing within organisations; programming by non-programmers, departmental computing the place of microcomputers, the role of the EDP department and the information centre; the growth of the development backlog and attempts to improve productivity; the nature of maintenance and the increasing maintenance burden; the impact of 4GLs and allied tools on the development process; relevance of different kinds of control techniques e.g. PRIDE, SDM70, etc.; critical failures in computing; computing tools available to assist the system development process and their relevance to different development environments. Social impacts of information technology: security, integrity, privacy: inter-related, highly important and unresolved issues; invasion of the database by criminals and invasion of individuals' privacy by the computer; CSI, job de-skilling, interface design and other critical and unsolved problems; the next five years.

SYS316  Information Systems 6
Contact: Four hours per week for one semester.
Prerequisites: COT213, SYS216.
Syllabus: Nature of unstructured work environments: definitions; the role of decision support, knowledge based, expert and other systems for small, unstructured problem domains; descriptive analysis of managerial work and managerial information preferences; the managerial and the expert domains, and cognitive styles; human-machine interface issues, prototyping and iterative development. Decision support systems: institutional versus ad hoc DSS; organisational issues; evolutionary development methodologies; DSS architectures; hardware and software DSS with emphasis on integrated packages and modelling; DSS case studies. Knowledge based systems: the architecture of knowledge-based systems; control structures; knowledge representation evolution of knowledge based systems from academic AI research tools for knowledge engineering and the construction of expert systems.

SYS416  Decision Support Systems Technology
Contact: Four hours per week for one semester.
Prerequisite: SYS421
Syllabus: Review of the nature of managerial work and DSS development methodologies. Theoretical consideration of the nature of ideal DSS technologies. Topics considered include: DSS generators, managerial work stations, automated integration of software, automated system tailoring, psychology and linguistics of human-machine interface. Study critical evaluation of a selection of hardware and software products. The development of a software specification for a generalised but not global DSS generator.

SYS421  Systems Theory
Contact: Four hours per week for one semester.
Prerequisite: Nil.
Syllabus: The nature of managerial work; how managers use computers; prescriptive and descriptive approaches to decision making; the relationships between decision support systems (DSS), management information systems and electronic data processing systems; development methodologies for DSS, e.g., office automation, financial modelling, personal computing. Case studies of DSS; tools for DSS; DSS and artificial intelligence.


**SYS422 Analysis and Design**

Contact: Four hours of class contact per week for one semester.

Prerequisite: Nil.

Syllabus: Structured analysis: the system life cycle, the organisation chart, the context diagram, data flow diagrams, data dictionary, structured English, decision tables, decision trees, walkthroughs. The specification of systems using these tools, qualification and selection of options, logical design specifications. Introduction to physical design considerations. Information modelling: The entity-relationship model, functional models, collection of data items, normalisation, data structure diagrams, introduction to file and database design, design of procedures to maintain and retrieve data, interfaces with other approaches.


MARTIN, J. & FINKELSTEIN, C., Information Engineering, Savant Institute, 1981.


**SYS425 Systems Theory**

Contact: Four hours per week for one semester.

Prerequisites: SYS421.


**SYS426 Systems Theory**

Contact: Four hours per week for one semester.

Prerequisite: SYS425.

Syllabus: Introduction to journal control theory including the laws of cybernetics. Development of a cybernetic model of a viable system, including application of the model. Seminars on major issues in systems theory, e.g. centralisation versus decentralisation, measurement in systems, structure & function, control systems at different levels of recursion, expert systems.

**SYS427 Analysis and Design**

Contact: Four hours per week for one semester.

Prerequisites: SYS422.

Syllabus: Design: Quality techniques including formal reviews, walkthroughs and adherence to standards; structured design techniques including structure charts; coupling, cohesion and the morphology of systems; design heuristics; transform analysis; software ergonomics including screen and report design; input/output controls; computer controls and the security of information. Implementation: Project planning including estimating, the implementation plan, and user training; documentation including training guides and user, operating and system manuals; testing including system, acceptance and conversion testing; the cutover process including file establishment or conversion, parallel running, benchmarking, test running, system tuning and the post-implementation review.


DeMARCO, T. Controlling Software Projects. N.Y.: Yourdon Pr. (1982)


SEMPREVIVO, P. Systems Analysis: Definitions, Process and Design. 2nd ed. Chicago: SRA.


**SYS436 Analysis and Design**

Contact: Four hours of class contact per week for one semester.

Prerequisite: SYS422.

Syllabus: Project Management: People issues and technical issues; project manager qualities and reasons for project mismanagement; reasons for unsuccessful projects; the process of managing people/tasks and the styles needed; setting project deadlines; project control methodologies and standards; reporting project status and time; tools for project management and control. Organizational Management Issues: The role of information technology within the organization; management structures for information technology; responsibilities and problems of dedicated information technology departments; development centres; information centres; the control of the interfaces between separate areas; the growing importance of information systems management and its changing nature; strategic issues; managing systems development and end-user computing.


SYS444  Machine Intelligence
Contact: Four hours per week for one semester comprising lectures, presentations and practical work.
Prerequisite: Nil.
Syllabus: This subject provides students with a conceptual understanding of artificial intelligence and its commercial applications. Particular emphasis is placed on the development and use of expert systems and methods of knowledge representation and acquisition. A study of the objectives and implications of the fifth generation project is included.

SYS445  Preliminary Thesis 1
Contact: Four hours per week for one semester.
Prerequisite: The successful completion of at least four subjects in the course.
Aim: To study an area of computing in considerable depth and to give students an understanding of the nature of scientific research and its use in the solution of problems in computing and information systems. The first seven weeks will consist of four hours of class contact consisting of lecture, guest speaker presentation and student presentation. The remainder of the subject will consist of student research in an approved area under the supervision of an academic staff member.
Syllabus: (weeks one to seven). Introduction to research and the research process; selection and formulation of a research problem; literature search approaches; survey construction; data analysis techniques.
Assessment: Each student will be required to present a comprehensive literature review of the approved area (50 per cent) and must be able to show substantial progress on the development of the project by presenting a seminar outlining the thesis and the work done during the semester (50 per cent).
The Chicago Manual of Style: For Authors, Editors and Copywriters, 13th ed. Chicago: Univ. of Chicago Pr.

SYS446  Preliminary Thesis 2
Contact: Four hours per week or equivalent for one semester.
Prerequisite: Successful completion of Minor Thesis 1.
Objectives: Same as SYS445. This subject will consist of student research in an approved area under the supervision of an academic staff member.
Assessment: Each student will be required to submit a project on an approved topic (100 per cent).
The Chicago Manual of Style: For Authors, Editors and Copywriters, 13th ed. Chicago: Univ. of Chicago Pr.

SYS447  Intelligent Man–Machine Systems
Contact: Four hours per week for one semester.
Prerequisite: Nil

SYS510  Minor Thesis
Prerequisites: The student will be required to have studied a minimum of four of the master's subjects of which at least two are highly relevant to their thesis topic prior to the commencement of the minor thesis.
SYS511  Advanced Topics in Artificial Intelligence
Prerequisite: SYS444
Syllabus: Overview of the philosophical foundations of artificial intelligence. Techniques appropriate to the development of artificial intelligence systems including topics such as learning methods, search methods, general problem solver, production rules specified as situation action pairs, optimisation heuristics, case studies. Expert systems, concepts and definitions, the components of an expert system, the fifth generation computer project and its implications for the future.

SYS512  Advanced System Development
Prerequisites: SYS422 and COT423 from the Graduate Diploma in Information Technology or equivalent.
Syllabus: The definition of systems; information systems and methodologies; the purpose, nature (and problems) of information system development methodologies; strategic information systems planning; the role of data dictionary systems in system development; a comparative study of currently used system development methodologies; application metadata and methodologies; the potential for automation of approaches to information system development; software tools for information system development; computer-aided software engineering; adapting and creating methodologies for CASE technology; other approaches, including user-developed systems and prototyping.


SYS513  Technological Forecasting and Strategic Planning
Prerequisites: Nil.
Syllabus: Planning for Technological Change: Contemporary predictions and likely realities regarding videodisc, CD-ROM and desktop publishing; demand push and technological pull; short- and long-term economic waves; the transistor, the calculator, the automobile and the personal computer; a look at contemporary computing from the perspective of 1979; a look at the “information technology” industry as a whole from the perspective of 1977; a look at the impact of computers and artificial intelligence from the perspective of 1960. Strategic Short and Long-Term Planning in the enterprise: Some well documented examples of defective strategic planning; the first principles of strategic planning analysed; the “ratchet effect”; short and long-term planning; planning as “displacement activity”; planning as both futile and necessary; formal and informal strategic planning; the electronic data processing department and enterprise planning; aligning EDP planning processes with enterprise processes.


SYS514  Information Modelling
Prerequisite: SYS422 and COT423 from the Graduate Diploma in Information Technology, or equivalent.

SYS515  Advanced Topics in Decision Support
Prerequisite: SYS421 from the Graduate Diploma in Information Technology or equivalent.
Syllabus: Theoretical foundations for decision support systems (DSS) with emphasis on the development process. Topics considered include: Evolutionary system development, managerial learning styles, DSS tailoring, evaluating system effectiveness, personal versus group support systems, soft information, organisational structures for DSS provision, experimental development of a DSS.

SYS516  Decision Support System Software
Prerequisite: SYS421.
Syllabus: Review of the nature of managerial work and DSS development methodologies. Theoretical consideration of the nature of ideal DSS technologies. Topics considered include: DSS generators, managerial work stations, automated integration of software, automated system tailoring, psychology and linguistics of human-machine interface. Study critical evaluation of a selection of hardware and software products. The development of a software specification for a generalised but not global DSS generator.
SYS526 History of Computing Thought
Contact: Four hours per week for one semester.
Prerequisite: Nil.
Syllabus: Introductory overview. Computing and
computing machinery through Pascal and Leibniz. Taxes.
Sources of technology: clocks and navigation. Jacquez's
loom, automat. Imperialism. Charles Babbage and Lady
Ada Lovelace. The architecture of the Analytic Engine.
The invention of programming. George Boole and an
investigation of the laws of thought. Analog Turing and the
Turing Machine. The intellectual foundations of modern
computing. The development of ENIAC at the Moore
School. The arrival of von Neumann. EDVAC and the
specification of the von Neumann machine. War US
computing to 1952. British ENIGMA machines at Bletchley
park. British computing at Cambridge and Manchester
to 1950. Turing's post-war work. The development of data
storage techniques through magnetic core. The history of
IBM from the census of 1890 to 1950. Early computing in
Australia. The development of programming languages:
assembler, Fortran, COBOL, BASIC, Lisp etc. Commer-
cial and scientific computing, 1952-1964. Magnetic and
semiconductor storage and memory developments. AT&T's
regulatory environment. System 360.
AUGARTEN, S., Bit by Bit: An Illustrated History of
GOLSTEIN, H., The Computer from Pascal to von
Neumann, (paperback ed.), Princeton, Princeton UP,
1980.
RANDALL, B. (Ed.), The Origins of Digital Computers:
Selected Papers, (3rd ed.), Berlin, Springer-Verlag,
1982.

SYS527 Current Topics in Cognitive Science
Contact: Four hours per week for one semester.
Prerequisites: SYS444, SYS447.
Syllabus: The development of cognitive science, the
computer as paradigm and metaphor and the relationships
between contemporary computing and cognitive science.
Models of memory and cognitive structures. Neural net-
works in man and machine. The nature of expertise and
psychological aspects of its development. The expert sys-
tems engineering aspects of alternative models. Models of
social and psychological and reality underlying contempo-
rary computing in general and AI in particular. Models of
human language acquisition and use and their impact on
contemporary AI. Parallelism in human information pro-
cessing and the resulting models. Cognitive style research,
sits grounding in physiology and its applications in contem-
porary research. Human learning as AI paradigm.
DREYFUS, H. & DREYFUS, S., Mind over Machine: The
Power of Human Intuition and Expertise in the Era of
GARDNER, R., The Mind's New Science: Aspects of the

SYS528 Advanced Topics in Knowledge Engineering
Contact: Four hours per week for one semester.
Prerequisites: SYS444, SFT449.
Syllabus: Knowledge Representation: Rule based
systems; frame based systems; blackboard architectures;
conceptual structures. Knowledge engineering techniques:
designing knowledge bases; building expert systems.
Evaluating expert system tools: types of tools and their
features; evaluation techniques. Reasoning under uncer-
tainty: numerical methods; symbolic methods; control
strategies for managing uncertainty. Knowledge acquisi-
tion techniques: rule induction; concept formation.
BARR, A. & FREIGENBAUM, E.A., The Handbook of
Artificial Intelligence, (2nd ed.), Pitman Books, Lon-
don, 1986.
HAYES-ROTH, F., WATERMAN, D. & LENAT, D.,
Building Expert Systems, Addison-Wesley, Massa-
echusetts, 1983.
SOWA, J.F., Conceptual Structures, Addison-Wesley,
Massachusetts, 1984.
WATERMAN, D., A Guide to Expert Systems, Addison-
Wesley, Massachusetts, 1986.
Relevant journals and manufacturers' manuals.

SYS616 Computer Project Management
Contact: Two hours per week for one semester.
Prerequisites: RDT651.
Coerequisites: RDT652, or equivalent knowledge.
Aim: This unit is for those concerned with the manage-
ment of computer installations. It covers the principles of
managing in a project situation, i.e. the coordination of
resources in order to reach a well defined endpoint under
defined constraints such as time and budget.
Syllabus: The general structure of projects. Identifying
goals, agreeing plans, progress monitoring. Project man-
gagement tools. Personnel issues. Issues involved in par-
ticular types of project, e.g. installation of equipment or the
development of software.

SYS618 Systems Analysis and Implementation
Contact: Two hours per week for one semester.
Prerequisite: RDT651, Computer Principles I or equivalent
knowledge.
Aims: To introduce the concepts of computer systems
development. To enable the student to be a participative
user-oriented member of a systems development project
team.
Syllabus: Overview of the nature of analysis, systems
development life cycle, system development methodolo-
gies, typical information systems, corporate information
systems planning & project management. The nature of
information gathering; sources and search strategies.
Information engineering approach to systems development.
Implementation issues; testing, documentation, training,
cutover strategies, security & backup. Post implementa-
tion actions; reviews, tuning & maintenance.
DATE, C.J. An Introduction to Database Systems, (4th ed)
Addison-Wesley, 1986.

MARTIN & FINKELSTEIN, *Information Engineering – Savant Institute*.


**SYS705 Introduction to Business Computing**

Contact: Four hours per week for one semester.

Prerequisite: Nil.

Aim: To provide an introduction to computer technology and to provide an introduction to end-user computing.

Syllabus: Introduction to computer systems, people and their roles in the computer industry, computer hardware, office technology and related hardware, data communications, data representation and storage techniques, data and file organisation and data retrieval, batch and real-time systems: Software: systems and application, selection and evaluation. Programming languages and concepts, end-users, information centres and software for application development.


**SYS716 Analysis Techniques for Business Systems**

Contact: Four hours per week for one semester.

Prerequisite: SYS705.

Aim: To understand the organisation as an information system; to understand the analysis and documentation techniques appropriate to technology based business systems; to appreciate aspects of the integration of traditional computer systems with office automation.

Syllabus: Introduction to information systems: introduction to system development; new skill requirements for the new roles for systems analysis; traditional systems development cycle; alternate systems development cycle; human aspects of analysis; project management; estimating costs and benefits. Structured analysis techniques: tools for structured analysis; stages of structured analysis; levelling of functions to reduce complexity; development of a logical model of a business operation. The office environment: can structured techniques be used for analysis of office systems? Data modelling techniques: The entity-relationship model of an organisation; functional modelling; levelling of E-R model using functions; detailed data design; procedure modelling.


**SYS720 Expert Systems**

Contact: Four hours per week for one semester.

Prerequisites: Nil.

Syllabus: Language understanding; machine learning; knowledge-based systems; knowledge representation; knowledge engineering.


Relevant journal articles and manufacturers’ manuals.

**SYS750 Information Systems 1**

Contact: Four hours per week for one semester.

Prerequisite: Nil.

Syllabus: Some common business systems e.g., order filling, invoicing, debtors and creditors including the public sector; typical information flows in a business; the need for information in a business system; the relevance and need for computers in the provision of the required information; the need for systems analysis; a conceptual framework for systems development; the systems life cycle and the role and importance of users in the development of systems, and their interaction with computer professionals; characteristics of analysis and including interviewing techniques. Methodologies used for analysis, e.g., the data centred approach to analysis, including entity relationship modelling, normalisation, finishing with a functional decomposition model of user requirements, plus procedure models for the data; structured analysis techniques including the tools and stages of structured analysis, using the data centred approach for data stores. The importance of documentation to be maintained throughout the life cycle, including easy to understand user interfaces; The need for quality assurance during system development, e.g., reviews, standards; deliverables during the system development process.


TEC205  Materials Technology  

Contact: Four hours per week for two semesters.  
Prerequisite: Nil.  


TEC206  Manufacturing Technology  

Contact: Four hours per week for one semester.  
Prerequisite: Nil.  

Syllabus: The relevance of the scale of production and the possibilities and economics of alternate processes. Casting processes; mechanical working; welding and allied processes; surface hardening and finishing. Manufacturing processes for plastics, rubber and ceramics. Machining processes; metrology; principles and method of basic measurement.  

TEC207  Graphics Communications  

Contact: Two hours per week for two semesters.  
Prerequisite: Nil.  


TEC211  Information Processing  

Contact: Three hours per week for two semesters.  
Prerequisite: Nil.  

Syllabus: Programming; introduction to programming languages and standards, e.g. INS, interpreters and compilers, effects on users and efficiency. Introduction to operating system to be used. Pascal: scalar data types, operators and expressions, assignment statements, standard input and output, arrays and records. Data modelling and file organisation; data modelling; construction of information systems. Serial and sequential files, extracting, sorting, merging, updating, characteristics of magnetic tape storage, blocking. Randomly addressable secondary storage, suitable media, disc addressing, disc directories. Random files, key transforms, allocation of file space. Index techniques, index sequential access method, ISAM VSAM. Logical data organisation, networks, lists, rings, entry point access, navigational access. The data base concept, controlled redundancy, multi-user access, multi-key access, ad hoc query facilities. Data communications; remote I/O devices and networks. Telephone and telex networks, stored message switching systems, voice, text, graphics and image communication. Data storage and retrieval, professional management tools (DSS), text processing and personal support tools.

TEC212  Technological Principles II

Contact: Two hours of theory per week and two hours of laboratory work per fortnight for two semesters.
Prerequisite: To be accepted into the Bachelor of Technology course with passes in Technical Principles I and Analytical Methods I.
Syllabus: Electrical measurements, introduction to applied mechanics, hydraulics, optical and acoustical measurements, equipment appreciation.
Assessment: Theory 60 per cent; laboratory work 40 per cent.

TEC213  Analytical Methods II

Contact: Two hours per week for two semesters.
Prerequisite: Analytical Methods I.
Syllabus: Mathematical methods and modelling; differential and integral calculus; applications; differential equations. Statistical methods and modelling; special distributions; fitting data to distributions including graphical methods; non-parametric procedures; predictive model building.
Assessment: Assignments, tests and formal examinations.

TEC215  Application Programming

Contact: Four hours of classes per week for two semesters.
Prerequisite: Nil.
Syllabus: Programming design theory; study of current program structured design methodologies. Programming techniques: for example, table handling, data representation and movement, file handling. Study of COBOL programming language: COBOL syntax rules, implementation of programming techniques using COBOL. Study of common types of application programs, e.g. report generating programs, update programs, validation programs, inquiry programs.
GRAUER, R.T., Structured Methods Through COBOL, Prentice-Hall.

TEC216  Computer Science I

Contact: Semester 1: Two hours per week of lectures plus two hours per week of laboratory work for two semesters.
Prerequisite: Nil.
TEC216 Laboratory Manual.

TEC217  Digital Signal Processing I

Contact: Two hours of lectures and two hours of laboratory work per week for two semesters.
Prerequisite: To be admitted to the Bachelor of Technology with a pass in Computing I.

TEC305  Introduction to Methods Study

Contact: Two hours per week for two semesters.
Syllabus: Effect of methods improvement on productivity. Introduction to the various techniques of work measurement and the setting of time standards. Predetermined motion time systems; work sampling. Computer-


**Tec306 Industrial Equipment Design Principles**

Contact: Two hours per week for two semesters.

Syllabus: Design principle; the phases of design-feedback and iterative aspects; various methods for creative thinking. Model formulation including application of solid mechanics and machines theory to design of real components with static and dynamic loads. Specification of design by detail drawings and assembly drawings. Factors of safety. Design detail; beams and column, keys for shafts, bolted and welded joints. Design of shafts. Selection of chain drives including belt conveyors. Selection of bearings. The influence of forming and fabrication on design solutions.


Australian Standards: AS1250 — Structural Code; AS1403 — Shaft Code; AS1131 and AS1163 — Steel Sections.

**Tec307 Safety and Environmental Technology**

Contact: Two hours per week for two semesters.

Syllabus: Introduction; current experiences and future projections, the need for a system safety concept. Principles of accident prevention; safety design concepts; safe life and fail safe, system redundancy and diversity. Safety programs; use of descriptive and analytical accident statistics and rates, assessing priorities, the design of practical programs. Major environmental problems of industry; land, water, air, noise and radiation. Common methods of monitoring and analysis associated with waste disposal. Legislative and administrative approaches to pollution control.


**Tec308 Industrial Systems Technology**

Contact: Two hours per week for two semesters.


**Tec311 Management Principles**

Contact: Three hours per week for two semesters.


**Tec312 Industrial Project**

Contact: Three hours per week for two semesters.

Syllabus: Within the nominal three hours per week, students should complete an investigation into an industry problem related to a student’s particular area of interest. It is intended that, where possible, the investigation should be industry based.

**Tec313 Entrepreneurship**

Contact: Two hours per week for one semester.


TEC314  Professional Presentation Methods
Contact: Two hours per week for one semester.
Syllabus: Objective setting, planning and structures: The variation necessary for different messages. Non-verbal messages and their impact on communication. Understanding audience needs, tailoring the material to the audience. Personal presentation: the impact of dress, diction and speaking style on the audience.

TEC315  Systems Development
Contact: Four hours per week for two semesters.
Syllabus: Information engineering: system life cycle, entity-relationship modelling, functional modelling, data definition and normalisation, correctness, procedure derivation and integration, case study. Structured development methodologies: system life cycle, structured analysis stages, data flow diagrams, structured design including structure charts, coupling and cohesion, design heuristics, packaging, interface to structured programming, case study.

TEC316  Computer Science II
Contact: Four hours per week for two semesters.
Syllabus: Advanced Pascal. List structures, forward and backward pointers, recursion. Assembler. Instruction sets, types of assembler, labels mnemonics, operands. 6800 architecture, instruction set and addressing modes. 68000 architecture and instruction set. Programming examples. Operating systems. Input and output, the filing system, resource allocation and scheduling. Computer systems. CPU structures, system architecture, interrupt concepts, input/output operation. Data communications. Overview of computer-based data communication systems, analog and digital transmission of data, modulation techniques, multiplexing, data link control procedures, error detection and correction, BISYNC and HDLC protocols, the ISO model for open systems interconnection.

TEC317  Digital Signal Processing II
Contact: Four hours per week for two semesters.
Syllabus: Quantisation, sampling and aliasing: time frequency domain approaches. Correlation and convolution: their uses and methods of implementation. Transforms used in digital signal processing: FFT, Walsh and discrete cosine transforms. Recursive and non-recursive digital filters and their implementation. Data transmission and communication: protocols, interfacing and handshak-
Map of Campuses

Caulfield Campus

Admissions — A
Applied Science — F
Art & Design — B
Bookshop — A
Cafeteria — S
Careers Advisory Service — A
Central Registry — L
Child Care — H
Computer Centre — F
David Syme Business Schools — C
Development Office — S
Digital Technology — E
Defractorate — A
Educational Development Unit — A
Equal Opportunity Office — 10
Engineering — B
Enrolments — A
Faculty of Technology — F
Finance Branch — H
Human Resources Department — A
Computing & Information Systems — F
Institute Community Services — J
Library — A
Promotions Branch — 10
Printing Services — C
Property Supervisor — G
Public Relations Office — A
Registrar’s Office — A
Resources Branch — 27
Social & Behavioural Studies — B
Staff Club — G
Student Administration — A
Student Union — S
Store — A
Supply Department — A

Frankston Campus

Administration — C
Art & Design — B
Bookshop — A
Cafeteria — A
Continuing Education — F
Child Care — G
David Syme Business Schools — D
Education — A & B
Educational Development Unit — A
Enrolments — C
Faculty of Technology — D
George Jenkins Theatre — A
Hall of Residence — H
Institute Community Services — A
Klin — M
Library — A
Nursing — E
Puddling Shed — K
Social & Behavioural Studies — A
South Pacific Centre — O
Student Administration — C
Study Room — A
Studio, Clay Research — L
Teaching Block — D
White College — O

© Chisholm Institute of Technology 1989