The Caulfield Campus is adjacent to the Caulfield Railway Station which is on the Dandenong and Frankston lines. It is on the No. 3 tram line from Swanston Street in the city (alight at the Caulfield East shopping centre). Private bus lines also serve the Institute (consult transport map).

A  (K.H. Boykett Building) - Administration, Directorate, Enrolment Information (Admissions), Human Resources, Department, Student Administration, Public Relations, Cafeteria (Level 1); Bookshop, Educational Development Unit, Princes Branch, Careers Advisory Service, Chisholm Concepts (Level 2), Library (Level 3); handicapped access.

B  (Phillip Law Building) - Civil Engineering (Level 1); Lecture Theatres (Level 2); Electrical & Electronic Engineering (Level 3); School of Social & Behavioural Studies (Level 4); School of Art & Design (Levels 5, 6 & 7); handicapped access.

C  (Frank Groves Building) - Maintenance, Printing Services (Level 1); Coffee Shop (Level 2); David Syme Business School (Levels 3, 4 and 5); School of Art & Design (Level 6 & 7).

D  School of Art & Design, Language Development Section.


S  Student Union and Technology Tower, Cafeteria.

T  David Syme Business School, Classrooms.

7  Princess Avenue - Community Services, Police Studies, Applied Sociology, Visitors Flat (rear block).

10  Princes Avenue - Premises Branch.

13  Princes Avenue - Welfare Studies.

4  Queens Avenue - Associate Director and Registrar's Department, Equal Opportunity Officer, Institute Solicitor.

882 Dandenong Road - Group Child Care Centre.

888 Dandenong Road - Staff Club.

27 Railway Avenue - Resources Planning Unit.

Vehicle Entry and Exit

- Entry to Buildings
1989 Handbook:  
Volume 1: School of Art and Design  
Volume 2: David Syme Business School  
Volume 3: School of Education  
Volume 4: School of Nursing  
Volume 5: School of Social and Behavioural Studies  
Volume 6: Faculty of Technology  
Volume 7: Student Manual

There are seven volumes to the Handbook

INTRODUCTION

Chisholm Institute of Technology is a multi-disciplinary higher education institution specialising in the technologies and applied science, business, art and design, education, nursing and the social and behavioural sciences.

The Institute offers award programs at Associate Diploma, Degree, Graduate Diploma and Master's Degree levels at its two Campuses which are situated at Caulfield and Frankston. It is the second largest of Victoria's Colleges of Advanced Education with an enrolment of around 7,750 students. Both full-time and part-time enrolments are available in most of the courses which are offered.

Through making provision and special effort to provide part-time enrolment, Chisholm has made higher education available to a wide sector of the community who have special needs. Approximately half of the total student population are enrolled in part-time courses.

At Caulfield, a full range of courses is offered in the Faculty of Technology's four divisions (Digital Technology, Engineering and Industrial Technology, Information Technology, and Mathematical and Environmental Sciences), the David Syme Business School (with three exceptions), the School of Art and Design (with two exceptions) and the School of Social and Behavioural Studies.

At Frankston, the Schools of Education and Nursing offer their full range of courses and undergraduate programs are offered in the School of Art and Design, the David Syme Business School, the School of Social and Behavioural Studies, and the Division of Information Technology. The David Syme Business School also offers two courses at Frankston.

In addition to the award programs, Chisholm offers a wide range of short courses in many areas of expertise and special interest and enjoys a high reputation as a research and consultancy organisation with industry, business, government and the community.

Both Campuses have well equipped Libraries to support all of the teaching areas and the latest technology is provided to support each of the teaching programs. The Frankston Campus is linked by landline to the powerful computing facilities of the Computer Centre at Caulfield. In addition there are supplementary computing facilities within the Individual Schools and Divisions.

This handbook gives full details of the many courses provided by Chisholm and hopefully indicates the Institute's endeavour to provide courses of the highest quality to meet contemporary needs of the wider community. Chisholm fully supports the government initiative to increase access to, and participation within, higher education and provides the maximum number of places within its available resources to be a contributor to the national effort in higher education through which Australia's skill-base will be elevated for the benefit of future generations.

Dr G.N. Vaughan
Director
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## DIVISION OF DIGITAL TECHNOLOGY

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<tr>
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<td>Bachelor of Applied Science (Multi-discipline) (C)</td>
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<td>Graduate Diploma in Digital Communications (C)</td>
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<td>Graduate Diploma in Robotics (C)</td>
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<td>Master of Applied Science/PhD in Applied Science (C)</td>
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* In conjunction with the Division of Mathematical and Environmental Sciences.

## DIVISION OF ENGINEERING AND INDUSTRIAL TECHNOLOGY

<table>
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<td>Bachelor of Engineering (Mechanical and Computing) (C)</td>
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<td>Graduate Diploma in Project Management (C)</td>
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<tr>
<td>Graduate Diploma in Structural Computations (C)</td>
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<td>Master of Engineering (C)</td>
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</table>

## DIVISION OF INFORMATION TECHNOLOGY

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<tbody>
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<td>Bachelor of Applied Science (Computing) (C&amp;F)</td>
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<tr>
<td>Bachelor of Applied Science/Bachelor of Business (Computing and Accounting) (C&amp;F)</td>
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<td>Master of Applied Science – by Thesis (C)</td>
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## DIVISION OF MATHEMATICAL AND ENVIRONMENTAL SCIENCES

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<td>Undergraduate Course</td>
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<td>Bachelor of Applied Science (Multi-discipline) (C)</td>
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<td>Graduate Courses</td>
<td></td>
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<td>Graduate Diploma in Applied Polymer Science (C)</td>
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**Notes:** Courses marked C are offered at Caulfield only, those marked F at Frankston only, and those marked C&F at both campuses. Courses marked CF may be started at Frankston but must be completed at Caulfield.
HOW TO USE THE HANDBOOK

The information contained in this Handbook is accurate as at September 1988. Inevitably, changes will occur after publication so you should confirm details, such as references to required textbooks.

You should also note that the Council reserves the right to amend, postpone, or withdraw any course or subject being conducted or offered by Chisholm.

This volume is one of seven containing course details and subject synopses of courses offered by Chisholm, along with a Student Manual volume.

Within each volume, the courses offered by that School or Faculty are listed followed by brief synopses of subjects within each course.

Where a course is offered by more than one School or Faculty, for example, double degrees, it is listed under both but the subject synopses are included only in the one volume. There is a list at the back of this book indicating in which volume each course may be found. Students of double degrees may find they will have to purchase two volumes to gain a listing of all their subjects.

Subject synopses are listed in alphabetical/numerical order by subject code, in the same way as they are identified in the course listings.

These synopses are designed to convey the flavour of the subjects as well as provide such necessary information as prerequisites, contact hours and, where possible, major reference books.

This book provides most of the information you need to plan a course. You should bear in mind, however, that because of staff commitments and timetabling constraints, you may not be able to undertake a particular subject in any given semester.

The seventh volume of the set is the 1989 Student Manual which provides information about enrolment, financial assistance available to students, scholarships and the regulations governing the relationship between Chisholm and its students. The Manual is issued free through the Student Administration Office (Caulfield) and from the Assistant Registrar (Frankston). The Student Manual volume is included as part of the complete set of volumes which comprise the 1989 Handbook.

For more information:

Enrolment – Admissions Office, Level 1, Boykett Building (A Block), Caulfield, 573 2000.

Financial Assistance, Scholarships, Regulations, etc – Student Administration, Level 1, Boykett Building (A Block), Caulfield, 573 2115.

Particular Courses – School/Divisional Assistant Registrars as appropriate.

SUBJECT CODES

Subject code prefix guide and guide to code locations

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ACC</td>
<td>Accounting</td>
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<tr>
<td>ADM</td>
<td>Management</td>
<td>35</td>
</tr>
<tr>
<td>CHE</td>
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<td>37</td>
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<td>CIV</td>
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<td>COM</td>
<td>Communication Studies</td>
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</tr>
<tr>
<td>COT</td>
<td>Computer Technology</td>
<td>47</td>
</tr>
<tr>
<td>ELE</td>
<td>Electrical and Electronic Engineering</td>
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</tr>
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<td>ENG</td>
<td>Engineering</td>
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</tr>
<tr>
<td>FIN</td>
<td>Banking and Finance</td>
<td>60</td>
</tr>
<tr>
<td>GRA</td>
<td>Graphic Design</td>
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<td>IND</td>
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<td>MEC</td>
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<td>PSY</td>
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<td>SOC</td>
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<td>SYS</td>
<td>Information Systems</td>
<td>92</td>
</tr>
<tr>
<td>TEC</td>
<td>Technology</td>
<td>99</td>
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</tbody>
</table>
The Faculty of Technology currently offers two courses which draw upon a wide range of disciplines within the Faculty and the wider Institute. In order to reflect their interdisciplinary nature, those courses are listed as general Faculty courses rather than under any one of the Faculty's four Divisions.
Admission Requirements for Undergraduate Courses

This Institute makes the following statement regarding its entrance requirements:

GENERAL STATEMENT: Applicants with the following qualifications are eligible for consideration for admission.

(a) Successful completion of a Year 12 course of study accredited by VCAB (i.e. VCE). This can include: VCE (HSC) subjects can be group one or two; VCE (TOP) accredited or recognised by Chisholm; VCE (T12); VCE Approved Composite Courses. Interstate or overseas qualifications certified by VCAB as equivalent to Year 12; or

(b) any other qualification requirement approved by the Academic Board, (e.g. Certificate of Business Studies); or

(c) qualifications and/or experience acceptable to the Chisholm Admissions Committee.

For information regarding COURSE REQUIREMENTS (prerequisite and recommended subjects, special requirements, etc), see course descriptions following.

PREREQUISITE AND RECOMMENDED SUBJECTS may be drawn from any of the qualifications mentioned above as acceptable, except where otherwise stated.

Bachelor of 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.

Course Structure

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

Notes:
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>Year</th>
<th>Subject</th>
<th>Hrs per wk</th>
<th>Semester</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>TEC215 Applications Programming</td>
<td>4</td>
<td>1</td>
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<td></td>
<td>TEC216 Computer Science I, or</td>
<td>4</td>
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<tr>
<td></td>
<td>TEC217 Digital Signal Processing I</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>TEC315 Systems Development</td>
<td>4</td>
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<tr>
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<td>TEC316 Computer Science II, or</td>
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<tr>
<td></td>
<td>TEC317 Digital Signal Processing II</td>
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</table>

(2) Industrial Technology

<table>
<thead>
<tr>
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<th>Subject</th>
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<th>Semester</th>
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<td></td>
<td>TEC206 Manufacturing Technology</td>
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<td>TEC207 Graphics Communication</td>
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<td>3</td>
<td>TEC305 Introduction to Methods Study</td>
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<td>TEC306 Industrial Equipment Design Principles</td>
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<tr>
<td></td>
<td>TEC307 Safety &amp; Environmental Technology</td>
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<td></td>
<td>TEC308 Industrial Systems Technology</td>
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</table>
GRADUATE COURSE

Graduate Diploma in Computer Graphics

Course Code: GG
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 in the selection of ‘Introduction to Design Studies’ or ‘Introduction to Mathematics and Programming’.

<table>
<thead>
<tr>
<th>Year</th>
<th>Subject</th>
<th>Hrs per wk</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>1</td>
<td>GRA611 Introduction to Design Studies, or</td>
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<tr>
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<td>MAT619 Introduction to Mathematics and</td>
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<tr>
<td></td>
<td>Programming</td>
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<td>PHY611 A Thousand Words - A Million Pixels</td>
<td>1.5</td>
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<td>MAT620 Mathematics and Programming</td>
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<td>RDT711 Interactive Graphics &amp; Application</td>
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<td>Software</td>
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<td>COT610 Graphics Data Base Structures</td>
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<td>RDT712 Computational Geometry and Modelling</td>
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<td>RDT713 Systems Implementation and Support</td>
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<td></td>
<td>PHY612 Visual Realism</td>
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<tr>
<td></td>
<td>RDT715 Computer Graphics Project</td>
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<tr>
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<td>PHY613 Image Generation and Processing</td>
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</tr>
<tr>
<td></td>
<td>RDT714 Advanced Computer Graphics Topic</td>
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8
DIVISION OF DIGITAL TECHNOLOGY

Chairman
Raymond F. Pugh
BSc, BEd(Melb), MEnuSc(Monash), FMTC, MAIP, MSTLE

Secretary
Elizabeth Lithgow

Assistant Registrar, Digital Technology
Barbara Harkin
BComfAfc/ft;

Technical Staff

Laboratory Manager
Milton Richardson

Technical Officers
Nino Benci
CertTechElec
Ross Harrop
CertMechTech, CertAeroInst-Maker
Simon Hill
BEng(Chisholm)
Ron Van Schyndel
BApplSc(CIT)

Laboratory Technicians
Rodney Cutts
CertMechTech, BEngCert(Holmesglen)
Alison Hall
Cert Tech(ElecEng)
Ian Herbert
FMTT, TTTC, MIEAust, MIEE
George Margolios
Peter Oliver
CertElectTechComp, Cert-CompFieldService

Laboratory Assistant
Maria Ozadovsky

DEPARTMENT OF APPLIED PHYSICS

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

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, MAIP
Imants sleibe
BSc(Hons), PhD, DipEd (Melb), MAIP, MIEEE
Graham G. Swenson
MSc, BEEdSt(Qued), PhD(Sydf), DipTerEd(New England)
Peter Wells
BSc(Hons), PhD, DipEd(Monash), MAIP

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

Senior Tutors
Andrew Cramond
BApplSc(VIC), MApplSc (Chisholm), PhD(Salford)
Greg Jakovidis
BSc(Hon)(LaTrobe)
Ian McLeod
BSc(Hon)(Melb)
Reg J. Roberts
BSc(Melb), MSc(Sheffield)

DEPARTMENT OF ROBOTICS AND DIGITAL TECHNOLOGY

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

Secretary
Maureen Richardson
Admission Requirements for Undergraduate Courses

This Institute makes the following statement regarding its entrance requirements:

GENERAL STATEMENT: Applicants with the following qualifications are eligible for consideration for admission:

(a) Successful completion of a Year 12 course of study accredited by VCAB (i.e. VCE). This can include: VCE (HSC) subjects can be group one or two; VCE (TOP) accredited or recognised by Chisholm; VCE (T12); VCE Approved Composite Courses. Interstate or overseas qualifications certified by VCAB as equivalent to Year 12; or

(b) any other qualification requirement approved by the Academic Board, (e.g. Certificate of Business Studies); or

(c) qualifications and/or experience acceptable to the Chisholm Admissions Committee.

For information regarding COURSE REQUIREMENTS (prerequisite and recommended subjects, special requirements, etc), see course descriptions following.

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 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.

Course Structure

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 to membership of the Australian Computer Society.

Course Code: BR
First Year Subject List

<table>
<thead>
<tr>
<th>Codes</th>
<th>Names</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Semester</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td><strong>ELECTIVES</strong></td>
<td></td>
</tr>
<tr>
<td>RDT130</td>
<td>Software Development I</td>
<td>4</td>
</tr>
<tr>
<td>RDT140</td>
<td>Software Development II</td>
<td>-</td>
</tr>
<tr>
<td>RDT132</td>
<td>Digital Design I</td>
<td>-</td>
</tr>
<tr>
<td>RDT142</td>
<td>Microprocessor Applications I</td>
<td>-</td>
</tr>
<tr>
<td>ELE103</td>
<td>Electrical Networks</td>
<td>4</td>
</tr>
<tr>
<td>ELE130</td>
<td>Electronics I</td>
<td>-</td>
</tr>
<tr>
<td>MAT124</td>
<td>Mathematics IA</td>
<td>4</td>
</tr>
<tr>
<td>MAT125</td>
<td>Mathematics IB*</td>
<td>(2)</td>
</tr>
<tr>
<td>PHY190</td>
<td>Physics I</td>
<td>4</td>
</tr>
<tr>
<td>COM170</td>
<td>Communication Skills</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>**</td>
<td>(25)</td>
</tr>
</tbody>
</table>

* Mathematics IB may be omitted by students with good results in two Mathematics subjects at Year 12 level.
** Students must select ONE of these electives for study in Semester 2.
Course Code: B112  
Second Year Subject List

<table>
<thead>
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<th>Codes</th>
<th>Names</th>
<th>Hrs per wk</th>
<th>Semester</th>
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<tbody>
<tr>
<td>RDT230</td>
<td>Software Development III</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>RDT240</td>
<td>Software Engineering</td>
<td>–</td>
<td>2</td>
</tr>
<tr>
<td>RDT231</td>
<td>Systems Software</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>RDT241</td>
<td>Operating Systems</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>RDT232</td>
<td>Digital Design II</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>RDT242</td>
<td>Microprocessor Applications II</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>RDT233</td>
<td>Digital Electronics I</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>RDT243</td>
<td>Digital Electronics II</td>
<td>–</td>
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<tr>
<td>RDT234</td>
<td>Electronics II</td>
<td>4</td>
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</tr>
<tr>
<td>RDT246</td>
<td>Signals and Systems</td>
<td>–</td>
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<tr>
<td>MAT228</td>
<td>Mathematics II</td>
<td>2</td>
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<tr>
<td>MAT229</td>
<td>Numerical Methods</td>
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<td>PHY291</td>
<td>Instrumentation Physics</td>
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<td><strong>Total</strong></td>
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</table>

Note: Students are required to pass in FOUR Elective Units. They should enrol for ONE in Semester 1 and THREE in Semester 2. Students may select up to two appropriate electives other than those above, with the approval of the Course Leader.

Course Code: BR3  
Third Year Subject List

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<th>Codes</th>
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<th>Hrs per wk</th>
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<tr>
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<td>Real Time Systems &amp; Programming</td>
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<td>RDT340</td>
<td>Software Systems Implementation</td>
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<tr>
<td>RDT332</td>
<td>Digital Design III</td>
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<tr>
<td>RDT334</td>
<td>Microchip Design I</td>
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<td>RDT335</td>
<td>Signal Processing</td>
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<td>RDT336</td>
<td>Project</td>
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<td><strong>(4)</strong></td>
</tr>
<tr>
<td>RDT350</td>
<td>Intelligent Systems</td>
<td>(4)</td>
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<tr>
<td>RDT351</td>
<td>Computer Graphics</td>
<td>(4)</td>
<td></td>
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<tr>
<td>RDT352</td>
<td>Computer Communication &amp; Networks</td>
<td>(4)</td>
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<td>RDT353</td>
<td>Robotics</td>
<td>(4)</td>
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<tr>
<td>RDT354</td>
<td>Microchip Design II</td>
<td>–</td>
<td></td>
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<tr>
<td>PHY390</td>
<td>Computer Image Processing</td>
<td>–</td>
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<td></td>
<td><strong>Total</strong></td>
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</table>

Note: Students are required to pass in FOUR Elective Units. They should enrol for ONE in Semester 1 and THREE in Semester 2. Students may select up to two appropriate electives other than those above, with the approval of the Course Leader.
GRADUATE COURSES

Graduate Diploma in Digital Communications

Course Code: PX1
Course Leader: A. McGregor

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:
(a) To provide a thorough understanding of the central subject of the course, Computer Communications;
(b) To consolidate students' skills in the underlying foundation disciplines of Computing, Digital Technology and Communications;
(c) 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 12 units and a project. Each unit involves one 2-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 12 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:
- RDT664 Computer Networks I
- RDT665 Computer Networks II
- RDT666 Network Analysis and Design
- RDT667 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
- RDT672 Microelectronic Technology and Design
- ADM605 Entrepreneurship and Small Enterprises
- COM491 Communications Networks in Society
- COT615 Systems Selection and Procurement
- COT616 Computer Project Management
- COT617 Computer Operations Management
- COT618 Systems Analysis and Implementation
- COT619 Database Systems
- ELE636 Communications Principles II
- MKT681 Digital Communications Marketing
- MAT670 Queuing Theory

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

The Project:
- RDT601 Communications Project

Graduate Diploma in Robotics

Course Code: PI
Course Leader: 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 aims to provide specialised training in Robotics for those people who will work as engineers, programmers, technical specialists or managers in manufacturing industry with special interests in robotics and its applications. To achieve this aim the course has been designed around three objectives:
(a) as an educational program to update technologists with rapid advances in robotics and computer-based manufacturing technology;
(b) as a process to bridge the gap between the software and hardware specialists in robotics applications and design;
(c) as a training program to provide in-depth appreciation of the technicalities involved in the design of industrial robots.

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><strong>Core Units:</strong></td>
<td></td>
</tr>
<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>RDT638 Assembly Automation</td>
<td>2</td>
</tr>
<tr>
<td>RDT639 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>
<tr>
<td>The first seven of the above are compulsory. Either Project A or Project B must be completed.</td>
<td></td>
</tr>
</tbody>
</table>

**Bridging Units**

<table>
<thead>
<tr>
<th>RDT636 Computing Systems &amp; Software</th>
<th>2</th>
</tr>
</thead>
<tbody>
<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**

| RDT640 Production Planning & Management | 2 |
| RDT641 Software Development            | 2 |
| RDT642 Industrial Systems & Human Factors | 2 |
| RDT644 Computer Aided Design with Graphics | 2 |
| RDT645 Robot Communication & Control   | 2 |
| RDT646 Microelectronic Technology & Design | 2 |
| RDT647 Artificial Intelligence        | 2 |
| RDT648 Sensory Instrumentation        | 2 |
| RDT649 Introduction to Computer       | 2 |
| RDT650 Advanced Microprocessor Systems | 2 |
| PHY691 Industrial Machine Vision Systems | 2 |
| MEC622 Machines and Mechanisms        | 2 |
| MKT601 Marketing High Technology      | 2 |
| Products                             | 2 |
| ADM601 Human Resource Management and Industrial Relations | 2 |
| ADM605 Entrepreneurship and Small Enterprises | 2 |

* 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 16. 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.
Lecturers
John Griffiths  
BE(Qld), MEngSc(Melb), MIEAust
Halit Okyar  
BEMech(Istanbul)
Daniel Phelan  
DipMet(RMIT), BSc(Hons)(Melb), TTTC
Donald Scutt  
DipMet(RMIT), TTTC, MIM
Kees Sietsma  
BEng(Elec)(Syd)

Laboratory Manager
Ivor G. Little  
DipMechEng(CIT)

Technical Staff
Jack Craig
Ian Dent
Adrian Sietsma
Arthur Turnock
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(b) any other qualification requirement approved by the Academic Board, (e.g. Certificate of Business Studies); or

(c) qualifications and/or experience acceptable to the Chisholm Admissions Committee.

For information regarding COURSE REQUIREMENTS (prerequisite and recommended subjects, special requirements, etc), see course descriptions following.

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 studies 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:

(a) obtain a pass mark at the annual assessment in each subject of the year; or

(b) 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 (a) or (b) 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>Year</th>
<th>Subject</th>
<th>Hrs per wk</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Semester</td>
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<tr>
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<tr>
<td>1</td>
<td>MAT112 Mathematics</td>
<td>4</td>
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<tr>
<td></td>
<td>PHY150 Physics</td>
<td>2</td>
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<td></td>
<td>ENG101 Electrical Technology</td>
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<td></td>
<td>ENG102 Applied Mechanics</td>
<td>3</td>
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<tr>
<td></td>
<td>ENG103 Engineering Communications</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ENG104 Computer Science</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ENG105 Computer Applications I</td>
<td>4</td>
</tr>
</tbody>
</table>
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:
(a) obtain a pass mark at the annual assessment in each subject of the year; or
(b) 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 (a) or (b) 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>Year</th>
<th>Subject</th>
<th>Hrs per wk</th>
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</thead>
<tbody>
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<td></td>
<td></td>
<td>Semester 1 2</td>
</tr>
<tr>
<td>1</td>
<td>MAT112</td>
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<td></td>
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<td>ELE380</td>
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</table>
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 Regulation 3 - Admission to Courses. (See Volume 7 of the 1989 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:  
(a) obtain a pass mark at the annual assessment in each subject of the year; or  
(b) 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 (a) or (b) 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 the course.

Course Structure

<table>
<thead>
<tr>
<th>Year</th>
<th>Subject</th>
<th>Hrs per wk</th>
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<tr>
<td>1</td>
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<td>ENG104 Computer Science</td>
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<td>ENG105 Computer Applications I</td>
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<td>ENG204 Engineering Material Science</td>
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<td>ENG205 Computer Applications II</td>
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<td>ENG206 Engineering Management I</td>
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<td>MAT212 Mathematics</td>
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<td>MEC207 Workshop Practice</td>
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<td>IND255 Methods Engineering</td>
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<td>IND256 Theory of Manufacturing Processes</td>
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<td>MEC356 Thermo-fluids</td>
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<td>ELE337 Electronic Systems</td>
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<td>IND355 Design of Productive Systems I</td>
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<td>ACC310 Engineering Accounting I</td>
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<td>ACC311 Engineering Accounting II</td>
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<td>IND453 Safety &amp; Environmental Engineering</td>
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<td>IND454 Operations Research</td>
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<td>IND455 Design of Productive Systems II</td>
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<td>ADM310 Personnel Administration &amp; Industrial Law</td>
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<td>IND456 System Reliability</td>
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<td>MEC409 Automation: Mechanisms &amp; Control</td>
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</table>
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:
(a) obtain a pass mark at the annual assessment in each subject of that year; or
(b) 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 (a) or (b) 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>
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<tr>
<th>Year</th>
<th>Subject</th>
<th>Hrs per wk</th>
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<td>MEC409</td>
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Graduate Diploma 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

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<th>Year</th>
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<td>MEC638</td>
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</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** – avionics; communication; electric power.
- **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 and Industrial Technology.

Graduate Diploma in Structural Computations

Course Code: PZ
Course Leader: H. Robert Milner

Content
This two year part-time course offers specialist training for qualified engineers who are involved in using computers for structural analysis and design. This course involves attendance at classes for approximately four hours per week.

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

Applicants who lack the necessary qualifications, or who do not wish to undertake the complete course, may be permitted to enrol for single subjects.
DIVISION OF INFORMATION TECHNOLOGY

Chairman
Jack Greig  
BSc(Melb), GradDipDP(CIT), DipEd(Melb), MACS

Secretaries
Lisa Darling  
Mary Dalpethado  
Kerri Jewell  
Judy Steele (Frankston)

Assistant Registrar, Information Technology
Kenneth Hobbs  
BA(Deakin)

Administrative Officers
Cheryl Ely  
Ann Gilbert  
BBus(Chisholm)

Administrative Assistant
Jen Sullivan

DEPARTMENT OF COMPUTER TECHNOLOGY

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

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

Senior Lecturers
Sue Eggleshaw  
BSc(Ed)(Melb), GradDipDP(CIT)

Lecturers
Chris Avram  
Noel Craske  
BSc(Hons)(Flind), GradDipCompStuds(CCAE), MSc(ANU), MACS, ACGA  
David Fott  
BA(JCUNQ), MLit(UNE), ALAA  
Peter Granville  
BSc(Monash), GradDipInfoTech(Chisholm)  
Ewen McPherson  
BSc(Monash), GradDipDP (Chisholm), TPTC  
Robert Redpath  
BSc(LaTrobe), DipEd, GradDipDP(CIT)

Senior Tutors
Bob Sier  
BAppSc(CIT), MACS  
Max Warland  
GradDipC&IS(Chisholm)

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

Technical Officers
Ann Livnat  
ARMIT(MLT), GradDipDP(CIT)

Barry Bron  
Louis Kourtidis

DEPARTMENT OF INFORMATION SYSTEMS

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

Senior Lecturers
Gail Bourne  
GradDipC&IS(Chisholm)  
Dan Eaves  
GradDipInfoTech(Chisholm)  
Graeme Shanks  
BSc, DipEd(Monash), GradDipC&IS(Chisholm), MACS, MAAAI  
Peter Torokfalvy  
BSc(Melb), GradDipDP(CIT), MACS, MASOR  
Jan Warracke

Lecturers
Raymond Canning  
DipEE, BAppSc(VIC), MBA(Melb)  
Peta Darke  
BA(Hons)(Monash)  
Ilona Jagielska  
MSc(Copernicus)  
Henry Linger  
BE(Swinburne), GradDipDP(Chisholm)  
John Moore  
GradDipCIS(Chisholm), BAppSc(Chisholm)  
Chris Rodrigues  
BAppSc(Chisholm)  
Helen Smith  
BSc(Melb), DipEd(Monash)

Senior Tutor
Lindy Stewart  
BA(Monash), MLS(Arizona)

DEPARTMENT OF SOFTWARE DEVELOPMENT

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

Senior Lecturers
Maurie Fabrikant  
PostDipCertMechEng, DipMechEng(CIT), BAppSc(VIC), MACS  
Robert Hagan  
BSc(Hons), MSc(Monash), MACS  
Paul Nash  
BSc(Hons), PhD(Monash), MACS, MACM

Lecturers
Peter Binding  
BAppSc(VIC)  
John Boutland  
Thl(Hons)(ACT), GradDipDP(CIT), MACS  
Andrew Blucher  
Michael du Jardin  
Ann McMillan  
BA(Melb), GradDipDP(CIT)  
Gerald Middleton  
BAppSc(Chisholm), AASA, MACS

Senior Tutors
Dianne Hagan  
Jan Miller  
DipBusStud(DP), BAppSc (Chisholm)  
Robyn Polan  
BAppSc(Chisholm)  
Patsy Segall  
BA, MEd(Melb)  
Sylvia Tucker  
BA, DipED(Qld)
Admission Requirements for Undergraduate Courses

This Institute makes the following statement regarding its entrance requirements:

**GENERAL STATEMENT:** Applicants with the following qualifications are eligible for consideration for admission:

(a) Successful completion of a Year 12 course of study accredited by VCAB (i.e. VCE). This can include: VCE (HSC) subjects can be group one or two; VCE (TOP) accredited or recognised by Chisholm; VCE (T12); VCE Approved Composite Courses. Interstate or overseas qualifications certified by VCAB as equivalent to Year 12; or

(b) any other qualification requirement approved by the Academic Board, (e.g. Certificate of Business Studies); or

(c) qualifications and/or experience acceptable to the Chisholm Admissions Committee.

For information regarding COURSE REQUIREMENTS (prerequisite and recommended subjects, special requirements, etc), see course descriptions following.

**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 Division of Information Technology. Students intending to purchase a microcomputer should consult the Division before purchase to ensure compatibility with Chisholm facilities.

**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 – 10 from first and second year and nine from third year.

<table>
<thead>
<tr>
<th>Yr</th>
<th>Subject</th>
<th>Hrs per wk</th>
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<tbody>
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<td>SYS115 Information Systems 1</td>
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<td>SYS116 Information Systems 2</td>
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<tr>
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<td>MAT123 Mathematics for Computing</td>
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<tr>
<td></td>
<td>PSY192 Applied Social and</td>
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<tr>
<td></td>
<td>Behavioural Studies</td>
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<td>ADM115 Introduction to Business</td>
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<tr>
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<td>ADM190 Business Communication for Computing</td>
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| 2  | SFT211 Software Development 3 | 4          | –          |
|    | SFT212 Software Development 4 | –          | 4          |
|    | COT213 Computer Technology 3 | –          | 4          |
|    | COT214 Computer Technology 4 | –          | 4          |
|    | SYS215 Information Systems 3 | 4          | –          |
|    | SYS216 Information Systems 4 | –          | 4          |
|    | ACC296 Accounting Systems and Procedures | – | 4          |

|    | Elective 1                     | 4          | –          |
|    | Elective 2                     | –          | 4          |
|    | Elective 3                     | –          | 4          |

| 3  | SFT303 Industrial Experience   | 2          | 2          |
|    | SFT311 Software Development 5  | 4          | –          |
|    | SFT312 Software Development 6  | –          | 4          |
|    | COT313 Computer Technology 5   | 4          | –          |
|    | COT314 Computer Technology 6   | –          | 4          |
|    | SYS315 Information Systems 5    | 4          | –          |
|    | SYS316 Information Systems 6    | –          | 4          |
|    | Elective 4                     | 4          | –          |
|    | Elective 5                     | –          | 4          |

Students may take any elective from the following areas providing they have the prerequisite required. Any other four hour, undergraduate, single semester subject may be taken upon approval from the course leader – Accounting; Administrative Studies; Communication Studies; Economics; Electronics; Marketing; Mathematics (especially MAT223 to MAT226); Psychology; Sociology.

_Bachelor of Applied Science/ Bachelor of Business (Computing and Accounting)_

**Course Code:** BJJ  
**Course Leaders:** Dr P. Nash (Computing)  
John Rice (Accounting)

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 activities, particularly the application of computerised business systems. Note: Students may have to refer to Volume 2 of the Handbook for respective Business subjects.

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

**Recognition**
Students will meet the academic requirements for entry to the professional year of the accounting bodies, 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. Day classes only are offered at Frankston.

**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 will enable credits to be processed by the David Syme Business School Admissions Committee and the Admissions Committee for the Division of Information Technology. In all cases at least eight equivalent semester subjects must be completed at Chisholm before a student is eligible for the award.

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 2 of the course. A list of approved professional bodies is available from the David Syme Business School Administrative Office.

**Right of Challenge**
In the Bachelor of Business the right of challenge exists in the subject ACC104 Accounting - Systems and Procedures.

**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. The course structure is set out below.

<table>
<thead>
<tr>
<th>Yr</th>
<th>Subject</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SFT111</td>
<td>Software Development 1</td>
</tr>
<tr>
<td></td>
<td>SFT112</td>
<td>Software Development 2</td>
</tr>
<tr>
<td></td>
<td>COT113</td>
<td>Computer Technology 1</td>
</tr>
<tr>
<td></td>
<td>COT114</td>
<td>Computer Technology 2</td>
</tr>
<tr>
<td></td>
<td>MAT123</td>
<td>Mathematics for Computing</td>
</tr>
<tr>
<td></td>
<td>ACC103</td>
<td>Accounting and Financial Decision Making, or</td>
</tr>
<tr>
<td></td>
<td>ACC104</td>
<td>Accounting Systems and Procedures</td>
</tr>
<tr>
<td></td>
<td>ACC105</td>
<td>Accounting Information Systems</td>
</tr>
<tr>
<td></td>
<td>FIN111</td>
<td>Contract Law</td>
</tr>
<tr>
<td></td>
<td>FIN115</td>
<td>Law of Business Organisations</td>
</tr>
<tr>
<td>2</td>
<td>SYS115</td>
<td>Information Systems 1</td>
</tr>
<tr>
<td></td>
<td>SYS116</td>
<td>Information Systems 2</td>
</tr>
<tr>
<td></td>
<td>ACC249</td>
<td>Company Reporting</td>
</tr>
<tr>
<td></td>
<td>ACC242</td>
<td>Productive Systems and Accounting</td>
</tr>
<tr>
<td></td>
<td>MKT112</td>
<td>Marketing Theory &amp;Practice</td>
</tr>
<tr>
<td></td>
<td>FIN171</td>
<td>Macroeconomics</td>
</tr>
<tr>
<td></td>
<td>FIN271</td>
<td>Microeconomics</td>
</tr>
<tr>
<td></td>
<td>ADM130</td>
<td>Introduction to Management</td>
</tr>
<tr>
<td></td>
<td>ACC263</td>
<td>Financial Management</td>
</tr>
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<td>3</td>
<td>SFT211</td>
<td>Software Development 3</td>
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<tr>
<td></td>
<td>SFT212</td>
<td>Software Development 4</td>
</tr>
<tr>
<td></td>
<td>COT213</td>
<td>Computer Technology 3</td>
</tr>
<tr>
<td></td>
<td>COT214</td>
<td>Computer Technology 4</td>
</tr>
<tr>
<td></td>
<td>SYS215</td>
<td>Information Systems 3</td>
</tr>
<tr>
<td></td>
<td>SYS216</td>
<td>Information Systems 4</td>
</tr>
<tr>
<td></td>
<td>ACC349</td>
<td>Financial Accounting Issues</td>
</tr>
<tr>
<td></td>
<td>ACC363</td>
<td>Auditing</td>
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<td></td>
<td>ACC362</td>
<td>Advanced Management Accounting</td>
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<td></td>
<td>FIN393</td>
<td>Taxation Law</td>
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<td>4</td>
<td>SFT311</td>
<td>Software Development 5</td>
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<td></td>
<td>SFT312</td>
<td>Software Development 6</td>
</tr>
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<td></td>
<td>COT313</td>
<td>Computer Technology 5</td>
</tr>
<tr>
<td></td>
<td>COT314</td>
<td>Computer Technology 6</td>
</tr>
<tr>
<td></td>
<td>SYS315</td>
<td>Information Systems 5</td>
</tr>
<tr>
<td></td>
<td>SYS316</td>
<td>Information Systems 6</td>
</tr>
<tr>
<td></td>
<td>SFT303</td>
<td>Industrial Experience</td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>4</td>
</tr>
</tbody>
</table>
GRADUATE COURSES

Graduate Diploma in Business Technology

Course Code: PO
Course Leaders: Pearl Levin and Ian Beaman

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:
1) SYS716  Analysis Techniques for Business Systems.
2) ADM720  Social and Behavioural Aspects of Business Technology
3) COT718  Principles of Data Base
4) COT717  Data Communications and Converging Technologies
5) FIN750  Legal Implications of Business Technology

The following are foundation subjects:
1) SYS705  Introduction to Business Computing
2) ACC705  Business and Financial Control Systems
3) 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

1. Students with prior qualifications in Computing:

<table>
<thead>
<tr>
<th>Year</th>
<th>Subjects</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ACC705 Business &amp; Financial Control Systems</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>SYS716 Analysis Techniques for Business Systems</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>COT718 Principles of Data Base</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ADM720 Social &amp; Behavioural Aspects of Business Technology</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Elective</td>
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<tr>
<td></td>
<td>FIN750 Legal Implications of Business Technology</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ADM730 Management of Business Technology and Personnel</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>COT717 Data Communications &amp; Converging Technologies</td>
<td>4</td>
</tr>
</tbody>
</table>

2. Students with prior qualifications in Business:

<table>
<thead>
<tr>
<th>Year</th>
<th>Subjects</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SYS705 Introduction to Business Computing</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>SYS716 Analysis Techniques for Business Systems</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>COT718 Principles of Data Base</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ADM720 Social &amp; Behavioural Aspects of Business Technology</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>FIN750 Legal Implications of Business Technology</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ADM730 Management of Business Technology and Personnel</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>COT717 Data Communications &amp; Converging Technologies</td>
<td>4</td>
</tr>
</tbody>
</table>

3. Students with qualifications NOT Business and NOT Computing will do the following:

<table>
<thead>
<tr>
<th>Year</th>
<th>Subjects</th>
<th>Hrs per wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SYS705 Introduction to Business Computing</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ACC705 Business &amp; Financial Control Systems</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>COT718 Principles of Data Base</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ADM720 Social &amp; Behavioural Aspects of Business Technology</td>
<td>4</td>
</tr>
</tbody>
</table>
Year 2
SYS716 Analysis Techniques for Business Systems 4 –
FIN750 Legal Implications of Business Technology 4 –
ADM730 Management of Business Technology and Personnel 4 –
COT717 Data Communications & Converging Technologies 4 –

4. 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 Course Leaders.

Graduate Diploma in Computing

Course Code: PP1
Course Leader: Sue Eggleshaw

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:

a) To provide appropriately trained professionals in the field of commercial computing.

b) To provide a conceptual framework for students to keep pace with developments in this area.

c) To provide students with a practical knowledge of computer hardware and software which can be put to immediate use.

d) 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 Code and Name</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>COT664 Case Study</td>
<td>4</td>
</tr>
<tr>
<td>COT776 Computer Technology III</td>
<td>4</td>
</tr>
</tbody>
</table>

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 enroll 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 numeric. Fifth year subjects codes contain a "5" as the first numeric. 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

Course Code: PCI 1
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 post-graduate 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 and in exceptional circumstances two semester subjects may be completed instead. Such action requires the recommendation of the Course Leader and approval of the Division Graduate Research and Coursework Committee.

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 Programming Systems</td>
<td>4</td>
</tr>
<tr>
<td>SFT449 Programming Systems</td>
<td>4</td>
</tr>
<tr>
<td>SYS421 Systems Theory</td>
<td>4</td>
</tr>
<tr>
<td>SYS422 Analysis and Design</td>
<td>4</td>
</tr>
<tr>
<td>COT432 Information Storage &amp; Retrieval</td>
<td>4</td>
</tr>
<tr>
<td>COT435 Distributed Systems</td>
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</table>

<table>
<thead>
<tr>
<th>Subjects with prerequisites:</th>
<th>Hrs per wk</th>
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</thead>
<tbody>
<tr>
<td>SFT409 Software Development</td>
<td>4</td>
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<tr>
<td>SYS425 Systems Theory</td>
<td>4</td>
</tr>
<tr>
<td>SYS426 Systems Theory</td>
<td>4</td>
</tr>
<tr>
<td>SYS427 Systems Development</td>
<td>4</td>
</tr>
<tr>
<td>COT430 Information Storage &amp; Retrieval</td>
<td>4</td>
</tr>
<tr>
<td>COT439 Distributed Systems</td>
<td>4</td>
</tr>
<tr>
<td>COT443 Information Storage &amp; Retrieval</td>
<td>4</td>
</tr>
<tr>
<td>SYS444 Intelligent Systems</td>
<td>4</td>
</tr>
<tr>
<td>SYS447 Intelligent Systems</td>
<td>4</td>
</tr>
</tbody>
</table>

### Stream Summaries

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

(a) **System Development Stream** (SYS421, SYS422, SYS427, SYS436)

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.

(b) **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.

(c) **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.
- Techniques used to control large software development.

(d) **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.

(e) Intelligent Systems (SYS444, SYS447, SFT449)
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.

(f) 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:
• Packetswitching, digital data, local area networks.
• Communication protocols.
• Distributed Systems.

Master of Applied Science (Computing) – by Coursework
Course Code: MC1 & MC2
Course Leader: Gail Bourne

Introduction
The Master of Applied Science (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:
(a) 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.
(b) 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
1. Prior undergraduate study such as a degree in Computing Science or Information Science.
2. Those students who in the pursuit of their occupation, or by other means have demonstrated their ability to successfully undertake studies at the Masters degree level and have also completed an appropriate post-graduate diploma course (or equivalent) shall require the approval of the Institute’s Admissions Committee before admission to the course.
3. Provision is made for students to enter the course with some non-computing tertiary study and at least several years work in the Computer Industry and suitable post graduate diploma course.

Stage 2
1. An honours degree in Computing Science or Information Science or a post-graduate diploma course in Information Systems, Digital Technology, or similar which is equivalent to a fourth academic year of study in one of the above areas.
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 Master’s 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 required to complete the course within a maximum of two years full-time and four years part-time except where exceptional circumstances exist.

Course Structure
The course consists of six 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:
COT519 Advanced Computer Communications
COT520 Distributed Processing
SFT518 Models of Programming
SYS510 Minor Thesis
SYS511 Artificial Intelligence
SYS512 Advanced System Development
SYS513 Convergent Technology
SYS514 Information Modelling
SYS516 Decision Support System Development
SYS516 Decision Support System Software
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: MS6
Course Leader: David Arnott

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, Information Technology. Areas for Master's research within this Division include system analysis and design methodologies, knowledge based systems, computer assisted software engineering, programming languages, decision support systems and information storage and retrieval.
DIVISION OF MATHEMATICAL AND ENVIRONMENTAL SCIENCES

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

Secretary
Divena Dalby

Assistant Registrar, Mathematical and Environmental Sciences
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
Jacki Mason
BSc, DipEd(Qld)

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

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Ian C. Campbell
BSc, MSc, PhD(Monash), MIBiol
Kevin R. Chynoweth
BSc(Melb), MSc(LaTrobe), TSTC, ARACI
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DipAppChem(Sydney Tech Coll), DipManagement, BSc(NSW), MAppSc (Chisholm), P. ARMIT, ARACI
Cornelius G. Duyvestyn
BSc, BEd(Melb), MEnvSc(Monash)

Lecturers
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PhD(LaTrobe)
Paul Bailey
BSc(Hons)(ANU), PhD(Adelaide)
Robert R. Burford
BSc(Hons)(Adelaide), DipEd(Monash), ARACI
Patricia Geraghty
BSc(Hons), BScEd(Melb), BA, MEnvSc(Monash)
Ian D. McKelvie
DipAppChem(CIT), MApplSc(VIC), ARACI
Mark O'Brien
BSc(Hons), PhD(Qld)

Laboratory Manager
Peter Moulden
BSc(Hons)(Adelaide)

Laboratory Staff
Robert McGregor
DipAppChem(RMIT)
Karen Naylor
BSc(Hons)(Monash)
Sandra Sdraulig
BSc(La Trobe)
Naga Suresh
BSc(India)

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Secretary
Barbara Hardie

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Peter A. Grossman
BSc(Hons), PhD(Monash)
John W. Hille
BSc, BEd(Melb), MSc (Monash)
John S. Jeavons
BSc(Hons)(Melb), MSc (Monash)
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), GradDipDataProc(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(Hons), PhD(La Trobe)
Bruce W. Stephens
BSc, DipEd, MStat(NSW)
Antonius P. Van Oosterwijk
BSc, DipEd(Melb), MAdmin(Monash)

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

Senior Tutor
Peter Davidson
BA(VIC)
Richard Farmer
BSc(Hons), MSc(Melb), PhD(Tas)

Technical Staff
Sothy Chea
BSc(VicNZ)
Gopikaranee Srisankadakumar
Admission Requirements for Undergraduate Courses

This Institute makes the following statement regarding its entrance requirements:

GENERAL STATEMENT: Applicants with the following qualifications are eligible for consideration for admission:

(a) Successful completion of a Year 12 course of study accredited by VCAB (i.e. VCE). This can include: VCE (HSC) subjects can be group one or two; VCE (TOP) accredited or recognised by Chisholm; VCE (T12); VCE Approved Composite Courses. Interstate or overseas qualifications certified by VCAB as equivalent to Year 12; or any other qualification requirement approved by the Academic Board, (e.g. Certificate of Business Studies); or

(b) qualifications and/or experience acceptable to the Chisholm Admissions Committee.

For information regarding COURSE REQUIREMENTS (prerequisite and recommended subjects, special requirements, etc), see course descriptions following.

PREREQUISITE AND RECOMMENDED SUBJECTS may be drawn from any of the qualifications mentioned above as acceptable, except where otherwise stated.

Bachelor of Applied Science (Multi-discipline)

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, Mathematical and Environmental Sciences.

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 section above 'Careers').

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Subject</th>
<th>Hrs per wk</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Semester</td>
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<tr>
<td></td>
<td>MAT106* Mathematics and Scientific Computing</td>
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<tr>
<td></td>
<td>CHE111 Chemistry</td>
<td>7 7</td>
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<tr>
<td></td>
<td>CHE181 Biology</td>
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<tr>
<td></td>
<td>PHY120 Physics</td>
<td>7 7</td>
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<td></td>
<td>PHY130 Computer Science</td>
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<tr>
<td></td>
<td>* Compulsory subject</td>
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</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>Year 2</th>
<th>Subject</th>
<th>Hrs per wk</th>
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<td>Semester</td>
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</tr>
<tr>
<td></td>
<td>CHE290 Aquatic Science (1 semester)</td>
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<tr>
<td></td>
<td>CHE291 Aquatic Science (1 semester)</td>
<td>6 6</td>
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<tr>
<td></td>
<td>CHE225 Basic Chemistry</td>
<td>8 8</td>
</tr>
<tr>
<td></td>
<td>CHE229 Applied Chemistry</td>
<td>8 8</td>
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<tr>
<td></td>
<td>*PHY250 Physics</td>
<td>5 5</td>
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<tr>
<td></td>
<td>*PHY260 Physics</td>
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<tr>
<td></td>
<td>MAT201 Applied Mathematics</td>
<td>6 6</td>
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<td></td>
<td>MAT202 Statistics &amp; Operations Research</td>
<td>6 6</td>
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<tr>
<td></td>
<td>MAT204 Computational Mathematics</td>
<td>6 6</td>
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<tr>
<td></td>
<td>RDT281 Computer Science</td>
<td>6 6</td>
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<tr>
<td></td>
<td>* PHY250 and PHY260 are both required to complete a Minor Study in Physics.</td>
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</table>
Major Studies

<table>
<thead>
<tr>
<th>Year</th>
<th>Hrs per wk</th>
<th>Semester</th>
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<td>1</td>
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<tr>
<td>CHE335</td>
<td>Basic Chemistry</td>
<td>10</td>
<td>10</td>
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<tr>
<td>CHE339</td>
<td>Applied Chemistry</td>
<td>10</td>
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<tr>
<td>PHYS</td>
<td>Physics</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>MAT301</td>
<td>Applied Mathematics</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>MAT302</td>
<td>Statistics &amp; Operations Research</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>RDT381</td>
<td>Computer Science</td>
<td>6</td>
<td>6</td>
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</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 (1 Credit point or 2 half Credit points)
Year 3
Major Major *Elective (1 Credit point or 2 half Credit points)

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

Year 1
Four subjects
Year 2
Minor Minor *Elective (1 Credit point or 2 half Credit points)
Year 3
Major Minor *Elective (1 Credit point or 2 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.
Applied Science electives are worth .5 of a Credit Point each. Elective values are calculated on the basis of one credit point = minimum of five hours per week for two semesters, or 0.5 = minimum of three hours per week for two semesters. Additional major and minor studies may be used as elective points, as well as subjects offered by other schools at Chisholm (subject to Course Leader's approval).

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hrs per wk</th>
<th>Semester</th>
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<tbody>
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<td></td>
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<td>1</td>
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<tr>
<td>Any subject in the list of major and minor studies of at least five hours duration.</td>
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<tr>
<td>PHY336</td>
<td>Advanced Computer Imaging</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>CHE339/MAT333/RDT333</td>
<td>Applied Science Thesis Project</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>CHE280</td>
<td>Biology (Principals and Applications)</td>
<td>3</td>
<td>3</td>
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<tr>
<td>CHE334</td>
<td>Chemical Technology</td>
<td>3</td>
<td>3</td>
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<tr>
<td>PHY236</td>
<td>Computer Imaging</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>MAT205</td>
<td>Mathematical Methods</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PHY226</td>
<td>Physical Astronomy</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PHY235</td>
<td>Scientific Photography</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>RDT291-4</td>
<td>Computer Science Electives</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
GRADUATE COURSES

Graduate Diploma 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:

a) Having a degree or diploma in science or engineering;

b) Having significant scientific 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:

a) Motivation and likelihood of completing the course;

b) Work history – length and nature of relevant work experience;

c) 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

Semester 1
CHE611 Polymer Science 1 8
CHE612 Polymer Science 2 8

Semester 3
CHE613 Polymer Science 3 8
CHE614 Polymer Science 4 8

Semester 4

Graduate Diploma 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

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: MS5

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, Mathematical and Environmental Sciences.

Areas for Master's research within this Division include:

Chemistry – water sciences, aquatic biology, applied electro-chemistry, 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.
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.
References: To be advised.

ACC310  Engineering Accounting I

Contact: Two hours per week for two semester.
Prerequisite: As prescribed under Progression through the Course.
Syllabus: Managerial accounting objectives: planning and control systems and reporting, performance evaluation, cost of behaviour patterns, variable and fixed costs, analysis of costs, cost volume profit relationships and direct (variable) costing. Absorption costing: process and job costing, flow of costs, production and inventory control systems, standard costing and variance from standard as a control mechanism. Control of service department costs: cost allocation, relevant costs, engineering appraisals of costs.
References:

ACC311  Engineering Accounting II

Contact: Two hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.
References:
GARRISON, R.H., Managerial Accounting.

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.
References: To be advised.

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.
References: To be advised.

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 coursework, 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.
Preliminary Reading:
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.
Prerequisites: 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.

References: To be advised.

ADM310 Personnel Administration and Industrial Law

Contact: Two hours per week for two semesters.

Prerequisite: As prescribed under Progression Through the Course.


References:

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 sub-systems 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.

References:


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 venture and to small business.

To provide opportunity for participants to experience the process of developing a business plan for a new business venture.

References:

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.

References:
ADM730 Management of Business Technology and Personnel

Contact: Four hours per week for one semester.
Prerequisites: ACC705, EDP705.

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.

References:
CHORAFAS, D.N., Office Automation—The Productivity Challenge, Prentice Hall.
KREVOLIN, N., Communications Systems & Procedures for the Modern Office, PHI.

CHE111 Chemistry

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

Syllabus: Data interpretation (3 hours): a brief introduction to proper interpretation of experimental results.

Molecular bonding and structure (7 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, electron negativity, intermolecular bonding and its effect on properties.

Equilibria (7 hours): Equilibrium constants, activities, acid-base equilibria, hydrolysis, solubility products, co-ordination compounds, formation constants, stability constants, multi-ligand equilibria.

Thermodynamics (7 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 (7 hours): rate laws, order of reaction, activation theory, mechanism and determination of mechanism.

Spectroscopy (8 hours): electromagnetic radiation, Beer-Lambert Law, molecular energy levels, infra-red spectra, identification using characteristic group frequencies, nuclear magnetic resonance spectroscopy.

Electrochemistry (6 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 (7 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 (7 hours): groups of the periodic table, metals and non-metals, co-ordination compounds, radio chemistry, some contemporary problems in inorganic chemistry.

Special topics (8 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 (4 hours per week).

References:

CHE181 First Year Biology

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

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

Syllabus: Human perception: perception as the basis for understanding how humans understand. Environmental perception. Values systems.

Cells: Procytotypes and eucaryotes, structures and functions, units of living systems.

Genetics: basic processes, human variation.

Human systems: structures and functions. Health.

Biological classification: classification principles, the kingdoms. Diversity in living things.

Animal behaviour: innate and learned behaviours.

Human behaviour.


References:

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.

References: To be advised.

CHE225 Basic Chemistry II

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

Prerequisites: CHE111.


Kinetics (7 hours): Rate laws, determination of reaction order, reaction mechanisms, temperature dependence of rate, absolute rate theory.

Spectroscopy Principles (14 hours): Electromagnetic radiation, emission and absorption, atomic and molecular energy levels, fundamental principles of microwave, infrared UV-visible and NMR spectroscopy.

Organic Chemistry (14 hours): Hybridisation, stereochemistry, bond reactivity, alkanes, ethers, alkenes, amines. Reaction mechanisms.

Inorganic Chemistry (14 hours): Periodic table trends, MO theory, ionic bonding, lattice energy, packing and crystal lattices, ionic radii and radius ratio, Born-Haber cycle. Transition metals. Co-ordination complexes. Crystal field theory.

Phase Separations (7 hours): Distillation and extraction, chromatography theory, plate theory/measures of column efficiency, resolution, band broadening, optimisation of separation.

Chromatography Principles and Methods (7 hours): Gas-liquid chromatography, liquid chromatography, paper, thin layer and gel chromatography, ion exchange chromatography.


Analytical Instrumentation (7 hours): Principles of instrument design, analytical signal generators, input and output transducers, signal processors, recorders.


References:

CHE225 Thermodynamics Notes.

CHE229/339 Applied Chemistry II/III

From the beginning of 1988 the syllabi of the Basic Chemistry subjects CHE229 and CHE339 will be made up from the following list of topics. Students studying CHE229 will be required to take 8 units and students of CHE339 will take 10 units. A full major study of CHE229 and CHE339 will therefore require 18 units of study. All the topics comprise 14 hours of lectures and are supported by an equal time of appropriate practical work. Students will be able to select their own topics, but not all topics will 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.

Co-requisite: CHE225 or CHE335.


Natural Products. Major classes of natural organic compounds, with an emphasis on their use by man. The chemistry and biosynthesis of carbohydrates, proteins, terpenes, steroids, alkaloids, etc.

Organic Synthesis I. Special reactions commonly used in synthesis; Grignard reaction, nucleophilic substitution, oxidation-reduction, carbonyl addition, Diels-Alder reaction. The disconnection approach. Aldol and Claisen condensations, malonic ester synthesis.

Organic Synthesis II. (Prerequisite: Organic Synthesis I). Functional group preparations, special synthetic techniques, styrchon approach in organic chemistry, organo-metallic reagents in organic synthesis, synthesis of some complex molecules.


Polymer Applications. (Prerequisite: Polymer Characterisation.) Polymer classification, macro and micro structure, crystallinity, melting and glass transitions, structural factors affecting transitions, design of polymers for specific applications. Crystalline morphology, crystallisation kinetics, MW and MWD, degradation of polymers, rubbers, use of NMR spectroscopy, 1H and 13C NMR, polymer blends, polymeric liquid crystals.
Macromolecular solutions. MW and MWD of polymers. Relative and absolute methods of determining MW averages.


Colloid Chemistry. Classification and stability of colloids, surface charge and the electrical double layer, coagulation, DLVO theory, Schultz-Hardy rules, polymer flocculation, emulsions, foams and aerosols. Applications in water treatment, paints, foodstuffs, cosmetics, air pollution control, suspension and emulsion polymerisation, etc.

Surface Chemistry. Surface tension, Kelvin and Laplace Equations, surfactants, contact angle and wetting, spreading co-efficient, gas absorption, applications to wetting agents, water repellents, adhesives, mineral flotation, detergency, etc.

Particle Size Analysis. Particle size distributions, particle shape and sampling problems, comparison of a range of techniques including sieving, settling, centrifugation, particle counters (Coulter and HIAC), photon correlation, Fraunhofer diffraction, light scattering, hydrodynamic chromatography, Field-Flow Fractionation.

Molecular Transport Processes. Diffusion, settling, electrophoresis, application to analytical and preparative separation techniques.

Applied Thermodynamics. Ideal and real gases, equations of state, Joule-Thompson effect, partial molar quantities.


Aquatic Chemistry II. (Prerequisite Aquatic Chemistry I.) Composition of natural water, sources of inorganic material, stratification in lakes, estuarine chemistry, biogeochemical cycles.

Ultratrace Analysis. Reagents, sampling, detection limits, sample storage and preservation, extraction and concentration techniques, dialysis, precipitation problems.

Organic spectroscopy. IR, UV, NMR and MS problems. Shift reagents, spin-decoupling, pulsed techniques. Applications of spectroscopy to the determination of organic structures.

Biochemistry. Photosynthesis, cell organelles, energy transformations in a cell, peptides, proteins and enzymes, DNA, mutations, mutation and carcinogenesis, organic synthesis via micro-organisms, lipids and fatty acids, detoxification mechanisms.


References: To be advised.

CHE290 Aquatic Science I

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

Prerequisites: CHE181, and preferably CHE111.

Syllabus: Origin of lake basins, morphology of lakes, temperature, stratification, sediment transport, chemical features of Australian lakes, sources and mechanisms of ion supply, chemistry of lake sediments, carbonate and redox equilibria, biota of lakes, major biological communities, biological production, energy flow, limiting nutrients, river characteristics, stream order, flow regimes, sediment transport in streams, influence of flow on water chemistry, composition of river biota, factors controlling distribution of biota, longitudinal zonation of biota.

References: Extensive reading list provided.

CHE291 Aquatic Science II

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

Prerequisites: CHE290.

Syllabus: River management, flood control programs, introduced species, river improvement, catchment management, salinisation, point and non-point sources of pollutants, heavy metal and organic contaminants, transport of pollutants, biological accumulation, toxic effects, toxicity testing, eutrophication, nutrient budgets, lake management, unit processes for waste-water treatment, anaerobic and aerobic treatment processes, physio-chemical treatment, advanced waste-water treatment, packaged treatment plants, process modification water re-use, effluent monitoring, water quality criteria.

References: Extensive reading list provided.

CHE333/PHY/RDT/MAT

Applied Science Thesis Project

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

Prerequisite or Co-requisite: 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.

References: Appropriate books and journals depending on the project.
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.

Co-requisite: 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.

Syllabus: Analytical Methods I (14 hours): Thermal analysis (4 hours): Principles and applications of DTA, DSC, TG and DMTA. Fourier Transform IR (4 hours): Frequency and time domain spectroscopy, Michelson interferometer, instrumentation and advantages of FTIR. X-ray Analysis (6 hours): Generation and monochromation of X-rays, absorption of X-rays, diffraction – Bragg’s Law, crystal lattices, lattice planes, diffraction techniques, introduction to wavelength and energy dispersive X-ray analysis (EDAX and XRF).


Organometallic and co-ordination chemistry (7 hours): Crystal field theory, crystal field stabilization energy, MO treatment of bonding in complexes. Metal carbonyls and nitrosyls.

Organic functional group chemistry (14 hours): Alkanes, alkenes, alkynes, alky and aryl halides, aromatic compounds, aldehydes and ketones, acids and acid derivatives, nitro compounds.

Organic reaction mechanisms (14 hours): Classification of reaction types, transition states, kinetics, mechanism, structure-activity relations, solvent effects, acidity and basicity, catalysis. Molecular rearrangements, ring expansion and contraction, carbenes, nitrenes and arynes.

Microprocessor Applications (14 hours): DAC and ADC principles, principles of interfacing, data acquisition, storage and manipulation.

Chromatography Principles and Methods II (14 hours): Ion chromatography, high performance liquid chromatography, head space chromatography. Phenomenated systems – GC-MS, GC-IR.

Advanced Methods in Atomic Spectroscopy (7 hours): Flame photometry, atomic absorption spectroscopy, emission spectroscopy, ICP, automatic analysis, electrophoresis.

Data Analysis (7 hours): Precision and accuracy, types of error, uncertainties in measurement, confidence limits, calibration curves, sensitivity and detection limits.

Electrochemical Analysis (7 hours): Voltammetry, polarography, anodic and cathodic stripping voltammetry, coulometric methods.


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).

SHAPIRO, M.A. (Director), Western Port Bay Environmental Study 1973-74, Melbourne, Ministry for Conservation, 1975.

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 (6 hours): Introduction to polymer types on the basis of methods of synthesis, reaction to heat, amorphous or crystalline. Polymers as plastics, fibres, and elastomers.
Structure and morphology (6 hours): Linear, branched and network polymers. Amorphous and semicrystalline polymers. Tactility.
Polymerisation techniques (6 hours): Bulk, suspension, solution and emulsion polymerisation. Mechanism and kinetics of emulsion polymerisation.
Suitable experiments are chosen from the following list:
- Kinetics of free radical polymerisation;
- Kinetics of polyesterrification;
- Emulsion polymerisation;
- Anionic polymerisation;
- Cationic polymerisation;
- Suspension polymerisation;
- Synthesis of a urea-formaldehyde resin;
- Determination of Tm and Tb by dilatometry;
- Crystallisation kinetics by dilatometry;
- Nucleation & growth rates by optical microscopy.
References:

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 (6 hours): Molecular weight average distributions. Experimental methods of measurement including osmometry, light scattering, ultracentrifuge, viscosity, SEC.
Introduction to polymer processing (6 hours): Basic principles of injection moulding, extrusion, blow moulding, film formation, vacuum forming, rotational moulding.
Materials selection (6 hours): Case studies of principles of selection and design of materials for specific applications.
Suitable experiments are chosen from the following list:
- 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 (i) Melt Flow Index; (ii) Brabender Extrusiograph (RMIT);
- Brookfield viscometer.
References:

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 and additive analysis (6 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 (6 hours): Chemical reactions of polymers. IR and NMR analysis. Chromatographic methods GLC, HPLC, head space analysis by GC, pyrolysis GC.


Thermal and photooxidation (6 hours): Thermal, photolytic, mechanical, radiative and oxidative degradation. Biological and environmental effects. Degradation products.

Polymer stabilisation (6 hours): Heat stabilizers, light absorbers, metal deactivators. Stabilisation methods during manufacture and use.

Compounding and additives (6 hours): Formulation principles applied to elastomers, thermosets, thermoplastics, cellular polymers, surface coatings, films, sheet, pipes. Mixing, calandering.

Elective units (6 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 list:
- 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 polyesters;
- Analysis of PVC additives;
- Antioxidant analysis by HPLC;
- Qualitative analysis of unknown polymers;
- Analysis of vulcanised rubbers;
- Accelerated degradation studies.

**References:**


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.

**Syllabus:**
Unit 1 – Basic Ecology and Systematic Biology. Basic ecology – components of ecosystems, energy flow, nutrient cycling, population ecology, interactions between species, community ecology. Systematic biology – the biota of aquatic systems; Animal Kingdom: protista, cnidaria, platyhelminthes, aschelminthes, annelida, mollusca, arthropods, chordate; Plant Kingdom: bacteria, algae, fungi, bryophytes, lower vascular plants, gymnosperms, angiosperms.

Unit 2: Introduction to Aquatic Systems. Lakes – formation of lake basins, morphology, thermal characteristics, light regimes, mixing; Streams – stream morphology, classification of streams, interactions between streams and their catchment, mixing; Estuaries – classification, physical characteristics, salinity regimes; Marine – tides, currents world oceans, physical characteristics. Introduction to aquatic chemistry – pH, redox potentials, major ions, trace components.

**References:**

CHE631 Supporting Concepts 1

Unit 1 – Social Issues.

**Contact:** Two hours per week for one semester.

**Syllabus:** 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 judgments 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).
Reference:

Unit 2 - Mathematical Principles.
Contact: Two hours per week for one semester.
Syllabus: 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
References:

Unit 3 - Basic Hydrology and Geology
Contact: Two hours per week for one semester.
Syllabus: 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.
References:
CLARK, J.P. & COOK, B.J. (Eds.), Perspectives of the Earth, Australian Academy of Science, 1983.

CHE632 Supporting Concepts 2

Unit 1 – Modelling of Aquatic Systems.
Contact: One hour per week for one semester.
Prerequisite: CHE631.
Syllabus: 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.
References:

Unit 2 – Coastal Geomorphology
Contact: One hour per week for one semester.
Syllabus: 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.
Reference:

CHE633 Aquatic Systems 2A
Contact: Four hours per week for one semester.
Prerequisite: CHE630.
Syllabus:
Unit 1 – Aquatic Chemistry (20 hours)
Chemical processes in freshwater, estuarine and marine systems including relationships between stream chemistry and flow, C02 and O2, cycles, nutrient cycles (P, N & Si), biogeochemical aspects of trace elements (Fe, Mn, Cu, etc.), sediments and particulate matter, natural organic matter cycles, trace organic compounds, coagulation.
References:

Unit 2 – Aquatic Microbiology (10 hours)
Reference:

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.

References:

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.

References:

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, Windhoek; 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.

References:


CIV211 Engineering Surveying

Contact: A course of four hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.
(b) Computations: Traverses, accuracy, adjustment, area of a closed traverse. Computation of areas: Trigonometrical formulae, Trapezoidal rule and Simpson's rule. Volumes, prismoidal, end-area formulae, contours and mass-haul diagram.

References:
WILSON, R.S.P., Land Surveying, McDonald & Evans, 1971.

CIV225 Structural Engineering I

Contact: A course of four hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.
Syllabus: Beam theory: flexural, direct and shear stresses, shear centre, skew bending, composite beams, deflection by integration of the governing differential equation, and moment area methods. Torsion: circular, hollow and structural section. Combined stresses: bending and axial load, torsion bending and shear, Mohr circle, Principal stresses. Force diagrams: review of bending moment and shear force diagrams and extensions to frames with complex beams. Columns: Elastic buckling, end conditions, Euler load, effective length, slenderness ratio, southwell plot, design formulae. Introduction to theory of elasticity: equilibrium and compatibility, stress-strain relationships, differential equations of equilibrium and compatibil-
ity, the bihormonic equations and stress functions. Plane stress, plane strain, torsion and membrane analogy. Theories of failure; experimental stress analysis; Strain gauges and instrumentation.

References:

CIV324 Geotechnics I

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


References:
POTTER, A.W.R. et al., Geology, McDonald & Evans, 1975.
CHISHOLM, Geological Maps and Laboratory Notes, 1983.

CIV325 Structural Engineering II

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


References:

CIV326 Water Engineering

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


References:

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 three 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 areas and construction. Typical designs are: 1. Design of a structure incorporating use of both structural steel and concrete. 2. The forward planning of a city water reticulation system using packaged programs and including economic analysis. 3. The design of a section of rural highway working to RCA standards. 4. 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.

References: To be advised.
CIV429 Structural Computations

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

References:
LAY, M.G., Source Book for the Australian Steel Structures Code AS1250.
TAHAIR, N.S., The Behaviour and Design of Steel Structures, Methuen, Australia, 1977.

CIV430 Civil Engineering

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


References:
O'FLAHERTY, Highways, Volume 1, Arnold, 1974.

CIV431 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. Fees and Charges: lump sum, percentage fee, combination fee, cost plus fee. 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.

References:

CIV432 Geotechnics II

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

References:
AS1726, SAA Site Investigation Code, 1981.
CIV603  Skeletal Frame Analysis

Contact: Two hours per week.
Prerequisites: Nil.

CIV604  Computer Application I (Project)

An individually based project involving an application relevant to skeletal frame analysis and design.

CIV606  Finite Element Analysis

Contact: Two hours per week.
Prerequisites: Nil.

CIV607  Numerical Analysis

Contact: Two hours per week.
Prerequisites: Nil.

CIV608  Computer Application II (Project)

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

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.

COM491  Communication Studies

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

COT113  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.
COT114 Computer Technology 2

Contact: Four hours per week for one semester.

Prerequisites: COT113, 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 (eg, UNIX, MS-DOS, PRIMOS, AOS) - Command syntax; macros.

Advanced Operating System Concepts: Concurrent programming; File control subsystems; Access to shared data, locks, semaphores; Co-operating concurrent processes; Scheduling schemes; Memory management.

References:


Manufacturers' reference manuals as indicated.

COT213 Computer Technology 3

Contact: Four hours per week for one semester.

Prerequisite: COT114.


The Database Concept: Data Sharing, Related Data, Data Independence, Data Integrity, Data Dictionary.


Micro Computer DBMS: Facilities and features, Limitations, Study of a micro DBMS product.

Mini/Mainframe Relational DBMS with SQL Interface: Data Definition - creating and amending tables and rows, Data Manipulation.

References:


COT214 Computer Technology 4

Contact: Four hours per week for one semester.

Prerequisite: COT213.

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 - DDL - Data Definition Language, DML - 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.

References:


COT313 Computer Technology 5

Contact: Four hours per week for one semester.

Prerequisite: COT214.

Syllabus: Data communications concepts and facilities: Remote I/O devices and networks; Data communications 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.

Distributed Systems: Introduction to distributed systems. Evolution, definitions, examples.

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 fallback 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.

References:
BLACK, U.D., Data Communications Networks and Distributed Processing, Prentice-Hall, Reston VA, 1983.


COT314 Computer Technology 6

Contact: Four hours per week for one semester.
Prerequisite: COT214.
Contemporary developments: A selection of contemporary developments in hardware and software.
References:

COT423 Information Storage and Retrieval

Contact: Four 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 Data Base Architecture.
References:
Relevant research papers and manuals.

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 DBPROTOTYPE, Design and optimisation of physical storage structures HASHING, INDEXING and other organisations, Database administration, roles and responsibilities, data administration.
References:
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.
COT439 Distributed Systems

Contact: Four hours of class contact per week for one semester.
Prerequisite: COT435.
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 co-ordination, performance data collection and analysis, the Communications Manager.
References:
BLACK, D., Data Communications Networks and Distributed Processing, Reston, 1983.

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 i.e. 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 throughout & 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-losely 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 mechanism 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 synchronisation.

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, hierarchial, 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, shear, 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.

References:

COT615 Systems Selection and Procurement

Contact: Two hours per week for one semester.
Prerequisite: RDT651, or equivalent knowledge.

Co-requisites: 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.
Co-requisite: 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.
Co-requisite: RDT652, or equivalent knowledge.

Aim: This unit is for those with a limited background in Data Processing who wish to extend their knowledge in that area. It covers the role of data and database systems in communications-based computer systems.

Syllabus: The functions of a database system; 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, Micro 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.

References:
GALITZ, W., Human Factors in Office Automation, LOMA, 1980.
COT664 Case Study

Contact: Four hours per week for 14 weeks.
Prerequisite: SYS751.

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.

References:
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.

References:
CHISHOLM INSTITUTE OF TECHNOLOGY, Division of Information Technology, The Citation of References, Chisholm Printing Services, 1985.

COT717 Data Communication & Converging Technologies

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

Aim: To explore the basic concepts, hardware and software components of communication systems; to develop an appreciation of the characteristics of alternative communication systems available in Australia; to investigate to evolution of various technologies and their convergence; and to study the application of these technologies to business functions.

Syllabus: 1. Data Communications: basic concepts in data, audio and video communications; network components, multiplexing techniques and devices, concentrators, terminals, controllers and digital PBX; transmission control, control protocols, error control and efficiency; security and encryption; network architecture, network design, network operations; common carrier services and tariffs; local area networks; network standards; trends in communications.

2. Converging Technologies: the fundamental technologies, computers and communications; developing technologies, data and text processing, audio processing, image processing – graphics, micrographics, optical systems, video, artificial intelligence; applications of technology, office automation – composite document processing, electronic mail, document output processes, teleconferencing, document storage and retrieval, expert systems; information system services, telex, teletex, videotex, commercial information networks; other applications, electronic funds transfer systems, electronic publications, video-audio Education System.

References:

COT718 Principles of Data Base

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

Serial storage media. Serial/Sequential file organization. Extracting, sorting, merging, updating data.
Logical data structures; trees, networks, lists, rings. Physical implementations. Entry point access; navigational access.
The data base concept. The data base models. Theory and practice of relational data base management systems. The CODASYL approach.

References:

COT770 Computer Technology I

Contact: Four hours per week for one semester.
Syllabus: (a) Equipment: The major components of computer hardware: The CPU; Secondary storage devices; Input and output units; Number system and code sets.

(b) 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.

(c) Data Communications: Remote I/O devices and networks; Data communications codes; Data commu-
COT771  Computer Technology II

Contact: Four hours per week for one semester.
Prerequisites: SY575I, COT770.


Database: The database concept, Database models, Relational data model, Using SQL — Data Definition Commands, Retrieval Commands, Security Commands, Data Dictionary Commands, Embedded Commands

References:

COT776  Computer Technology III

Contact: Four hours per week for one semester.
Prerequisites: ST5760, COT771.

2. Fourth Generation Languages (8 hrs lecture).
4. Codaest DBMS (10 hrs lecture), Data Description Language, Data Manipulation Language, Query Language.
5. Current and Future Trends in Data Management (2 hrs lecture). Data Dictionary Systems, Database Administration, Distributed Database.

References:

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).


References:

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.

References:

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.


References:
NILSON, J.W., Electrical Circuits, Addison-Wesley, 1983.

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.

Syllabus: Electronic Components: resistors, capacitors, relays, opto-couplers. Types available, ratings, selection criteria. Semiconductors: crystalline solids and energy bands, thermal excitation, charge generation and recombination, doping concentrations, diffusion and drift, current flow, contact potential, p-n junction characteristics. Two Terminal Devices: semiconductor diode. Special p-n devices, varactor diode, tunnel diode, photo diode, light emitting diode (LED), PIN diode, Schottky diode, pin photodiode. Rectifying diode applications. Breakdown diode; Clipping circuits, clamping circuits. Three Terminal Devices: construction, operation and characteristics of Bipolar junction transistor (BJT) and Field effect transistor (FET). Small Signal Amplifiers: Notation, amplifier configuration. Biasing, thermal stability, stabilisation of bias point. Small signal equivalent circuits - two port parameters, hybrid-$

ELE286 Signals and Communications

Contact: Three 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 mathematical representation and analysis of signals and systems using Fourier series and Fourier transforms. Analogue and digital modulation techniques (envelope, angle and pulse modulation) with emphasis on communication systems implementation. The basic concepts of information theory and coding are also introduced.

References:

ELE310 Design I

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

Syllabus: (a) Study of the fundamental concepts and principles of electrical design including CAD methods. Heating and cooling of machines with thermal transients and cyclic loading. Design of busbars, electromagnets and other items with and without CAD packages.
(b) Design of circuits and systems using operational amplifiers as general purpose building blocks in conjunction with power transistors and digital circuits in a variety of applications.

References:
CHISHOLM, Electrical Design Class Notes.

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.


References:

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: The application of transistors in amplifiers and switching circuits. Special circuit techniques used in wide band and tuned amplifiers. Voltage and current regulator circuits as applied to general purpose amplifier design. Feedback and its consequences in various types of circuits including oscillators.
Reference:

ELE337 Electronic Systems

Contact: Three hours theory 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.
References:
OGATA, K., Modern Control Engineering, Prentice-Hall, 1970.

ELE340 Control Systems

Contact: Three hours of lectures and laboratory/tutorials 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 time 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.
References:

ELE364 Fields in Communications

Contact: Two hours per week of lectures, laboratory and tutorials for two semesters.
Prerequisite: As prescribed under Progression Through the Course.
Syllabus: This subject reviews the electrostatic field, magnetostatic field, Gauss', Ampere's, Biot-Savart laws, Poisson's and Laplace's equations. Maxwell's equations in differential and integral form and their implications are introduced. Plain wave and transmission line propagation are studied in terms of impedance matches and transformations, reflection and transmission, plus traveling and standing waves. Various types of transmission line such as coaxial cable and waveguide are examined in terms of their propagation modes. Antenna theory and radio propagation for broadcast band to microwave frequencies are studied. Microwave active and passive components are introduced. Computer simulation and analysis are used to study the above.
References:

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.
References:

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.

References:
References:
LUDEMEN, L.C., Fundamentals of Digital Signal 
Processing, 1986.
TANLEY, W.D. et al., Digital Signal Processing, Reston 
STRUM, R.D., First Principles of Discrete Systems and 
Digital Signal Processing.
VAN VALKENBURG, M.E., Analog Filter Design, 
HRW, 1982.

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 Design in Semester One. All students take 
Integrated Circuit Design in Semester Two.
Syllabus: (a) Electrical Power Equipment Design. A 
study of the economics and methodology of design as 
applied to electric power equipment. Introduction to 
tendering, contracting, AAV assessment and price 
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 pack-
ages.
(b) Radio Frequency Design. A study of compo-
nents and their performance variation 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.
(c) Integrated Circuit Design. A study of the 
fundamentals of digital integrated circuit design, 
including a brief consideration of the fabrication proces-
sors and the relevant device theory.

References:
BOWICK, C., Radio Frequency Circuit Design, Sams 
LIAO, S.Y., Microwave Circuit Analysis and Amplifier 
RAMSHAW, R.S., Power Electronics — Thyristor Con-
trolled Power for Electric Motors, Chapman and 
Hall, 1975.

Relevant journals and printed notes.

ELE425 Power Electronics and 
Machine Control

Contact: Two hours of lectures and two hours labora-
tory/tutorial work per week for two semesters.
Prerequisite: As prescribed under Progression Through the 
Course.

Syllabus: Theory, ratings and characteristics of pn
pn devices, including firing circuits, control and trigger 
arrangements. Principles of phase control and zero 
voltage switching. AC voltage controllers, ac line 
commutated rectifiers and inverters. Forced commutat-
ted converters. Half-controlled rectifiers and free 
wheeling diodes. Effect of supply reactances, overlap. 
Output voltages and current relationships. Rectifiers 
transformer connections, ratings and currents. Output 
power, input power and power factor. Harmonics. 
Protection of power electronic circuits from overvolt-
ages and overcurrents. Classification of industrial 
drives. Characteristics of loads, duty cycles and load 
equalisation. Selection of machines with regard to load 
and drive specifications. Speed/time relationships, 
duty cycle, energy consumption, braking, reversing and 
regeneration. Rating, heating and cooling cycles, 
causes of insulation failure. Australian standards, 
Variable frequency inverter drives; dc machine control 
using phase-controlled converters, DC/DC choppers. 
Generation and effects of harmonics in machine de-
sign. Machines in control systems, voltage, speed and 
power control.

References:
RAMSHAW, R.S., Power Electronics — Thyristor Con-
trolled Power for Electric Motors, Chapman and 
Hall, 1975.

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.

Syllabus: Process Concepts: basic process elements; 
plant, measurements, controller. Control loop topo-
ologies. Control Hierarchies: direct digital control, supervi-
sory control, distributed control configurations, batch 
and sequencing, process interface, control safety. 
Modelling and Indentification: development of first 
and second order models, DDC Algorithms and Tun-
ing. Digital filters: Deadbeat, Kalman and Dahlin 
controllers. Selection of sampling interval. Effect of 
noise due to finite word length. Sequence Control and 
Advanced Control Techniques: deadline compensa-
tion, feedforward, cascade, multivariable and adaptive 
control. Supervisory Control: energy management and 
auditing. Human operator interface. Robotics: stepper 
motor behaviour and control of position and 
velocity, robotic devices and control.

References:
ISERMANN, R., Digital Control Systems, Springer- 
Verlag, 1981.
SHINSKEY, F.G., Process Control Systems, McGraw-
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.

Syllabus: Transmission of Digital Signals. Codes to 
aid transmission, keying techniques, line equalisation, 
pretransmission and predetection filtering, channel 
throughput, network switching and synchronisation, 
transmission system impairments, signal regenera-
tion.

Transmission Media. Microstrip, twisted pair, 
coaxial, fibre optic, microwave, digital radio, satellite.

Computer Networks: Network classification, the 
ISO model for Open System, Interconnection, the X25 
interface and packet switched networks, circuit 
switched networks, the X75 internetwork protocol,
LAN networks and characteristics, LAN protocols. Coding and Error Control in Digital Networks. Information theory and entropy, ARQ, error detecting and error correcting codes.

Network Planning and Management: Queueing theory, performance statistics, system utilization.

References:

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 analog 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.

References:
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.


References:


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.


Reference:
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.


References:
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.

References:

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.

References:

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.

References:

ENG102 Applied Mechanics

Contact: Three hours lectures, tutorials and laboratory work for two semesters.
Prerequisite: As prescribed under Admission Requirements to First Year.

References:

ENG103 Engineering Communications

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

References:


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.

References:

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 language – PASCAL, BASIC, 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.

References:

ENG204 Engineering Materials Science

Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.
ENG205 Computer Applications II

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

Syllabus: Problem solution techniques; task allocation between humans and machines. Programming languages; PASCAL. Microprocessor assembler language programming. Comparison of compiled versus interpreted. Characteristics and function of compilers, assemblers, interpreters, linkers, operating systems. File structures; data files, access to data structures, search algorithms. One semester will also be devoted to department specialisations.

References:

ENG206 Engineering Management I

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


References:
STANDARDS ASSOCIATION OF AUSTRALIA, AS1837 – Ergonomics in the Office and Factory, SAA.

ENG305 Computer Applications III

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

Syllabus: Software engineering; design principles for maintainable and modifiable software. Documentation. Structured analysis/design or equivalent. Network; interconnection of computers, error handling, data highway arbitration and control. Graphics; uses of computer graphics. Geometric principles, defining and manipulating objects, simple and complex graphics data bases. Graphics algorithms; scaling, clipping, windowing, three dimensional object definition, hidden line and hidden surface removal. One semester will also be devoted to department specialisations.

References:

ENG306 Engineering Management II

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


References:
WU, N. & COFFINS, R., Linear Programming and Extensions, McGraw-Hill.

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 is appro-
priate. 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: Computer selection; hardware and software. Security; management, access control. Standard algorithms; merging, sorting, text manipulation. Problem checking; formal methods of validation and testing. Large computer hardware; virtual memory, error handling. Throughout improvement; parallelism, distributed, hierarchial processing. Specialised computer structures; non von Neumann, Josephson and other machines. CAD/CAM; principles of computer numerical controlled machines, computer-aided drafting and manufacturing Graphics packages. Real time graphics. Imaging: Image sensors/displays, image manipulation, algebraic and geometric transformation. Animation in engineering; visualising machine operations, stress-strain-time-characterisation of dynamic structures.

References:

ENG406 Engineering Management III

Contact: Two hours lecture and one hour tutorial per week for two semesters. Prerequisite: As prescribed under Progression Through the Course.


References:
CAFFREY, B.A., Guidebook to Contract Law in Australia, CCH, 1981.
STANDARDS ASSOCIATION OF AUSTRALIA, AS2124-1981 General Conditions of Contract, SAA.

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.
Aim: Students will be able to identify the legal problems involved with business technology systems.

References:
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.
References: To be advised.

IND255 Methods Engineering

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


Motivation and Human Factors: Selling ideas, formal communication skills, employee involvement and human factors design.

Administration and Information Systems: The organisation and its information flow, business rules, cost effectiveness of organisational styles. Information Engineering; system life cycle, entity-relationship and functional modelling, data definition and normalisation, procedure derivative and integration. System Implementation; the process, prototyping coupling and cohesion, screen design, block versus line input, dBASE 111 as an implementation language. Structured Development Methodologies, stages of analysis, data flow diagrams, logical systems designs, warriner-orr diagrams.

References:

IND256 Theory of Manufacturing Processes

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


References:
YANKEE, H.W., Manufacturing Processes, Prentice-Hall, 19879.

IND354 Design for Production

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


References:
MANUFACTURER'S CATALOGUES. AUSTRALIAN STANDARDS, AS1250 - Structural Code, AS1403 - Shaft Code, AS1131 & AS1163 - Steel Sections.

IND355 Design of Productive Systems 1

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

Syllabus: (a) Materials handling - Objectives of material handling; the materials handling equation, principles for efficient materials handling. TRANSPORT MODAPS. Unit load concepts: pallets, containers and packaging. Types of Equipment. Loading, unloading, stacking and storage. Warehousing systems. Specifying equipment. Safety: Cranes and Hoists, manual repetitive handling.

(b) Facilities Planning and Layout - Objectives, effect on efficiency. Flow patterns and processes: techniques for analysing material flow. Introduction to quantitative methods: Product process and schedule design. Activity relationships and charts. Space determination and area allocation. Facility location. Layout tools, including computerised methods. Office planning; facility services.

(c) Quality Assurance - Management: Economic and organisational bases of the control of quality, the cost of quality, specifications and standard, functional relationships and special aspects such as visual inspection. Total Quality Control programs and their role in Australia. Product liability and life cycle costing. The inter-relationship between sample size, goodness and confidence as the fundamentals of sampling theory. The use of attributes and variables in control charting. Capability studies, cu-sum approaches, and other data interpretation. Supplier quality assurance. Concepts of experimental design for optimum statistical analysis; full and fractional factorial design in product and process improvement. Other strategies in multi-variable situations which affect the economics of quality and reliability.

References:

IND453 Safety and Environmental Engineering

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

Syllabus: Principles of accident prevention: accident models, the methodology of safety, strategies for protection, safety design concepts, 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, assessing priorities in safety strategies and the design of practical programs. Major environmental problems of industry. 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.

References:

IND454 Operations Research

Contact: A course of three hours per week for two semesters. Prerequisite: As prescribed under Progression Through the Course.


References:

IND455 Design of Productive Systems II

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

Syllabus: The student is required to integrate industrial engineering concepts in the design of productive systems. Students are required to work on productivity orientated projects. Covering technological, administrative, management and/or physical distribution situations as either separate or as integrated problems. Designs so produced are to be presented as formal reports and assessed, wherever possible, in collaboration with engineers in organisations external to Caldeholm.

Students are to be encouraged to visit companies and seek out their own individual projects as a matter of policy to encourage student initiative and entrepreneurship.
One of the projects involves students working in groups to develop computer-based decision support systems to aid operational management of a computer simulated manufacturing facility. In both instances, considerable emphasis is to be placed on the standard of reports presented.

Topics to be covered both in lectures and the design projects, include:

- **Systems Design Concepts:** Process parameters; materials, processes. Manufacturing systems, types, steady state design, dynamic design, input-output analysis, data collection and control designs. Use of designed experiments; conventional and statistical. Value analysis and cost reduction concepts. Reliability design evaluation including fault tree and failure modes and effects analysis. System productivity and profitability measurement.

- **Operational Planning and Control:** Demand forecasting, time series and casual, Aggregate Planning and Master scheduling. Manufacturing Resources Planning (MRP-II) for JIT and JIT philosophies. Inventory analysis and management, ABC analysis, cycle counting. Economic quantities, purchase and lot size. Price-Quantity discounting. Operational planning, sequencing and scheduling. Line balancing algorithms and heuristics. Overall operational performance evaluation and measures.

- **Strategic Management and Business Tactics:** Corporate Planning Concepts; Scale Economics, Life Cycle, Value added, experience curve. Strategic Management, corporate, business and functional. Functional tactics; Marketing and Manufacturing.

**References:**


**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.

**References:**


**MAT112 Mathematics**

**Contact:** Four hours per week for two semesters.

**Prerequisite:** VCE Mathematics A or equivalent. Mathematics B (recommended).

**Syllabus:** Basic differentiation and integration. Periodic functions: sinusoids, piecewise linear functions, average and RMS values. Elementary functions: circular and hyperbolic functions, their inverses, logarithmic equivalents. Systematic integration: completing the square, substitutions, using partial fractions, by parts, reduction formulae, numerical integration; applications to area, volume, arc length and surface area.

Partial differentiation: approximations and errors, maxima and minima, directional derivative, curve fitting by least squares.

Complex algebra: de Moivre's theorem, Euler's formula, phasors.

Vectors: scalar and vector products, scalar derivatives, applications.

First and second order differential equations with appropriate applications.

Series: convergence, power series, Taylor series.

Matrices and determinants: solution of simultaneous equations, consistency, dependency, conditioning, transformations, Eigenvalues and Eigenvectors.

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

**References:**
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 storage in computers and limitations.

Logic & Set Theory — propositions, logical operators, predicate logic and quantifiers, methods of proof, (including mathematical induction), set algebra, power set, product set, partitions of a set.

Relations and Functions — binary relations, graphical representation, properties of relations, equivalence relations, composition of relations, functions, injections, surjections, bijections.

Graphs — simple graphs, trees, application to sorting and searching.

Descriptive Statistics — a comparison of "classical" and "modern" techniques to summarise data; use of available computer packages.

Probability and Random Variables.

Textbook:


References:


MAT124 Mathematics 1A

Contact: Four hours per week for two semesters.
Prerequisites: 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.

References:


MAT125 Mathematics 1B

Contact: Two hours per week for two semesters.
Prerequisite: Mathematics A at Year 12 (or equivalent).
Co-requisite: MAT124.

Syllabus: Matrix algebra: inverse of order 3 x 3. Complex algebra: Cartesian and polar form; De Moivre’s theorem; the Fundamental theorem of algebra. Vector algebra: resolutes in three dimensions; scaler 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.

References:


MAT175 Statistics

Contact: Two hours per week for one semester.
Prerequisite: MAT161.


References:


MAT181 Mathematics and Computer Studies 1

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

Syllabus: Properties of the number of system including integers, rationals, irrationals and complex numbers. Elements of number theory; properties of primes, composites and modulo arithmetic. Structures in alge-
bra; groups and fields. Mode of operation of a computer; data representation and coding formats, modes of processing, operating systems and utilities. Algorithm development; programming in FORTRAN 77.

Assessment: One from Group B. One from Group F.

References:
MALCOLM, W.G., Number and Structure, Reed Education, 1975.

MAT182 Mathematics and Computer Studies 2

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

Prerequisite: Nil.


Assessment: One from Group B. One from Group F.

References:
LUMSDEN, J., Elementary Statistical Method, University of Western Australian Press, 1974.

Prime Computer Manuals.

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; 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.

References: To be advised in individual units.

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, transformations, 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, SPSS, MICROSTAT.

References: To be advised in individual units.

MAT204 Computational Mathematics

Contact: Six hours per week for two semester.

Prerequisite: MAT106.

Syllabus: Four compulsory and two elective units are taken.

Compulsory units:
Computational Linear Algebra: Errors; elimination, iterative and relaxation methods; eigenvalues and eigenvectors; Gaussian elimination, Gauss-Seidel iteration; special methods.

Computational Nonlinear Equations: Nonlinear equations, real and complex zeros; nonlinear systems, fixed point and iterative techniques.

Computational Calculus: Numerical differentiation; operators, interpolation formulae; numerical
quadrature, Newton-Cotes method, Gaussian, special integrals.

Computational Ordinary Differential Equations: Initial value, boundary value and eigenvalue problems; Reduction of higher order; systems of equations.

Elective units:
Two units are to be chosen from the available elective units.
References: To be advised in individual 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.
References: To be advised in individual units.

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 formulae 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.
Co-ordinate Geometry: plane polar co-ordinates and simple curve sketching, cylindrical and spherical polar co-ordinates, transformations from one system to another.
Multiple integration: double integrals using cartesian or polar co-ordinates, 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.
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.

MAT223 Quantitative Management and Planning Techniques
Contact: Four hours per week for one semester.
Prerequisite: MAT123, or equivalent.

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: Forecasting - concepts and model requirements, regression methods, moving average, exponential smoothing, seasonal models, Box-Jenkins model. Applications and case studies utilising computer packages. Inventory Control - basic concepts; simple EOQ, back-order and production models; multi-product EOQ models; stochastic models; single-period models.
References:
MAT228 Mathematics II

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

Co-requisite: MAT229.


Fourier analysis: Complex Fourier series; Fourier transforms, theorems, convolutions, correlations, impulse function; the discrete Fourier transform.

Co-ordinate geometry: polar, spherical and cylindrical co-ordinates; co-ordinate transformations.

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

References:

MAT229 Numerical Methods

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

Co-requisite: MAT228.

Syllabus: Fortran 77 and programming techniques.

Probability and statistics: random variables and special distributions; confidence intervals and hypothesis testing; correlation and convolution; data-reduction; use of statistical microcomputer software.

Assessment: By assignments and formal examination each semester.

References:

MAT281 Mathematics and Computer Studies 3

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

Prerequisites: MAT181 and MAT182.

Syllabus: The axiomatic method; inductive and deductive proof; mathematical induction. Symbolic logic; truth tables for common connectives; an algebra of propositions; logical equivalence; valid argument forms and methods of proof; logic and switching circuits.

Computing: Data structures, file structures and access methods, searching and sorting. Advanced programming using FORTRAN 77.

Assessment: One from Group B. One from Group F.

MAT282 Mathematics and Computer Studies 4

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

Prerequisites: MAT181 and MAT182.

Syllabus: Discrete and continuous probability distributions; binomial, geometric, uniform and normal distributions. Introduction to concepts of hypothesis testing and development of testing procedures involving normal, t- and chi square distributions.

Computing: Numerical methods; approximations and errors, solution of equations. Switching theory; logic functions, Boolean algebra, circuits.

Assessment: One from Group B. One from Group F.

References:
of methods, linear constraints and linearisation of nonlinear constraints.

Electromagnetic Theory I: Physical laws, Maxwell's equations, electrostatics, magnetostatics, motion of charged particles, electromagnetic waves.

Electromagnetic Theory II: Plasmas, electrodynamics and magnetodynamic models; electrophydrodynamics; magnetrohydrodynamics; solar winds; electromagnetic induction; waves, antennas, waveguides.

Variational Methods: Functionals, extrema and variations of functions; traversality conditions; inequality constraints; geodisics, Lagrange's equations.

Discrete Mathematics: Propositional logic, application to program design; Boolean algebra, switching networks; mathematical induction; graph theory, algorithms.

References: To be advised in individual units.

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 Lemma; 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, cost biased 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.

References: To be advised in individual units.

MAT382 Mathematics and Computer Studies 6

Contact: Four hours per week of lectures and practical work for one semester.
Prerequisites: MAT281 and MAT282.
Syllabus: Application of statistical concepts to problems in psychology and education including parametric and non-parametric methods, linear regression and correlation, ANOVA and sample survey techniques.
Assessment: One from Group B. One from Group F.
References:

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.
References:
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, scalar 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, mode mixing, call by value and by reference, FORTRAN 66 and FORTRAN 77 compatibility problems.
Assessment: Programming assignments, class tests.
References:

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.
References: To be advised.

MAT670  Queueing Theory

Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus: Review of probability and probability distributions. Introduction to queueing theory, M/M/1 queues, priorities, service distributions, multiserver, open and closed systems of queues, product form solutions, simulation and queueing.
References:

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.
References:

MEC202  Fluid Mechanics I

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

MEC204  Machine Design and Manufacture

Contact: Four hours per week for two semesters.
Prerequisites: As prescribed under Progression Through the Course.
Syllabus: (a) Manufacturing Processes – The relevance of the scale of production and the possibilities and economics of alternate processes. Casting processes; mechanical working; cold working and hot working. Powder metallurgy: Welding and allied processes; welding metallurgy, heat affected zone, weld cracking, testing of weld. Surface finishing: electroplating principles, electroforming, electromachining, Decorative coatings. Manufacturing processes for plastics, rubber and ceramics. Machining processes; Metrology:
principles and method of basic measurement, sources of error, surface texture measurement and principles of gauging.

(b) Machine Design - Description and use of stock machine elements and components. Functional and spatial design through the use of layout drawings; influence of basic manufacturing processes on design. Introduction to creative design. Selection of materials, 'factors of safety', shock loads. Analysis and design of components, e.g. shafts, keys, bolted and welded joints. Plain journal bearings. Design to resist fatigue failure.

References:
Manufacturers Catalogues.

MEC207 Workshop Practice

Contact: Thirty-five hours.
Prerequisite: As prescribed under Progression Through the Course.
Syllabus: Safety procedures in the work place. Basic First Aid. Use of hand tools and basic metrology. Turning, milling, grinding and CNC machining.
Reference:
AMSTEAD, OSTWALD & BEGEMAN, Manufacturing Processes, Wiley and Son.

MEC211 Mechanics of Solids and Machines

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

(b) Machines - Friction: Laws of friction between two contacting surfaces; motion on inclined plane, screw threads, modification of V-thread, overhauling. Clutches, and Thrust Bearings; Centrifugal clutches, uniform wear and uniform pressure theories, disc and cone clutches and thrust bearings. Brakes: types of brakes, band brakes, internal and external shoe drum brakes, Belt Drives: Ratio of belt tensions, modification for V-grooves pulley, effect of centrifugal tension, initial tension, power transmitted, creep. Flywheels: Cyclic fluctuation of energy, design of flywheel to control speed fluctuation. Gear Train: Kinematic analysis and synthesis of simple, compound and epicyclic gear trains, input, output and casing torque, computer aided synthesis of gear trains, harmonic drives.

References:


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.
References:
CARTER, A.D., Mechanical Reliability, Macmillan, 1972.
STANDARDS ASSOCIATION OF AUSTRALIA: AS 1250 Steel Structures Code; AS 1403 Shafts for Power Transmission; AS 1418 Crane Code; AS 1210 Unfined Pressure Vessel Code.

MEC304 Engineering Materials

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

References:
MEC308 Process Control

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

References:
DORF, R.C., Modern Control Systems, Addison-Wesley, 1986.
OGATA, K., Modern Control Engineering, PHI, 1970.

MEC309 Thermofluid Dynamics

Contact: Four hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.
References:
DUNCAN, W.J., THOM & YOUNG, Mechanics of Fluids, Arnold.

MIRONER, A., Engineering Fluid Mechanics, McGraw-Hill.

MEC311 Mechanics of Solids and Machines II

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

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 vapor 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.

References:

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.

References:
CAMERON, Basic Lubrication Theory, Ellis Norwood, 1981.
MALLING, Principles of Tribology, Macmillan.

MEC409  Automation: Mechanisms and Control

Contact: Two hours per week for two semesters.
Prerequisite: As prescribed under Progression Through the Course.
Syllabus: Algebraic and co-ordinate transformation methods; differential relationships; motion trajectories – joint and cartesian; 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 co-ordinate frames and joint forces and torques. Compliance; force, touch, vision and position feed-back related to homogenous transformations. Computers: control strategies and programming languages.

References:

MEC411  Mechanics of Solids & Machines III

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


References:

MEC412 Thermodynamics, Heat and Mass Transfer

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

MEC621 Principles of Mechanics of Machines

Contact: Two hours per week for one semester.
Prerequisite: Nil.
Assessment: Written tests and assignments.
References:

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 of evening study for one semester.
Prerequisite: Nil.
Syllabus: Introduction to project management, time planning and control, computer applications, CPM methods.
References:
BAILEY, I.H., Construction Law in Australian, Law Book, 1981.

MEC632 Project Management II

Contact: Three hours per week of evening study for one semester.
Prerequisite: Nil.
Syllabus: Cost planning and control, budgeting, earned value analysis, combined time and progress planning and control, computer applications 2.
References:
MEC633 Project Management III
Contact: Three hours per week of evening study for one semester.
Prerequisite: Nil.
Syllabus: Environmental and structural influences, organisational design, power structures, information management, managerial styles, motivation, conflict, leadership, organisation design.
References:
Publications of the Project Management Institute.

MEC634 Project Management IV
Contact: Three hours per week of evening study for one semester.
Prerequisite: Nil.
Syllabus: Project Management techniques; contracts, legal aspects, industrial relations, safety, quality control, site organisation and control, resource management, negotiations.
References:
INSTITUTION OF ENGINEERS, AUSTRALIA, Reliability of Large Machines, IE Aust, 1982.

MEC639 Project Evaluation
Contact: Three hours per week of evening study for one semester.
Prerequisite: Nil.
Syllabus: Discussion of all factors involved in evaluating and selecting projects, company strategy and mission, financial evaluation techniques, economic and technological forecasting, decision making under uncertainty, optimising and decision analysis techniques, decision trees, linear programming.
References:

MEC641 Industrial Project
Contact: Three hours per week of evening study for one semester.
Prerequisite: MEC640.
Syllabus: Students are to develop and present a project, preferably from their work environment, employing the techniques developed in the course.
References: To be advised.

MKT681 Digital Communications Marketing (incorporates MKT601 Robotics Marketing)
Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus:
1. The analysis of marketing problems: finding out about customers, competitors, resources supplies, regulations, pressure groups, the economy organisational constraints and opportunities.
2. 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.
References:

PHY120 Physics
Contact: Three hours theory, three hours laboratory work, and one hour tutorial per week for two semesters.
Prerequisites: VCE Physics (recommended).
Syllabus: Electrical measurement, energy and fields, waves and optics, AC and electronics and modern physics.
Recommended Texts:
The first year laboratory manual must be purchased.
References:

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-operations, instruction codes,
microprocessors, peripherals. Introduction to microcomputer systems – memory organisation, CPU, assembly codes, input/output, peripheral cards and devices, DOS. Structured programming and data structures in the Pascal language, including data types, control structures, procedures and functions, arrays, records, sets, input/output, files, pointers, lists, recursion.

Prescribed Text: The first year laboratory manual must be purchased.

References:

PHY150 Physics

Contact: Two hours per week for two semesters.
Prerequisite: Nil
Syllabus: Waves and Optics: SHM, energies 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 Schrodinger equation, electronic configuration of atoms, semiconductors, nuclear physics, lasers and holography.

References:
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' 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 numbers; band theory of solids; semiconductors; lasers.

References:

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 multi-discipline 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, gravitational collapse, novae, pulsars, black holes; galaxies; quasars; cosmology.

References:
PASACHOFF & KUTNER, University Astronomy, Saunders, 1976.

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.

References: To be advised.

PHY235 Scientific Photography

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

References: To be advised.

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.


PHY250 Physics

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

Prerequisite: PHY120.

Syllabus: AC and network theory, field theory, quantum physics, nuclear physics, optics, solid state physics.

References:

The Second Year Laboratory Manual must be purchased.

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.

References:

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.


References: Laboratory Manual must be purchased from the Bookshop.

PHY330 Contemporary Physics

Contact: Two hours per week for two semesters.

Prerequisite: To be admitted to the final year of the Bachelor of Engineering (Mechanical) course. This course is designed to give engineers an appreciation of the use of Physics in a modern society.


Assessment: The assessment will be a combination of report and examination (approximately equal weight).

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 contract 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.

References: The appropriate books and/or articles depend on the topics.

PHY336 Advanced Computer Imaging

Contact: Two hours theory plus two hours laboratory work per week.

Prerequisites: PHY236 and either RDT281 or PHY260.

Syllabus: Imaging Optics – hardware and software requirements, Transforms in Imaging – a thorough discussion of point, spatial and statistical transforms in 1 and 2D imaging, especially filtering, compression and enhancement of visual images.


Problems of imaging in geological, medical, industrial and art environments. This section will consist of case studies taken from the above fields.

References:

PHY350 Physics

Contact: Four hours theory and six hours laboratory per week. This subject is taken by students doing the Bachelor of Applied Science course.

Prerequisites: PHY250 and PHY260.

Syllabus: Instrumentation, electromagnetism, materials, acoustics, computer interfacing, nuclear physics,
optics, advanced instrumentation and signal processing.

References:

Third Year Laboratory Manual must be purchased.

PHY390  Computer Image Processing

Contact: Four hours per week for one semester.
Prerequisite: MAT228, MAT229, RDT246.
Applications: Some of the following topics will be considered in detail: Data Compression; Pattern Recognition; Gauging; Blob Analysis.
References:

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).
References:

PHY691  Industrial Machine Vision Systems

Contact: Two hours per week for one semester.
Prerequisite: RDT636 and RDT639.
Assessment: Written tests and assignments.
References:

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.

References:

Sociology:

Psychology:

PSY194 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.
References: To be advised.

RDT130 Software Development I

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: Nil.
Syllabus: 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.
References: To be advised.

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.

References: To be advised.

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 organisation, DBMS.
Reference:

RDT232 Digital Design II

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: RDT142.
Syllabus: Microprocessor based systems — CPU, RAM, ROM, I/O, buses. CPUS — microcoding, registers, ALU, sequencing, data paths, IO. Memory configurations, access, refresh, DMA. Buses — direction, timing, access, buffers. I/O techniques — parallel, serial, handshaking, interrupts.
References: To be advised.

RDT233 Digital Electronics I

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisites: RDT132, ELE130.
Syllabus: Digital system design — discrete gates, gate arrays, programmable logic arrays, ROMS. Testing and testability — built-in test circuits, signature analy-
sis, logic analysis. Crosstalk, noise, electromagnetic interference. Coding for error detection and correction. Introduction to VLSI design methodology.

References: To be advised.

**RDT234  Electronics II**

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

**Prerequisite:** ELE130.

**Syllabus:** Transistor applications - current source, reference voltage, input/buffers, output/drivers, differential amplifiers. Feedback principles, op. amps, DC/AC analysis. Applications - signal conditioning/converting, filters, oscillators, power supplies.


**RDT240  Software Engineering**

**Contact:** One hour lecture, two hours tutorial work per week for one semester.

**Prerequisite:** RDT230.

**Syllabus:** Design of task definitions, software specification. Development methodology, tools, debugging and testing. Portability, documentation, maintenance, quality assurance. Management of software development - scheduling, costing, team co-ordination.


**RDT241  Operating Systems**

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

**Prerequisite:** RDT230.

**Syllabus:** Specification and structure of OSs. Multi-programming, multi-tasking, concurrent processing, scheduling. Memory management, virtual memory, secondary memory transfers. I/O control, protection, resource allocation.


**RDT242  Microprocessor Applications II**

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

**Prerequisite:** RDT232.


References: To be advised.

**RDT243  Digital Electronics II**

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

**Prerequisites:** RDT233, RDT234.

**Syllabus:** Digital-Analog Interface: analog switches, sample and hold, ADC, DAC. Timing circuitry - oscillators, monostables, frequency and phase control, PWM. Phase locked loops - modulate/demodulate, frequency multipliers/dividers, digital filters, controllers.


**RDT246  Signals and Systems**

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

**Prerequisites:** MAT124.

**Co-requisites:** 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 detection/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. The compulsory units are:

- **Microprocessor Architecture and Programming:** (Four hours per week for one semester). Architecture of the M68000 micro-processor, 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.

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. See under RDT291 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.

References: To be advised in each unit.

**RDT291/292  Computer Science Elective 293/294**

**Contact:**

- **293/294:**
  - **Computer Science Elective**

These subjects are half-point electives in the Bachelor of Applied Science (Multi-discipline) course. Students may take one or more of these subjects in the second or third years of the course. To take one of these subjects, students must select two or more optional units such that a minimum of six semester hours of classes are taken. Each unit is taken over one semester only. The optional units are:

- CS1: Artificial Intelligence (2 hours per week). AI languages such as LISP and PROLOG, simple expert systems, natural language programming.
CS2 Computer Graphics (4 hours per week). See details under RDT351.

CS3 C Programming and UNIX (3 hours per week). Advanced programming unit in the C language, use of the UNIX operating system.

CS4 Cobol Programming (4 hours per week). Commercial computer programming, the COBOL language, file handling, sequential updating, array processing.

CS5 Fortran Programming (3 hours per week). Design and development of Fortran 77 software, structure and modularity, use of subroutine libraries.

CS6 Information Storage and Retrieval (4 hours per week). Principles and practices of file storage in a commercial processing environment.

CS7 Introduction to Computer Communications (2 hours per week). Data communications technology, techniques, protocols, network architecture.

CS8 Introduction to Instrumentation (2 hours per week). Physical principles of sensing devices, application of commercial sensors.

CS9 Numerical Computing (3 hours per week). Numerical and graphical application of Fortran 77, packages and libraries.

CS10 Real Time Systems and Programming (3 hours per week). See details under RDT330.

CS11 Robotics (4 hours per week). See details under RDT353.

CS12 Software Engineering (2 hours per week). Software specification and design, software tools, debugging, quality assurance, documentation, cost estimation.

CS13 Systems Analysis and Design (4 hours per week). Systems development cycle, project management, structured analysis, data modelling techniques, entity relationship model.

RDT330 Real Time Systems and Programming

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

Prerequisite: RDT241.

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.

References: To be advised in each unit.

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.

References: To be advised.

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, analogue filters, sampled data, Z transforms, FFT's, spectral analysis, applications of digital signal processing to speech, audio and image processing.

References: To be advised.

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.

References: To be advised.

RDT351 Computer Graphics

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

Prerequisites: MAT228, MAT229.


RDT352 Computer Communication and Networks

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: RDT246.

References: To be advised.

RDT353 Robotics

Contact: Two hours lectures, two hours practical/tutorial per week for one semester.
Prerequisites: RDT243, RDT246, MAT228.
Syllabus: Introduction and history of robotics, architecture, geometry and kinematics, actuators, and effectors, sensors, control, programming industrial robots, applications.

References: To be advised.

RDT354 Microchip Design II

Contact: Two hours lectures, two hours practical/tutorial work per week for one semester.
Prerequisite: RDT334.

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 and a number of optional units.
Project: (two hours per week for two semesters). 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.

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 RDT291 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.
References: To be advised in each unit.

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: (i) To consolidate and extend the student's knowledge of communications by application to a practical problem.

(ii) 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.

(iii) 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, compliancy in wrists, control loops for assembly programming, high-level programming language requirements, gripper design, pre-conditioning 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 pro-
gramming, file handling, I/O and external interrupts. 
Assessment: 50 per cent by assignment, 50 per cent 
written test.
References:
ADEPT Manipulator Systems, VAL II reference guide 
Selected papers from Robotics Research and other 
Robotics journals.

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 meth-
dos, sensors. End effectors; design considerations, 
operational constraints. Introduction to the kinemat-
ic of robots. Introduction to path and trajectory 
control. Robot-based manufacturing systems; con-
cepts and practical considerations. Social financial 
implications of robotic installations.
Assessment: Written test and assignments.
References:
CRAIG, J., Introduction to Robotics, Addison-Wesley, 
1986.
KOREN, Y.K., Robotics for Engineers, McGraw-Hill, 
1985.
WOLOVICH, W., Robotics – Basic Analysis & Design, 

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 co-ordinated and interpolated motion. 
Control: servoloops, electronic hardware, techniques 
of servo-control, role of the microprocessor. Program-
ming: interfacing to computers; programming lan-
guages of industrial robots. Sensing devices; tactile 
sensing; vision; speech.
Assessment: Written tests and assignments.
References:
CRAIG, J., Introduction to Robotics, Addison-Wesley, 
1986.
ENGELBERGER, J.F., Robotics in Practice, Kogan 
Page, 1982.
KOREN, Y.K., Robotics for Engineers, McGraw-Hill, 
1985.
WOLOVICH, W., Robotics – Basic Analysis Design, 
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 consid-
eration of financial and social issues. Economic analy-
ases 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. Selectional testing procedures; research and 
development trends in robotics; artificial intelligence 
and robotics. General robotics.
Assessment: Written tests and assignments.
References:
ENGELBERGER, J.F., Robotics in Practice, Kogan 

RDT633 Robotics Practical I

Contact: Two hours per week for one semester.
Co-requisite: RDT630.
Syllabus: Laboratory work and exercises to acquaint 
the student with the structure, geometry and program-
m of typical robots.
Assessment: Laboratory work, assignments and re-
ports.
References: Selected robot manuals and journal ar-
ticles.

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 re-
ports.
References: Manufacturers' manuals and journal ar-
ticles.

RDT635 Robotics Project A

Contact: Two hours per week for two semesters.
Prerequisites: RDT631 and RDT634.
Syllabus: Projects may be of an investigational, re-
search 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. Oper-
ating systems, compilation, assembly, linking, loading 
and execution of programs. User friendly systems and 
man-machine interface.
References:
CALINGAERT, P., Operating System Elements: A User 
HELDERMANN, N., Digital Computer Principles, (2nd 
STONE, H.S., Introduction to Computer Architecture, 
SRA, 1975.
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 logics 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.
Manufacturers’ manuals.

RDT639 Physical Instrumentation

Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus: Introduction to transducers, signal interfacing, amplification, linearisation, noise. Analogue 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.
References: To be advised.

RDT641 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.

RDT642 Industrial Systems and Human Factors

Contact: Two hours per week for one semester.
Prerequisite: Nil.
Syllabus: Industrial systems: the basis of systems analysis, and design. Factors involved in an industrial organisation, relationships between industries. The manufacturing process, scale and complexity. Large and small-scale organisations. Plant design and operation. The robot in the organisation.
Human factors: signal detection theory, the ‘ideal observer’, information processing and decision making, the human operator and tracker, controller and supervisor, decision errors, causes of human error, vigilance, information overload. Factors causing fatigue and stress. Effect upon performance.
Design of systems for efficient use of labour, the robotic environment. Shift in the work force. Job design, enrichment, motivation, satisfaction. New tasks, effects on education and retaining requirements.
Selected papers and articles.

RDT643 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.
RDT644 Computer Aided Design with Graphics

Contact: Two hours per week for one semester.
Prerequisite: RDT636, or equivalent.
References: To be advised.

RDT645 Robot Communication and Control

Contact: Two hours per week for one semester.
Prerequisite: 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.
References: To be advised.

RDT646 Microelectronic Technology and Design

Contact: Two hours per week for one semester.
Prerequisite: RDT636, or equivalent.
Syllabus: Introduction to present fabrication technology for microelectronic devices. Design rules for existing processing technique. Design tools commonly used in VLSI design.

RDT647 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.
References: To be advised.

RDT648 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: RDT636, 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.
References: 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 operat-
ing 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 combinatorial 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.
Co-requisite: 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 modern interfaces (e.g., V.24/RS-232C). Synchronous communications. Principles of communications protocols; examples of protocols, e.g., Bisynic 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 considera-

RDT657 Terminal-Based Systems

Contact: Two hours per week for one semester.
Prerequisite: RDT651, or equivalent knowledge.
Co-requisite: 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.
Co-requisite: 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. IBM's 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.
Co-requisite: 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., RS-232C, RS-422, RD-423, IEEE-488. Local area networks. Combined analogue 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 and 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.
**Co-requisite:** 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.
**Prerequisite:** 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 system. 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, EDP619, 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.
**Co-requisite:** 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.

*UNIX is a trade mark of AT & T Bell Laboratories.

**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 8 & 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.

**RDT672 Microelectronic Technology and Design**

**Contact:** Two hours per week for one semester.
**Prerequisite:** RDT653, or equivalent knowledge.
Aim: This unit is for those involved in hardware design. It covers the range of semiconductor technologies available and the principles of designing integrated circuits.


RDT711 Interactive Graphics and Application Software

Contact: Three hours per week for seven weeks.
Prerequisite: Entry requirements into the Computer Graphics Graduate Diploma.
Assessment: Software assignments, library research, unit test.
References:
GILOI, W.K., Interactive Computer Graphics,
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.
References:

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.
References:
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).
References: Current books and journals.

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
conjuncti on with an industrial supervisor where this is appropriate.

References: As advised by supervisor.

SFT111  Software Development 1

Contact: Four hours per week for one semester.
Prerequisite: Nil.
Syllabus: Introduction to computer systems, hardware and software. Use of a multi-user computer system, directories, utilities and budgets.

Programming as a discipline. What is a program-data plus processing. Basic programming elements: sequence, selection and iteration. Types of data, data storage. Internally stored data: variables and constants. Externally sorted data: files, records, fields and characters. Control data versus information. Types of files: sequential/non-sequential.

Stages of writing a program: determining requirements, design, implementation, testing. Design tools, algorithm, source program, compilation/compiler, object program, loader/linker, executable code, syntax errors, logic errors, execution errors, debugging, programming standard guidelines. Program documentation.

Introduction to the COBOL Programming language: purpose and uses. Structure of COBOL programs: DIVISIONS, SECTIONS, paragraphs, sentences, statements, words.


Defining data in COBOL: single data items and complex data structures.

Table handling in COBOL: One-dimensional tables. OCCURS clause; subscript management; relationship to iterative processing using PERFORM verb (including PERFORM...VARYING and its inadvisability). Partially full tables, free pointer concept versus current number of entries pointer.

References:

SFT112  Software Development 2

Contact: Four hours per week for one semester.
Prerequisites: SFT111, COT113.
Syllabus: Master File Updating: Inputs (transaction file and old master file); Outputs (new master file, error report, reconciliation report); transaction types and their actions (Addition/Creation/Insertion, Amendment/Change/Alteration/Deletion); 'Insitu' versus 'Father-Son' updating; balance line algorithm.

Further reporting techniques: What should be printed if there is no report body? Positioning of heading routine processing, end of report message; line-up routines for pre-printed stationery control break logic; REDEFINES clause—explicit and implicit.

Searching tables: Linear search and binary search techniques, sorted and unsorted table, and their effect on search logic.

Initialising Tables: VALUE clause and its problems. VALUE in conjunction with REDEFINES clause; use of reference files to build tables. Multi-dimensional tables and subscript management.

Updating tables: inserting and deleting entries from sorted and unsorted tables.

Validating programs: purpose; extent or depth of validation; data definition to suit processing; use of tables (including tables containing error messages); error reporting; use of reference files; INSPECT, UNSTRING, STRING.

Subprogramming: its place in modern methodology; relationship to design techniques already studied, driver programs and test harnesses.

CASE structure in COBOL: GOTO...DEPENDING ON, IF structure. Further table handling: INDEXED BY, SET, SEARCH.

Data representation and USAGE clause. Efficiency in COBOL: the historical view and current attitudes; programmer, time and space efficiency; suggestions.

Qualification of data names: suffix, prefix, OF and IN. CORRESPONDING options. SORT verb.

Record structures in COBOL: fixed, variable, varying, data sensitive; OCCURS...DEPENDING ON...clause. Relative files.

Further Indexed Sequential File processing: multiple keys, error handling including DECLARATIVES.

References:

SFT211  Software Development 3

Contact: Four hours per week for one semester.
Prerequisite: SFT112.
Syllabus: Interactive versus batch processing; Screen handling modes: field and block; Screen types: menu screens, data entry screen, components of a data entry screen, screen id, title, prompts, data entry area (field), field delimiters, confirmation/verification, error messages and other field protection. Fields: data and/or control; validating fields. Subscreens: field grouping;
movement between subscreens. Forms of Data: internal, enterable, confirmation/verification.

Processing one Held... Management, Yourdon Press, 1980.

Contact: Four hours per week for one semester.

References:


**SFT212 Software Development 4**

Contact: Four hours per week for one semester.

**Prerequisite:** SFT112, COT114.

**Syllabus:** Overview of History and Concepts of C. Basic syntax; Declarations and Types; Arithmetic Operators; Relational Operators; If and While Statements; Simple Input/Output; print format specifiers; Character Types; Logical Operators; Assignment Operators; Operator Precedence; Type Conversion. Arrays: More Control Structures; Pointers; Size of Operator; Pointer Arithmetic; Pointers and Arrays; Strings; Address arguments; 2D Arrays; Arrays of Pointers.

Functions; parameter passing by reference and by value; macro definitions.

Formatted Input — scanf( ); Text File Handling;

Pipes; filters and I/O redirection.

Structures and unions; Pointers to a Structure;

Typedef; Unions.

Binary I/O; Random Access.

Separate compilation; linking.

Storage Allocation, Lists, Trees; Dynamic Storage Allocation; Data Abstraction; Recursion; Self-Referential Structures; Linear Linked Lists; List Operations; List Processing Functions; Binary Trees; Binary Tree Creation and Traversal.

Sorting; Sorting by Insertion; Sorting by Selection; Sorting by Exchange — Bubble Sort; Sorting by Partitioning.

Quicksort; Evaluation of sorting techniques.

Bitwise expressions and operations.

Functions as parameters.

**References:**


**Manufacturer's Language Manuals as appropriate.**

**SFT303 Industrial Experience**

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.

References:


**SFT311 Software Development 5**

Contact: Four hours per week for one semester.

References:
Prerequisite: SFT211, SFT212.

Syllabus: Overview of language processors. The study of system-defined data types, both elementary and structured. The concepts of abstract data types and module encapsulation. Sequence and data control in programming languages. Storage management. A comparative presentation of the languages, FORTRAN 77, PL/1, PASCAL, ADA, LISP, APL, C and COBOL, SMALLTALK. An overview of systems software. Design principles and structure of modern general purpose operating systems. Introduction to Performance Monitoring. System Administration. Concepts of dedicated operating systems, Process Control systems and Embedded systems. Programming issues in system software: Data structures, Finite State Machines, Scanning and Parsing, Interrupt handling, Device level programming, Concurrent programming, Interprocess communications.

Examples will be drawn from UNIX, PC-DOS, XINU, VAX VMS and OST.

The programming language required for practical work will be C which must be available on both the PC's and UNIX (on the Pyramid).

Any assembler level programming required will be based on the 8088/86 architecture (IBM PC).

References:

SFT312 Software Development 6

Contact: Four hours per week for one semester.
Prerequisites: SFT211, SFT212.

Syllabus: Programming Support Tools: Cross-references; Source Program Re-Structuring Utilities; Source Code Control Systems and Version Controls; Source and Object Library Management and Data-Hiding Techniques.


Quality Assurance: Test Data Generators; Test Harnesses.

Documentation and Control: Computer Assisted Flow-Charts and Design Diagrams; WP for System Documentation; WP and/or HELP Systems for User Documentation; Office Automation for project communication; Computer-Assisted Project Control.


4GL's: Implications for 4GL's: 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 3GL's and 4GL's; Hybrid systems: Interfacing 3GL and 4GL components.

References:
MARTIN, J., Fourth Generation Languages Volume 1, Savant, Carnforth, 1983.
Suppliers Reference Manuals.

SFT408 Fundamental Programming

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

Syllabus: Introduction: Short history of LISP and SCHEME.

Procedural Abstraction: Naming and the environment; Interaction versus recursion; Higher-order procedures.


References:

SFT409 Advanced Programming Tools

Contact: Four hours per week for one semester.
Prerequisite: SFT608.

Syllabus: Quality Assurance: Unit, subsystem and system testing; Technical review methods; Testing strategies.

Software Reusability: The design, maintenance and accessing of large software libraries; Portable Software. Domain specific application generators. Productivity Tools: Syntax-directed editors; Pretty-printers; Standard enforcers; Symbolic debuggers; Cross-referencing tools; Pre- and Post-processors; Integrated environments. Source and object code control systems (e.g. UNIX's make and SCCS).

References:
SFT583  Foundations of Artificial Intelligence

Contact: Four hours per week for one semester
Prerequisite: SYS444.

Syllabus: Theoretical Background: Philosophical Logic; Formal Systems/Axiomatic Systems, formal languages, proof theory, model theory; Propositional Calculus; First-order Predicate calculus; Logic in Artificial Intelligence: Prolog; Resolution Strategies; Inference Mechanism; Semantic Representation; Monotonic and Non-monotonic logics; Multi-valued logics; Uncertainty (e.g., fuzzy logics); Meta-representation

References:
Journal Articles to be prescribed.

SFT760  Software Development I

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


Local and global variables. Methods of passing of parameters. Coupling and cohesion. Application of structured techniques to programming languages which lack such features.

References:
Programmers' Reference Manual as appropriate.
Reference texts for Programming Languages as appropriate.

SFT764  Software Development II

Contact: Four hours per week for one semester
Prerequisite: COT770, SFT760.

Syllabus: Differences between batch and interactive
References:

SYS116 Information Systems 2

Contact: Four hours per week for one semester.
Prerequisite: SYS115.

Syllabus: Introduction to the Systems Development Life Cycle: system development life cycle; organisational structures for computing; computer professionals; skill requirements; job functions; analyst/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: deliverables; user and operational documentation; standards; technical reviews.

References:

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).

References:

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, procedure models, procedure hierarchies, 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, testing - system, 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.
References:
BIRD, E. & FIRNBERG, D. (Eds.), The Information Centre: A State of the Art Report, Pergamon In-
foritech, Maidenhead, 1984.
DE MARCO, T., Controlling Software Projects, Your-
STUART, A., Writing and Analysing Effective Computer System Documentation, Holt, Reinhart and

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-oriented) member of a system development team.
Syllabus: Concepts of on-line, batch, real-time, database; systems; systems analysis techniques; systems design techniques; system implementation including file creation, user training, system testing, cut-over, system maintenance, post-implementation review.
References: To be advised.

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; RSI, job deskilling, interface design and other critical and unsolved problems; The next five years.
References:
Research papers as appropriate.

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; Man-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.
References:
BENNETT, J.W. (Ed.), Building Decision Support Sys-
tems, Addison-Wesley, Reading, MA, 1983.

SYS416 Decision Support Systems Technology

Contact: Four hours per week for one semester.
Prerequisite: SYS415.
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 man-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.
References: To be advised

SYS421 System Theory

Contact: Four hours per week for one semester.
Prerequisite: Nil.
References:
Related research papers.

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.
References:
MARTIN, J. & FINKELSTEIN, C., Information Engineering, Savant Institute, 1981.
Course notes and relevant research manuals.

SYS425 Systems Theory

Contact: Four hours per week for one semester.
Prerequisite: SYS421.
References:
Related research papers.

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).
References:
Related research papers.

SYS427 Analysis and Design

Contact: Four hours per week for one semester.
Prerequisite: SYS422.
Syllabus: Structured Design: Structured design concepts; coupling and cohesion; morphology of systems; design heuristics; transform analysis; packaging; implementation. Corporate Strategic Planning: A Study of Corporate Strategic Planning and its importance in system development.

Project Management: Project scope and justification; project control and documentation; resource estimation of project costing; project management systems; project team, group problem solving; change control; roles for users and data processing professionals.

References:
MARTIN, J. & FINKELSTEIN, C., Information Engineering, Savant Institute, 1981.

SYS436 Analysis and Design

Contact: Four hours of class contact per week for one semester.
Prerequisite: SYS422.
Syllabus: Systems Development Aids: An investigation of the latest tools available to assist in the development of applications for the computer. Automation of parts of the system development process. Use of fourth generation languages such as FOCUS, MAPPER and INFORMATION in system development. Future directions in system development including the use of natural language. Investigation of such methods as the Nissen Information Analysis Methods (NIAM).
User Driven Computing: Information centres; user rights, fourth generation languages; query languages; analysis and design methodologies for the user; application generators.

References:
MARTIN, J., Applications Development without Programmers, Savant Institute, 1981.
Relevant research manuals.
Literature describing the commercial products.

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.

References:


SYS445 Minor Thesis 1

Contact: Four hours per week or equivalent 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 1–7). 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).

References:
CHISHOLM INSTITUTE OF TECHNOLOGY, Department of EDP, The Citation of References, Chisholm Institute Printing Services, 1984.

SYS446 Minor 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).
References:
CHISHOLM INSTITUTE OF TECHNOLOGY, Department of EDP, The Citation of References, Chisholm Institute Printing Services, 1984.

SYS447 Intelligent Man Machine Interfaces

Contact: Four hours per week for one semester.
Prerequisite: COT423.


4. Graphic Representation Techniques: Graphic and advanced tools for professional and end user man-machine interaction. Graphic representation in object-based programming languages. General principles of intelligent graphic interface design and use. The workbench and the desk top.

References:
Relevant research papers.

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 Artificial Intelligence

Prerequisite: Nil.

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: Generalised system modelling; Organisational information systems and components thereof. Operational Information systems development processes. A framework for the automation of the information system development process. The conceptual schema and the data dictionary. A review of products available, or under development, that may assist in the system development process. The appropriateness of products to different developmental environments. Organisation structures or system development. Review of the traditional system life cycle and its relevance to system development in an automated system development environment. New approaches to the system development process. Changing professional roles within the system development environment.

SYS513 Convergent Technology

Prerequisites: Nil.

Syllabus: Study of the various technologies and their evolutionary paths. This includes some study of technologies that are still being initiated.

Technologies that would be covered currently include: computer architecture, high level software, user based computing, management decision support systems, communications, distributed processing, and the automation of the office, image processing, text processing, graphics, audio processing, robotics, human factors and artificial intelligence.

Study of the types of convergence of the technologies that could occur and an exploration of some likely consequences.

Study of the social, psychological and economic forces that will affect the convergence process. Planning for change.

Study of the organisation and organisational functions and structures. Exploration of consequences of the convergence of technologies on the structure and function of the organisation.

SYS514 Information Modelling

Prerequisite: SYS422 and COT423 from the Graduate Diploma in Information Technology, or equivalent.


SYS515 Decision Support System Development

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 man-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.


British ENIAC 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.


**References:**


**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 networks in man and machine. The nature of expertise and psychological aspects of its development. The expert systems engineering aspects of alternative models. Models of social and psychological and reality underlying contemporary computing in general and AI in particular. Models of human language acquisition and use and their impact on contemporary AI. Parallelism in human information processing and the resulting models. Cognitive style research, its grounding in physiology and its applications in contemporary research. Human learning as AI paradigm.

**References:**


**SYS528 Advanced Topics in Knowledge Engineering**

**Contact:** Four hours per week for one semester.

**Prerequisites:** SYS444, SPT449.

**Syllabus:** Knowledge Representation: Rule Based Systems; Frame Based Systems; Blackboard Architectures; Conceptual Structures.


Evaluating Expert System Tools: Types of Tools and Their Features; Evaluation Techniques.


Knowledge Acquisition Techniques: Rule Induction; Concept Formation.

**References:**


Relevant journals and manufacturers’ manuals.

**SYS616 Computer Project Management**

**Contact:** Two hours per week for one semester.

**Prerequisites:** RDT651.

**Co-requisites:** RDT652, or equivalent knowledge.

**Aim:** This unit is for those concerned with the management of computer installations. It covers the principles of managing in a project situation, i.e., the co-ordination 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 management tools. Personnel issues. Issues involved in particular 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, or equivalent knowledge.  
Aim: This unit is for those with a limited background in Data Processing who wish to extend their knowledge in that area. It covers the basic principles of Systems Analysis and Systems Implementation in a conventional data processing environment.  

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, packages - selection and evaluation, programming languages and concepts, end-users, information centres and software for application development.  
References:  

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 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.  
References:  
GREIG, J., Course Notes for Information Engineering, Chisholm Institute of Technology, 1985.  

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.  
References:  
WINSTON, P.H., Artificial Intelligence, (2nd edn.), Addison-Wesley, Massachusetts, 1984.  
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. (i) 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; (ii) 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.  
References:  


SYS751 Information Systems II

Contact: Four hours per week for one semester
Prerequisites: SYS750, SYS760.

Syllabus: The need for good system design including quality assurance techniques; Coupling and cohesion (factors to be considered), structure charts; Procedure models, procedure hierarchies; model size, program size – consideration copy libraries; The need for user friendly software, design screen – menu functions; Report design; Prototyping; Design of security and backup; Conversion – file creation – parallel running; Testing – system, user and acceptance; Post implementation actions, reviews, efficiency tuning, maintenance; Documentation which needs to be maintained during design and implementation; User documentation and training; UDC, more specifically, DSS, user friendly software products, support and assistance, access to data; why users can/cannot do it themselves; Information Centres – a possible alternate way of development; Standards – PRIDE, SDM70 etc, and what they are.

References:


TEC205 Materials Technology

Contact: Four hours per week for two semesters.


References:


TEC206 Manufacturing Technology

Contact: Two hours per week for two semesters.
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.

References:


TEC207 Graphics Communications

Contact: Two hours per week for two semesters.

References:


TEC211 Information Processing

Contact: Three hours per week for two semesters (84 hours).
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.

References:

TEC215 Application Programming

Contact: Five 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: For example, report generating programs, update programs, validation programs, inquiry programs.
References:
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: To be accepted into the Bachelor of Technology with a pass in Computing I.
Digital Circuits: Number systems and Computer codes. Boolean algebra and logic gates, Karnaugh maps, multiplexers and demultiplexers, encoders, decoders and code converters, flip-flops, counters and registers, arithmetic logic circuits.
Structured Program Design and Data Structures: PASCAL and Turbo-PASCAL. Data types, the array data structure, control structures. Algorithms, BNF and syntax diagrams. Case studies in PASCAL programming.
Computer Systems and architecture. The microprocessor, programming the microprocessor, interfacing, the M6800 microprocessor. Introduction to other microprocessors. Semiconductor memory, ROMs, RAMs and PLAs.
Assessment: Two examinations, one at the end of each semester 80 per cent. Continuous laboratory assessment through the year 20 per cent. To pass this subject, students must have satisfactorily completed the laboratory component of the course.
Prescribed Text:
TEC216 Laboratory Manual.
References:
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.
Preceded Text: To be advised.
References:

TEC305 Introduction to Methods Study

Contact: Two hours per week for two semesters.
References:

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. Detail design; 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.
References:


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.
References:

TEC308 Industrial Systems Technology

Contact: Two hours per week for two semesters.
References:

TEC311 Management Principles

Contact: Three hours per week for two semesters.
References:

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.
References: To be advised, dependent on the project.

TEC313 Entrepreneurship

Contact: Two hours per week for one semester.
References:

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.
References: A wide range of Marketing and Audio-visual journals and magazines will be used as appropriate.

TEC315 Systems Development

Contact: Four hours per week for two semesters.
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.
References:

TEC316 Computer Science II

Contact: Four hours per week for two semesters.
Syllabus: Advanced Pascal. List structures, forward and backward pointers, recursion.
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.
References:
DROMEY, R.G., How to Solve it by Computer, Prenice-Hall, 1982.

TEC317 Digital Signal Processing II

Contact: Four hours per week for two semesters.
References:
LIST OF CHISHOLM COURSES

NOTE: Courses marked C are offered at Caulfield only, those marked F at Frankston only, and those marked C&F at both campuses. Courses marked C/F may be started at Frankston but must be completed at Caulfield.

### BACHELOR DEGREES

<table>
<thead>
<tr>
<th>Course Description</th>
<th>VOLUME</th>
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<tbody>
<tr>
<td>Bachelor of Applied Science (Computing) (C&amp;F)</td>
<td>DSBS</td>
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<tr>
<td>Bachelor of Applied Science (Digital Technology) (C)</td>
<td>C</td>
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<tr>
<td>Bachelor of Applied Science (Multi-discipline) (C)</td>
<td>F</td>
</tr>
<tr>
<td>Bachelor of Applied Science/Bachelor of Business (Computing &amp; Accounting) (C&amp;F)</td>
<td>DSBS</td>
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<tr>
<td>Bachelor of Arts (C&amp;F)</td>
<td>SSBS</td>
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<tr>
<td>Bachelor of Arts/Bachelor of Business (C&amp;F)</td>
<td>SSBS</td>
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<tr>
<td>Bachelor of Arts (Ceramic Design) (C)</td>
<td>A&amp;D</td>
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<tr>
<td>Bachelor of Arts (Fine Art) (C)</td>
<td>A&amp;D</td>
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<tr>
<td>Bachelor of Arts (Craft) (F)</td>
<td>A&amp;D</td>
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<tr>
<td>Bachelor of Arts (Graphic Communication) (C)</td>
<td>A&amp;D</td>
</tr>
<tr>
<td>Bachelor of Business (Accounting) (C&amp;F)</td>
<td>DSBS</td>
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<tr>
<td>Bachelor of Business (Banking and Finance) (C)</td>
<td>DSBS</td>
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<tr>
<td>Bachelor of Business (Business Administration) (F)</td>
<td>DSBS</td>
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<tr>
<td>Bachelor of Business (Management) (C)</td>
<td>DSBS</td>
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<tr>
<td>Bachelor of Business (Marketing) (C)</td>
<td>DSBS</td>
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<tr>
<td>Bachelor of Business (Office Administration) (C)</td>
<td>DSBS</td>
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<tr>
<td>Bachelor of Education (Fourth Year) (F)</td>
<td>ED</td>
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<tr>
<td>Bachelor of Engineering (Civil and Computing) (C)</td>
<td>Fac</td>
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<tr>
<td>Bachelor of Engineering (Electrical and Computing) (C)</td>
<td>Fac</td>
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<tr>
<td>Bachelor of Engineering (Industrial and Computing) (C)</td>
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<tr>
<td>Bachelor of Engineering (Mechanical and Computing) (C)</td>
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### DIPLOMAS

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<tr>
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<tbody>
<tr>
<td>Diploma of Applied Science (Nursing) (F)</td>
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<tr>
<td>Diploma of Art and Design (Graphic Design) (C/F)</td>
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<tr>
<td>Diploma of Teaching (Early Childhood) (F)</td>
<td>ED</td>
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<tr>
<td>Diploma of Teaching (Primary) (F)</td>
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### ASSOCIATE DIPLOMAS

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<tr>
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<tbody>
<tr>
<td>Associate Diploma in Art and Design (Ceramic Design) (C)</td>
<td>A&amp;D</td>
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<tr>
<td>Associate Diploma in Art and Design (Ceramic Design) — Part-time (F)</td>
<td>A&amp;D</td>
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<tr>
<td>Associate Diploma in Marketing (C)</td>
<td>DSBS</td>
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<tr>
<td>Associate Diploma in Police Studies (C)</td>
<td>SSBS</td>
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<tr>
<td>Associate Diploma in Secretarial Studies (Legal) (C)</td>
<td>DSBS</td>
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<tr>
<td>Associate Diploma in Secretarial Studies (Medical) (C)</td>
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<tr>
<td>Associate Diploma in Tribology (C)</td>
<td>Fac</td>
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<tr>
<td>Associate Diploma in Welfare Studies (C)</td>
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### GRADUATE DIPLOMAS

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<tr>
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<tbody>
<tr>
<td>Graduate Diploma in Accounting Information Systems (C)</td>
<td>DSBS</td>
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<tr>
<td>Graduate Diploma in Administrative and Secretarial Studies (C)</td>
<td>DSBS</td>
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<tr>
<td>Graduate Diploma in Agribusiness (F)</td>
<td>DSBS</td>
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<tr>
<td>Graduate Diploma in Applied Polymer Science (C)</td>
<td>Fac</td>
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<tr>
<td>Graduate Diploma in Applied Psychology (C)</td>
<td>SSBS</td>
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<tr>
<td>Graduate Diploma in Banking and Finance (C)</td>
<td>DSBS</td>
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<tr>
<td>Graduate Diploma in Business Technology (C)</td>
<td>Fac</td>
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<tr>
<td>Graduate Diploma in Ceramic Design (C&amp;F)</td>
<td>A&amp;D</td>
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<tr>
<td>Graduate Diploma in Community Education (C&amp;F)</td>
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<tr>
<td>Graduate Diploma in Computer Graphics (C)</td>
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<td>Graduate Diploma in Computing (C)</td>
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<td>Graduate Diploma in Digital Communications (C)</td>
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<td>Graduate Diploma in Educational Studies (F)</td>
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<tr>
<td>Graduate Diploma in Fine Art (C)</td>
<td>A&amp;D</td>
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<tr>
<td>Graduate Diploma in Information Technology (C)</td>
<td>Fac</td>
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<tr>
<td>Graduate Diploma in Logistics Management (F)</td>
<td>DSBS</td>
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<tr>
<td>Graduate Diploma in Marketing (C)</td>
<td>DSBS</td>
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<tr>
<td>Graduate Diploma in Multicultural Studies (C&amp;F)</td>
<td>SSBS</td>
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Graduate Diploma in Outdoor Education (F) ......................................................... ED
Graduate Diploma in Project Management (C) ...................................................... Fac
Graduate Diploma in Robotics (C) ........................................................................ Fac
Graduate Diploma in Structural Computations (C) .............................................. Fac
Graduate Diploma in Water Science (C) ............................................................... Fac
Graduate Diploma in Welfare Administration (C) ................................................ SSBS

MASTER'S DEGREES by Coursework
Master of Applied Science (Computing) (C) ........................................................ Fac
Master of Business (Marketing) (C) ..................................................................... DSBS

MASTER'S DEGREES by Thesis/Research
Master of Applied Science (C) ............................................................................... Fac
Master of Arts (C) ............................................................................................... SSBS
Master of Business (C) ....................................................................................... DSBS
Master of Education (F) ..................................................................................... ED
Master of Engineering (C) ................................................................................... Fac

BOOK CODES:
A&D .................................................................................................................... School of Art and Design
DSBS .................................................................................................................. David Syme Business School
ED ....................................................................................................................... School of Education
Nur ....................................................................................................................... School of Nursing
SSBS .................................................................................................................. School of Social and Behavioural Studies
Fac ...................................................................................................................... Faculty of Technology
The Frankston Campus is located on a major arterial road linking the Mornington Peninsula Freeway and the Frankston/Flinders Road. On-campus parking is available for students. The Frankston Railway Station is approximately two kilometres from the campus and the area is serviced by a local bus network.

A. George Jenkins Theatre, Student Union, Educational Development Unit, Institute Community Services, Computer Centre (Level 1); Bookshop, Cafeteria (Level 2); Lecture Theatres (Levels 2 & 4); School of Education, Staff Lounge (Level 3); Library (Levels 3 & 4); handicapped access.

B. School of Art and Design, Science, Music & Physical Education, Gymnasium, handicapped access.

*1 Art & Design Workshop
*2 Ceramic Production Workshop

C. Administration, Conference Room

CC. Childcare Centre

D. David Syme Business School, Division of Information Technology, Division of Mathematical and Environmental Sciences, School of Social and Behavioural Studies.

E. School of Nursing, Division of Mathematical and Environmental Sciences, Chemistry and Biology

G. Garages

H. Halls of Residence

S. Struan House, Division of Continuing Education, Education

T. Tennis Courts

W. White Cottage: South Pacific Centre for School and Community Development

Vehicle Entry and Exit

Entry to buildings

GP. General car parking
SP. Staff parking area
RP. Residents parking
VP. Visitors parking area
PO Box 197, Caulfield East, Vic. 3145

900 Dandenong Road, Caulfield East,
Telephone: (03) 573 2222

McMahon's Road, Frankston,
Telephone: (03) 784 4211