

## School of Information Technology and Mathematical Sciences

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## School of Information Technology & Mathematical Sciences

The School of Information Technology and Mathematical Sciences began its existence as a Department of Mathematics with responsibility for mathematics majors within the Applied Science, Arts and Education degrees, as well as the service teaching of mathematics and statistics in numerous other courses. A major in Computing was introduced into the Applied Science degree in 1984. The incorporation of the Bachelor of Computing as the first degree controlled solely within the department in 1990 saw a change of name to Mathematics and Computing. University restructure in 1995 resulted in the formation of the School of Information Technology and Mathematical Sciences.

The evolution of names reflects the gradual change in emphasis of the School from solely mathematics to a much broader focus on computing supported by mathematics and applied statistics. The current School teaching focus is on the delivery of innovative programs in Information Technology, Computing and Applied Statistics, as well as the delivery of mathematics, statistics and computing studies across the University. The research emphasis is on informatics and applied optimization.

### Head of School

Sidney Morris	BSc(Hons) <i>Qld</i> , PhD <i>Flin</i> , FIMA, CMath, FAustMS, CompIEAust	<i>Prof</i>
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### Academic Staff

Alex Rubinov	MSc <i>Leningrad</i> , PhD <i>Novisibirsk</i> , DSc <i>Moscow</i>	<i>Prof</i>
John L Yearwood	BSc(Hons), DipEd <i>Monash</i> , MSc <i>Syd.</i> , PhD <i>RMIT</i> , MACM	<i>Assoc Prof</i>
Peter J Martin	BA <i>Monash</i> , TPTC <i>BallaratTC</i> , MEd <i>Deakin</i> , IASE	<i>Sr Lect</i>
Heping Pan	BSc and MSc <i>Wuhan</i> , PhD <i>Twente</i>	<i>Sr Lect</i>
Philip A Smith	BSc(Hons) <i>New England</i> , PhD <i>Deakin</i> , MACM	<i>Sr Lect</i>
Andrew Stranieri	BA <i>Melb.</i> , GDipCompSci <i>LaT.</i> , AdvDipCompSci <i>LaT.</i> , PhD <i>LaT.</i>	<i>Sr Lect</i>
Faezeh Afshar	GDipComp <i>BCAE</i>	<i>Lect</i>
Ewan J Barker	BSc(Hons) <i>Melb.</i> , MSc <i>Monash</i> , PhD <i>Edin.</i> , GCertTertTeach <i>Ballarat</i>	<i>Lect</i>
Marcello Bertoli	DipApp Physics <i>RMIT</i> , BSc App Physics <i>RMIT</i> , Dip. Ed. <i>Hawthorn</i> , GDipComp <i>Deakin</i> , B.Sc (Hons.) Geology <i>Ballarat</i>	<i>Lect</i>
Frank De Luca	BComm <i>Melb.</i> , GDipCDP <i>FIT</i> , MComp <i>Monash</i>	<i>Lect</i>
Jason Giri	BSc(Math/Stats) <i>LaT.</i>	<i>Lect</i>
Scott A Hebbard	BSc(Hons) <i>Deakin</i>	<i>Lect</i>
Marijke Heywood	GDipComp <i>Ballarat</i> , GDipTerTeach <i>Ballarat</i>	
Cameron Hurst	BSc(Hons) Applied Mathematics and Statistics <i>Griffith</i>	<i>Lect</i>
Keyurkumar Patel	BE, MEng(Robotics), CNE, NEE, MCSE, MCT, Cert. IV <i>WTA</i> , AACs, PhD Candidate <i>SUT</i>	<i>Lect</i>
Eric Lindberg	BAppSc <i>Monash</i> , GDipEd <i>Melb.</i> , MCNE (Novell), MCSE (Windows 2000), CCNA (Cisco)	<i>Lect</i>
Michelle O'Brien	GDipComp, BAppSc, Speech Pathology	<i>Lect</i>
Kylie Pegg	BAppSc(Maths&Comp) <i>Ballarat</i> , CertIV(WorkplaceTraining) <i>IBT</i>	<i>Lect</i>
Robyn U Pierce	BA, DipEd <i>Monash</i> , BEd, MEd <i>Deakin</i>	<i>Lect</i>
Gregory L Simmons	BSc, MSc <i>Victoria UT</i> , CLP (AD & SA), CLI	<i>Lect</i>
Adrian D Smith Gaudlitz	BEc <i>ANU</i> , MBA <i>Deakin</i> , MACS	<i>Lect</i>
Glenn R Stevens	BAppSc(Physics) <i>BCAE</i> , MEng <i>Victoria UT</i> , CNE/CNI(Novell)	<i>Lect</i>
David Stratton	BA(Hons), GDipCompSc <i>Camb.</i> , CNE(Novell), MACM	<i>Lect</i>
Chris Turville	BSc(Hons), PhD <i>UWS Macarthur</i>	<i>Lect</i>
Adil Bagirov	MSc <i>Baku, Azerbaijan</i> , PhD <i>Ballarat</i>	<i>Post Doctoral Research Fellow</i>

### Administrative Staff

Julie Howes	CertIVBus(Administration) <i>Ballarat</i>	<i>Admin Officer (Student Liaison)</i>
Belinda Kent		<i>Admin Assistant</i>
Kym Kingston	BBus <i>Charles Sturt</i>	<i>School Admin Officer (Staffing)</i>
Maxine J Kingston		<i>Secretary to Head of School</i>
Kaye J Lewis		<i>School Secretary</i>
Theresa Saunders	DipBus(Administration) <i>Ballarat</i>	<i>Admin Officer (International)</i>
Belinda J Wallesz	AdvCertBus(Acc) <i>Ballarat</i>	<i>School Admin Officer (Finance)</i>

### Technical Staff

Graeme Cowling	B.Sc, Dip. Ed. <i>Monash</i> , Dip. IT	<i>Technical Support Officer</i>
Ian Lee	BComp, <i>Ballarat</i> , AssocDipElec <i>SMB</i> , CNA(Novell)	<i>Technical Support Officer</i>

**Centre for Informatics & Applied Optimization (CIAO)**

<b>Staff Member</b>	<b>Position</b>
Alex Rubinov	Director
John Yearwood	Deputy Director

**International Programs**

<b>Staff Member</b>	<b>Role</b>
Frank DeLuca	Director

**Coordinators**

<b>Staff Member</b>	<b>Role</b>
John Yearwood	Research
Philip A Smith	Research Degrees
Robyn Pierce	Undergraduate Degrees
Gregory L Simmons	Honours
Chris Turville	Masters
Adrian Smith Gaudlitz	Graduate Diploma and Graduate Certificate
Peter J Martin	Graduate Certificate of Statistical Process Management

**Adjunct Professor**

Gerry Anderson

**Academic Associate**

Jack Harvey                      BSc, DipEd *Melb.*, PhD *Ballarat*, MACS

**School of ITMS Website:** [www.ballarat.edu.au/itms](http://www.ballarat.edu.au/itms)

# School of Information Technology and Mathematical Sciences Courses

## Bachelor of Computing

CRICOS : 008780B

### COURSE COORDINATOR

Dr Robyn Pierce

### ADMISSION REQUIREMENTS

Satisfactory completion of the VCE including prerequisite units 1 and 2 - two units of Mathematics, (excluding Foundation Maths) or interstate or overseas equivalent.

All Year 12/VCE applicants must apply through VTAC. Non-Year 12 applicants applying through VTAC are encouraged to complete Form SI. Alternatively Non-Year 12 applicants can apply direct to the University through the Tertiary Access Scheme. Refer to the Admissions, Policy and Procedures section in this Handbook.

### CREDIT POINTS

360

### DURATION

3 years full-time or part-time equivalent

### MODE

Semester (day)

### COURSE OVERVIEW

This course is directed to the needs of industry. Its principal aim is to produce graduates who have a wide range of skills in programming, database and software engineering supported by a background of theoretical studies in computing and practical experience on both microcomputers and larger multi-user systems. In the latter part of the course you have the opportunity to specialise in an area of your choice. The areas of specialisation may include databases, object-oriented programming, expert systems, computer networks, collaborative computing, interactive multimedia and WWW technology. As a final year student, you will undertake a substantial project. This not only builds on the theoretical training you have received, but also provides a balance between theory and practice which prepares you for employment in the computing industry.

### COURSE OBJECTIVES

On completion of this course you will be able to:

- Apply practical skills and a conceptual understanding in the solution of a broad range of industrial and commercial computing problems;
- Use a conceptual framework in computing hardware and software to keep abreast of future developments in information technology;
- Make a worthwhile contribution as a team member and as an individual in a professional computing environment at an early stage after graduation by applying the communication skills acquired and practised during the course;
- Act in the manner expected of a computing professional by displaying behaviour consistent with the ethical standards applied by professional computer societies; and
- Develop further skills in a postgraduate environment by following computing interests developed in the undergraduate course.

### COURSE STRUCTURE

The course provides for major studies in computing together with approved elective studies able to be taken from other approved degree programs of the University.

#### Year 1

unit code	Semester 1	credit points
CP510	Intro to Operating Systems	15
CP514	Programming 1	15
CP586	Multimedia Communication	15
	<i>Elective*</i>	15
	Semester 2	
MA552	Bits, Bytes and Algorithms	15
CP627	Programming 2	15
CP685	Network Operating Systems	15
	<i>Elective*</i>	15

#### Year 2

unit code	Semester 1	credit points
CP611	Database Mgt. Systems	15
CP515 <sup>#</sup>	Software Engineering: Processes and Methods	15
CP582	Network Protocols & Services	15
	<i>Elective*</i>	15
	Semester 2	
CP616 <sup>#</sup>	Software Engineering: Analysis and Design	15
CP704	Professional Development	15
	<i>Computing elective*</i>	15
	<i>Elective*</i>	15

#### Year 3

unit code	Semester 1	credit points
CP728	Advanced Programming	15
CP710	Project 1	15
	<i>Computing elective*</i>	15
	<i>Computing elective*</i>	15
	Semester 2	
CP703	Systems Programming	15
CP711	Project 2	30
	<i>Computing elective*</i>	15

\*Approved by The School Of Information Technology and Mathematical Sciences

<sup>#</sup> Subject to approval

## Bachelor of Commerce/ Bachelor of Computing

CRICOS : 023217D

### COURSE COORDINATORS

Dr Robyn Pierce (Computing)

Dr Bernard O'Meara (Commerce)

### ADMISSION REQUIREMENTS

Satisfactory completion of the VCE including prerequisite units 1 and 2 - two units of Mathematics, (excluding Foundation Maths) or interstate or overseas equivalent.

All Year 12/VCE applicants must apply through VTAC. Non Year 12 applicants applying through VTAC are encouraged to complete Form SI. Alternatively Non-Year 12 applicants can apply direct to the University through the Tertiary Access Scheme. Refer to the Admissions, Policy and Procedures section in this Handbook.

**CREDIT POINTS**540; *Computing 240; Commerce 240; Electives 60***DURATION**

Equivalent of 4.5 years full-time. May be completed in 4 years by overloading by one unit per year (see course structure).

**MODE**

Semester (day)

**COURSE OVERVIEW**

The Bachelor of Commerce/ Bachelor of Computing combined degrees provide you with the opportunity to undertake in-depth studies in the areas of Computing and Business. For further information on the range of offerings from the Bachelor of Commerce, please refer to the Bachelor of Commerce entry in the School of Business section of this handbook. Students graduating with the combined degrees Bachelor of Computing/Bachelor of Commerce receive two degree testamurs - one for each degree.

**COURSE OBJECTIVES**

The objectives of each combined degrees course must be considered in the context of each of the individual degrees. The objectives of each of the individual degree programs should be consulted.

**COURSE STRUCTURE****Year 1**

unit code	Semester 1	credit points
CP510	Intro. to Operating Systems	15
CP514	Programming 1	15
	BCommerce unit	15
	BCommerce unit	15
	Semester 2	
MA552	Bits, Bytes and Algorithms	15
CP627	Programming 2	15
	BCommerce unit	15
	BCommerce unit	15
	<i>Elective</i>	15

**Year 2**

unit code	Semester 1	credit points
CP586	Multimedia Communication	15
CP515 <sup>#</sup>	Software Engineering: Processes and Methods	15
	BCommerce unit	15
	BCommerce unit	15
	BCommerce unit	15
	Semester 2	
CP616 <sup>#</sup>	Software Engineering: Analysis and Design	15
CP685	Network Operating Systems	15
	BCommerce unit	15
	BCommerce unit	15

**Year 3**

unit code	Semester 1	credit points
CP611	Database Mgt. Systems	15
CP582	Network Protocols & Services	15
	BCommerce unit	15
	BCommerce unit	15
	<i>Elective</i>	15
	Semester 2	
CP704	Professional Development	15
	BCommerce unit	15
	BCommerce unit	15
	<i>Elective</i>	15

**Year 4**

Unit code	Semester 1	credit points
CP710	Project 1	15
CP728	Advanced Programming	15
	BCommerce unit	15
	<i>Elective</i>	15
	Semester 2	
CP703	Systems Programming	15
CP711	Project 2	30
	BCommerce unit	15
	BCommerce unit	15

<sup>#</sup> Subject to approval

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## Bachelor of Computing/ Bachelor of Management

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CRICOS : 023220J

**COURSE COORDINATORS**

Dr Robyn Pierce (Computing)  
Dr Bernard O'Meara (Management)

**ADMISSION REQUIREMENTS**

Satisfactory completion of the VCE including prerequisite units 1 and 2 - two units of Mathematics, (excluding Foundation Maths) or interstate or overseas equivalent.

All Year 12/VCE applicants must apply through VTAC. Non-VCE applicants applying through VTAC are encouraged to complete Form SI. Alternatively Non-VCE applicants can apply direct to the University through the Tertiary Access Scheme. Refer to the Admissions, Policy and Procedures section in this Handbook.

**CREDIT POINTS**540: *Management 240; Computing 240; Electives 60***DURATION**

Equivalent of 4.5 years full-time. May be completed in 4 years by overloading by one unit per year (see course structure).

**MODE**

Semester (day)

**COURSE OVERVIEW**

The Bachelor of Computing/Bachelor of Management combined degrees provide you with the opportunity to undertake in-depth studies in the areas of both Computing and Management. For further information on the range of offerings from the Bachelor of Management, please refer to the Bachelor of Management entry in the School of Business section of this handbook.

Students graduating with the combined degrees Bachelor of Computing/Bachelor of Management receive two degree testamurs - one for each degree.

**COURSE OBJECTIVES**

The objectives of each combined degrees course must be considered in the context of each of the individual degrees. The objectives of each of the individual degree programs should be consulted.

**COURSE STRUCTURE****Year 1**

unit code	Semester 1	credit points
CP510	Intro to Operating Systems	15
CP514	Programming 1	15
	BManagement unit	15
	BManagement unit	15

Semester 2		
MA552	Bits, Bytes and Algorithms	15
CP627	Programming 2	15
	BManagement unit	15
	BManagement unit	15
	<i>Elective</i>	15

**Year 2**

unit code	Semester 1	credit points
CP586	Multimedia Communication	15
CP515 <sup>#</sup>	Software Engineering: Processes and Methods	15
	BManagement unit	15
	BManagement unit	15
	BManagement unit	15
Semester 2		
CP616 <sup>#</sup>	Software Engineering: Analysis and Design	15
CP685	Network Operating Systems	15
	BManagement unit	15
	BManagement unit	15

**Year 3**

unit code	Semester 1	credit points
CP611	Database Mgt Systems	15
CP582	Network Protocols & Services	15
	BManagement unit	15
	BManagement unit	15
	<i>Elective</i>	15
Semester 2		
CP704	Professional Development	15
	<i>Elective</i>	15
	BManagement unit	15
	BManagement unit	15

**Year 4**

unit code	Semester 1	credit points
CP710	Project 1	15
CP728	Advanced Programming	15
	BManagement unit	15
	<i>Elective</i>	15
Semester 2		
CP703	Systems Programming	15
CP711	Project 2	30
	BManagement unit	15
	BManagement unit	15

<sup>#</sup> Subject to approval

### Bachelor of Engineering Science/ Bachelor of Computing

CRICOS : 044119K (Civil Engineering)  
CRICOS : 044121E (Mechanical/Electrical Engineering)

**COURSE COORDINATORS**

Dr Michael Tuck (Engineering)  
Dr Robyn Pierce (Computing)

*This combined degrees program is administered by the School of Science and Engineering; please refer to that School's course entry for information.*

### Bachelor of Computing (Honours)

CRICOS : 033920J

**COURSE COORDINATOR**

Mr Greg Simmons

**ADMISSION REQUIREMENTS**

To gain entry to the Honours Degree a student requires a good record in an undergraduate degree which contains a major study in computing. In general, "good record" means an average of D or better. A student who wishes to enter the course but

who does not completely fulfil these requirements, may present a case in writing to the Course Coordinator, at whose discretion they may be admitted to the course. A student may be admitted to the course at the end of the second year of the Bachelor of Computing degree or upon completion of their first degree.

**CREDIT POINTS**

120

**DURATION**

1 year full-time or 6 months in addition to the first degree if admitted upon completion of the second year of the Bachelor of Computing.

**MODE**

Semester (day)

**COURSE OBJECTIVES**

The Bachelor of Computing (Honours) is designed to provide advanced studies in computing, at a professional level for students with sufficient background in computing or information technology. It is also designed to provide you with an introduction to a research program and enable you access to research degrees at universities throughout Australia and internationally.

**COURSE STRUCTURE \***

unit code	Full Year	credit points
CP837	Research Project & Thesis	60
Semester 1		
CP836	Research Skills & Academic Communication	15
	Honours Approved Elective 1	15
Semester 2		
	Honours Approved Elective 2	15
Summer		
CP806	Special Topics in Computing	15

\* This structure is subject to approval.

### Bachelor of Information Technology

CRICOS : 028643A

**COURSE COORDINATOR**

Dr Robyn Pierce

**ADMISSION REQUIREMENTS**

Satisfactory completion of the VCE including prerequisite units 1 and 2 - two units of Mathematics, (excluding Foundation Maths) or interstate or overseas equivalent.

All Year 12/VCE applicants must apply through VTAC. Non-Year 12 applicants applying through VTAC are encouraged to complete Form SI. Alternatively Non-Year 12 applicants can apply direct to the University through the Tertiary Access Scheme. Refer to the Admissions, Policy and Procedures section in this Handbook.

**CREDIT POINTS**

360

**DURATION**

3 years full-time or part-time equivalent

**MODE**

Semester (day)

**COURSE OVERVIEW**

The Bachelor of Information Technology is an innovative course designed with input from major IT industry partners. The course is based on a number of core units, which cover the fundamentals of information technology, such as World Wide Web (WWW) technology, design techniques for multimedia and the internet, Java programming, software engineering, human computer interaction, electronic data interchange and networks,

collaborative computing and groupware applications. The focus is on fundamental concepts which enable you to become a skilled IT professional. These core units are complemented by elective studies. There is a balance between specific knowledge of particular development tools (languages, operating systems, development environments) and general lifelong learning skills which ensure that graduates are able to remain at the forefront of this vibrant and rapidly developing sector.

### COURSE OBJECTIVES

Upon completion of the course you will:

- have achieved industry recognised qualifications;
- have the foundation to become leaders in the IT field;
- be able to understand the impact of technological change;
- be able to appreciate not only current usage of IT in business and industry environments, but also trends in computing; and
- be able to analyse, design and implement up-to-date computer-based systems including those related to internet technology, multimedia and web-based applications

### COURSE STRUCTURE

The course provides for major studies in computing together with approved elective studies able to be taken from other approved degree programs of the University.

#### Year 1

unit code	Semester 1	credit points
CP510	Intro to Operating Systems	15
CP514	Programming 1	15
CP586	Multimedia Communication	15
	<i>Elective*</i>	15
	Semester 2	
CP611	Database Mgt Systems	15
CP627	Programming 2	15
CP685	Network Operating Systems	15
	<i>Elective*</i>	15

#### Year 2

unit code	Semester 1	credit points
CP582	Network Protocols & Services	15
CP515 <sup>#</sup>	Software Engineering: Processes and Methods	15
CP687	World Wide Web Tech. 1	15
	<i>Elective*</i>	15
	Semester 2	
CP688	World Wide Web Tech. 2	15
CP751	Interactive Multimedia	15
	<i>Elective*</i>	15
	<i>Elective*</i>	15

#### Year 3

unit code	Semester 1	credit points
CP704	Professional Development	15
	<i>Elective*</i>	15
	<i>Specialist Stream A1</i>	15
	<i>Specialist Stream B1</i>	15
	Semester 2	
CP782	Current Development W' shop	15
CP785	IT Management	15
	<i>Specialist Stream A2</i>	15
	<i>Specialist Stream B2</i>	15

\*Approved by the School of ITMS.

# Subject to approval

## Bachelor of Information Technology (Professional Practice)

### COURSE COORDINATOR

Dr Robyn Pierce

### ADMISSION REQUIREMENTS

Satisfactory completion of the VCE including prerequisite units 1 and 2 - two units of Mathematics, (excluding Foundation Maths) or interstate or overseas equivalent.

All Year 12/VCE applicants must apply through VTAC. Non-Year 12 applicants applying through VTAC are encouraged to complete Form SI. Alternatively Non-Year 12 applicants can apply direct to the University through the Tertiary Access Scheme. Refer to the Admissions, Policy and Procedures section in this Handbook.

### CREDIT POINTS

360

### DURATION

4 years full-time (4 years full time, incorporating practical experience)

### MODE

Semester (day)

### COURSE OVERVIEW

The Bachelor of Information Technology (Professional Practice) is an innovative course, developed in conjunction with IBM®. From the second year of the course you will combine university studies and practical experience with IBM® in an 'Earn As You Learn' program. Units on industry awareness and industry application are delivered in association with IBM® staff, who may also supervise your final year project. The course is based on a number of core units, which cover the fundamentals of information technology, such as World Wide Web (WWW) technology, design techniques for multimedia and the internet, Java programming, software engineering, human computer interaction, electronic data interchange and networks, collaborative computing and groupware applications. The focus is on fundamental concepts which enable you to become a skilled IT professional. These core units are complemented by elective studies. There is a balance between specific knowledge of particular development tools (languages, operating systems, development environments) and general lifelong learning skills, which ensure that graduates are able to remain at the forefront of this vibrant and rapidly developing sector.

### COURSE OBJECTIVES

The course is designed to produce graduates who have an appreciation of the culture of work as an IT professional. Specifically, the course is designed to enable you to:

- be able to analyse, design and implement up-to-date computer-based systems;
- have an understanding of the role of software and hardware in Information Technology;
- experience the practical application of computing knowledge and techniques;
- evaluate critically technology systems;
- have an understanding of the human-computer interface;
- understand the role of legacy software;
- fit into an organisational work culture;
- work in a team environment;
- interact with customers;
- appreciate the importance of good communication skills;
- develop sound oral and written communication skills;

- develop an appreciation of the ethical and social implications of the use of computers in society; and
- have the critical skills necessary to gather, analyse and synthesise information, and to make decisions based on this information.

### COURSE STRUCTURE

The course provides for major studies in computing together with approved elective studies taken from other approved degree programs of the University.

#### Year 1

unit code	Semester 1	credit points
CP510	Intro to Operating Systems	15
CP514	Programming 1	15
CP586	Multimedia Communication	15
	<i>Elective*</i>	15
	Semester 2	
CP685	Network Operating Systems	15
CP627	Programming 2	15
CP611	Database Management Systems	15
	<i>Elective*</i>	15

#### Year 2

unit code	Semester 1	credit points
CP515 <sup>#</sup>	Software Engineering: Processes and Methods	15
CP687	World Wide Web Technology 1	15
CP602	Industry Awareness	15
	Semester 2	
CP681	Collaborative Computing	15
CP688	World Wide Web Technology 2	15
CP751	Interactive Multimedia	15

#### Year 3

unit code	Semester 1	credit points
CP682	Groupware and Document Management	15
CP704	Professional Development	15
CP582	Network Protocols and Services	15
	Semester 2	
CP603	Industry Applications	15
CP785	IT Management	15
CP782	Current Development Workshop	15

#### Year 4

Unit code	Semester 1	credit points
CP783	Project 1	15
	Specialist Stream 1	15
	Semester 2	
CP784	Project 2	15
	Specialist Stream 2	15

\*Approved by the School of ITMS.

# Subject to approval

## Bachelor of Applied Science (Human Movement)/ Bachelor of Information Technology

CRICOS : 031810J

### COURSE COORDINATORS

Mr Mick Poulton (Human Movement)

Dr Robyn Pierce (Information Technology)

*This combined degrees program is administered by the School of Human Movement and Sport Sciences; please refer to that School's course entry for information.*

## Bachelor of Information Technology (Honours)

CRICOS : 033921G

### COURSE COORDINATOR

Mr Greg Simmons

### ADMISSION REQUIREMENTS

To gain entry to the Honours Degree a student requires a good record in an undergraduate degree which contains a major study in computing. In general, "good record" means an average of D or better. A student who wishes to enter the course but who does not completely fulfil these requirements, may present a case in writing to the Course Coordinator, at whose discretion they may be admitted to the course. A student may be admitted to the course at the end of the second year of the Bachelor of Information Technology degree or upon completion of their first degree.

### CREDIT POINTS

120

### DURATION

1 year full-time or 6 months in addition to the first degree if admitted upon completion of the second year of the Bachelor of Information Technology.

### MODE

Semester (day)

### COURSE OBJECTIVES

The Bachelor of Information Technology (Honours) is designed to provide advanced studies in computing and information technology, at a professional level for students with sufficient background in computing or information technology. It is also designed to provide you with an introduction to a research program and enable them access to research degrees at universities throughout Australia and internationally.

### COURSE STRUCTURE \*

unit code	Full Year	credit points
CP837	Research Project & Thesis	60
	Semester 1	
CP836	Research Skills & Academic Communication	15
	Honours Approved Elective 1	15
	Semester 2	
	Honours Approved Elective 2	15
	Summer	
CP806	Special Topics in Computing	15

\* This structure is subject to approval.

## Graduate Certificate of Statistical Process Management

### COURSE COORDINATOR

Mr Peter Martin

### ADMISSION REQUIREMENTS

Entry to the course requires the candidates to have one of the following:

- Three year degree or diploma (with at least one unit in statistics); or
- Three year post secondary certificate training, appropriate industry experience, and the successful completion of The Certificate in Workplace Training Category 2; or
- Technical competency, appropriate industry experience, and the successful completion of The Certificate in Workplace Training Category 2; or
- Appropriate industry experience and an Associate Diploma of Engineering, or equivalent award.

Candidates who do not satisfy entry requirements may be considered for special entry. All candidates must have access to a suitable industrial/training environment.

#### CREDIT POINTS

60

#### DURATION

1 year part-time

#### MODE

Block

#### COURSE OVERVIEW

The Graduate Certificate in Statistical Process Management is designed to serve the needs of manufacturing industries by providing the knowledge and experience to qualify their staff to lead and support major process improvement projects and teams in industrial settings.

The course comprises four core units. The first three units cover the areas of basic statistics for process management, statistical process design and capability, and statistical process control and evaluation.

The final unit involves a workplace project. You will be required, in consultation with the lecturer, to identify a work-based problem, to read and develop appropriate methodologies applicable to the problem, to establish and lead a team of colleagues at the work site, and to present written and oral reports on the process and outcomes.

#### COURSE OBJECTIVES

This course is designed to enable you to:

- Develop a rigorous approach to understanding and controlling the factors which determine the quality of manufactured goods;
- Develop a comprehensive knowledge of the critical steps in the improvement process and an understanding of their implications in an industrial context;
- Collect and evaluate statistically valid data to determine process variability, baseline performances, improvements and reliability;
- Develop a comprehensive and critical knowledge of the data driven methodologies used to achieve statistically valid and well documented process management plans;
- Insure that sources of variation in a manufacturing process will be objectively identified and eliminated or controlled through a well documented and executed management plan;
- Optimise process reliability and quality so as to insure high quality product with minimum unplanned downtime;
- Provide the basis for putting into place a continuous improvement plan to insure improvement over time; and
- Develop the knowledge and skills necessary to communicate the implications of experimental results to the complete spectrum of the workforce.

#### COURSE STRUCTURE

The course consists of four compulsory units. The three coursework units will be delivered in block mode and will be scheduled to cater for the industrial work commitments of participants. The fourth unit comprises a major workplace project.

The four units are:

unit code		credit points
MS401	Basic Statistics for Process Management	15
MS402	Statistical Process Design & Capability	15
MS403	Statistical Process Control & Evaluation	10
MS404	Statistical Process Management Workplace Project	20

### Graduate Certificate of Computing

CRICOS : 040042C

#### COURSE COORDINATOR

Mr Adrian Smith-Gaudlitz

#### ADMISSION REQUIREMENTS

Applicants should normally have completed a university degree. A two-year Diploma, even with relevant work experience or certifications, does not satisfy the entry requirements for the Graduate Diploma of Computing.

#### CREDIT POINTS

60

#### DURATION

1 year part-time

#### MODE

Semester (evening, day)

#### COURSE OVERVIEW

This course provides an opportunity for you to develop your skills in the area of computing. It also provides an appropriate qualification for students not wishing to pursue a full Graduate Diploma. You may however, apply for admission to the Graduate Diploma of Computing and, if accepted, obtain credit transfer for their Graduate Certificate studies.

#### COURSE OBJECTIVES

On completion of this course you will be able to:

- Apply practical skills and a conceptual understanding in the solution of a broad range of industrial and commercial computing problems;
- Use a conceptual framework in computing hardware and software to keep abreast of future developments in information technology; and
- Act in the manner expected of a computing professional by displaying behaviour consistent with the ethical and social standards applied by professional computer societies.

#### COURSE STRUCTURE \*

The course consists of two compulsory units and two elective units. The structure is detailed in the table below:

unit code		credit points
CP510	Intro to Operating Systems	15
CP586	Multimedia Communication	15
	Elective	15
	Elective	15

\* This structure is subject to approval.

### Graduate Certificate of Information Technology

See entry for Master of Information Technology

### Graduate Diploma of Computing

CRICOS : 008779F

#### COURSE COORDINATOR

Mr Adrian Smith-Gaudlitz

#### ADMISSION REQUIREMENTS

Applicants should normally have completed a university degree. A two-year Diploma, even with relevant work experience or certifications, does not satisfy the entry requirements for the Graduate Diploma of Computing.

#### CREDIT POINTS

120

#### DURATION

1 year full-time

#### MODE

Semester (evening, day)

#### COURSE OVERVIEW

The Graduate Diploma of Computing is designed for people who have a Bachelor degree in an area other than Computing or Information Technology. It offers continuing education at a graduate level for professionals from all disciplines. You do not need a specific background in computing.

#### COURSE OBJECTIVES

The emphasis of the course is on the development of relevant computing knowledge and skills, and the practical application of these skills in real work situations. It consists of a compulsory core of computing studies, together with elective studies in computing areas appropriate to your individual interests and background.

#### COURSE STRUCTURE

The course consists of two core units and six elective units in computing and applications appropriate to each student's interests and background. At least one of the elective units must be taken at a '700' level.

The two compulsory core units are:

unit code		credit points
CP586	Multimedia Communication	15
CP704	Professional Development	15

### Graduate Diploma of Information Technology

See entry for Master of Information Technology

### Master of Information Technology (by Coursework)

#### COURSE COORDINATOR

Dr Chris Turville

#### ADMISSION REQUIREMENTS

Applicants may be admitted to the Master of Information Technology on completion of at least a 3-year degree course.

#### CREDIT POINTS

180

#### DURATION

1 ½ years or three semesters full-time

#### MODE

Semester (day)

#### COURSE OVERVIEW

The Master of Information Technology is designed to provide advanced theoretical and practical concepts by coursework. There is an in-depth approach to project management skills, programming and software engineering.

On completion of this course you should be able to:

- demonstrate familiarity with the theoretical basis of Information Technology;
- develop appropriate project management principles and techniques;
- develop programming skills required to architect and implement complex computer systems;
- analyse, design and implement software systems, including functional, relational and object-oriented methodologies;
- enhance your skills in explaining and communicating in written and oral form your own work and the work of others;
- become familiar with the latest developments in IT; and
- show an awareness of the ethical and social implications of your area of interest.

#### COURSE STRUCTURE \*

The curriculum consists of twelve units providing theoretical and practical skills in advanced information technology, each being worth 15 credit points. The structure may be summarised as follows:

Semester 1	credit points
CP510 Operating Systems	15
CP586 Multimedia Communication	15
CP514 Programming 1	15
CP515 Software Engineering: Processes and Methods	15
Semester 2	
CP611 Database Management Systems	15
CP627 Programming 2	15
CP616 Software Engineering: Analysis and Design	15
CP704 Professional Development	15
Semester 3	
CP808 Advanced Software Engineering	15
CP828 Advanced Programming	15
CP829 IT Project Management	15
CP800 Project or CP8XX Computing Elective	15

\* This structure is subject to approval.

Exit points are available if you wish to leave your studies prior to the completion of your Masters program. Students leaving the program after 60 credit points, or 4 units may be awarded with a Graduate Certificate of Information Technology, or 120 credit points, or 8 units of study, with a Graduate Diploma of Information Technology.

### Higher Degrees by Research

#### • Doctor of Philosophy (PhD)

CRICOS : 023229M

This degree is awarded on the basis of a thesis making a substantial contribution to knowledge and demonstrating an understanding of the relationship of the investigations undertaken to a wider field of knowledge. Whereas in most cases the thesis will be a text reporting research undertaken by the candidate, the regulations also allow for a thesis to be creative work supported by an exegesis. The minimum requirement for enrolment is an Honours degree at first-class honours level, or Masters by Research (or equivalent qualifications and/or experience).

Enrolment can be on a full-time or part-time basis. While the expectation is that a PhD degree will be completed within 3 to 4 years full-time (or the equivalent in part-time study), it is possible to meet degree requirements over a shorter or longer period of enrolment.

A student works during candidature under the guidance of a principal supervisor and an associate supervisor appointed by the Research and Higher Degrees Committee on the recommendation of the School.

Areas of research strength in which supervision is available in the School of Information Technology and Mathematical Sciences include:

- applied optimization
- distributed simulation
- knowledge management
- health informatics
- mathematical and statistical analysis
- computer science and statistics education

- **Doctor of Information Technology (DIT)**

*CRICOS : 026142E*

The professional doctorate is awarded on the basis of making a significant contribution to knowledge in the Information Technology area having demonstrated an understanding of the relationship to a wider field of knowledge. The program consists of a combination of research projects and advanced study units. The minimum requirement for enrolment is an Honours degree at upper second class honours level and 5 years of professional experience.

- **Master of Information Technology (MIT)**

*CRICOS : 023231F*

This degree is awarded on the basis of a thesis demonstrating “command of the knowledge and skills pertinent to the area of investigation as well as a critical appreciation and understanding of the relationship of his or her own work to that of others”. The prerequisite for enrolment is an Honours degree at least second-class honours level (or equivalent qualifications and/or experience). There is provision for transfer from Master’s to PhD candidature, with credit for the period spent as a Master’s candidate.

Enrolment can be on a full-time or part-time basis. A student works during candidature under the guidance of a principal supervisor appointed by the Research and Higher Degrees Committee on the recommendation of the School.

A Master’s by research degree is undertaken as a twelve month full-time program, or the equivalent in part-time study.

### **Further Information**

The Higher Degree Regulations for the University of Ballarat provide information about prerequisites for enrolment, procedures during candidature, and the examination process. A copy of these Regulations, as well as application forms for candidature and scholarships, may be obtained from the Research Office, University of Ballarat, telephone (03) 5327 9608.

Information about research topics and supervision may be obtained from the School Research Degrees Coordinator, Dr Philip Smith, telephone (03) 5327 9237, facsimile (03) 5327 9289 or the Head of School, Professor Sidney Morris, telephone (03) 5327 9253, facsimile (03) 5327 9289.

Listed below are the accredited undergraduate units from the School of Information Technology & Mathematical Sciences available as elective units to students enrolled in any University program. Availability of these units is subject to sufficient enrolment numbers. Students should confirm availability with the School Administrative Officer.

unit code	School of Information Technology & Mathematical Sciences Units	credit points
CP510	Introduction to Operating Systems	15
CP514	Programming 1	15
CP515*	Software Engineering: Processes and Methods	15
CP571	Business Information Systems	15
CP582	Network Protocols & Services	15
CP586	Multimedia Communication	15
CP600	Professional Experience	15
CP601	Information Services Experience	15
CP602	Industry Awareness	15
CP603	Industry Applications	15
CP611	Database Management Systems	15
CP616*	Software Engineering: Analysis and Design	15
CP621	Database Design	15
CP627	Programming 2	15
CP641	Internet Design	15
CP681	Collaborative Computing	15
CP682	Groupware and Document Management	15
CP684	Human Factors in Information Systems	15
CP685	Network Operating Systems	15
CP687	World Wide Web Technology 1	15
CP688	World Wide Web Technology 2	15
CP703	Systems Programming	15
CP704	Professional Development	15
CP710	Project 1	15
CP711	Project 2	30
CP726	Windows Programming	15
CP728	Advanced Programming	15
CP729	Commercial Programming	15
CP742	Knowledge Based Systems	15
CP743	Artificial Intelligence	15
CP744	Graphics	15
CP746	Interactive Instructional Design	15
CP751	Interactive Multimedia	15
CP752	Internet Courseware	15
CP753	Advanced Network Services	15
CP754	Network Operating System Internals	15
CP755	Advanced Network Operating Systems Integration	15
CP756	Network API Programming	15
CP771	Guided Study	15
CP772	Special Topics in Computing	15
CP781	Distributed Systems 1	15
CP782	Current Development Workshop	15
CP783	Project 1	15
CP784	Project 2	15
CP785	IT Management	15
CP786	Electronic Business Systems	15
CP787	Electronic Commerce 1	15
CP788	Electronic Commerce 2	15
CP789	Multimedia Database Systems	15
CP790	Distributed Systems 2	15
CP800	Project	15
CP802	Research Project 1	20
CP803	Minor Thesis 1	20
CP804	Minor Thesis 2	20
CP805	Advanced Computing	20
CP806	Special Topics in Computing	20
CP807	Studies in Computing	20
CP808	Advanced Software Engineering	15
CP810	Advanced Topics in Database	20
CP812	Data Security	20
CP813	Object Oriented Databases	20
CP814	Industrial Experience	20
CP815	Guided Study Unit	20
CP821	Advanced Programming	20
CP828	Advanced Programming	15

\* Subject to approval

unit code	School of Information Technology & Mathematical Sciences Units (continued)	credit points
CP833	Data Mining	15
CP834	Information Security, Privacy And Access	15
CP836*	Research Skills and Academic Communication	15
CP837*	Research Project & Thesis	60
CP840	Advanced Topics in Web Technology	20
CP841	Advanced Topics in Programming	20
CP842	Special Topics in Network Systems	20
CP843	Advanced Topics in Software Engineering	20
CP844	Special Topics in Database Systems	20
CP845	Professional Project Skills	20
CP846	Project	20
CP847	Advanced Interactive Instructional Design	20
CP910	Collaborative Computing for Business	15
CP911	Designing Groupware Systems	15
CP912	Collaborative Computing Project	15
CT510	Introduction to Computing	15
MA518	Linear Programming and Game Theory	15
MA550	Upon the Shoulders of Giants (Introductory Level)	15
MA551	Modelling and Change (Introductory Level)	15
MA552	Bits, Bytes and Algorithms (Introductory Level)	15
MA553	Profit, Loss and Gambling (Introductory Level)	15
MA558	Topics in Mathematics (Introductory Level)	15
MA559	Space, Shape and Design (Introductory Level)	15
MA650	Upon the Shoulders of Giants (Intermediate Level)	15
MA651	Modelling and Change (Intermediate Level)	15
MA652	Bits, Bytes and Algorithms (Intermediate Level)	15
MA653	Profit, Loss and Gambling (Intermediate Level)	15
MA654	Space, Shape and Design (Intermediate Level)	15
MA655	Logic and Imagination (Intermediate Level)	15
MA656	Modelling Reality (Intermediate Level)	15
MA658	Topics in Mathematics (Intermediate Level)	15
MA659	Space, Shape and Design (Intermediate Level)	15
MA755	Logic and Imagination (Advanced Level)	15
MA756	Modelling Reality (Advanced Level)	15
MA758	Topics in Mathematics (Advanced Level)	15
MB521	Business Statistics	15
MG410	Statistical Methods in HSE	10
MR811	Advanced Statistical Research Methodology	20
MR816	Advanced Statistical Research Methods	20
MR817	Statistical Research Methods	20
MR818	Statistical Research Methods	15
MR819	Statistical Research Methods	15
MR825	Quantitative Research Seminars	10
MS401	Basic Statistics for Process Management	15
MS402	Statistical Process Design & Capability	15
MS403	Statistical Process Control & Evaluation	10
MS404	Statistical Process Management Workplace Project	20
MS501	Statistical Methods	15
MS502	Sampling and Sample Surveys	15
MS521	Statistics for Nursing Research	15
MS601	Experimental Design and Analysis	15
MS602	Statistics for Prediction	15
MS703	Multivariate Analysis	15
MS704	Categorical Data Analysis and Statistical Consulting	15

\* Subject to approval