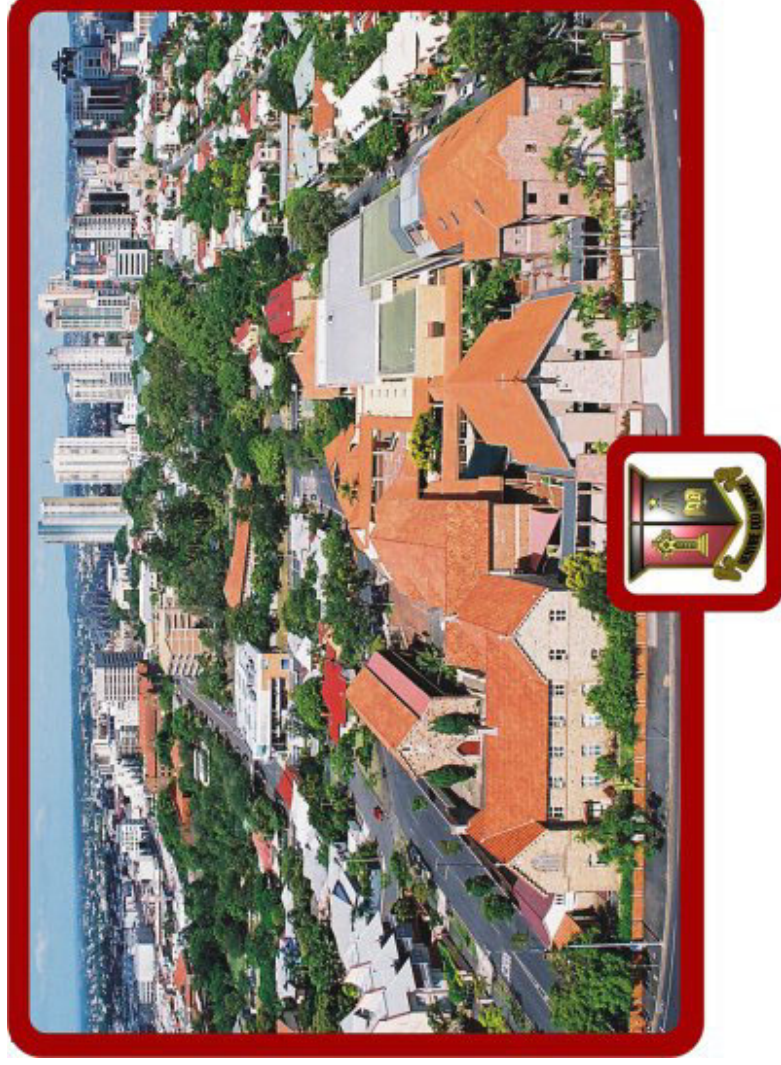


Information Processing and Technology

St. Joseph's College, Gregory Terrace.



Work Program - 2004 Syllabus

Course Organisation

St. Joseph's College, Gregory Terrace's academic calendar allows for students to participate in a minimum 220 timetabled hours (inclusive of exams) of multi-disciplinary activities. The anticipated delivery would conform to a schedule similar to the following (allowing for local variations to term and semester lengths):

Sem 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
	<i>Database Languages</i>																		
	<i>Online Databases</i>																		
	RT1																		
	T1																		
	WT1																		
	EX1																		
	Sem 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		<i>Database Design</i>																	
<i>Knowledge Discovery</i>																			
T2																			
MP1																			
EX2																			
Sem 3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		<i>Hardware Systems Architecture</i>																	
		<i>Algorithm Theory and Design</i>																	
	RT2																		
	T3																		
	WT2																		
	EX3																		
	Sem 4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
		<i>Games Programming 1</i>																	
		<i>Games Programming 2</i>																	
MP2																			
T4																			
EX4																			

The overall weighting of the topics is as follows:

Topic Weightings (including extension)			
SEI	HCI	IIS	SSE
10% core	10% core	30% core + 10% extension	30% core + 10% extension

Social and Ethical Implications (SEI)

This topic examines Information Technologies and their impact on society. It is integrated with the two major topics as detailed below:.

Human-Computer Interaction (HCI)

This topic deals with the nature of humans and their interaction with Information Technologies. It is integrated into the two major topics as detailed below.

Information and Intelligent Systems (IIS)

Database Languages: 10 weeks - Semester 1	
THIS IS THE SAMPLE UNIT	
Overview	<p>This unit introduces students to relational databases and how they can be implemented and manipulated in SQL, using RDBMSs like MS Access and MySQL.</p> <p>Students should know:</p> <ul style="list-style-type: none"> • Concepts such as relational databases, keys, relationships (foreign keys), domain constraints (check constraints), cascade effects, <p>Students should be able to:</p> <ul style="list-style-type: none"> • Perform Database Definition Language (DDL) commands such as creation, deletion, insertion, modification of tables in a relational database language using a language like SQL in a stand-alone or online relational database management system shell (like MySQL or Access). • <i>Link tables via relationships (foreign keys) and other inter-table constraints</i> • <i>Compose tables with a wide range of textual, numeric and graphical data fields , and compose output reports with these tables.</i> • Perform Database Manipulation Language (DML) commands such as projection, selection, intersection, difference, union and correlation. • Selectively update records in a table and selectively insert data into another table from existing records. • Make use of built-in functions for column aggregation, derivation and manipulation (like sum, average, max, min), operators that allow sub-string searching. • Ordering and grouping (agglomerating) columns in an output report via one or more criteria. • Design query solutions using a visual metaphor (like relational query diagrams), translate solutions into valid retrieval requests (in a language like SQL) and determine the effectiveness of their solutions - this encompasses the DDE cycle.
Subject Matter and Learning Experiences	

SAMPLE UNIT continued	
Students should have experience with:	
<ul style="list-style-type: none"> • <i>Visual querying methodologies (like QBE) and visual query design using relational diagramming methods.</i> • Making, populating and manipulating tables in a relational database system. • Constructing output reports and composing them visually on a form for an audience. 	
SEI	<ul style="list-style-type: none"> • Privacy • Uncertainty, ambiguity and error • Information veracity • The "Big Brother" concept including monitoring and content control • Backup systems, redundancy, version control and currency of records
HCI	<ul style="list-style-type: none"> • Command-line interfaces • Visual querying • Structure, function and audience of output reports • Abstraction barriers User-RDBMS and RDBMS-data. • Composing output reports for a particular audience. • Simple, functional navigation.
Integrated	
Extension	<ul style="list-style-type: none"> • <i>Read, compose and explain complex queries including union, intersection, difference, correlated sub-queries and other logical and set-based concepts.</i> • QBE • <i>Write supplemental procedural code to augment built-in functionality of the DBMS</i>
Assessment	
<p>Students will engage in a scaffolded research task [RT1] involving collecting and analyzing information, evaluating and justifying solutions. It ranges over a period of 2 weeks (mixture of class and own time) where they investigate a database system, commenting on query capability, interface design and usability. Students will sit for a test [T1] in a supervised session for reporting purposes.</p>	

Online Databases: 8 weeks - Semester 1					
Overview	This unit focuses on networked and online databases, introducing students to server-side scripting, live to network and Internet databases, online environments and related concepts.				
Subject Matter and Learning Experiences	Students will query and construct elements of an online and/or networked relational database system using a RDBMS like MySQL and server-side a scripting language like PHP to construct and display output reports. They will engage in design, development and evaluation of those systems and suitable web-based interfaces.				
	<table border="0"> <tr> <td style="vertical-align: top;">SEI</td> <td> <ul style="list-style-type: none"> • Computer fraud and identity theft • Security, privilege and user accessibility. • Copyright and content control on the WWW • Equity and accessibility • Aspects of the Internet including cookies, pop-ups and e-business </td> </tr> <tr> <td style="vertical-align: top;">HCI</td> <td> <ul style="list-style-type: none"> • The web page as a convergent portal • Usability, click analysis • Skinnability and customization of interfaces • Adaptive interfaces • Virtual environment interfaces (MOO, MUD) and other database-driven content management systems </td> </tr> </table>	SEI	<ul style="list-style-type: none"> • Computer fraud and identity theft • Security, privilege and user accessibility. • Copyright and content control on the WWW • Equity and accessibility • Aspects of the Internet including cookies, pop-ups and e-business 	HCI	<ul style="list-style-type: none"> • The web page as a convergent portal • Usability, click analysis • Skinnability and customization of interfaces • Adaptive interfaces • Virtual environment interfaces (MOO, MUD) and other database-driven content management systems
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Integrated					
Extension	<ul style="list-style-type: none"> • Use scripting languages to extract and display data to create reports from online databases using languages like PHP • Construct output reports from remote databases • Create online database solutions using Server-side applications (like MySQL), and Server-side scripting languages (like PHP). 				
Assessment	Students will collect and analyze information [WT1] and will sit for a supervised examination [EX1]				

Database Design: 10 weeks- Semester 2					
Overview	This unit introduces students to terminology allowing them to formally describe architectures of information systems and methodologies for specification via a fact-oriented method (like ORM) and a process-oriented method (like IFDs), allowing them to design and implement relational databases.				
Subject Matter and Learning Experiences	Students will engage in a major system analysis and development project integral to this unit. They will use ORM as part of the Design process, they will Develop a working information system and Evaluate it's effectiveness given an understanding of audience, interfaces and accessibility. They will work collaboratively in teams and apply theoretical knowledge and processes in practical implementation.				
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Integrated					
Extension	<ul style="list-style-type: none"> • Reverse-engineer an existing database system to extract it's Conceptual framework using an accepted design methodology like ORM • Compare conceptual representations between visual methodologies like ORM with mathematical or logical/set exposition models like Z schemas 				
Assessment	Students will begin working on a Major System Development project [MP1] which is the vehicle through which much course content is delivered. Students will sit for a supervised test [T2] for reporting purposes if required.				

Knowledge Discovery: 8 weeks- Semester 2					
Overview	This unit provides students with an understanding of issues and philosophical viewpoints of AI, along with some current areas of research and application in the areas of expert systems and neural networks				
Subject Matter and Learning Experiences	Students will explore AI concepts and investigate knowledge representation in Artificial Neural Networks, Expert Systems and explore search techniques.				
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Extension	<ul style="list-style-type: none"> Explore components, learning and structure of Neural networks Construct applications or simulations of neural networks using appropriate shells or development tools Explore forward and backward chaining techniques Explore search techniques 				
Assessment	This is a continuation of Relational database case study [MP1 cont] culminating in a supervised Exam [EX2] covering database design and AI concepts.				

Software and Systems Engineering (SSE)

Hardware Systems Architecture: 10 weeks- Semester 3					
Overview	This unit covers hardware systems, software systems and network systems.				
Subject Matter and Learning Experiences	Students will investigate hardware components, network components, architecture and management and network/Internet technologies.				
Integrated	<table border="1"> <tr> <td>SEI</td> <td> <ul style="list-style-type: none"> Security Hacking Viruses, Malicious and 'Buggy' Programs Competition in the Software/Hardware Industry Equity and accessibility The Internet Network systems and Security Cryptography The Future of ICTs </td> <td>HCI</td> <td> <ul style="list-style-type: none"> Desktop, command-line and windowing metaphors Computer-supported cooperative work Virtual Reality and multi-user environments Input/Output device interfaces Physical and computational interfaces and suitability </td> </tr> </table>	SEI	<ul style="list-style-type: none"> Security Hacking Viruses, Malicious and 'Buggy' Programs Competition in the Software/Hardware Industry Equity and accessibility The Internet Network systems and Security Cryptography The Future of ICTs 	HCI	<ul style="list-style-type: none"> Desktop, command-line and windowing metaphors Computer-supported cooperative work Virtual Reality and multi-user environments Input/Output device interfaces Physical and computational interfaces and suitability
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Extension	<ul style="list-style-type: none"> Investigation of systems security, management and administration Systems integration and Thin-client/remote computing options Boolean logic 				
Assessment	Students will engage in a scaffolded research task [RT2] over a period of 2 weeks (mixture of class and own time) where they investigate a database system, commenting on query capability, interface design and usability. Students will sit for a test [T3] in a supervised session for reporting purposes.				

Algorithm Theory and Design: 8 weeks - Semester 3					
Overview	In this unit, students are introduced to the standard Algorithmic elements (assignment, sequence, selection, iteration and modularization) to describe algorithms.				
Subject Matter and Learning Experiences	This unit introduces students to Design methods suitable for implementation in Algorithmic/Visual programming languages. they will learn methods of step-wise refinement and top-down analysis along with simple programming constructs and drag-and-drop RAD environments. Using the DDE cycle, students specify and then implement these simple algorithms in a platform game authoring environment (like Game Maker)and a RAD environment (like Delphi)				
Integrated	<table border="1"> <tr> <td>SEI</td> <td> <ul style="list-style-type: none"> Software distribution models. Hacking and malicious programming. </td> <td>HCI</td> <td> <ul style="list-style-type: none"> Command-line vs visual programming. User-proofing, error trapping. </td> </tr> </table>	SEI	<ul style="list-style-type: none"> Software distribution models. Hacking and malicious programming. 	HCI	<ul style="list-style-type: none"> Command-line vs visual programming. User-proofing, error trapping.
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Extension	<ul style="list-style-type: none"> Recursion Use of commercial game engines (like Game Maker) to implement algorithmic concepts using drag and drop strategies. 				
Assessment	Students will collect and analyze information [WT2] and will sit for a supervised examination [EX3].				

Games Programming 1: 9 weeks - Semester 4					
Overview	This unit will concentrate on decision and Control Logic and Windows programming				
Subject Matter and Learning Experiences	Students will learn decision structures, loops and their application in windows-based application programming. Event handling and modularisation will be the focus here, wherever possible seeking general solutions to varied problems.				
Integrated	<table border="1"> <thead> <tr> <th>SEI</th> <th>HCI</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> Games and society - gender bias, games audiences and their effects. Game playing cultures - local and global. Games standards, content and classification. </td> <td> <ul style="list-style-type: none"> Principles of user-centred design including usability analysis, design error. Planning and construction of interaction spaces for a targeted audience using a RAD environment. Windows visual components. Conducting usability tests. </td> </tr> </tbody> </table>	SEI	HCI	<ul style="list-style-type: none"> Games and society - gender bias, games audiences and their effects. Game playing cultures - local and global. Games standards, content and classification. 	<ul style="list-style-type: none"> Principles of user-centred design including usability analysis, design error. Planning and construction of interaction spaces for a targeted audience using a RAD environment. Windows visual components. Conducting usability tests.
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Extension	<ul style="list-style-type: none"> Use a <i>platform game authoring program (like Game Maker)</i> to code aspects of a game in both 'drag and drop' and 'run a script' modes. 				
Assessment	Students will engage in software development [MP2] and will sit for a test for reporting purposes if required [T4]				

Games Programming 2: 7 weeks - Semester 4					
Overview	This unit will concentrate on compound data structures, user interaction and graphics programming.				
Subject Matter and Learning Experiences	In this unit, students will explore graphical interactivity and experience elements of game engine programming and use. The emphasis will be on game development				
Integrated	<table border="1"> <thead> <tr> <th>SEI</th> <th>HCI</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> Communication using visuals and hypertext and effects on user Accountability, responsibility for damage caused by inadequate or faulty software Software distribution and licensing models. </td> <td> <ul style="list-style-type: none"> Ergonomics and the gamer. Designing prototypes given standards. re-designing poor interfaces with reference to audience, accessibility and useability. Control and error trap interactivity in a windows system. </td> </tr> </tbody> </table>	SEI	HCI	<ul style="list-style-type: none"> Communication using visuals and hypertext and effects on user Accountability, responsibility for damage caused by inadequate or faulty software Software distribution and licensing models. 	<ul style="list-style-type: none"> Ergonomics and the gamer. Designing prototypes given standards. re-designing poor interfaces with reference to audience, accessibility and useability. Control and error trap interactivity in a windows system.
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Extension	<ul style="list-style-type: none"> Use <i>graphics languages (like DirectX, OpenGL etc)</i> for hardware and software rendering of graphical processes Use of <i>static structures like records, user-defined types and objects</i> Use of <i>dynamic structures like sets, files and pointers</i> Develop <i>help systems online and in print</i> 				
Assessment	Students will continue software development [MP2cont] abs sit for a supervised examination on Algorithms and Programming[EX4]				

Assessment Overview

Semester Assessment Program:

Sem 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	<i>Database Languages</i>																	
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	RT2																	
	T3																	
	WT2																	
	EX3																	
Sem 4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	<i>Games Programming 1</i>																	
	<i>Games Programming 2</i>																	
	MP2																	
	T4																	
	EX4																	

Assessment Program - Detail

Throughout the course, student will be exposed to a varied plan of assessment paced to complement the underlying topics, providing scaffolded experiences where appropriate. Typically, **projects** are staged learning experiences complementing classroom activities and **examinations/tests** measure progress to date in a particular topic. It should be noticed that ALL items provide students with opportunities to engage in both **KNOWLEDGE** and **RESEARCH and DEVELOPMENT** criteria.

Assessment Items				
Item	Details	Duration	Conditions	k r&d
RT1	Investigation of online database examples, query capability, interface, audience	2 weeks [CT=OT]	U,C	yes yes
T1	Test for reporting purposes if required	CT	S	yes yes
WT1	Extended writing task (>600 words)	4 weeks [OT>CT]	U	yes yes
EX1	Examination - Database Languages	BT	S	yes yes
T2	Test for reporting purposes if required	CT	S	yes yes
MP1	Case Study: Information System specification, design and implementation	17 weeks [OT>CT]	U,C	yes yes
EX2	Examination - Database Design	BT	S	yes yes
RT2	Hardware Investigation	2 weeks [CT=OT]	U,C	yes yes
T3	Test for reporting purposes if required	CT	S	yes Yes

WT2	Extended writing task (>600 words)	4 weeks [OT>CT]	U	yes yes
EX3	Examination - Hardware and Algorithms	BT	S	yes yes
T4	Test for reporting purposes if required	CT	S	yes yes
MP2	Case Study: Game Programming specification, design and implementation	8 weeks [OT>CT]	U,C	yes yes
EX4	Examination - Programming	BT	S	yes yes

Key:

U=unsupervised; **S**=supervised; **C**=opportunities for collaborative work;

CT=class time; **OT**=own time; **BT**=block test

Examinations and **Tests** typically contain a mixture of response-styles including multi-choice, matching, true/false, short and extended response items. **Tests** are typically up to 1hr duration and may occur in class or block examination time. **Examinations** are typically up to 2hrs in duration and occur in block examination time. **Research tasks** typically involve scaffolded collection and reflection exercises. **Writing tasks** typically involved scaffolded collection, annotation, drafting and final response opportunities. Typically, these learning experiences allow students to collect and evaluate information, evaluate and justify alternatives. Both types of activities would typically provide students opportunities to demonstrate authentic authorship.

Major Projects typically emphasise problem solving and the processes required in the design, development and evaluation (DDE) of complex solutions to non-trivial problems. As such, they are scaffolded and students are required to provide evidence of all stages of development leading (possibly) to a finished product.

Student Profile

Sample Student Profile						
Item	Candidate Topics	Duration	Conditions	F/S	K	R&D LOA
RT1	IIS, HCI, SEI	2 weeks [CT=OT]	U,C	F		
T1	IIS	CT	S	F		
WT1	IIS, SEI	4 weeks [OT>CT]	U	F		
EX1	IIS, HCI	BT	S	S		
Semester Report						
T2	IIS	CT	S	F		
MP1	IIS, HCI	17 weeks [OT>CT]	U,C	S		
EX2	IIS	BT	S	S		
Monitoring						
RT2	SSE, HCI, SEI	2 weeks [CT=OT]	U,C	F		
T3	SSE	CT	S	F		
WT2	SSE, SEI	4 weeks [OT>CT]	U	S		
EX3	SSE, HCI	BT	S	S		
Semester Report						
T4	SSE	CT	S	F		
Verification						
MP2	SSE, HCI	8 weeks [OT>CT]	U,C	S		
EX4	SSE	BT	S	S		
Exit						

Key:
U=unsupervised; **S**=supervised; **C**=opportunities for collaborative work;
CT=class time; **OT**=own time; **BT**=block test;
F/S=Formative/Summative.

Note: Items in sample profile above are indicative of a typical profile, allowing for a selection of items to be available for inclusion in a Monitoring and Verification folio. Professional discretion will be exercised to ensure the items selected in the cohort's folios best represent the standards of work of that cohort. It is intended that the MP1 will be included in both as an example of a major project.