

Information Processing and Technology (2010)

Sample work program

December 2010

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Compiled by the Queensland Studies Authority

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A work program is the school's plan of how the course will be delivered and assessed, based on the school's interpretation of the syllabus. The school's work program must meet syllabus requirements, and indicate that there will be sufficient scope and depth of student learning to reflect the general objectives and meet the exit criteria and standards.

This sample demonstrates one approach, and should be used as a guide only to help teachers plan and develop school work programs.

1.0 Course Organisation and Assessment Plan (Year A/B)

	Unit	Syllabus Topics	Time (Hours)	Assessment Technique/Item	Topics Assessed	Conditions	Dimensions
Semester One	Algorithmic Design Concepts	<ul style="list-style-type: none"> Algorithms (A) Software programming (SP) Social and ethical issues (SEI) 	27½ Core: 23 Add: 4½	Extended response Review	SP SEI	<ul style="list-style-type: none"> Formative 600–1000 words 3 weeks Draft required 	KA AS EC
	Software Design	<ul style="list-style-type: none"> Algorithms Software programming Social and ethical issues Human - computer interaction (HCI) 	27½ Core: 24 Add: 3½	Extended response Folio	A SP HCI	<ul style="list-style-type: none"> Formative 5 weeks Series of practical exercises Exercises to range from implementing algorithms to the design and development of solutions to problems 	KA AS EC
Semester Two	Software Development	<ul style="list-style-type: none"> Algorithms Software programming Human - computer interaction 	43 Core: 38 Add: 5	Product Major project	A SP HCI	<ul style="list-style-type: none"> Formative 8 weeks Group based Use of software development cycle Written explanation 800 – 1000 words 	KA AS EC
				Supervised written Short Response	A SP	<ul style="list-style-type: none"> Formative 90 minutes No notes allowed 	KA AS EC
	Knowledge Based Systems	<ul style="list-style-type: none"> Intelligent systems (IS) Human - computer interaction (HCI) 	12 Core: 2 Add: 10	Product Minor project	IS HCI	<ul style="list-style-type: none"> Formative 3 weeks Individual work Written explanation 800 words 	KA AS EC

	Unit	Syllabus Topics	Time (Hours)	Assessment Technique/Item	Topics Assessed	Conditions	Dimensions
Semester Three	Information Systems Design	<ul style="list-style-type: none"> Relational information systems (RIS) Structured Query Language (SQL) Social and ethical Issues 	27½ Core: 25 Add: 2½	Extended response Essay	RIS SEI	<ul style="list-style-type: none"> Summative 800 – 1200 words 3 weeks Draft required 	KA AS EC
	Querying Information Systems	<ul style="list-style-type: none"> Structured Query Language Relational information Systems Human - computer interaction 	27½ Core: 22½ Add: 5	Extended response Folio	SQL RIS	<ul style="list-style-type: none"> Summative 3 weeks Series of practical exercises based on querying of online relational databases Exercises to be combination of SQL and QBE. 	KA AS EC
Semester Four	Information Systems Development	<ul style="list-style-type: none"> Structured Query Language Relational information systems Human - computer interaction 	27½ Core: 22½ Add: 5	Product Major project	SQL RIS HCI	<ul style="list-style-type: none"> Summative 6 weeks Individual work Written explanation 1000 – 1500 words Use of information system development cycle 	KA AS EC
				Supervised written Short Response	RIS SQL	<ul style="list-style-type: none"> Summative 90 minutes No notes allowed 	KA AS EC
	Information Systems Design and Web Development	<ul style="list-style-type: none"> Relational Information Systems Computer Systems (CS) 	27½ Core: 9½ Add: 18	Product Minor Project	CS RIS	<ul style="list-style-type: none"> Summative 3 weeks Individual work Written explanation 1000 words 	KA AS EC
Time Allocations			Core topics: 166½ hours Additional material: 53½ hours Total: 220 hours	KEY: KA – Knowledge and application; AS - Analysis and synthesis; EC – Evaluation and communication			

1.0 Course Organisation and Assessment Plan (Year B/A)

	Unit	Syllabus Topics	Time (Hours)	Assessment Technique/Item	Topics Assessed	Conditions	Dimensions
Semester One	Information Systems Design	<ul style="list-style-type: none"> Relational information systems (RIS) Structured Query Language (SQL) Social and ethical issues (SEI) 	27½ Core: 25 Add: 2½	Extended response Review	RIS SEI	<ul style="list-style-type: none"> Formative 600 – 1000 words 3 weeks Draft required 	KA AS EC
	Querying Information Systems	<ul style="list-style-type: none"> Structured Query Language Relational information systems Human - computer interaction (HCI) 	27½ Core: 22½ Add: 5	Extended response Folio	SQL RIS	<ul style="list-style-type: none"> Formative 3 weeks Series of practical exercises based on querying of online relational databases Exercises to be a combination of SQL and QBE. 	KA AS EC
Semester Two	Information Systems Development	<ul style="list-style-type: none"> Structured Query Language Relational information systems Human - computer Interaction 	43 Core: 38 Add: 5	Product Major project	SQL RIS HCI	<ul style="list-style-type: none"> Formative 6 weeks Group Work Use of information system development cycle 	KA AS EC
				Supervised written Short Response	RIS SQL	<ul style="list-style-type: none"> Formative 90 minutes No notes allowed 	KA AS EC
	Knowledge Based Systems	<ul style="list-style-type: none"> Intelligent Systems (IS) Human Computer Interaction 	12 Core: 2 Add: 10	Product Minor project	IS HCI	<ul style="list-style-type: none"> Formative 3 weeks Individual work Written explanation 800 words 	KA AS EC

	Unit	Syllabus Topics	Time (Hours)	Assessment Technique/Item	Topics Assessed	Conditions	Dimensions
Semester Three	Algorithmic Design Concepts	<ul style="list-style-type: none"> Algorithms (A) Software programming (SP) Social and ethical issues 	27½ Core: 23 Add: 4½	Extended response Essay	SP SEI	<ul style="list-style-type: none"> Summative 800 – 1200 words 3 weeks Draft required 	KA AS EC
	Software Design	<ul style="list-style-type: none"> Algorithms Software programming Social and ethical issues Human - computer interaction 	27½ Core: 24 Add: 3½	Extended response Folio	A SP HCI	<ul style="list-style-type: none"> Summative 5 weeks Series of practical exercises Exercises to range from implementing algorithms to the design and development of solutions to problems 	KA AS EC
Semester Four	Software Development	<ul style="list-style-type: none"> Algorithms Software programming Human -computer interaction 	27½ Core: 22½ Add: 5	Product Major project	A SP HCI	<ul style="list-style-type: none"> Summative 6 weeks Individual Use of software development cycle 	KA AS EC
				Supervised written Short Response	A SP	<ul style="list-style-type: none"> Summative 90 minutes No notes allowed 	KA AS EC
	Software Design and Web Development	<ul style="list-style-type: none"> Computer Systems (CS) Software programming 	27½ Core: 9½ Add: 18	Product Minor Project	CS SP	<ul style="list-style-type: none"> Summative 3 weeks Individual work 	KA AS EC
Time Allocations			Core topics: 166½ hours Additional material: 53½ hours	KEY: KA – Knowledge and application; AS - Analysis and synthesis; EC – Evaluation and communication			
			Total:	220 hours			

2.0 Outlines of Intended Student Learning

SAMPLE UNIT 1: Information Systems Design

Core topics:	Structured Query Language	Additional material:	Structured Query Language
	Relational Information Systems		
	Social and Ethical Issues		
Time allocation: 25 hours		Time allocation: 2½ hours	

Unit description

This unit introduces students to a formal model for describing the architecture of information systems and presents methods for developing these systems. Within the unit, social and ethical issues related to, for example, security, privacy and identity theft will be integrated. Students will also be introduced to a formal query language Structured Query Language (SQL), for the manipulation of data within a database.

Dimensions of the General Objectives assessed within this unit:

1. Knowledge and application (KA)
2. Analysis and synthesis (AS)
3. Evaluation and communication (EC).

Topic: Structured Query Language

Core:

- Terminology such as retrieval, insertion, deletion, update and modification
- Data definition concepts including:
 - table and column names
 - column data types
 - defining tables
 - populating a table with data.
- Data manipulation using SQL including:
 - analysing requests for information in order to recognise one or more types of query required
 - retrieval from one or more columns in one table
 - retrieval from one or more columns based on some selection criteria
 - sorting data based on one or more columns
 - use of logical, arithmetic and relational operators to build the relevant selection criteria
 - predefined functions such as maximum, minimum, average and number of elements in a column
 - inserting, updating and deleting of queries.

Additional material:

- Query by example (QBE)

Topic: Relational information systems**Core:**

- Data, information, knowledge and wisdom, and the differences between the terms as they apply to information systems.
- External, logical, conceptual and physical views of information systems
- Classification systems for different types of information systems
- Steps of the information system development cycle for the production of an information system, i.e. identification, conceptualisation, formalisation, implementation, testing, evaluation, documentation and specification documentation.
- Maintaining security and privacy in information systems

Topic: Social and ethical issues**Core:**

- Appropriate terminology for discussing social, ethical, legal and moral issues
- Issues associated with the physical and logical security of computer systems e.g. data protection, backup systems, data integrity
- Hacking
- Privacy
- Unauthorised access
- Identity theft
- Storing and displaying sensitive information e.g. pictures of indigenous people

Learning Experiences

- Retrieving information from an existing database through ad hoc queries and the production of formal reports.
- Creating a database, setting field properties, inserting, modifying or deleting data.
- Identifying and using online database resources
- Presenting situations or problems to help students discriminate between facts and opinions

Assessment Technique / Item**Year 11 - Extended Response (Review)**

- Formative
- 600 – 1000 words
- 3 weeks
- Draft required
- Review of literature on database security issues

Year 12 - Extended Response (Essay)

- Summative
- 800 – 1200 words
- 3 weeks
- Draft required
- Argumentative essay based upon issues of privacy with regard to databases

SAMPLE UNIT 2: Software Design

Core topics:	Algorithms	Additional material:	Algorithms
	Software Programming		Software programming
Time allocation:	Social and Ethical Issues	Time allocation:	
24 hours	Human Computer Interaction	3½ hours	

Unit description:

This unit involves the study of the development of software. Students will gain experience and skills in the design, development and evaluation of computer programs that solve practical problems. The steps in the software development cycle will be used to solve these problems.

Dimensions of the General Objectives assessed within this unit:

1. Knowledge and application
2. Analysis and synthesis
3. Evaluation and communication

Topic: Algorithms

Core:

- General principles of algorithm development such as top-down design and modularity
- Basic elements of algorithms
 - assignment
 - procedure call
 - skip
- Standard algorithm control structures:
 - sequence
 - selection
 - iteration

Additional material:

- Search techniques

Topic: Software Programming**Core:**

- Procedural design and implementation
- Use of a 3rd generation programming language
- Implementation of sequence, selection and iteration in a 3GL
- Implementation of modularity in a 3GL and passing of values to and from modules
- Metrics and protocols of testing, e.g. alpha- and beta- testing
- Common data types including:
 - real numbers
 - integer numbers
 - character strings
- Common data structures including:
 - variables
 - arrays
 - text files

Additional material:

- Static Structures including:
 - user-defined types
 - objects

Topic: Social and ethical issues**Core:**

- Software piracy/cracking – the responsibilities of software developers and retailers as well as users and purchasers
- Copyright / intellectual property, commercial licensing, open-source, freeware/shareware
- monopolies and the nature of competition in the software industry
- Malicious code e.g. viruses, trojans and worms
- Phishing

Human – computer interaction**Core:**

- Role of affordances and metaphors in the design of interfaces
- Approach to interfaces from the perspectives of different individuals, e.g. users, designers, programmers, hardware engineers.
- Fundamental importance of user-centred design for building new interfaces.

- Principles of user-centred design:
 - design errors such as clutter, embellishment and interference
 - usability
 - accessibility i.e. accommodating for special needs including legal aspects and standards, verification of standards
 - use of style guide

Learning Experiences

- Use of algorithm and code libraries
- Analysis of a problem and selection of the most appropriate algorithm for solution
- Solving a variety of problems
- Developing algorithmic solutions to simple problems given varying amounts of guidance.
- Solving a variety of problems using 3GL
- Observing, analysing, modifying, testing, evaluating and/or documenting existing solutions.
- Developing partial or complete solutions to problems.
- Presenting situations or problems to help students discriminate between facts and opinions
- Justifying design choices they have made in interfaces they have developed

Assessment Technique / Item

Year 11 – Extended Response (Folio)

- Formative
- 5 weeks
- Series of practical exercises
- Exercises range from implementing given algorithms to the design and development of solutions to problems
- Open book / notes allowed
- Help menus available

Year 12 – Extended Response (Folio)

- Summative
- 5 weeks
- Series of practical exercises
- Exercises range from implementing given algorithms to the design and development of solutions to problems.
- Open book / notes allowed
- Help menus available

3.0 Student Profile (Year A/B)

Item	Assessment	Topics	Unit	F/S	K & A	A & S	E & C
1	Extended response Review	SP, SEI	Algorithmic Design Concepts	F			
2	Extended response Folio	A, SP, HCI	Software Design	F			
Standards - Monitoring							
Interim Level of Achievement - Monitoring							
3	Product Major Project	A, SP, HCI	Software Development	F			
4	Supervised written Short response	A, SP	Software Development	F			
5	Product Minor Project	IS, HCI	Knowledge Based Systems	F			
Standards - Monitoring							
Interim Level of Achievement - Monitoring							
6	Extended response Essay	RIS, SEI	Querying Information Systems	S			
7	Extended response Folio	SQL, RIS	Information Systems Design	S			
Standards - Verification							
Proposed Level of Achievement - Verification							
8	Product Major project	SQL, RIS, HCI	Information Systems Development	S			
9	Supervised written Short Response	SQL, RIS	Information Systems Development	S			
Standards - Verification							
Proposed Level of Achievement - Verification							
10	Product Minor project	CS, RIS	Information Systems Design and Web Development	S			
Exit Standards							
Exit Level of Achievement							

KEY: F– Formative; S –Summative; K&A – Knowledge and application; A&S - Analysis and synthesis; E&C – Evaluation and communication

3.0 Student Profile (Year B/A)

Item	Assessment	Topics	Unit	F/S	K & A	A & S	E & C
1	Extended response Review	RIS, SEI	Querying Information Systems	F			
2	Extended response Folio	SQL, RIS	Information Systems Design	F			
Standards - Monitoring							
Interim Level of Achievement - Monitoring							
3	Product Major project	SQL, RIS, HCI	Information Systems Development	F			
4	Supervised written Short response	SQL, RIS	Information Systems Development	F			
5	Product Minor project	IS, HCI	Knowledge Based Systems	F			
Standards - Monitoring							
Interim Level of Achievement - Monitoring							
6	Extended response Essay	SP, SEI	Algorithmic Design Concepts	S			
7	Extended response Folio	A, SP	Software Design	S			
Standards - Verification							
Proposed Level of Achievement - Verification							
8	Product Major project	A, SP, HCI	Software Development	S			
9	Supervised written Short response	A, SP	Software Development	S			
Standards - Verification							
Proposed Level of Achievement - Verification							
10	Product Minor project	CS, RIS	Software Design and Web Development	S			
Exit Standards							
Exit Level of Achievement							

KEY: F– Formative; S –Summative; K&A – Knowledge and application; A&S - Analysis and synthesis; E&C – Evaluation and communication;

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