

MSC217 Database Management Systems

Semester 2, 2004

Unit Outline

Unit overview

Nature of the unit

MSC217 Database Management Systems introduces database concepts, systems, design and implementation. This unit not only includes the process of analysis and design of database systems and concomitant technical and administrative functions, but also emphasises the business context – that of information resource management and its activities within organisations.

Upon successful completion of this unit, students should be able to:

- perform abstract data modelling and implement developed models in a relational database management system;
- distinguish between the types of languages required for database management;
- create and define, fill with data, and query, a relational database;
- recognise information resource management and its activities; and
- recognise the need for certain database administration functions

Prerequisites

Before undertaking this unit it is essential that students have completed the prerequisite unit *MSC120 Business Information Systems*.

Content

The unit is structured into the following topics:

Topic 1 Information resource management and database administration

Topic 2 Database design – an overview

Topic 3 Overview of a high-level data modelling process

Topic 4 Semantic modelling with E-R diagrams

Topic 5 Further semantic modelling with EE-R diagrams

Topic 6 The relational model and normalisation

Topic 7 Physical design

Topic 8 SQL and database languages

Topic 9 Database Security and Distributed Databases

Topic 10 Further study and research

The Deakin Advantage

Deakin University aims to ensure that undergraduate courses provide educational experiences designed to develop an appropriate level of expert knowledge of a field of study and the attributes, including skills and personal qualities, that will serve graduates in their lives beyond graduation. The University is progressively accrediting its undergraduate courses to ensure that they explicitly develop and assess (to the extent possible) the attributes of a Deakin graduate, known as the Deakin Advantage:

- an understanding of, and the ability to work with, a systematic body of knowledge in their major field or fields of study, based on the highest standards of scholarship and research, to a level of mastery appropriate to the level of award;
- an understanding of the professional, industrial and social contexts at a standard appropriate to the discipline area and level of award;
- the ability to identify, gather, retrieve and operate on textual, graphical and numerical information at a standard appropriate to the discipline area and level of award;
- a good standard of oral and written communication and presentation;
- a capacity for teamwork and collaboration;
- an ability for critical thinking, analysis and problem solving;
- organisational and personal management skills;
- information technological literacy;
- a capacity for lifelong learning and an appreciation of its necessity;
- an understanding of ethics, social responsibility and cultural sensitivity;
- an understanding of international perspectives and competence in a global environment; and
- an understanding of the principles and applications of sustainable development.

This unit develops skills in critical thinking and analysis of real world situations with the goal of creating a computer representation of those real world situations. This of course contributes to student's overall computer literacy and there are some opportunities for team-work and collaboration.

Learning environments/Learning approach

Lectures, tutorials and practical workshops are available to on-campus students. Off-campus students may attend on-campus lectures but cannot participate in on-campus tutorials and workshops. Off-campus students are expected to work through tutorial and workshop materials in their own time.

As is common with all units, there is a DSO website available to all students where resources are placed and it includes a general discussion area. From time to time general announcements will be made through this medium. Private asynchronous discussion areas will be set up for off-campus students who seek to work in a small group for the second assignment.

We suggest that you complete the topics in time to prepare for your assignments and for the examination. To achieve this, set yourself a timetable each week and organise your other activities around it. If you try to do the reverse, that is, endeavour to find time for your studies after other activities have taken precedence, you will find that you are rushing through your work without really absorbing the content or understanding it to the standard required. A suggested calendar is included under the heading "Unit Planner" later in this *Unit Outline*.

Study schedule (Practicals)

You should try to gain practical experience with the software package you have as soon as possible (see later reference to software). Set up your system and begin working through any tutorial information to gain familiarity with negotiating your particular system.

Once you are familiar with your system, you should begin working on the SQL practical exercises as soon as possible.

The practical component (apart from the first assignment) consists of working through a series of exercises. You should begin with simple queries and work up to more complex queries.

Time requirements

How much time per week do you need? The minimum time you would require for this unit would be three hours for lectures and workshops and up to six hours for reading and research in preparation for assignments and the exam. The examination is closed book.

Students studying this unit in off-campus mode are advised to spend the same amount of time per week on the unit as those studying it in on-campus mode, that is ten hours.

Remember that the allocation of time to undertake your assignment must be built into your timetable. Thus you must plan to complete all topics required for the assignment well in advance of when the assignment is due. You must then build into your timetable extra time to complete the assignments. Unless you can get a week ahead of the schedule, you cannot afford to have a week just working on the assignment and not spend any time working on the regular topics. If you do otherwise, you will find yourself very rushed towards the end of the semester.

Unit road map

This overview is given as a guide for you whilst you are working through the topics presented in the unit. If you become lost or worried about the importance of any topic in the unit, firstly consult the objectives for the unit and then if they don't help to clarify the situation, consult this overview. This will help you clarify what is of importance and what is not and to get an idea for how the unit is structured.

The unit is divided into three parts.

Part one (topics 2-7) deals with the database development life-cycle; how we model data, design databases and implement them.

Part two (topic 8) deals with how to query relational databases.

Part three (topics 1 and 9) deals with a number of important issues concerning database management, which are separate from the design and implementation of databases and from the querying of databases.

Study schedule (Topics)

Good organisation and adherence to a schedule should ensure that you do not fall behind with your study. Other wise you will place yourself under great stress when assignments become due and during the last few days before the final examination.

Learning resources

Prescribed textbook

The prescribed textbook for this unit is:

Hoffer, J A, Prescott, M B and McFadden, F R (2004) *Modern Database Management*, 7th edn., Pearson Education, Inc., Upper Saddle River, New Jersey.

To order textbooks, reference books, general books and software from Unitexts, you can choose from the following options:

- phone 1800 686 681 (freecall) for fast processing of your order;
- email to unitexts@deakin.edu.au; or
- order online from the Unitexts web site at <http://www.unitexts.deakin.edu.au>

Payment by Bankcard, Visa or Mastercard. All orders are processed and sent via fast courier delivery to your door.

If you require further information please phone **(03) 5563 3212**.

Study Guide/Readings

The Study Guide provides a guide to the unit topic-by-topic or module by module. Readings may be provided for some or all topics.

- MSC217 Study Guide
- MSC217 Readings

These learning resources are available online in the Resources area in the unit's area in DSO or in printed form from Unitexts.

The materials are provided in hardcopy form to offcampus students. If you do not receive materials provided by Deakin you can contact the Course Materials Hotline:

- phone 1800 242 251 (freecall); or
- email to coursematerials@deakin.edu.au.

Further resources

Software

Off-campus students are required to arrange access to a relational database management system that supports standard SQL.

On-campus students are encouraged to make similar arrangements if maximum flexibility is desired and if students wish to avoid the inevitable crowding of laboratories during high-demand periods. Micro SQL is installed on-campus in all PC laboratories.

Note: We do not recommend Microsoft Access for this unit. However students may use it if no other product is available. The dialect of SQL in Access is not quite standard. Further, it is possible to generate SQL queries using the Access QBE interface without thinking through SQL and one of the goals of this unit is for you to learn SQL directly.

Many implementations of SQL are available in workplaces and some trial versions may be downloaded from vendors from the Internet. There are several and some of you may feel comfortable

in downloading and implementing one of them on your computer. We are not able to support you in this.

Should you wish to purchase a product we suggest MicroSQL from MicroResearch, 26 Peter Street, Innisfail QLD 4860 Australia. Phone and fax: (07) 4061 1803 (+61 7 4061 1803). The package contains a CD-ROM and Vol. 1 of a printed user manual (\$42.50). This price includes GST and express post, in 2003.

Students having difficulty obtaining access to a software product that supports SQL should contact the unit chair.

If you are studying in off-campus mode and you live within reach of the Warrnambool, Geelong, or Melbourne campuses of Deakin University, it is possible to use Deakin University computing laboratories for practical computing. Many of the laboratories are reserved for classes throughout the week, so you are advised to check the availability of laboratories via the timetable link on the Deakin University web site.

Other resources

- The Deakin Learning Toolkit contains a number of resources that may be useful for this unit:
 - Web browsers and other software
 - Information about the Library

Further reading

- There is a wealth of excellent textbooks available on DBMS's. Some that are relevant and available are listed below.

Awad, E M and Gotterer, M H (1992) Database Management, Boyd and Fraser, Massachusetts.

Benyon, D (1997) Information and Data Modelling, 2nd edn., McGraw-Hill, Sydney.

Connolly, T M and Begg, C E (2002) Database Systems: A Practical Approach to Design, Implementation, and Management, 3rd edn., Addison Wesley, Harlow, England

Connolly, T M and Begg, C E (2004) Database Solutions: a step by step guide to building databases, 2nd edn., Addison Wesley, Harlow, England

Elmasri, R and Navathe, S B (1997) Fundamentals to Database Systems, 2nd edn., Addison-Wesley, Redwood City.

Gillenson, M.L., (2005) Fundamentals of Database Management Systems, John Wiley & Sons, USA

Hansen, G W and Hansen, J V (1996) Database Management and Design, 2nd edn., Prentice Hall, New Jersey.

Hawryszkiewicz, I T (1991) Database Analysis and Design, 2nd edn., McMillan, Sydney.

Mannino, M V (2001) Database Application Development and Design, McGraw-Hill, Irwin, Boston.

Silberschatz, A, Korth, H F and Sudarshan, S (1997) Database System Concepts, 3rd edn., McGraw-Hill, Sydney.

Ward, J and Griffiths, P (1996) Strategic Planning for Information Systems, 2nd edn., John Wiley and Sons, Chichester.

Staff and contact details

Within the span 9am to 5pm Monday–Friday, academic members of staff are normally contactable as follows:

- on-campus students should usually be able to have their enquiries dealt with during tutorials;
- for 'in person' student consultation on campus: a staff member will be available at least two days per week and for at least three hours per unit, up to a maximum of six hours; it is unreasonable though to expect staff to cover issues privately that were discussed during classes that students failed to attend;
- for general student queries, other than during consultation time: through DSO; and
- staff endeavour to respond within two business days of the query being received.

Students are encouraged to make telephone, email or facsimile contact only during the staff members nominated consultation times, or by prior arrangement with the staff member. At other times, please use DSO. This is the preferred medium for (non-confidential) academic discussion, because public discussion may benefit all students.

Unit chair

Alwyn Richardson

email: alwynr@deakin.edu.au,

Telephone: (03) 5563 3225,

Room number J437 on the Warrnambool Campus.

Alwyn has been involved in teaching DBMS's at the tertiary level since 1985. He is normally campus coordinator for Warrnambool on-campus students and all off-campus students.

Other teaching staff

Not known at the time of preparation of this document.

Development team

Dr Simon Milton and Alwyn Richardson developed the study guide.

Dr Carla Wilkin developed the tutorial and lecture materials.

Administrative queries

Queries relating to administrative matters should be addressed, in the first instance, to a student adviser, staff at the Faculty Office, Student, Administration Group Manager or the Faculty Registrar. Inquiries can be made via email to:

- enqblm@deakin.edu.au (for students at Burwood)
- enqbuslaw-g@deakin.edu.au (for students at Geelong)
- enqblw@deakin.edu.au (for students at Warrnambool)

Assessment

Assessment tasks

Your overall assessment in this unit will be based on your performance in the continuous assessment (the assignments) and the final examination. The marks will be allocated as follows, but your result is also subject to an *excellence rule*, detailed below.

Assignment 1 Database Implementation and Querying	<i>Due date: Monday 23rd August, 2004 by 10-00am.</i>	20%
Assignment 2 Database Design – Information Systems Modelling	<i>Due date: Monday 4th October, 2004 by 10-00am.</i>	20%
Final examination	<i>Period commencing Monday 1st November, 2004</i>	60%
TOTAL		<u>100%</u>

Note

1. Assessment will be weighted 40% on continuous assessment and 60% on the final examination.
2. The assignments are compulsory in this unit.
3. The final examination is a **closed book three-hour written examination** paper. A Supplementary Examination can only be given to students who have applied for Special Consideration in this unit, and as a result of this request, been granted a Supplementary Examination.
4. It is the responsibility of each student to retain a copy of all work submitted.
5. The first assignment is to be undertaken individually. A group submission is required for on-campus students for the second assignment. Group work for the second assignment is optional for off-campus students.

Awarding marks and grades in this unit. “the Excellence Rule”

In order to obtain a pass grade (P) in this unit, the following conditions must be satisfied:

- Achieve at least 45% in both the total continuous assessment and the total examination assessment.
- The total of the assessments (continuous assessment and final examination) must be $\geq 50\%$.
- A failure to satisfy either one or both of these conditions will result in an overall grade of Fail (N). The corresponding mark will be the smaller of 45 or the sum of the continuous assessment and the final examination.
- In order to achieve a higher grade (C, D, HD), work of a uniform standard is required in both sections of the assessment. These rules aim to ensure there is consistency between the standard attained in the continuous assessment and the final examination mark. To illustrate this, consider the following scenario. Suppose the continuous assessment mark was 35 out of

40, but the examination mark was 27 out of 60. In this case, the conditions required to pass the unit have been satisfied. Moreover the direct sum of these is 62% (27 + 35) that theoretically would result in the grade C. However, the unit team is not prepared to award such a grade in these circumstances.

- **The unit team has decided that, providing the conditions outlined above are satisfied (i.e. at least 27 out of 60 for the exam, and 18 out of 40 for the continuous assessment and a total assessment $\geq 50\%$), the unit team has decided that the maximum mark that will be awarded will be the examination % + 12.**
- **If the sum of the marks for the continuous assessment and the final examination is less than the examination % + 12, then the sum of these marks will be the mark awarded.**
- Returning to the scenario above, the examination mark is 27 out of 60 (45%), the mark awarded would be $45 + 12 = 57\%$, with a corresponding grade of P, not C.

To illustrate further how these rules will be applied in determining the final mark in this unit, see Table 1 below.

Table 1 Calculating the Final Mark

Continuous Assessment (40)	FinalExam (60)	Sum (100)	Exam % + 12	Mark awarded	Comment
26	28	54	$46.6 + 12 = 58.6$	54	No special conditions
38	20	58	$33.3 + 15 = 48.3$	45	Low Exam mark < 45%
38	33	71	$55 + 12 = 68$	68	Sum > (Exam % + 15)
20	20	40	$33 + 12 = 45$	40	No special conditions
35	42	77	$70 + 12 = 82$	77	No special conditions

Grades are awarded according to the Deakin University scale, namely:

< 50	N
50 – 59	P
60 – 69	C
70 – 79	D
80 - 100	HD

Assignment submission rules

- 1 Printed versions of the assignments must be submitted along with a completed copy of the Faculty Assignment Attachment Sheet that must be and attached. This form is available from the Faculty offices or online. Off-campus students should also attach the form provided with their course materials.
- 2 Assignments are on time if they are submitted on or before the due date.
 - On campus students must submit the printed version at the Faculty office in the Faculty assignment drop box by the due date;
 - Offcampus students must mail their submission on or before the due date. Assignments must be mailed to:

Assignment Tracking
AASD
Deakin University
Waurm Ponds, VIC, 3217

Remote students: A student is classified as remote if they are living in a place where it takes more than 3 days for mail to reach Deakin University, Geelong, for example overseas in certain locations. If you are a remote student, you may submit your assignment by email or fax. Submission Details:

Email - award-assign@deakin.edu.au
Fax (Aust) - 03 5227 2344
Fax (International) - + 61 3 5227 2344

If you are a remote student and submit via email, you will receive a reply from the Assignment Tracking staff upon receipt of your assignment. Please clearly state your Name, Student ID Number, Unit Code and Assignment Number on the email. It is also recommended that you place this information on your assignment as a Footer or Header. The Assignment Tracking staff will print your assignment and place an Assignment Attachment Form onto your assignment. It will then be tracked and sent to your assessor for marking the same day. When returning the assignment, the assignment will be sent by normal postage and not via email. Please do not post another version in the mail if you email or fax in your assignment.

- Students enrolled through partnership agreements must submit as required by the unit coordinator at the partner institution on the due date.
- 3 No extensions will be considered for assignment submission due dates unless a written request is submitted and negotiated with the designated Unit Chair/Coordinator **prior to the due date**.
 - 4 Assignments submitted late without an extension being granted will not be marked.

Return of marked assignments and requests for reviews

Your assignment will be marked, commented upon and every attempt will be made to despatch them back to 15 business days of the due date or extension date of the assignment.

Please note that before results are returned to you, the teaching team will have applied methods to ensure that the standards by which your work has been assessed are the same for all students enrolled in the unit.

You may request additional information from assessors or checks on addition or recording errors. You can contact the unit chair/coordinator directly, or use the 'Stage 1 Review' form available from the Faculty office. However, no reviews or remarks of assessment tasks are allowed unless you formally request such a review through the Faculty Academic Progress and Disciplinary Committee.

Such requests must be submitted on the Administrative Review of Result form and may be submitted at any time up to 10 days after the release of final results for the unit.

Special consideration

If you consider that your assessment was or is likely to be adversely affected by serious and exceptional circumstances beyond your control, you may apply for special consideration. Grounds can be medical, compassionate or hardship/trauma. A form is available from the Faculty office. Special consideration is not normally intended for assignments and other forms of continuous assessment during the semester – you should apply to the unit chair/coordinator for an extension in such cases.

Applications for special consideration must be made no later than three days after the due date of the assessment task. They are referred to the relevant unit chair or nominee for determination and the outcome is notified within 10 working days of the application or before publication of final results for the unit.

Plagiarism and other academic offences

Plagiarism is the copying of another person's ideas or expressions and presenting them as your own without an explicit indication of the source of the material. It includes copying written works such as books or journals, data or images that may be presented in tables, diagrams, designs, plans, photographs, film, music, formulae, web sites and computer programs. Plagiarism also includes the use of the work of lecturers or other students as your own without acknowledgment.

Intention to cheat is irrelevant in determining whether plagiarism has occurred. If you pass off the work of others as your own without acknowledgement, then you have offended, whether you knew you were doing it or not. Even the 'George Harrison defence' is irrelevant in determining if plagiarism has occurred. George's explanation for "My Sweet Lord" sounding like "He's So Fine" as recorded by the Chiffons in 1962 was "I did not knowingly copy another's work – it was just in my head so that I assumed it was original". George still plagiarised.

The University regards plagiarism as an extremely serious academic offence. The penalties associated with plagiarism may be severe and extend to cancelling all marks for the specific assessment item or for the entire unit or even exclusion from your course. These penalties are detailed in Part 2 of Regulation 4.1 (1) Student Discipline.

It is important to realise, however, that it is certainly not an offence to use the work of others in your work. On the contrary, a well-constructed essay or report should normally refer to and build on the work of others for positioning, supporting and strengthening your work and advancing knowledge. Plagiarism occurs when due recognition and acknowledgement of the work of others is not provided. Therefore, whenever you are using another person's research or ideas (whether by direct quotation or by paraphrasing) you must appropriately cite the source. If you are ever in doubt about the most appropriate form of referencing, you should consult your lecturer or Student Life.

Teaching teams will use a variety of methods to detect plagiarism, and some units may require that you submit your work to a system that can check your work for possible plagiarism.

Unauthorised collaboration is a similar offence. Unauthorised collaboration involves working with others with the intention of deceiving examiners about who actually completed the work. If there has been any collaboration in preparing individual assessment items, this must be disclosed. In the case of group project work, lecturers provide guidelines on what level of collaboration is appropriate and how the work of each participant in the project is to be assessed. If you have any doubt about what constitutes authorised and unauthorised collaboration you should consult your lecturer.

Academic skills – understanding academic requirements

Referencing requirements

Referencing involves acknowledging original sources of information when producing written work. By referencing correctly, you not only give weight to any arguments or statements made in your work, but also avoid plagiarism.

Exam Preparation

Examinations are an important part of assessment for most units in the Faculty of Business and Law. It is imperative that you learn how to prepare for an examination and how to best use your time during an examination so that you can attain academic success.

The following links to the Student Life website provide valuable information about how best to prepare and sit for an examination:

www.deakin.edu.au/studentlife/academic_skills/undergraduate/handouts/exams.php#
www.deakin.edu.au/studentlife/academic_skills/postgraduate/handouts/exams.php#

Research skills

The library provides many resources to support your research. See www.deakin.edu.au/library/findout/research/

Information about research skills specific for the School of Law can be found at www.law.deakin.edu.au/research/index.htm

Further Information

The Division of Student Life provides free on-campus academic skills workshops including: Organising and Time Management Skills; English Language Class; How to Avoid Plagiarism; Working in Groups; Your First Assignment; Lectures and Tutorials; and Writing University Assignments. See the following website for further details and dates of workshops: www.deakin.edu.au/studentlife/academic_skills/oncampus_workshops/index.php

Unit planner

As already mentioned the unit MSC217 is divided into ten topics. Some are practical topics that involve setting up and using a specific DBMS, others are more theoretical. We recommend that you study practical and theoretical topics in parallel. You are advised to begin practical work using SQL as soon as possible. We suggest around two or three hours practical work for the first few weeks. Before you can perform SQL statements you must have a product installed on your computer and be able to enter, edit and run SQL statements. Details of this are product specific and you must utilise product manuals to find out how operations are required.

It is recommended that, unless otherwise specified, you study one topic per week. These topics and the due dates for your assignment are given below. The calendar is a guide only, however, the deadlines set for your assignment must be met (see the assessment policy). The date set for your final exam will not be negotiable. Note that the suggested calendar includes a one week intra-semester break.

Lecture	Week Commencing	Lecture	Tutorial
1	19 th July 03	Topic 1: IRM and database administration (Pt 1) Topic 8: SQL and database languages	No Tutorial
2	26 th July 03	Topic 1: IRM and database administration (Pt 2) Topic 8: SQL and database languages	SQL
3	2 nd Aug 03	Topic 2: Database design – an overview Topic 8: SQL and database languages	SQL
4	9 th Aug 03	Topic 3: Overview of high-level data modelling process Topic 8: SQL and database languages	SQL
5	16 th Aug 03	Topic 4: Semantic modelling with E-R diagrams	Topics 1 and 2
6	23 rd Aug 03	Topic 5: Further Semantic Modelling with EE-R diagrams <i>(Assignment 1 due: Monday 23rd August 2004 by 10-00am)</i>	Topic 4
7	30 th Aug 03	Topic 6: The relational model and normalisation (Pt 1)	Topics 4 & 5
8	6 th Sept 03	Topic 6: The relational model and normalisation (Pt 2)	Topic 6
9	13 th Sept 03	Topics 4-6: Practice with E-R and EE-R diagrams and normalisation	Topic 6
10	20 th Sept 03	Topic 7: Physical design (Pt 1)	Topics 4-6

<i>Intra-semester Break - Saturday 25th September - Sunday 3rd October 2002</i>			
11	4 th Oct 03	Topic 7: Physical design (Pt 2) <i>(Assignment 2 due: Monday 4th October 2004 by 10-00am.)</i>	Topic 7
12	11 th Oct 03	Topic 9: Database security and distributed databases	Topic 7
13	18 th Oct 03	Topic 10: Further study and research (including revision)	Topic 9