Unit Outline*

INMT8518 / INMT8818

Computer Modelling for Business

Semester 2, 2011
Crawley

Professor Peter Goldschmidt

Business School
www.business.uwa.edu.au

* This Unit Outline should be read in conjunction with the Business School Unit Outline Supplement available on the Current Students website http://www.business.uwa.edu.au/students
UNIT DESCRIPTION

Introduction

This unit provides a foundation to supporting operations and decision making through effective data modelling.

Dr Nick Letch will lead students in the fundamentals of database design and queries to help managers access information about their operations. Mr Brett Smith will introduce students to good spreadsheet design and the use of optimisation software to plan operations or support capital decisions. Dr Min Qiu will guide students through the thinking behind modelling decisions by incorporating probability theory to model the uncertainty underpinning many decision environments.

Unit content

The unit introduces practical application of selected decision support methods and database administration. The aim is to develop the capacity to define a problem, specify data models and apply software.

The Goal of the unit

The unit is a foundation unit covering the skills and methods that are expected in further units of study in the Masters of Information Management (or M. Com with an information management core). Students are expected to exit the unit with a solid understanding of designing models to support decisions and designing databases to plan and track operations.

Learning outcomes

On completion of this unit, you should be able to:

1. **Design and Develop a database for operations management and decision making**
   a) Describe the file organisation for databases in terms of entities, relationships and attributes
   b) Identify appropriate database designs for managing operations (relational) and for decision support (flat or star schema). Recognise that different data models are appropriate for different purposes.
   c) Discuss the importance of data integrity and identify best practices for maintaining data integrity.
   d) Design and build a suitable database to meet the requirements of a business problem
   e) Write SQL statements to support business questions.
2. Evaluate computer models for business decisions
   a) Identify the management science process and adapt this to business decisions.
   b) Recognise that models are adequate representations of some business problems
      and that assumptions of the models need to be communicated and understood to
      be correctly applied in business decision making
   c) Distinguish between optimisation/satisfying for business decisions and management
      of investigation into business processes. Adopt the appropriate tools for each task.
   d) Appreciate that many activities are affected by a series of interacting uncertainties
      that make it impossible to analyse precisely. In this situation, system simulation is a
      valuable technique to use to rank alternatives against a simple decision criterion.
   e) Assess results of a decision model and communicate recommendations in terms of
      business strategy

3. Apply management science tools to business applications
   a) Solve a business problem using a data model. Interpret the solution and sensitivity
      reports.
   b) Model a business system using a simulation tool and use it to investigate the
      performance of the system prior to implementation or reengineering.
   c) Apply simulation to support policy decisions by modelling a business system and
      using it to investigate how the system develops over time.

4. Demonstrate proficiency in specialised management science software
   a) Build and solve an optimisation model using the Solver add-in to Microsoft Excel.
   b) Design and build a database using Microsoft Access
   c) Incorporate @Risk add-in for Excel to support decision making under uncertainty.

Educational Principles and Graduate Attributes

The learning outcomes contribute to the University’s aim to nurture excellence, enable
creativity and intellectual exploration, and promote effective citizenship among its students
and graduates in the Australian community and beyond. The unit promotes the ability and
desire:
   ▪ to think, reason and analyse logically and creatively (Learning Outcome #1, 2, 3)
   ▪ to question accepted wisdom and be open to innovation (Learning Outcome #2)
   ▪ to acquire the skills needed to embrace rapidly changing technologies (Learning
     Outcome #4)
   ▪ to acquire skills in information literacy (Learning Outcome #1, 2, 3, 4)
   ▪ to develop spoken and written English communication skills at high levels (The
     assessment items require written reports to communicate decision model results
     in terms of decision making; learning outcome 2b)
TEACHING AND LEARNING RESPONSIBILITIES

Teaching and learning strategies

There are three learning areas covered in this unit. Each module will be taken by a different lecturer. For each module your lecturer will introduce you to the topics and guide you through the necessary skill acquisition. Your assessment for each component is a group assignment, which requires building the model and reporting results in terms of business decision making.

Teaching and learning evaluation

You may be asked to complete two evaluations during this unit. The Student Perception of Teaching (SPOT) and the Students’ Unit Reflective Feedback (SURF). The SPOT is optional and is an evaluation of the lecturer and the unit. The SURF is completed online and is a university wide survey and deals only with the unit. You will receive an email from the SURF office inviting you to complete the SURF when it is activated. We encourage you to complete the forms as your feedback is extremely important and can be used to make changes to the unit or lecturing style when appropriate.

Attendance

Participation in class, whether it be listening to a lecture or getting involved in other activities, is an important part of the learning process, therefore it is important that you attend classes. More formally, the University regulations state that ‘to complete a course or unit students shall attend prescribed classes, lectures, seminars and tutorials’. Where a student, due to exceptional circumstances, is unable to attend a scheduled class, they are required to obtain prior approval of the unit coordinator to be absent from that class. Any student absent from class without having had such absence approved by the unit coordinator may be referred to the faculty for advice and may be required to withdraw from the unit.
CONTACT DETAILS

We strongly advise students to regularly access their student email accounts. Important information regarding the unit is often communicated by email and will not be automatically forwarded to private email addresses.

<table>
<thead>
<tr>
<th>Unit coordinator/lecturer</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Peter Goldschmidt</td>
</tr>
<tr>
<td>Email:</td>
<td>Peter Goldschmidt @uwa.edu.au</td>
</tr>
<tr>
<td>Phone:</td>
<td>6488 2799</td>
</tr>
<tr>
<td>Consultation hours:</td>
<td>by appointment except Tuesday</td>
</tr>
<tr>
<td>Lecture times:</td>
<td>Wednesday, 5:00 - 8:00pm</td>
</tr>
</tbody>
</table>
| Lecture venue:           | Week 1 - BUSN:G42  
Week 2 – TBC in Week 1’s lecture  
Week 3-13 – BUSN:242 |

TEXTBOOK(S) & RESOURCES

Unit Website
http://Webct.uwa.edu.au

Recommended/required text(s)
Brady J. and Monk E. 2009 Problem Solving Cases in Microsoft® Access and Excel, Sixth Annual Edition, Cengage Course Technology Boston, Massachusetts

Software requirements
Students will need access to word processing software, Microsoft Excel and Palisade @Risk (available in student labs).
## UNIT SCHEDULE

<table>
<thead>
<tr>
<th>Week commencing</th>
<th>Topic</th>
<th>Text Resource</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module 1: Modelling Business Decisions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 BS 3 Aug</td>
<td>Unit outline</td>
<td>Handout</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Building Decision Models in Excel</td>
<td>Tutorial C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tutorial C Building a decision support system in Excel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 BS 10 Aug</td>
<td>CASE 1 Financial Model for ERP decision</td>
<td>Handout</td>
<td></td>
</tr>
<tr>
<td>3 BS 17 Aug</td>
<td>Linear Programming, Sensitivity Analysis</td>
<td>Lecture Notes</td>
<td>CASE 1 Computer file only 10%</td>
</tr>
<tr>
<td>4 BS 24 Aug</td>
<td>Transport Models and Network Design Model</td>
<td>Lecture Notes</td>
<td></td>
</tr>
<tr>
<td>5 BS 31 Aug</td>
<td>Assignment 1: Designing a distribution Network under uncertainty (Biopharma) --- Non Teaching Week ---</td>
<td></td>
<td>Assignment 1 Report and computer file 30%</td>
</tr>
</tbody>
</table>

**Module 2: Database Design and Application**

| 6 NL 7 Sept | Database concepts | Tutorial A |
| 7 NL 14 Sept | Data warehousing | Tutorial B |
| | Data integrity | |
| 8 NL 21 Sept | Building a database using MS Access | |
| 26 Sept | NON_TEACHING_WEEK | |
| 9 NL 5 Oct | Assignment 2: --- Non Teaching Week --- | Assignment 2 Report and computer file 30% |

**Module 3: Project Execution and Project control**

| 10 MQ 12 Oct | Introduction to Simulation | |
| | Simulation Basics | |
| 11 MQ 19 Oct | Distribution Fitting | |
| 12 MQ 26 Oct | Application of Simulation Model | |
| 13 MQ 2 Nov | Assignment 3: --- Non Teaching Week --- | Assignment 3 Report and computer file 30% |
ASSESSMENT MECHANISM

The purpose of assessment

There are a number of reasons for having assessable tasks as part of an academic program. The assessable tasks are designed to encourage you to explore and understand the subject more fully. The fact that we grade your work provides you an indication of how much you have achieved. Providing feedback on your work also serves as part of the learning process.

Assessment mechanism summary

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Remarks</th>
<th>Submission</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>10%</td>
<td>Financial model for ERP and CRM capabilities in a mid-sized organisation</td>
<td>WebCT</td>
<td>Aug 17 10 8:30 am</td>
</tr>
<tr>
<td>Assignment 1</td>
<td>30%</td>
<td>Designing a distribution Network under uncertainty (Biopharm)</td>
<td>WebCT</td>
<td>Aug 31 8:30 am</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>30%</td>
<td>Database design and application</td>
<td>WebCT</td>
<td>Oct 5 8:30 am</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>30%</td>
<td>Database design and application</td>
<td>WebCT</td>
<td>Nov 2 8:30 am</td>
</tr>
</tbody>
</table>

Note 1: Results may be subject to scaling and standardisation under faculty policy and are not necessarily the sum of the component parts.

Note 2: The grade FC indicates failure to complete an identified essential assessment component and means failure of the unit.

Note 3: Your assessed work may also be used for quality assurance purposes, such as to assess the level of achievement of learning outcomes as required for accreditation and audit purposes. The findings may be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential, and the outcome will not affect your grade for the unit.
Submission of Assignments

Electronic submissions are managed by WEBCT assignment function. Find the appropriate assignment in WEBCT and attach documents. You will attach your report and model.

Assessment criteria for the assignments

- Note: Because there are three lecturers in this unit covering three different areas, each assignment may have different assessment criteria. Below is a general statement of expectations for business reports based on quantitative modelling techniques. The sections suggested for the business report are universal and would reflect the suggestions by any instructor (though they may use different words). The basic outline is
  - Introduction (context, aim, methodology)
  - Analysis (what is the problem? what are the key inputs?)
  - Solution and interpretation of results
  - Conclusion (recommendation, further analysis)

Suggested format for Business Reports

1. Introduction –

   Problem statement: Context of the problem and any background knowledge needed to understand the report
   Assumptions made: clearly indicate the simplifying assumptions used in the mathematical model. This will allow the manager responsible for the decision to make a judgement on the usefulness of the report
   Solution Approach: brief description of the mathematical model. If it is a standard model (i.e. linear program) then just a statement indicating the model used is all that is necessary. You should also indicate the software used – Excel, Extend, Solver, custom built software, etc.

2. Problem analysis: present the details of the problem. Including, the data used in the model, the source of that data, intermediate calculations performed before the data is ready for use in the model.

3. Results: present clearly and concisely. Use tables, charts and graphs (where applicable). Your results should indicate the objective function value, the decision variable values and demonstrate the solution is within the constraints set for the problem.

4. Interpretation of the results including sensitivity analysis: Clearly interpret the results in terms of the original problem. Consider the problem beyond the results. What other questions does your model help answer. Conduct sensitivity analysis by investigating the impact of the constraints presented in the problem.

5. Overall Recommendation: The section involves considering both results and sensitivity analysis. It provides the decision maker with a set of solutions to differing scenarios.

6. Further analysis: The initial report may lead some insight on important but neglected components of the problem - these are indicated in the final section.
**Weighting of assignment components**
30 points weighted by the value of the assignment

**The Analysis – [10 points]**
- Reasonableness of assumptions – [2 points]
- Accuracy of inputs – [2 points]
- Accuracy of the model; correct logic is used – [3 points]
- Completed analysis including sensitivity analysis or SQL capabilities and reports – [3 points]

**The Presentation of the Report – [20 points]**
- Format and length of the report – [2 points]
- Introduction components – [2 points]
- Development of model – [4 points]
- Results and interpretation; appropriate information is included and a synthesis of results is completed. Discussion of results is accurate and comprehensible. – [6 points]
- Recommendations; makes use of the results and sensitivity analysis (remember you are the analyst not the decision maker, so it is important to explain your recommendations and there is no need to be definitive) – [4 points]
- Spelling, grammar and style; general presentation of report* – [2 points]

*Other components of the report rely on clear communication. In a sense, your report's general presentation is worth 20 pts. I have allocated 2 marks to remind you that presentation is important.

**Student Guild**
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