INFS5873
BUSINESS ANALYTICS

Course Outline
Semester 2, 2015

Part A: Course-Specific Information

Please consult Part B for key information on Business School policies (including those on plagiarism and special consideration), student responsibilities and student support services.
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PART A: COURSE-SPECIFIC INFORMATION

1 STAFF CONTACT DETAILS
Lecturer-in-charge: A/Prof Chung-Li Tseng
Room 2087 QUAD
Phone No: 9385 9704
Email: c.tseng@unsw.edu.au
Consultation Times – Tuesday 2:30 – 3:30, Friday 10:00 – 11:00 (or by appointment)

Lecture: Dr Sam Kirshner
Room TBA
Phone No: TBA
Email: TBA
Consultation Times – TBA (or by appointment)

The best way to contact your lecturers is via email or to see them during their consultation times. Please note that only your UNSW email account will be used for formal notices and correspondence regarding the course, all students and staff are expected to use email responsibly and respectfully. Moodle will be used for all course communication i.e. notices, questions regarding assignments and course content.

If you need to contact the school urgently, please call 9385-5320 or email istm@unsw.edu.au.

2 COURSE DETAILS

2.1 Teaching Times and Locations
Lectures start in Week 1 (to Week 12): The Time and Location are:
Thursday 18:00 – 21:00 ASB 105

2.2 Units of Credit
The course is worth 6 units of credit.

2.3 Summary of Course
Decision-making is a primary function and responsibility of management. This course addresses the process of transforming data into actions through modelling and analysis. The purpose of this process is to help managers to make better, fact-based decisions. This course covers basic decision analysis techniques, including how to analyse data and model decisions, uncertainties and preferences. This course also covers using software for problem solving and decision making.

2.4 Course Aims and Relationship to Other Courses
We are entering an era of Big Data. One biggest challenge for companies in this new era is to thrive in an analytics environment. Namely, companies must learn how to better leverage data and information to make analytics-based decisions. Basically, Business Analytics is the use of data, information technology, analytical methods, and
mathematical or computer based models to help managers gain improved insight about their business operations and make better fact-based decisions. This course addresses how to collect data, design systems, build models, and make decisions to improve business operations.

This course addresses statistical thinking in business management. The importance of applying statistical concepts to make good business decisions and improve performance cannot be overestimated. This course covers tools, analytical frameworks and general principles for decision making. INFS5870 Operations Management covers more fundamental operational topics. INFS5871 Supply Chain and Logistics Planning focus specifically on interactions between firms within a supply chain, such as information sharing, contracting and coordination. The knowledge provided by INFS5870 and INFS5871 can add value to decision making. The School of ISTM also offers INFS5991 Business Intelligence Methods, which uses real-world business case studies and software tools. INFS5991 can be viewed as an extension of this course that makes use of the analytical concept and techniques learned from this course to study how businesses are using business analytics to gain strategic advantages.

This course is an elective course with the prerequisites listed on the Postgraduate Online Handbook. Overall the course aims:

1. To understand the steps of modelling process from a general management perspective.
2. To develop knowledge of the basics of business analytics methods to make fact-based decisions.
3. To develop the basic knowledge of using simulation to analyse risk in business decisions.

2.5 Student Learning Outcomes

The Course Learning Outcomes are what you should be able to DO by the end of this course if you participate fully in learning activities and successfully complete the assessment items. Once you have completed this course you will be able to:

1. analyse practical business decision-making problems, including validating data, testing hypothesis, and understanding effectiveness of different analytical methods
2. implement analytical decision making models on spreadsheets
3. practice decision analysis in the face of uncertain environment
4. build regression models and interpret regression statistics
5. understand different types of statistical forecasting models
6. understand common approaches used in revenue management analytics
7. understand simulation by asking what-if questions about the change of the system
8. interact with team members to achieve group objectives.

The Learning Outcomes in this course also help you to achieve some of the overall Program Learning Goals and Outcomes for all postgraduate coursework students in the Business School. Program Learning Goals are what we want you to BE or HAVE by the time you successfully complete your degree (e.g. ‘be an effective team player’). You demonstrate this by achieving specific Program Learning Outcomes – what you are able to DO by the end of your degree (e.g. ‘participate collaboratively and responsibly in teams’).
Business Postgraduate Coursework Program Learning Goals and Outcomes

1. **Knowledge**: Our graduates will have current disciplinary or interdisciplinary knowledge applicable in local and global contexts.
   You should be able to identify and apply current knowledge of disciplinary or interdisciplinary theory and professional practice to business in local and global environments.

2. **Critical thinking and problem solving**: Our graduates will have critical thinking and problem solving skills applicable to business and management practice or issues.
   You should be able to identify, research and analyse complex issues and problems in business and/or management, and propose appropriate and well-justified solutions.

3. **Communication**: Our graduates will be effective communicators in professional contexts.
   You should be able to:
   a. Produce written documents that communicate complex disciplinary ideas and information effectively for the intended audience and purpose, and
   b. Produce oral presentations that communicate complex disciplinary ideas and information effectively for the intended audience and purpose.

4. **Teamwork**: Our graduates will be effective team participants.
   You should be able to participate collaboratively and responsibly in teams, and reflect on your own teamwork, and on the team's processes and ability to achieve outcomes.

5. **Ethical, social and environmental responsibility**: Our graduates will have a sound awareness of ethical, social, cultural and environmental implications of business issues and practice.
   You should be able to:
   a. Identify and assess ethical, environmental and/or sustainability considerations in business decision-making and practice, and
   b. Consider social and cultural implications of business and/or management practice.

For more information on the Postgraduate Coursework Program Learning Goals and Outcomes, see Part B of the course outline.

The following table shows how your Course Learning Outcomes relate to the overall Program Learning Goals and Outcomes, and indicates where these are assessed (they may also be developed in tutorials and other activities):

<table>
<thead>
<tr>
<th>Program Learning Goals and Outcomes</th>
<th>Course Learning Outcomes</th>
<th>Course Assessment Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course helps you to achieve the following learning goals for all Business postgraduate coursework students:</td>
<td>On successful completion of the course, you should be able to:</td>
<td>This learning outcome will be assessed in the following items:</td>
</tr>
</tbody>
</table>
| 1 | Knowledge | - implement analytical decision making models on spreadsheets  
- practice decision analysis in the face of uncertain environment  
- build regression models and interpret regression statistics  
- understand different types of statistical forecasting models  
- understand common approaches used in revenue management analytics  
- understand simulation by asking what-if questions about the change of the system | - Assignment  
- Project  
- Final Exam |
| 2          | Critical thinking and problem solving | • analyse practical business decision-making problems  
• practice decision analysis in the face of uncertain environment | • Assignment  
• Project  
• Final Exam |
|------------|--------------------------------------|-----------------------------------------------------------------|----------------|
| 3a         | Written communication                | • analyse practical business decision-making problems, including validating data, testing hypothesis, and understanding effectiveness of different analytical methods | • Assignment  
• Project report  
• Final Exam |
| 3b         | Oral communication                   | • interact with team members to achieve group objectives          | • Project presentation |
| 4          | Teamwork                             | • interact with team members to achieve group objectives          | • Project  
• Participation |
| 5a         | Ethical, environmental and sustainability responsibility | Not specifically addressed in this course. | Not specifically assessed. |
| 5b         | Social and cultural awareness        | Not specifically addressed in this course. | Not specifically assessed. |

### 3 LEARNING AND TEACHING ACTIVITIES

#### 3.1 Approach to Learning and Teaching in the Course

This course is developed and delivered within the context of the following learning and teaching philosophy.

To maximize the effect of classroom learning, students are expected to read assigned course materials before attending each class. Students should also be aware that real world examples of operations in their surroundings and daily life that may be improved using analytics. Therefore, students are encouraged to pay attention to discover them.

The learning experience offered by this course includes lectures, homework assignments, hands-on practice, group project, and presentations. Through hands-on practice, students will practice and solve exercise questions in class that apply the concepts and methods learned in the same class. The group project is designed to develop critical thinking and to facilitate the methods learned to manage big data. The course and its delivery are designed with a view to assisting the development of problem solving skills.

Assessment is weighted toward informed, reasoned and well-argued personal opinion based on the contextual factors and constraints presented in the various scenarios and is consequently, not based on the acquisition of knowledge alone.

#### 3.2 Learning Activities and Teaching Strategies

The course involves three key components – the lecture and your out-of-class study.
Lectures
Each lecture provides an overview of specific topics in the textbook. The instructor in each lecture goes over the concepts and issues that are deemed important or more difficult to understand. Lecture slides can be downloaded from the course website Moodle prior to each lecture.

Hands-on Practice
In each class, after the lecture of analytical methods, students will practice and solve exercise questions in class to help their understanding. Therefore, each student is required to bring his/her own laptop with the required Excel-based software installed in each class.

Out-of-Class Study
While each student may have preferred individual learning strategy, it is important to note that most learning will be achieved outside of class time. Lectures can only provide a structure to assist your study. An “ideal” strategy may include:

1. Reading of the relevant chapter(s) of the textbook and accessing the lecture slides from the course website Moodle before the lecture. This will give you a general idea of the topic areas.
2. Attendance at lectures. Here the context of the topic in the course and the important elements of the topics are identified. The relevance of the topic will be explained.
3. Do the homework problems. You may discuss problems or difficulties encountered with fellow students or the instructor. But you must write your assignment by yourself.
4. Attend and participate the lectures, where the instructor will discuss and help you to do exercises.

4 ASSESSMENT

4.1 Formal Requirements
To receive a pass grade in this course, you must meet ALL of the following criteria:
- Attain an overall mark of at least 50%.
- Attend at least 80% of all scheduled classes.
- Attain a satisfactory performance in each component of the course. A mark of 45% or higher is normally regarded as satisfactory.
- Attain a mark of at least 45% in the final exam.
- In case of peer assessed group work, the mark assigned to each member of the group may be scaled based on peer assessment of each member’s contribution to the task.
   The School reserves the right to scale final marks to a mean of 60%.

4.2 Assessment Details
The final composite marks for this course are summarized in the following table.

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Weighting</th>
<th>Length</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework 1 (individual)</td>
<td>5%</td>
<td>-</td>
<td>13/08/15</td>
</tr>
<tr>
<td>Assignment</td>
<td>Percentage</td>
<td>Deadline</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>Homework 2 (individual)</td>
<td>5%</td>
<td>20/08/15</td>
<td></td>
</tr>
<tr>
<td>Homework 3 (individual)</td>
<td>5%</td>
<td>27/08/15</td>
<td></td>
</tr>
<tr>
<td>Homework 4 (individual)</td>
<td>5%</td>
<td>3/09/15</td>
<td></td>
</tr>
<tr>
<td>Homework 5 (individual)</td>
<td>5%</td>
<td>10/9/15</td>
<td></td>
</tr>
<tr>
<td>Homework 6 (individual)</td>
<td>5%</td>
<td>24/9/15</td>
<td></td>
</tr>
<tr>
<td>Homework 7 (individual)</td>
<td>5%</td>
<td>8/10/15</td>
<td></td>
</tr>
<tr>
<td>Homework 8 (individual)</td>
<td>5%</td>
<td>15/10/15</td>
<td></td>
</tr>
<tr>
<td>Class participation (individual)</td>
<td>10%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Project report (group)</td>
<td>20%</td>
<td>5 pages</td>
<td>22/10/15</td>
</tr>
<tr>
<td>Final Exam (individual)</td>
<td>30%</td>
<td>-</td>
<td>TBA</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Homework**

There are eight homework assignments given in this course. These homework assignments are designed to help the students practice analytical methods from the text. Each assignment is due one week after it is assigned.

**Final Exam**

The final exam will be held during the University examination period with the date and time determined by the University. It will cover materials covered in lectures during Weeks 1 – 12 (inclusive). The exam will be held in a computer room, where each student is assigned a desktop computer to use. Some questions will require you to use the computer to get answers. The exam will be open book and notes. Further instructions will be given.

**Participation**

To encourage effective interaction, a mark will be awarded for your participation in terms of your attendance and the degree to which you engage in class discussions. Assessment will be based on your attendance, the frequency and quality of your contribution to class discussion, and your participation in team activities. An additional survey will be conducted to your group members at the end of the semester to measure your contribution to your group assignments and activities.

**Project**

Each team will conduct a project involving a big data set. A project statement along with a big data set will be provided by the instructor. The team is expected to analyse data and derive insights from the analysis to aid decision making. Details of the project will be given in Week 7; and each team has five weeks to work on it. A presentation of the project will be made during Week 12. A project report of five pages or less plus exhibits will be due on the last day of classes (Week 12).

**4.3 Assessment Format**

The project report must be typed and printed. The page limit is five pages of text and exhibits. Supporting materials (such as detailed statistics of analysis) can be put in the appendix, which is not included in the page limit. The report should be concise and coherent.
4.4 Assignment Submission Procedure

Homework assignments should be submitted by handing to the instructor at the beginning of the lecture in the relevant week unless otherwise instructed. Students should keep a copy of all work submitted for assessment and keep returned marked assignments.

4.5 Late Submission

The late submission of assignments carries a penalty of 10% of the maximum marks for that assignment per day of lateness (including weekends and public holidays), unless an extension of time has been granted. An extension of time to complete an assignment may be granted by the course co-ordinator in case of misadventure or illness. Applications for an extension of time should be made to the course co-ordinator by email or in person. You will be required to substantiate your application with appropriate documentary evidence such as medical certificates, accident reports etc. Please note that work commitments and computer failures are usually considered insufficient grounds for an extension.

Quality Assurance

The Business School is actively monitoring student learning and quality of the student experience in all its programs. A random selection of completed assessment tasks may be used for quality assurance, such as to determine the extent to which program learning goals are being achieved. The information is required for accreditation purposes, and aggregated findings will 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.

5 COURSE RESOURCES

The prescribed textbook for this subject (available at the UNSW Bookshop) is


We will use Microsoft Excel and SPSS, which together provide extensive capabilities for business analytics in this course. Students should bring their laptops in each class. (Note while some parts of the textbook use the Frontline Systems’ Excel add-ins, Risk Solver Platform and XLMiner, these add-ins will not be used in the lectures. You may install the add-ins by yourself.)

6 COURSE EVALUATION AND DEVELOPMENT

Based on the student feedback collected from the last year, some adjustments have been made in the course design, which include:

- Readjust lecture coverages.
- In addition to Microsoft Excel, SPSS is also introduced to aid analysis.
- A special topic of revenue management analytics is introduced.
We will continue to seek feedback from the students about the offering of this course and use it as a basis for continual improvement. UNSW’s Course and Teaching Evaluation and Improvement (CATEI) Process is one of the ways in which student evaluative feedback is gathered. In this course, we shall use your course-level feedback, both quantitative and qualitative, to guide our continued review and redesigning of the course.

7 COURSE SCHEDULE
The following is a tentative schedule for lectures and tutorials.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic [instructor]</th>
<th>References</th>
<th>Other Activities/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>30 July -- Introduction to Business Analytics [Tseng]</td>
<td>Ch 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-- Analytics on Spreadsheets</td>
<td>Ch 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-- Visualising and Exploring Data [Tseng]</td>
<td>Ch 3</td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td>6 Aug -- Descriptive Statistical Measures [Tseng]</td>
<td>Ch 4</td>
<td>Hw 1 Handed Out</td>
</tr>
<tr>
<td>Week 3</td>
<td>13 Aug -- Sampling and Estimation [Tseng]</td>
<td>Ch 6</td>
<td>Hw 2 Handed Out</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hw 1 due</td>
</tr>
<tr>
<td>Week 4</td>
<td>20 Aug -- Statistical Inference [Tseng]</td>
<td>Ch 7</td>
<td>Hw 3 Handed Out</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hw 2 due</td>
</tr>
<tr>
<td>Week 5</td>
<td>27 Aug -- Predictive Modelling and Analysis [Tseng]</td>
<td>Ch 8</td>
<td>Hw 4 Handed Out</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hw 3 due</td>
</tr>
<tr>
<td>Week 6</td>
<td>3 Sep -- Regression Analysis [Tseng]</td>
<td>Ch 9</td>
<td>Hw 5 Handed Out</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hw 4 due</td>
</tr>
<tr>
<td>Week 7</td>
<td>10 Sep -- Using SPSS &amp; Exercises [Tseng]</td>
<td></td>
<td>Hw 5 due Project Statement Handed Out</td>
</tr>
<tr>
<td></td>
<td>-- Project Introduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 8</td>
<td>17 Sep -- Forecasting Techniques [Kirshner]</td>
<td>Ch 10</td>
<td>Hw 6 Handed Out</td>
</tr>
<tr>
<td>Week 9</td>
<td>24 Sep -- Simulation and Risk Analysis [Kirshner]</td>
<td>Ch 11</td>
<td>Hw 6 due</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hw 7 Handed Out</td>
</tr>
</tbody>
</table>

Mid-Semester break: Saturday 26 Sep – Monday 5 Oct inclusive

| Week 10| 8 Oct -- Decision Analysis [Kirshner]                                              | Ch 18      | Hw 8 Handed Out                                  |
|        |                                                                                   | Handout    | Hw 7 due                                         |
| Week 11| 15 Oct -- Special topic: Revenue Management Analytics [Kirshner]                  |            | Handout                                          |
|        |                                                                                   |            | Hw 8 due                                         |
| Week 12| 22 Oct -- Project Presentation and Course Review [Tseng & Kirshner]               |            |                                                 |

Project Report Due