



Victoria Management School

MGMT 315 SYSTEMS THINKING AND MODELLING

Trimester Two, 2008

COURSE OUTLINE

Contact Details

COURSE COORDINATOR

A/Prof Bob Cavana

Room: RH 904, Rutherford House

Phone: 463 5137

Email: bob.cavana@vuw.ac.nz

Website: www.vuw.ac.nz/vms

ADMINISTRATOR

Luisa Acheson

Room: RH919, Rutherford House

Phone: 463 5381

Email: luisa.acheson@vuw.ac.nz

Class Times and Room Numbers

Lecture: Monday: 08:30 – 9:20 (Old Government Building, GBLT 4)

Lecture: Wednesday: 11:30 – 13:20 (Old Government Building, GBLT 4)

They will comprise formal lectures supplemented by case discussion, student presentations and practical exercises. See schedule in Annex A for a week-by-week plan of sessions.

Tutorials/computer workshops will start in week 3 and continue until week 12 (in the computer lab, RLWY 402, on Mondays, 9.30am – 1.30pm, 1 hour for each tutorial). Procedures for signing up to tutorials will be provided in class.

Trimester Dates:

Monday 7 July to Saturday 8 November 2008.

This course has a 3-hour closed book final examination. 'Students who enrol in courses with examinations should be able to attend an examination at the University at any time during the formal examination period. **Examination dates for trimester two: Friday 17 October to Saturday 8 November 2.**

Introduction

The course continues to examine the notions of systems thinking and how they relate to decision making in a managerial context. It extends some of the systems thinking concepts introduced in MGMT 206, and provides further understanding of how situations can be better managed taking into account short term and long term factors.

The main focus of this course is to provide an overview of the systems thinking and modelling approach using the system dynamics methodology for managerial decision making. This 'systems' approach involves observing and analysing any complex organisation, system [including supply chains] or issue in a comprehensive manner: seeking to understand its structure, the interconnections between its components, and how changes in any area will affect the whole system and its constituent parts over time. A key feature of the system dynamics method is the explicit recognition of the underlying feedback loop structure that is inherent in any dynamic system.

The course will also challenge students to think critically and systemically about issues that confront managers in the fields of managing change, managing resources, managing projects, and in general, managing in situations where uncertainty unfolds over time.

By the end of this course, students should be able to:

- Understand the system dynamics approach to systems thinking and strategic analysis;
- Construct policy / strategy models using the *iThink* and/or *Vensim* simulation modeling packages;
- Critically evaluate & utilise dynamic models for policy analysis, strategy evaluation and scenario analysis; and
- Develop simplified management flight simulators for organisational learning.

Programme and Course-related Learning Objectives

This course will provide students opportunity:

- to develop oral, written, visual and IT-related communication skills
 - through active participation in tutorial and class discussion
 - through the development and presentation of oral and written reports, using narrative, rhetoric, logic-based, diagrammatic, and other schema as forms of presentation
 - through formal and informal classroom debate
- to develop critical and creative thinking skills
 - through exposure to methods designed specifically to improve creative thinking skills, and exercises and assignments designed to practise these skills
 - through exercises and assignments that require analysis, evaluation, interpretation and synthesis
 - through exercises and assignments requiring the generation of creative ideas to solve problems
 - through debate and classroom discussion
 - through case studies based on real situations where these skills can be applied
- to develop leadership skills
 - through structuring independent study, choosing own examples for tutorials and assignments
 - through facilitation of small group discussions or activities
 - through fulfilling spokesperson duties, reporting on a group's activities or ideas to a class
 - through contribution of ideas to the tutor or lecturer in a constructive way
 - through designing action plans to help lead and implement change.

Overall Course Objectives

The course has several objectives, which include:

- understanding the nature of systems, systems thinking and systemic reasoning
- understanding the systemic nature of problems facing managers in organizational settings
- examining the nature of systems approaches
 - o to describing and understanding organizations, and organizational and managerial problem situations
 - o to managerial problem situation solving and decision making
- understanding the variety of ways in which decisions are and can be made
- improving competence in structuring problems
- exploring ways of approaching a range of typical managerial problems and tasks ...
... in different functional areas of management, at strategic and operational levels
- developing an ability to devise robust strategies and make balanced decisions
.... comprehending the complex interaction of systemic forces acting on organisations

Course-related Student Learning Objectives

On successful completion of the course, students should be able to:

- demonstrate an understanding of some major systems frameworks, concepts and conceptual vocabulary underpinning successful systems thinking, problem-solving and decision analysis relevant to management
- demonstrate an ability to critically analyse and work with these different systems frameworks for examining managerial issues
- use such frameworks to describe and develop an understanding of managerial decision situations, and develop robust solutions
- develop an ability to communicate the logic behind your recommendations
- recognise the importance of critical analysis, leadership and communication in managerial problem solving and decision making using systems thinking and modelling approaches.

Course Coverage

A schedule of topics to be covered is attached at the end of this outline (Annex A).

Expected Workload

One point typically requires about 10 hours of student work, including both scheduled contact time. Since this course is for 24 points, this requires the student should spend at least 240 hours of effort on this course, including attending lectures, tutorials, computer workshops, assignments, preparation for group presentations and evaluations.

Readings

The textbook for the course is:

Maani KE & Cavana RY (2007). *Systems Thinking, System Dynamics: Managing Change and Complexity*, 2nd ed. Pearson Education, Auckland.(available from VUW BookCentre)

Other readings will be distributed in class and/or on Blackboard.

Other relevant books include:

Flood RL (1999). *Rethinking the Fifth Discipline: Learning within the Unknowable*. Routledge, London.

Jackson MC (2003). *Systems Thinking: Creative Holism for Managers*, Wiley, Chichester.

Pidd M. (1996). *Tools for Thinking: Modelling in Management Science*. Wiley, Chichester.

- Pidd M. (2004). *Systems Modelling: Theory and Practice*. Wiley, Chichester.
- Rosenhead J & Mingers J. (eds) (2001). *Rational Analysis for a Problematic World Revisited: Problem Structuring Methods for Complexity, Uncertainty and Conflict*. 2nd ed. Wiley, Chichester
- Sterman JD (2000). *Business Dynamics: Systems Thinking and Modelling for a Complex World*. Irwin McGraw-Hill, Boston.
- Vennix JAM (1996). *Group Model Building: Facilitating Team Learning Using System Dynamics*. Wiley, Chichester.

Library Materials

The library holds a couple of copies of the textbook and other relevant books on closed reserve loan. Also in the library are the following conference proceedings, which students might find useful for this course:

Cavana, R.Y., Vennix, J.A.M., Rouwette, E.A.J.A., Stevenson-Wright, M. and Candlish, J. (eds) 1999. *Systems Thinking for the Next Millennium. Proceedings of the 17th International Conference of the System Dynamics Society and the 5th Australian & New Zealand Systems Conference*. Held in Wellington, New Zealand, 20-23 July. System Dynamics Society, Albany, USA.

Cavana & Hutchinson (eds) (2007). Special Issue on Australia and New Zealand Systems (ANZSYS). *Systems Research & Behavioural Science*. **24**(2).

In addition the library contains a wide variety of management science and systems books and journals you may find relevant for this course. The international journals include:

- *System Dynamics Review* (SDR)
- *Systems Research and Behavioural Sciences* (SRBS)
- *Systems Practice and Action Research* (SPAR)
- *European Journal of Operational Research* (EJOR)
- *Journal of the Operational Research Society* (JORS)

EJOR and JORS can be accessed directly through the Library's database of electronic journals. SDR and SRBS can also be accessed electronically through the library's database, by double clicking on 'Wiley InterScience' (full text e-journals) in the library's Alphabetical List of Electronic Resources & Databases. (the web address is: <http://www.interscience.wiley.com/>).

Annual conference proceedings since the 1997 International System Dynamics Conference are available on line from the System Dynamics Society web site:

http://www.systemdynamics.org/society_activities.htm

Computer Software

The computer package Vensim will be used on the course from week 4 to week 12. This will be available in the computer laboratory in the Railway Building (RLWY 402). A version of this computer software is available on a CD-Rom with the text book. The computer package Vensim is produced by Ventana Systems Inc. Their web site is: <http://www.vensim.com/>

The computer package *ithink* will also be used on this course. Unfortunately models cannot be saved with 'save disabled' version of *iThink* on the CD-Rom (with the text), but the models available on the CD-Rom can be run, and small models can be constructed (but not saved). The computer package *iThink* is produced by iSee Systems Inc. Their web site is: <http://www.iseesystems.com/>

If students have private access to a home personal computer (PC), they are able to download a free copy of the Vensim PLE simulation modelling package (produced by Ventana Systems, Inc.) from the internet. The web site is: <http://www.vensim.com/freedownload.html>

Assessment Requirements

The course will be assessed as follows:

	<u>Max Marks</u>	<u>Due Date</u>
1. Systems Thinking Essay	20%	13 August
2. Dynamic Modelling Assignment	25%	24 September
3. Group systems modelling presentation	15%	6 & 8 October
4. Final Examination	40%	17 Oct - 8 Nov
<hr/>		
Total	100%	

Assignments

Assignments should be type-written or prepared on a Word processor. The **assignments** are briefly described as follows. Further details will be provided during the course:

1. Systems Thinking Essay *Due: 13 August*

An essay topic will be provided in class and put on Blackboard also.

2. Dynamic modelling assignment *Due: 24 September*

This assignment will involve constructing dynamic simulation models based on Peter Senge's systems archetypes. This should be written up as a management report.

3. Group Systems Modelling Presentation *Due: Mon, 6 or Wed, 8 October*

This will involve working in a small group of 2 to 4 students. This assignment will involve developing or critically evaluating an existing system dynamics simulation model and presenting the results as in class on Monday 6 or Wednesday 8 October [a 20 minute presentation followed by 10 minutes of questions and answers].

Note, all members of the group are expected to contribute to the group oral presentation. Paper and electronic versions of the group presentations should be submitted on the due date to the course coordinator. On the first page, the members of the group should be identified and a statement made that either all members have on balance contributed equally, or the relative contributions of the members stated. All members of the group will receive the same mark unless their contributions are unequal, in which case the lecturer will make an equitable adjustment.

If it becomes clear that the group dynamics will preclude the group from submitting an effective group presentation, group members should discuss the matter immediately with the lecturer. If necessary to ensure that no student is unfairly disadvantaged, the lecturer will permit some or all members of the group to submit an individual presentation of a defined subset of the project.

4. Final Examination

This will be a 3 hour closed book examination covering all aspects of the course. Further details will be provided later in the course.

Referencing

There are many different styles of referencing and the Faculty of Commerce & Administration at VUW has decided to make APA (American Psychological Association) referencing style the common standard across the Faculty. The Commerce and Central Libraries hold the APA Style Guide. You can also access the information from the online VUW library site (<http://www.vuw.ac.nz/library/resources/virtualref.shtml#style>).

Handing in Assignments

Your assignments should be handed in either in class or put into the course **Assignment Box 23** on the Mezzanine floor, Rutherford House by 5 pm on the due date. Late assignments are to be handed in at the Victoria Management School reception on Level 10, Rutherford House and the time handed in will be noted.

Students must prepare two copies of each hand-in and keep the second copy for their own reference. Students must also keep an electronic copy of their work archived in case the original assignment goes missing. Failure to do so will jeopardise any claim by you that your work was submitted in the rare cases where your work goes astray.

Mandatory course requirements

To meet Mandatory Course Requirements, students are required to:

- (a) Attend at least 7 out of the 10 tutorial/ computer workshop sessions;
- (b) Submit all assignments by the scheduled date and time; and
- (c) To obtain at least 40 per cent (i.e. 16 marks out of 40) of the final examination marks available.

Students who fail to satisfy the mandatory requirements for this course but who obtain 50% or more overall, will be awarded a "K" grade.

Standard fail grades (D or E) will be awarded when the student's overall course mark falls below the minimum pass mark, regardless of whether the mandatory course requirements have been satisfied or not.

Notice of Failure to meet Mandatory Course Requirements will be posted on Blackboard or on the Mezzanine Floor Notice-board.

Penalties- for lateness & excessive length of assignments

- (i) In fairness to other students, work submitted after any deadline will incur a penalty for lateness. **The penalty is 2 of the marks available (marks available means what the assignment is worth i.e. 20% or 20 marks) for an assignment submitted after the due time on the due date for each part day or day late.** (for example if an assignment is out of 20 and the assignment receives 50% then one day late means the mark will be out of 18 and the student will receive 50% of 18). **Saturdays, Sundays and public holidays** will be included when counting the number of days late. Assignments received **more than 7 days after the due date** will not be accepted and the student will **automatically fail the Mandatory Course Requirements**.
- (ii) Course Outlines provide a signal to student of forthcoming workload, dates of submission etc, and thus student study plans should take account of course requirements across all courses. Consequently, workload issues related to other courses and employment will not be accepted as reason for dispensation from mandatory requirements or waiver of penalties. **Extensions** to submission deadlines for any assigned work will only be granted in **exceptional circumstances**.
- (iii) Students who are unable to comply with any of the mandatory requirements should make a written application for an extension to the due date for submission of assigned work or for waiver of a penalty, **in advance**, to the **Course Coordinator**, providing documentary evidence of the reasons of their circumstances.
All such applications must be made **before** the deadline and be accompanied by documentary evidence, eg a medical certificate, or counsellor's report that indicates the degree of impairment,

and for how long the student has been impaired. Please be sure to ask at the time of consultation for the degree of impairment to be stated in any certificate you provide to support your case.

- (iv) In the event of unusual or unforeseeable circumstances (e.g. serious illness, family bereavement or other exceptional events), that precludes an application in advance, students should make contact with the **Course Coordinator** as soon as possible, and make application for waiver of a penalty as soon as practicable.
- (v) Word limits should be adhered to, especially so when they provide a guide to limiting the student's coverage of a topic. **The penalty will be 5% of the grade for an assignment which is 10% over the word limit.**

Grading Guidelines

The following broad indicative characterisations of grade will apply in grading assignments and the exam:

A+	excellent performance in all respects at this level
A	excellent performance in almost all respects at this level
A-	excellent performance in many respects at this level
B+	very good, some aspects excellent
B, B-	good but not excellent performance at this level
C+, C	work satisfactory overall but inadequate in some respects
D	poor performance overall, some aspects adequate
E	well below the required standard
K	failure to achieve mandatory course requirements and have achieved at least an average "C" over all the assessment. Note this is a failing grade.

Policy on Remarking:

Every attempt is made to ensure that the marking is consistent across tutors and fair to students. Students may ask for their written work to be remarked. A different tutor will do the remarking and provide comments. The original marking sheet is removed to ensure the process is independent. If the mark differs by 10% or less the two marks are averaged. If it exceeds 10% then it is independently marked by a third marker and the average of the two closest marks is taken. Experience from previous years is that almost all remarks are within 10% and where there is a change in mark, half the assignments go up and half go down. Occasionally there is a significant shift in the mark.

Application for remarks must be made within 5 days after the marks are available. To apply for a remark, complete the request for re-examination of assessed work form stating which sections (criteria listed in the mark sheet) you wish re-examined. Write on why you think the mark does not, in your view, fairly reflect the quality of your work. Hand this with your assignment into the following place:-

- Pipitea Campus – the Reception Desk on Level 10 Rutherford House where your assignment will have the **time, date and signature** noted on the front cover by the person receiving it.

Allow up to 5 days for remarks to be completed.

Referencing

There are many different styles of referencing and the Faculty of Commerce & Administration at VUW has decided to make APA (American Psychological Association) referencing style the common standard across the Faculty. The Commerce and Central Libraries hold the APA Style Guide. You can also access the information from the online VUW library site (<http://www.vuw.ac.nz/library/research/reference/referencingguides.aspx>).

Communication

Information on course-related matters will be announced at class and posted on the **Blackboard** website at <http://blackboard.vuw.ac.nz/>. It will be crucial for you to regularly check Blackboard for messages, announcements and materials.

Email Contact

Students wishing to contact staff by email should adhere to the following instructions:

Include the **Course Code**, your **Name**, your **Student ID** and the **Topic** in the subject area of the email, eg

MGMT300_Smith_Pauline_3000223344_Ass1 Query

All students must use their VUW SCS email account and ID. Otherwise, email will be classified as Spam and will be dumped without being read. All emails with attachments will be dumped, unless requested by staff.

Faculty of Commerce and Administration Offices

Railway West Wing (RWW) - FCA Student and Academic Services Office

The Faculty's Student and Academic Services Office is located on the ground and first floors of the Railway West Wing. The ground floor counter is the first point of contact for general enquiries and FCA forms. Student Administration Advisers are available to discuss course status and give further advice about FCA qualifications. To check for opening hours call the Student and Academic Services Office on (04) 463 5376.

Easterfield (EA) - FCA/Education/Law Kelburn Office

The Kelburn Campus Office for the Faculties of Commerce and Administration, Education and Law is situated in the Easterfield Building on the ground floor (EA005). This counter is the first point of contact for :

- Duty tutors for student contact and advice.
- Information concerning administrative and academic matters.
- Forms for FCA Student and Academic Services (e.g. application for academic transcripts, requests for degree audit, COP requests).
- Examinations-related information during the examination period.

To check for opening hours call the Student and Academic Services Office on (04) 463 5376.

General University Policies and Statutes

Students should familiarise themselves with the University's policies and statutes, particularly the Assessment Statute, the Personal Courses of Study Statute, the Statute on Student Conduct and any statutes relating to the particular qualifications being studied; see the Victoria University Calendar or go to www.victoria.ac.nz/home/about/policy/students.aspx

For information on the following topics, go to the Faculty's website www.victoria.ac.nz/fca under Important Information for Students:

- Academic Grievances
- Student and Staff Conduct
- Meeting the Needs of Students with Impairments
- Student Support

Academic Integrity and Plagiarism

Academic integrity is about honesty – put simply it means *no cheating*. All members of the University community are responsible for upholding academic integrity, which means staff and students are expected to behave honestly, fairly and with respect for others at all times.

Plagiarism is a form of cheating which undermines academic integrity. The University defines plagiarism as follows:

The presentation of the work of another person or other persons as if it were one's own, whether intended or not. This includes published or unpublished work, material on the Internet and the work of other students or staff.

It is still plagiarism even if you re-structure the material or present it in your own style or words.

Note: including the work of others will not be considered plagiarism as long as the work is acknowledged by appropriate referencing.

Plagiarism is prohibited at Victoria and is not worth the risk. Any enrolled student found guilty of plagiarism will be subject to disciplinary procedures under the Statute on Student Conduct and may be penalised severely. Consequences of being found guilty of plagiarism can include:

- an oral or written warning
- cancellation of your mark for an assessment or a fail grade for the course
- suspension from the course or the University.

Find out more about plagiarism, and how to avoid it, on the University's website:

www.victoria.ac.nz/home/studying/plagiarism.html

Manaaki Pihipihinga Programme

Manaaki Pihipihinga is an academic mentoring programme for undergraduate Māori and Pacific students in the Faculties of Commerce and Administration, and Humanities and Social Sciences. Sessions are held at the Kelburn and Pipitea Campuses in the Mentoring Rooms, 14 Kelburn Parade (back courtyard), Room 109D, and Room 210, Level 2, Railway West Wing. There is also a Pacific Support Coordinator who assists Pacific students by linking them to the services and support they need while studying at Victoria. Another feature of the programme is a support network for Postgraduate students with links to Postgraduate workshops and activities around Campus.

For further information, or to register with the programme, email manaaki-pihipihinga-programme@vuw.ac.nz or phone (04) 463 6015. To contact the Pacific Support Coordinator, email pacific-support-coord@vuw.ac.nz or phone (04) 463 5842.

Annex A
MGMT 315 Systems Thinking and Modelling
Course Content & Schedule, 2008

Course Content

WEEK (1)	LECTURE	TOPIC	READINGS (2)
1	7 & 9 Jul	Course overview Hard & soft systems thinking Review of systems thinking concepts	ST, SD Ch 1-2
2	14 & 16 Jul	Problem structuring approaches Mapping approaches	ST, SD Ch 2
3	21 & 23 Jul	Causal loop modelling Group model building Systems Archetypes	ST,SD Ch 3, Cases 1-3.
4	28 & 30 Jul	Stock flow diagrams Intro to <i>ithink</i> & Vensim simulation modelling	ST, SD Ch 4
5	4 & 6 Aug	Supply chain modelling	ST, SD Case 4
6	11 & 13 Aug	Constructing dynamic models [Asst 1 due – Systems thinking essay]	ST, SD Ch 4
MID-TRIMESTER BREAK (4)			
7	1 & 3 Sep	Analysing dynamic models	ST, SD Ch 4
8	8 & 10 Sep	Technical aspects of simulation modelling	ST, SD Ch 4
9	15 & 17 Sep	Policy analysis & strategy development	ST, SD Case 5
10	22 & 24 Sep	Scenario planning & modelling [Asst 2 due - Dynamic modelling]	ST, SD Ch 5 Case 5
11	29 Sep & 1 Oct	Management flight simulators Systems thinking in learning organisations Discrete event simulation	ST, SD Ch 6 & 7
12	6 & 8 Oct	[Asst 3 - Group systems modelling presentations] Course review	

Notes:

- (1) Please bring the textbook & CD-Rom to each class and computer workshop from week 4 to week 11.
- (2) ST, SD refers to the textbook *Systems Thinking, System Dynamics*, by KE Maani and RY Cavana (2007). Additional readings each week will be available on blackboard or distributed in class.

Annex B



Victoria Management School

MGMT 315 Assignment Cover Sheet

Assignment No. _____

Name: _____ **Student ID:** _____

Tutorial Day: _____ **Tutorial Time:** _____

Date Due: _____ **Date Submitted:** _____

*I have read and understood the university policy on Academic Integrity and Plagiarism.
I declare this assignment is free from plagiarism.*

Signed: _____

Extension of the due date (*if applicable*)

Please attach a copy of the note authorising your extension.

Date extension applied for: _____

Extension granted until: _____

Extension granted by: _____