

Victoria Management School

MGMT 315
SYSTEMS THINKING AND MODELLING

Trimester Two 2009

COURSE OUTLINE

COURSE COORDINATOR

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ADMINISTRATOR

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Teaching Period: Monday 13 July to Friday 16 October 2009

End of Year Study Period: Monday 19 October to Monday 26 October 2009

Examination Period: Tuesday 27 October to Saturday 14 November 2009 (inclusive)

Note: 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.

Withdrawal dates: Information available via

<http://www.victoria.ac.nz/home/admisenrol/payments/withdrawalsrefunds.aspx>

Class Times and Room Numbers

Lecture: Monday: 8:30 – 9:20 (Government Building, GB LT 4)

Lecture: Friday: 8:30 – 10:20 (Rutherford House, RH LT 2)

Tutorials/computer workshops will start in week 3 and continue until week 12 (in a computer lab tba, Railway building, on Mondays, 9.30-10.20; 11.30-12.20pm; or 12.40-1.30pm, 1 hour for each tutorial). Procedures for signing up to tutorials will be provided in class.

This course has a 3-hour final closed book examination to be held in the examination period from 27 October to 14 November 2009.

Course Content

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 and approaches 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.

Course-related Student 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.

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

- Appreciate a range of systems thinking approaches to problem structuring;
- 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.

The assessment for this course comprises a systems thinking essay, a group systems modelling project presentation, a systems modelling project report, and a final examination. Each piece of assessment involves a combination of each objective outlined above.

Course Delivery

This course will comprise formal lectures supplemented by case discussion, student presentations and practical exercises. In addition there will be a computer lab workshop/tutorial each week. See schedule in Annex A for more details of the course.

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.

Group Work

While the course has a tradition of study group collaboration, there are important elements in the assessment process that are strictly individual. Collaboration on individual assignments is not allowed beyond general discussion as to how one might interpret the nature of the assignment question. Please do not work together to formulate a response and do not loan out your completed assignments. You will be expected and encouraged to work in groups on in-term cases and assignments; however reports must be individual submissions, except for the group work components.

Tutorial Signup Instructions

Tutorials will be organised, in class, in the 1st & 2nd weeks of the course, and they will start in week 3. As there is a maximum of 14 students per computer lab/tutorial class you are encouraged to sign up early. Placement into a tutorial will be strictly on a first-come-first-served basis. Confirmation of your tutorial group will be posted on Blackboard by 5pm Friday, 24 July 2009. If you have any serious problems about the allocations see the Course Coordinator ASAP.

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 collected editions, 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)
- *International Journal of Applied Systemic Studies* (IJASS)
- *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 3 to week 12. This will be available in the computer laboratory in the Railway Building (tba). 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

Assignment	Title	Weight	Date
1	Systems thinking essay	25%	Monday, 7 September
2	Group systems modelling presentation	10%	In class, Monday 12 October
3	Systems modelling project report	25%	Tuesday, 20 October
4	Final Examination	40%	27 Oct– 14 Nov 2009
	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: by 4pm, Monday, 7 September*

An essay topic will be provided in class and put on Blackboard also (2,000 words max).

2. Group Systems Modelling Presentation *Due: In class, Monday 12 October*

This will involve working in a small group of 2 to 4 students. This assignment will involve developing a system dynamics simulation model and presenting the results in class on Monday 12 October [a 20 minute presentation followed by 10 minutes of questions and answers]. Further details of the assignment will be presented in class, and on Blackboard.

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.

3. Systems Modelling Project Report *Due: by 4pm, Tuesday, 20 October*

This assignment will involve developing and analysing a dynamic simulation model, based on the group work for Assignment 2. This should be written up, individually, as an management report, 2,500 words max, plus appendices. Further details of the assignment will be presented in class, and on Blackboard.

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.

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 4 pm on the due date. Late assignments are to be handed in to the Victoria Management School Reception on the 10th floor of Rutherford House and the time handed in will be noted.

All Hand-Ins should have: a Cover Sheet stating your name, the course name, assignment name and number, a word count and due date, with a signed declaration regarding freedom from plagiarism (See Annex's B & C). Please put page numbers on each page, and use in-text referencing and include a list of references at the end.

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.

All assignments will be marked for writing - that is, correctness, clarity, organisation, referencing - as well as for meeting the specific assignment objectives.

Mandatory Course Requirements

To meet Mandatory Course Requirements, students are required to:

- a. Attend at least 6 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.

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 students 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 **Tutorial 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 clearly stating the degree of impairment, and the dates the illness or event prevented you from undertaking your academic studies. This can be applied retrospectively.

- (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 **Tutorial 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 (Annex D) 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.victoria.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.

For the following important information follow the links provided:

Academic Integrity and Plagiarism

<http://www.victoria.ac.nz/home/study/plagiarism.aspx>

General University Policies and Statutes

<http://www.victoria.ac.nz/home/about/policy/academic.aspx>

Faculty of Commerce and Administration Offices

<http://www.victoria.ac.nz/fca/studenthelp/Contactus.aspx>

Manaaki Pihipihinga Programme

http://www.victoria.ac.nz/st_services/mentoring/

ANNEX A
MGMT 315 Systems Thinking and Modelling
Course Content & Schedule, 2009

WEEK (1)	LECTURES	TOPICS	READINGS (2), (3)
1	13 & 17 Jul	Course overview Viable Systems Model <i>(Guest lecturer – Mr Raed Murad)</i>	
2	20 & 24 Jul	Review of systems thinking concepts Problem structuring approaches Multi-methodological issues	Ch 1 & 2
3	27 & 31 Jul	Causal loop modelling Group model building Systems archetypes	Ch 3, Cases 1-3.
4	3 & 7 Aug	Stock flow diagrams Intro to <i>ithink</i> & Vensim simulation modelling	Ch 4
5	10 & 14 Aug	Constructing dynamic models	Ch 4
6	17 & 21 Aug	Supply chain modelling	Case 4
<i>MID-TRIMESTER BREAK</i>			
7	7 & 11 Sep	Analysing dynamic models <i>[Asst 1 due – Systems thinking essay]</i>	Ch 4
8	14 & 18 Sep	Technical aspects of simulation modelling	Ch 4
9	21 & 25 Sep	Policy analysis & strategy development Group modelling project proposals	Cases 4 & 5
10	28 Sep & 2 Oct	Scenario planning & modelling	Ch 5 Case 5
11	5 & 9 Oct	Management flight simulators Systems thinking in learning organisations	Ch 6 & 7
12	12 & 16 Oct	<i>[Asst 2 - Group systems modelling presentations]</i> Course review	
	----- 20 Oct	<i>[Asst 3 due - Systems modelling report]</i>	

Notes:

- (1) Please bring the textbook & CD-Rom to each class and computer workshop each week.
- (2) The chapters & cases are from the course textbook *Systems Thinking, System Dynamics*, by KE Maani and RY Cavana (2007).
- (3) Additional readings each week will be available on blackboard or distributed in class.

ANNEX B

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI



Victoria Management School

MGMT 315 Individual Assignment Cover Sheet

Name: _____ Student ID: _____

Tutor's Name: _____ Tutorial Number: _____

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: _____

ANNEX C MGMT 315 GROUP Assignment Cover Sheet

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI



Victoria Management School

Name: _____ Student ID: _____

Name: _____ Student ID: _____

Name: _____ Student ID: _____

Name: _____ Student ID: _____

Lecturer's Name: _____

Date Due: _____ Date Submitted: _____

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

Signed: _____

Signed: _____

Signed: _____

Signed: _____

We agree to an equal share of the marks awarded Yes / No (Please circle)

If **No**, please attach a letter detailing your preferred split of marks, **signed by all group members**.

If an extension has been granted, please attach a copy of the note authorising your extension.

Date extension applied for: _____

Extension granted until: _____

Extension granted by: _____

ANNEX D

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI



Victoria Management School

MGMT 315

Request for re-examination of assessed work

	Assessment affected <i>e.g. Individual Assignment, In-class Test</i>	
Student ID	Name <i>As it appears in your enrolment</i>	Tutorial No/Tutor's name
Contact Details	<i>Phone</i> _____ <i>Email</i> _____	

Specify which section (criteria specified in the mark sheet) you wish to be re-examined

Note: requests to re-examine "all" criteria will not be considered.

Clearly state why you believe each of these sections should be re-examined:

Note: "I think it is worth more," is insufficient.

In requesting a re-examination of my submitted work, I understand that the result may be an increase OR decrease in the mark obtained.

.....
Signature Date