

School of Management

MGMT 315 SYSTEMS MODELLING

Trimester 2, 2013

COURSE OUTLINE

COURSE COORDINATOR

A/Prof Bob Cavana

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ADMINISTRATOR

Misa Ito

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Trimester Dates

Teaching Period: Monday 15 July – Friday 18 October

Study Period: Monday 21 October – Thursday 24 October

Examination Period: Friday 25 October – Saturday 16 November (inclusive)

Withdrawal from Course

1. Your fees will be refunded if you withdraw from this course on or before Friday 26 July 2013.
2. The standard last date for withdrawal from this course is Friday 27 September. After this date, students forced to withdraw by circumstances beyond their control must apply for permission on an *'Application for Associate Dean's Permission to Withdraw Late'* including supporting documentation. The application form is available from either of the Faculty's Student Customer Service Desks.

Class Times and Room Numbers

Lectures: Monday, 9.30 – 11.20am, Government Building, Room GBLT4
Note: There is no class on Monday 22 July, and two extra computer workshops have been scheduled.

Computer workshops One hour per week from weeks 3 – 11, in the Railway Building computer lab RWW 402:

Tut A	Tues	9:30 – 10:20 am
Tut B	Tues	10:30 – 11:20 am
Tut C	Tues	11:30 – 12:20 pm
Tut D	Tues	13:40 – 14:30 pm
Tut E	Tues	14:40 – 15:30 pm

Prescription

An exploration of ways of using systems thinking and modelling approaches to understand and improve complex organisational and managed systems; an examination of the dynamic behaviour of systems and the development of policies and strategies emphasising the use of state of the art systems modelling software.

Course Content

The course 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 and influences.

The main focus of this course is to provide an overview of the systems modelling approach using the system dynamics methodology for managerial decision making. This ‘systems’ approach involves observing and analysing any complex organisation, system 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 involved in managing change and resources, and in situations where risk and uncertainty unfold over time.

Course Learning Objectives

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

- LO1: Appreciate a range of systems thinking approaches to problem structuring;
- LO2: Understand the system dynamics approach to systems thinking and strategic analysis;
- LO3: Construct policy / strategy models using the *iThink* and/or **Vensim** simulation modelling packages;
- LO4: Critically evaluate & utilise dynamic models for policy analysis, strategy evaluation and scenario analysis; and
- LO5: Develop simplified management flight simulators for organisational learning.

The assessment for this course comprises a systems thinking assignment (individual), a systems modelling project presentation and report (group), a personal reflections essay (individual) and a final examination (individual). Each piece of assessment involves a combination of each learning 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 (from week 3 to week 11). See schedule in Annex A for more details of the course.

Expected Workload

A total of 150 hours of work is expected from students in this course. This consists of 33 hours of classes, eight hours per week outside classes during teaching weeks spent reading, studying and writing assignments, and a further 21 hours revising during mid-trimester break and study week.

Group Work

There is group work as part of this course. It is anticipated that this work will involve one study group meeting each week of 2-4 hours duration (from weeks 7 – 11). Further details regarding group work follow under ‘Assessment Requirements’.

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.

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:

Coyle, R.G. 1996. *System Dynamics Modelling: A Practical Approach*. London: Chapman & Hall.

Ford, A. 2009. *Modeling the Environment*. Washington, DC: Island Press.

Forrester, J.W. 1961. *Industrial Dynamics*. Cambridge, MA: The MIT Press. Reprinted by Pegasus Communications, Waltham, MA.

Morecroft, J. D. W. 2007. *Strategic Modeling and Business Dynamics: a Feedback Systems Approach*. Chichester: Wiley.

Richardson, G.P. 1991/1999. *Feedback Thought in Social Science and Systems Theory*. Philadelphia: University of Pennsylvania Press; reprinted by Pegasus Communications, Waltham, MA.

- Richardson, G.P. and A.L. Pugh III. 1981. *Introduction to System Dynamics Modeling with DYNAMO*. Cambridge, MA: The MIT Press. Reprinted by Pegasus Communications, Waltham, MA.
- Roberts, E.B. 1978, ed. *Managerial Applications of System Dynamics*. Cambridge, MA: The MIT Press. Reprinted by Pegasus Communications, Waltham, MA.
- Senge, P.M. *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York: Doubleday/Currency.
- Sterman, J.D. 2000. *Business Dynamics: Systems Thinking and Modeling for a Complex World*. Boston: Irwin McGraw-Hill.
- Vennix, J. A. M. 1996. *Group Model Building: Facilitating Team Learning Using System Dynamics*. Chichester: Wiley.

Materials and Equipment

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, R.Y. & Hutchinson, W.E. (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)

These journals can be accessed directly through the Library's database of electronic journals.

Previous International System Dynamics Conference proceedings are available on line from the System Dynamics Society web site:

http://conference.systemdynamics.org/past_conferences/

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 (RWW 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

Assessment	Description (1)	Weight	Date
Assignment 1	Individual Systems Thinking Assignment (max 2,000 words) <i>[Assesses LO 1 & 2]</i>	25%	12 noon Weds 21 st Aug
Assignment 2	Group systems modelling project report (two to four/group) on a selected topic (a) Short group presentation (15 mins) <i>[Assesses LO 3-5]</i> (b) Individual management report (max 2,500 words) <i>[Assesses LO 2-5]</i>	10% 15%	In class or tutorial – Mon 7 or Tues 8 Oct (week 11) 12 noon Tues 15th Oct (individual report)
Final Examination	A 3 hour closed book exam <i>[Assesses LO 1-4]</i>	50%	During examination period: Fri 25 Oct – Sat 16 Nov
	TOTAL	100%	

(1) Further details of the assignments will be provided in class and made available on Blackboard.

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 Assignment*

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

2. *Group Systems Modelling Project*

This will involve working in a small group of 2 to 4 students. This assignment will involve developing a small system dynamics simulation model to assist with the examination of a relevant managerial issue or policy. This project will involve 2 components:

- (a) Group oral presentation (15 mins)
- (b) Individual management report (max 2,500 words)

Note, all members of the group are expected to contribute to the group oral presentation. Paper and electronic versions of the group presentation 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.

2a. Group oral presentation (10 marks)

Your group will present their results in class or the computer lab in Week 11 [a 20 minute presentation followed by 5 minutes of questions and answers]. The oral presentation can be in the form of a 'progress report' as each group member will produce their final management report the following week (ie Week 12). Further details of the assignment will be presented in class, and on Blackboard.

2b. Individual management report (15 marks)

The assignment outlined should be written up by each individual as a management report, 2,500 words max, plus appendices. Further details of the assignment will be presented in class, and on Blackboard.

3. Final Exam

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

Examination Period: Friday 25 October to Saturday 16 November 2013 (inclusive).

Handing in Assignments

Your completed assignments should be put into the course **Assignment Box 23** on the Mezzanine floor, Rutherford House by 12 noon on the due date. Late assignments are to be handed in to the School of Management Administrator in RH 1022 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 also 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. Submit all assignments within the allowed time frame; and
- b. To obtain at least 40 per cent (i.e. 20 marks out of 50) of the final examination marks available.

Students who fail to satisfy the mandatory requirement 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 requirement has been satisfied or not.

Notice of Failure to meet Mandatory Course Requirements will be posted on Blackboard.

Penalties

Late assignments are to be handed in at **Level 10 Reception, RH 1022**, during Reception Desk hours, **9am till 5pm Monday to Friday during term time**. An Administrator or Duty Receptionist will stamp the assignment with the date and time. Late assignments that do not have **the time and date and signed by** the Administrator for the course or Duty Receptionist, will incur late penalties from the time the Administrator receives it. Assignments left on the Reception Counter, or slid under the door of the Reception office will also incur penalties from the time and date they are recovered. Note that there is no provision to accept assignments on weekends or public holidays.

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 **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, e.g. 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 **Course Coordinator** as soon as possible, and make application for waiver of a penalty as soon as practicable.
- (v) The ability to write in an economical style is a skill that is valued in both academic and business settings and therefore word limits should be strictly adhered to. +/- 10% is acceptable. Beyond that, **a penalty may be applied.**

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.

For marks: 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.

For grades: If the grade differs by one grade then the highest grade is taken. If the grade differs by more than one grade then the assignment is marked by a third marker and the average grade is taken.

Experience from previous years is that almost all remarks are within 10% or one grade and where there is a change in mark or grade, half the assignments go up and half go down. Occasionally there is a significant shift in the mark or grade. Application for remarks must be made within 5 days after the assignments 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 a minimum of 5 days for remarks to be completed.

Referencing

There are many different styles of referencing and the Faculty of Commerce 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>).

Class Representative

A class representative will be elected in the first class, and that person's name and contact details will be available to VUWSA, the Course Coordinator and the class. The class representative provides a communication channel to liaise with the Course Coordinator on behalf of students.

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, e.g. MGMT320_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.

Quality Control

Your assessed work may also be used for quality assurance purposes, such as to assess the level of achievement of learning objectives as required for accreditation and audit purposes. The findings may be used to inform changes aimed at improving the quality of FCA programmes. All material used for such processes will be treated as confidential, and the outcome will not affect your grade for the course.

Use of Turnitin

Student work provided for assessment in this course may be checked for academic integrity by the electronic search engine <http://www.turnitin.com>. Turnitin is an online plagiarism prevention tool which compares submitted work with a very large database of existing material. At the discretion of the Head of School, handwritten work may be copy-typed by the School and subject to checking by Turnitin, in addition to electronic assignment / project submissions. Turnitin will retain a copy of submitted materials on behalf of the University for detection of future plagiarism, but access to the full text of submissions will not be made available to any other party.

General University Policies and Statutes

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

Find key dates, explanations of grades and other useful information at www.victoria.ac.nz/home/study

Find out about academic progress and restricted enrolment at

<http://www.victoria.ac.nz/home/study/academic-progress.aspx>

The University's statutes and policies are available at www.victoria.ac.nz/home/about/policy, except qualification statutes, which are available via the Calendar webpage at

<http://www.victoria.ac.nz/home/study/calendar.aspx> (See Section C).

Further information about the University's academic processes can be found on the website of the Assistant Vice-Chancellor (Academic) at

www.victoria.ac.nz/home/about_victoria/avcacademic/default.aspx

AVC (Academic) Website: information including: Conduct, Academic Grievances, Students with Impairments, Student Support

http://www.victoria.ac.nz/home/about_victoria/avcacademic/Publications.aspx

Faculty of Commerce Offices

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

Manaaki Pihipihinga Programme

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

ANNEX A
MGMT 315 Systems Modelling
Course Content & Schedule, 2013

WEEK (1)	LECTURES	TOPICS	READINGS (2), (3)	COMPUTER LAB
1	15 Jul	Course overview Review of systems thinking concepts	Ch 1 & 2	
2	22 Jul	No class		
3	29 Jul	Causal loop modelling Group model building	Ch 3, Cases 1&3	Lab 1
4	5 Aug	Stock flow diagrams Intro to <i>ithink</i> & Vensim simulation modelling	Ch 4	Lab 2
5	12 Aug	Constructing dynamic models	Ch 4	Lab 3
6	19 Aug	Supply chain modelling <i>[Asst 1 due – Systems thinking]</i>	Case 4	Lab 4
MID-TRIMESTER BREAK				
7	9 Sep	Analysing dynamic models	Ch 4	Lab 5
8	16 Sep	Policy analysis & strategy development	Case 5	Lab 6
9	23 Sep	Scenario planning & modelling	Ch 5 Case 5	Lab 7
10	30 Sep	Management flight simulators Systems thinking in learning organisations	Ch 6 & 7	Lab 8
11	7 Oct	<i>[Asst 2a due Mon 7 or Tues 8 Oct - Group systems modelling presentations]</i>		Lab 9
12	14 Oct	Course review <i>[Asst 2b due 15 Oct – Individual management 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



School of Management

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



School of Management

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: _____