ANSC*6030 Modelling Metabolic Processes

After completion of the course, you should be able to:

knowledgeably discuss simulation modelling of any nature
build and test complex mathematical models
use the computer language Python
understand the processes of numerical and analytical integration
think of biological problems in terms of mathematical constructs
more fully understand your area of experimental research, no matter the subject

Following is the outline of the course. The emphasis is really on teaching you to be able to build and test complex models of the systems you will study in your future research careers. You will build a repertoire of modelling techniques from weekly assignments. Lectures will be used to discuss the results of the previous assignment(s) and introduce the methods for the subsequent piece of work. I will lead the discussion and lecture on modelling methodology. Each of you will obtain independence in model construction and analysis with a term project to develop, reproduce, test or use a model related to a research area of your interest. Once the basics of modelling have been taught, we will examine different types of more advanced models considering such phenomena as distribution in space and chaos. The orientation of the models selected is towards an improvement in understanding of biological systems currently being studied by experimentation. A previous knowledge of animal biochemistry and physiology is useful.

Assignments are to be submitted in CourseLink Dropbox. A preliminary draft of the weekly assignment is due by midnight each friday and the final write-up is due at the beginning of the following tuesday's class. The write-up should be in 12-pt font, with only salient figures and tables, title and date, and a max of 4 pages. It should include the original question along with the answer and be clear enough to make sense to your boss, your parents, or a fellow student in Tazmania.

marks:	weekly assignments	55
	participation in discussion	15
	term project (written and oral presentation)	30

	subject	write-up due
1	introduction to modelling philosophies	sep 19
2	the 1-compartment model	sep 26
3	the 2-compartment model	oct 3
4	reference state parametization	oct 17
5	isotope dilution kinetics	oct 24
6	behaviour analysis	oct 31
7	enzyme kinetics	nov 7
8	goodness of fit and sensitivity analysis	nov 14
9	distributed-in-space modelling	n/a
10	chaos modelling	n/a
11	project presentations	tbd