

Sultan Qaboos University Course outline

Program:natural resource economics

Course Code	NREC 3302	
Course Title	Quantitative Management Decision M	laking
Credits	3 CH, 12 CP, 6 ECTS	
Pre-requisite	CAMS 2003, NREC3100, NREC3301	
Co-requisite	N/A	
Equivalent	N/A	
Course Category	University Requirement	University Elective
	College Requirement	College Elective
	🛛 Department Requirement	Department Elective
	Specialization Requirement	Specialization Elective
	Other (specify):	
Course Owner	College: CAMS	Department:NRE
Course Type	Lecture	🖂 Lecture/Lab
	Lecture/Seminar	🗌 Lecture/Studio
	Lecture/Tutorial	🗌 Lecture/Lab/Seminar
	🗌 Tutorial	🗌 Lab or Practical
	🗌 Field Work	🗌 Field Placement
	🗌 Studio	🗌 Seminar
	🗌 Internship	Workshop
	🗌 English Language Skill	Project
Language of	English	

Course Description

The course imparts knowledge and mostly skills on the use of Operations Research to guide agricultural business and policy decision-making. The course is conducted in the computer laboratory where students develop and solve mathematical models on business and policy decision making. The course imparts skills on conceptualizing business decisions, formulating equations as required for quantitative modeling, solve mathematical models using computer software and interpret analytical output to decision makers, such as farm managers and policy decision makers.

The main topics covered are as follows.

 Introduction to agribusiness. The specific nature of agribusiness: its dependence on biological systems, its inherent risks based on bio-weather-market phenomena is emphasized.
Decision making as function of business management. Decision making is highlighted as major skill required by agribusiness managers and policy makers. The role quantitative modeling could play in facilitating decision making will be appreciated.

3. The business decision-making model. Business decision making process would be conceptualized based on economic theory.

4. Operations Research as an analytical tool in decision-making. Principles of linear programing will be learnt.

5. Conceptualizing decision problems as Linear Optimization problem. A simple example of a green hose production decision making model would develop, solved and discussed.

6. Introduction to Linear Programming computer software. The use of Excel Solver would be practiced.

7. Solving basic LP problems and interpreting results. Maximizing and minimizing models.

8. Solving varied business decision models of farm and agricultural policy decision making.

An Omani farm would be modeled, step by step, of introducing decision variables and constraints. Oman's farming systems data will be used.

9. Sensitivity analysis of variables would be discussed at farm business and policy decision applications.

10. Risk modeling through MOTAD programming will be learnt.

11. Advanced variants of LP: Goal, Target, Multi period, Multiple criteria, Game theoretic modeling etc. would be discussed.

12. Published applications using operations techniques in the agricultural sector of Oman would be presented and discussed.

Teaching/Learning Strategies

Computer lab based. Each brief lecture will be followed up with hands on practice on modeling decision problems, solving and interpreting. Exercises in the form of case studies and would be given in class. Students are allowed to work as groups. Students will be required to do oral presentations on interpretations of results of exercises.

Students would be provided homework to strengthen their abilities to independently conceptualize, formulate, solve and interpret decision problems in business and policy making. Writing professional interpretations in non-technical language will be done. Students would visit few farms in Oman to understand farming systems in Oman. The class exercises would be mostly based on Oman's farming system data.

Course notes will not be provided to encourage students to take their own notes, particularly in formulating quantitative models.

It is absolutely essential that students self-learn the general use of the Excel spread sheet package. Students should bring a USB to class. Students may bring personal computers to class. All exercises must be methodically stored so that recall is easy.

Please try to attend to all classes. Since it is a course designed to impart skills, attending lab based

classes and gaining hands on learning is extremely vital. Grasping the conceptual and modeling skills from the very beginning would ease learning. Learning skills requires practice; hence solve problems as much as possible by yourself, whilst group discussions are encouraged.

Evaluation Methods

The course will be assessed based on a Midterm exam, Unannounced quizzes, Homework (assignments/ presentations), and End term exam (comprehensive).

The content of the midterm exam will be the content covered up to the last lecture before the midterm exam date.

Please submit homework assignments, within 2 weeks after receiving the assignment. Neatness/ clarity of presentation of assignments will be appreciated. Marks (10% of the total mark of each assignment) for each delayed day of submission of assignments. The number of unannounced quizzes and homework will be adaptively decided. Each homework and quiz will be equally weighted.

Type of Exams:

Most exams will be to formulate and solve problems using computer software and to interpret results (descriptively). However the final exam may be to formulate and interpret management decision problems. Clarifications about the exams should be done only in class in presence of all students. The result of the midterm exam could be discussed within a week of releasing results. The marking scheme is as follows.

Midterm exam	30%
quizzes	15%
Homework (assignments/ presentations)	10%
Class participation	5%
End term (comprehensive)	40%

Required Course Core Material

Monahan, George E (2007) Management Decision Making: Spreadsheet Modeling, Analysis, and Applications, Cambridge University Press.

Research papers that relate to Oman shall be distributed.

There are many general textbooks available; on topics of Business Decision Making, Operations Research, Mathematical Modeling, and Quantitative Decision Making, in both the Main and Commerce libraries.

Matching Course Objectives with Program Outcomes and SQU Graduate Attributes SQU Graduate Attributes

SQU graduates should be able to:	SQU graduates possess	SQU graduates should
apply the knowledge and skills	interpersonal communication skills	relish good citizenship
relevant to the specialization	and alignment with culture of	qualities, conscious of
communicate effectively and use	international labour market to	their national identity
information and communication	assist them in practical life and in	and socially responsible,
technologies	living successfully	engage in community
critically analyze complex	skills and motivation for	affairs and mindful of
information and present it in	independent learning and	contemporary issues.
simple legible manner	engagement in lifelong learning	
	and research	
	work ethics and positive values,	
	and intellectual independence and	
	autonomy	
	teamwork skills and display	
	potential leadership qualities	

#	Course Learning Objective	Relevant Program Outcome(s)	Applicable Attribute(s)
	1. Conceptualize (draw a conceptual model and explain it) of a business decision, based on information gathered/ provided as problems or case studies;	The ability to identify, formulate, economic and business problems The ability to think critically and address problems especially in a team context Demonstrate knowledge	
		of contemporary issues	
	2. Write the equations representing the conceptual model as a quantitative model;	The be quantitatively analytical.	
	3. Solve the quantitative model using computer software and	Demonstrate ability to use computer software to analyse problems on theory and analytical methods in natural resource economics and business	
	4. Interpret (explain verbally and written form) the solution.	The ability to communicate orally and in writing	

Student Responsibilities

It is the student's responsibility to know and comply with all University Academic Regulations relevant to participation in this course. These regulations specifically include attendance requirement and students` academic code of conduct.

For attendance, it is the student's responsibility to be punctual and to attend all classes. Students are expected to perform their work with honesty and avoid any academic misconduct, which is defined as the use of any dishonest or deceitful means to gain some academic advantage or benefit. This can take many forms, including but not limited to, the following: copying, plagiarism, collusion and forging documents. For full details please refer to the Undergraduate Academic Regulations and to the Student Academic Misconduct Policy.

Additionally, this course requires that you:

Students should use a pen to answer exams. Students should bring a calculator. Students should not use mobile phones during exams. Time should be checked on a wrist watch. Students should not ask any questions from the exam invigilators during the exam. The internet should not be used during exams. Any clarification regarding the marking of an exam paper must be done within a week of receipt of the assessment.

Course INFORMATION

Course Code	NREC 3302	Course Title	Quantitative Management Decision
			Making
Year/Semester	2020 Spring	Section	10
Day, Time, and	Sundays and Tues	days 12:00 to 1:	20
Place		-	

Course	Ibtisam Al Abri		
Office Location		Office Hours	10:00 am to 12:00 Am Sundays and
			Tuesdays
Office Tel. Ext.	6563	Email	ialabri@squ.edu.om

Tentative Schedule

Wee k	Lecture/Topic	Material to be covered	Assignme nt/Exam	Weigh t (%)
1	Introduction to Modeling and agribusiness.			
2	Decision making as function of business management. The business decision-making model.			
3	Operations Research as an analytical tool in decision-making. Conceptualizing decision problems as Linear Optimization problem: Linear Programming.			
4	Introduction to Linear Programming computer software: Excel Solver. Solving basic LP problems and interpreting results. Maximizing and minimizing models.			
5	Solving varied business decision models of farm and agricultural policy decision making.			
6	Sensitivity analysis			
7	Farming systems modelling			
8	Farming systems modelling			
9	Farming systems modelling			
10	Farming systems modelling			
11	Farming systems modelling			
12	Farming systems modelling			
13	Risk modeling. MOTAD			
14	Discussion on advanced variants of LP: Goal, Target, Multi period, Multiple criteria, Game theoretic modeling etc.			
15	Discussion on research conducted in			

		Oman.			
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appendix A: Instructors of multiple sections

Section	Instructor	Day, Time, and Location	Office Location and Extension	Email	Office Hours

appendix B: ADDITIONAL INFORMATION

Additional information on group exercise will be provided