

Course Syllabus

offered by Department of Management Sciences
with effect from Semester A 2022 / 2023

Part I Course Overview

Course Title:	Stochastic Operations Research
Course Code:	MS8945
Course Duration:	One Semester
Credit Units:	3
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: (Course Code and Title)	MS8944 Introduction to Probability Models
Precursors: (Course Code and Title)	Nil
Equivalent Courses: (Course Code and Title)	Nil
Exclusive Courses: (Course Code and Title)	Nil

Part II Course Details

1. Abstract

This course is designed for PhD students in the field of management sciences. It will introduce fundamental stochastic models used in the management science field, including decision making under stochastic environments. Sequential decision-making via dynamic programming. Applications in inventory control, pricing strategy and finance. Special emphasis on the effects of uncertainty in operational decision making and to the interplay between high-level financial objectives and low-level operational guidelines. This course is designed to introduce fundamental models and technical tools of solving these models to OR/OM PhD students.

2. Course Intended Learning Outcomes (CILOs)

No.	CILOs	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Understand the basic concepts of stochastic processes		✓	✓	
2.	Understand the modelling issues in operations research		✓	✓	
3.	Able to model and solve problems in the management science field			✓	✓
		100%			

A1: *Attitude*

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: *Ability*

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
Interactive lectures	Topics will be covered during lectures	✓	✓	✓	3 hours/week
Individual Assignments	6-7 individual assignments for the course	✓	✓	✓	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.			Weighting*	Remarks
	1	2	3		
Continuous Assessment: <u>40</u> %					
Assignments	✓	✓	✓		
Examination: <u>60</u> % (duration: 3 hours, if applicable)					
				100%	

5. Assessment Rubrics

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Assignments		Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.	Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.	Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited, or irrelevant use of literature.
2. Examination		Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.	Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.	Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited, or irrelevant use of literature.

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignments		Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.	Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with	Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material.	Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited, or irrelevant use of literature.

			literature.			
2. Examination		Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.	Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.	Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material.	Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited, or irrelevant use of literature.

Part III Other Information

1. Keyword Syllabus

Review of Probability Theory, Renewal Theory, Martingales, Random Walks, Brownian Motions, Optimal Stopping Problems and Dynamic Programming

2. Reading List

2.1 Compulsory Readings

1.	Sheldon M. Ross. 1996. Stochastic Processes, Second Edition, John Wiley & Sons
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2.2 Additional Readings

Nil.

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