

DEPARTMENT OF STATISTICS
FORMAN CHRISTIAN COLLEGE, LAHORE
(A Chartered University)
Semester: Spring 2022

Instructor Information:

Dr. Nadia Mushtaq, Assistant Professor Office No: S -418
Office Hours/ Students meeting: 10:00 to 11:00 (Monday, Wednesday, Friday)
Email: nadiamushtaq@fccollege.edu.pk

Course Information:

Title: Operation Research Code: Stat-313 or Math-304 Credits: 3
Prerequisite: Stat-102 or Math-103 Section: A
Class Timings: Monday, Wednesday, Friday (8:00 to 8:50 in Room: S – 420)

Course Contents:

Introduction to operations research, graphical solution, Simplex method, two phase method, M-method, sensitivity analysis, primal dual relationship, dual simplex method, transportation model, assignment models, network models, queuing theory.

Recommended Books:

1. Introduction to Operations Research, by F.S. Hillier and G.J. Lieberman, seventh edition, McGraw Hill, 2000.
2. Operations Research, by Taha, H.A. 7th edition.
3. Operation research by Gupta, P. K. & Hira, D. S. New Delhi.

Resources:

- Lecture notes, exercises, and their solutions and answers will be uploaded on Moodle.

Mode of teaching:

- In case of blended mode, students with even and odd roll numbers will rotate weekly as per academic calendar provided by university. There will be on-campus lectures accompanied with video lectures & notes on Moodle/ regular Zoom sessions.
- In case of in-person (on campus) classes, there will be in class lectures.
- In case of fully online teaching, regular Zoom classes will be conducted along with recorded video lectures and lecture notes uploaded on Moodle.
- Note: Assessments' criteria will be same for all modes of teaching. Assignments will be conducted on Moodle for every mode. Quizzes, mid-term exam & final exam will be conducted on campus in case of in-person & blended classes. Otherwise for

online mode, all assessments will be conducted online on Moodle.

Course Objectives:

The objectives of this course to introduce students to use quantitative methods and techniques for effective decisions making; model formulation and applications that are used in solving business decision problems.

And at the end of this course students should be able to:

- Formulate a real life situation into a mathematical model,
- Develop an optimal solution for the problem using appropriate algorithm
- Solve Transportation Models and Assignment Models.

Course Evaluation:

Course grading is based on the following criteria:

- At least 2 Quizzes (worth 10% of the final grade)
- At least 2 Assignments (worth 10% of the final grade)
- 1 Case Study/Project (worth 10% of the final grade)
- Midterm exam (worth 25% of the final grade)
- Final exam (worth 40% of the final grade)
- Class Participation (worth 05% of the final grade)

Note:

- Late submission of the assignments will result in deduction of marks.
- Students are expected to do their own work on all assignments.
- Academic dishonesty and / or plagiarism will result in the assignment of ‘F’ for the course grade and other university sanctions as they may apply.

Class Attendance and missed-exam. Policy:

Students are required to attend all the class sessions in the course. Irregular are far likely to meet the requirements of the course. Frequent absentees from classes may cause zero credit from class participation marks. Student shall not be permitted to sit in the final examination in case of attendance below 67%. Students are advised strictly to not to miss any exam under any circumstances. A makeup exam will be allowed only under very special circumstances and subject to the approval of the head of the department.

Grading Legend:

Grades	Quality Pts	Numerical Value	Meanings
A	4.00	93-100	Superior
A-	3.70	90-92	
B+	3.30	87-89	Good
B	3.00	83-86	
B-	2.70	80-82	
C+	2.30	77-79	Satisfactory
C	2.00	73-76	

C-	1.70	70-72	
D+	1.30	67-69	
D	1.00	60-66	Passing
F	0.00	59 or below	Fail

Course contents, Learning Material & Activities Schedule

WEEK	Title/ Topic	Instructional Material	Assessment
1	Introduction to Operations Research (OR) Operations Research	PowerPoint Presentations, worksheet, activities and Reading Material	
	definition and origin. Essential features of the OR approach.		
2	Introduction to Foundation mathematics and statistics Linear		
	Programming (LP), LP definition, Linearity requirement		
3	Expressing LP problems, Limitations or constraints,		Quiz 1
	Maximization Then Minimization problems.		
4	Linear Programming – Graphical Solutions,		
	Graphical LP Maximization solution.		Assignment 1
5	Graphical LP Minimization solution, Introduction,		
	Simplex method definition, formulating the Simplex model.		
6	Linear Programming – Simplex Method for Maximizing.		
		Quiz 2	
	Simplex maximizing example for		

7	similar limitations.		
8	Example containing mixed constraints, Minimization example for similar limitations.		
Mid - Term			
9	Example containing mixed limitations, Duality Theory, The Primal Vs Dual Solutions.	PowerPoint Presentations, worksheet, activities and Reading Material	Assignment 2
10	Two-phase and M- method		
11	Transportation Models		Quiz 3
12	Assignment Models: Basic Assumptions Solution Methods:-Different Combinations Method, Short-Cut Method (Hungarian Method)		Assignment 3
13	Network Models		
			Quiz 4
14	Queuing Theory		
15	Project		
16	Final Exam		