

**Parvatibai Chowgule College of Arts & Science
(Autonomous)
Margao – Goa**

MINUTES OF MEETING OF THE BOARD OF STUDIES IN MATHEMATICS

HELD ON 7th MAY 2022

A meeting of this BOS was convened on 7th May 2022 via online mode through Google Meet. Since the number of members present represented the Quorum, the BOS began its proceedings.

Minutes are presented in the format.

Members present:

1. Anand Masur
2. Danielle Monteiro
3. Chitra Mekoth
4. Darshana Umarye
5. MeetalRaikar
6. Dr. Stefan Dais Barreto
7. Dr. Rajeev Sapre

Members Absent with Intimation

1. Dr.Milind Kulkarni

Proceedings

The Chairperson welcomed the members of the Board of Studies. The Chairperson introduced and explained the agenda for the meeting and Board transacted the following business:

Agenda Items:

1. Approve syllabus of New Course Operations Research II.
2. Approve modifications to Course structure.
3. Any other matter with permission of the chair.

PART A:

The following resolutions were passed by the members of the BOS:

1. Course restructure was approved.
2. The syllabus of Operations Research I and II were approved.
3. A course on Data Science was suggested by the BOS members.

The syllabus and course structure are attached

	Core	Core	Elective-I	Elective-II	Elective-III	Elective-IV	Elective V
Sem -I	Basic Algebra	Basic Real Analysis	-----	-----	-----	-----	
Sem -II	Coordinate Geometry	Mathematical Analysis-I	-----	-----	-----	-----	
Sem -III		Mathematical Analysis-II	Abstract Algebra-I	Number Theory-I	Combinatorics	Numerical Methods	
Sem -IV		Linear Algebra	Advanced Analysis	Number Theory-II	Operations Research I	Probability Theory	
Sem -V		Functions of Several Variables	Metric Spaces	Cryptography	Graph Theory	Logic and Boolean Algebra	Operations Research II
Sem -VI		Vector Analysis	Complex Analysis	Abstract Algebra-II	Computational Linear Algebra	Computers for Mathematics	Pedagogy of Mathematics

Semester	Skill Enhancement Course
Sem III	Differential Equations- I
Sem IV	Differential Equations- II

Semester	Core (Minor)
I	Basic Algebra
II	Coordinate Geometry
III	Basic Real Analysis/ Numerical Methods
IV	Mathematical Analysis I/ Linear Algebra/Operations Research-I
V	Graph Theory / Numerical Methods/Operations Research-II
VI	Probability Theory/ Vector Analysis

Course Title: Operation Research -I

Course Code: MAT-IV. E -7

Marks: 100

Credits: 4

Course Objectives: This course aims to teach linear programming

Learning outcome: Students will be able to solve linear programming problems

1. Linear Programming Problem (5 lectures)

Definition of standard form, formulation of LPP, convex set and their properties, extreme points. Graphical solution of LPP (Only two variables).

2. Simplex Method: (20 lectures)

Theorems related to simplex method and problems. Cases pertaining to existence of multiple solutions, unbounded and no feasible solution. Big M method and two phase Simplex method

3. Duality in LPP: (10 lectures)

General Primal-Dual Pair, Formulating Dual problem, Primal-dual pair in matrix Form, Duality theorems, Duality and simplex Method.

4. Post Optimal analysis: (10 lectures)

Change in Objective function/constraint/activity coefficients, Structural changes.

5. Transportation Problems: (8 lectures)

Mathematical formulation, condition for existence of feasible solution, rank of transportation matrix, Initial basic feasible solution by (i) NWC method (ii) Matrix-minima and (iii) VAM, Modi's method to find an optimal solution, balanced and unbalanced transportation problems.

6. Assignment Problems: (7 lectures)

Mathematical formulation, Hungarian methods to solve assignment problems, balanced & unbalanced assignments problems

References:

1. Kanti Swarup, Gupta P.K, Man Mohan, Operations research, S Chand
2. Loomba, Linear Programming
3. Taha H, Operation Research, Pearson
4. Vajda, Game Theory

Course Title: Operation Research -II

Course Code: MAT-V. E-13

Marks: 100

Credits: 4

Prerequisites: OR-I ,Probability Theory

Course Objectives: This course aims to teach more methods of OR.

Learning outcome: Students will be able to use more methods to solve OR problems.

1. Game Theory: (15 lectures)

Optimal Solution of Two-Person Zero-Sum Games, Solution of Mixed Strategy Games, Graphical solution of $2 \times n$ and $2 \times m$ Games, arithmetic method for $n \times n$ games, general solution of $m \times n$ games, Converting Game theory into LPP.

2. Inventory Control: (15 lectures)

Types, Reasons, Objective and the Factors affecting inventory control, Concept of EOQ, deterministic Inventory problem with/without shortage, Price Breaks, Multi-item deterministic problem. Uncertain demands, one period problem with / without set-up cost.

3. Queueing Theory: (15 lectures)

Elements of Queueing system, Probability Distribution in queuing system, Classification of queuing system, queuing models, Transient and Steady states, Poisson/ non-Poisson queuing systems, Cost model in queuing.

4.Simulation: (15 lectures)

Need of simulation, processes of simulation, simulation models, Event type of simulation, generation of random numbers, Monte-Carlo simulation, Simulation of – Inventory/ Queuing/ Maintenance problems. Simulation in investments, budgeting and job sequencing.

References:

1. Kanti Swarup, Gupta P.K, Man Mohan, Operations research, S Chand
2. Lomba, Linear Programming
3. Taha H, Operation Research, Pearson
4. Vajda, Game Theory

The foregoing minutes of the meeting were read out by the Chairman at the meeting itself and they were unanimously approved by all the members present

Ms. Danielle Monteiro
Member Secretary, BOS

Mr. Anand Masur
Chairman, BOS

Date:

PART C: The remarks of the Dean of the Faculty:-

- a. The minutes are in order.
- b. The minutes may be placed before the Academic Council with remark, if any.
- c. Important points of the minutes which need clear policy decision of the Academic council to be recorded.

Date:

Signature of the Dean: _____
(Faculty of Sciences)