DEPARTMENT OF MATHEMATICS
N A M COLLEGE , KALLIKKANDY

CERTIFICATE COURSE
2021-2022

LINEAR PROGRAMMING PROBLEM
(LPP)

Offered by

Department of Mathematics
NAM College, Kallikkandy

About the course

The certificate course "Linear Programming Problem (LPP)" be open to those who have passed Higher Secondary Examination.The aim of this course is to make the learner to acquire knowledge of basic optimization problems.

Course duration : 30 hours

For Details & Registration

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Course Details

The Certificate Course "**Linear Programming Problems (LPP)**" be open to all those who have passed higher secondary examination .The aim of this course is to make the learner to acquire knowledge of basics of optimization problems. The emphasis will be in problem solving skills for managerial decisions. The course will be of 30 hour duration, 5 hour per each week (maximum 6 week).

There will be two assignments as continuous evaluation and an examination after the completion of all classes. Marks obtained by the candidate both in Assignment and end examination will be considered for the purpose of determining the final results. A certificate will be issued by the College, to the candidate who has been declared successfully completed the course. ***To pass the course, the candidate must secure at least 40% of the aggregate marks as a total of internal and examination marks.*** Assignment marks are considered as internal mark and end examination marks as examination mark.

Mark Distribution

Total mark for the course is 50 marks

Maximum marks for assignment is 20 (10 for each assignment)

Maximum Mark for end examination is 30

End examination structure

Maximum Time for end examination is 2 hours

Question pattern is as follows (***All questions will be compulsory)***

Three questions with 2 mark each (Total 6)

Three questions of 4 mark each (Total 12)

Two question of 6 marks each (Total 12)

Grading

Above 80% (including) is first division with distinction and will obtain A+ grade

60% and above but below 80% is first class and will obtain A grade

50% and above but below 60% is second class and will obtain B grade

40% and above but below 50% is third class and will obtain C grade

Course Introduction and Objectives

Optimization is the process by which the optimal solution to a problem, or optimum, is produced. The word optimum has come from the Latin word ***optimus***, meaning best. There has been a host of contributions, from Archimedes to the present day, scattered across many disciplines. Many of the earlier ideas, although interesting from a theoretical point of view, were originally of little practical use, as they involved a intimidating amount of computational effort. Now modern computers perform calculations, whose time was once estimated in man-years, in the figurative blink of an eye. Thus it has been worthwhile to resurrect many of these earlier methods. The advent of the computer has helped bring about the unification of optimization theory into a rapidly growing branch of applied Mathematics. The major objective of this course is to provide an introduction to the some basic linear optimization methods also known as Linear programming Problem. The course is designed for under graduate students studying Mathematics, engineering, business & Commerce etc.

This course is focussing on Linear Programming Problem (LPP) and two methods – Graphical Method and Simplex Method- to solve a Linear Programming problem.

The content of the course include three modules and the topics in each module are mentioned in syllabus

Objectives of the course are

- To understand the optimization techniques in real time situations
- To frame the Mathematical model of a real time optimization problems
- To understand the different forms of Linear Programming problem (LPP)
- To acquaint with graphical method to solve LPP
- To acquaint with the terms used in Simples Method
- To expertise in solving LPP using Simplex method

Prerequisite for the course

The Course designed in a simple manner such a way that, anyone with high school level mathematical skills can follow easily. Prerequisite include some basic logical ideas, basic numerical & computational skills and a little linear geometry .However the Tutor will discuss this ideas whenever it is necessary.

Course Content (Syllabus)

Module 1. Introduction to Linear Programming Problem (7 hours)

1.1. Literature of optimization techniques
1.2. Real Life Examples and their Mathematical Modelling
1.3. Linear Programming Problems –L.P.P
1.4. General form of LPP
1.5. Canonical form of LPP
1.6. Slack and Surplus Variables
1.7. Standard form of LPP
1.8. Solution of a general LPP

Module 2. Solution of LPP – Graphical Method (8 hours)

2.1. Geometry of linear inequalities
2.2. Convex Set and convex Hull
2.3. Graphical Method
2.4. Special Cases in Graphical method

Module 3. Solution of LPP – Simplex Method (15 hours)

3.1. Basic definitions
3.2. Simplex Algorithm
3.3. Solution using Simplex Method
3.4. Duality in LPP

Text Book: K.Swarup, P.K.Gupta and M. Mohan, Operations Research (14^{th} Edn), S.Chand Publication

Reference:

1. S.Kalavathy, Operation Research (4^{th} Edn), Vikas Publishers
2. Hamdy A.Taha, Operation Research (9^{th} Edn), Pearson
3. P.K.Gupta, D.S Hira, Problems in Operation Research , S.Chand Publishers
4. G.Hadley, Linear Programming , Narosa Publishers