

Operations Research in Agricultural Economics

Course Description

This course will help students to acquire the knowledge of operation research. Specifically the Origin, nature and impact of operational research, operational research modeling approach, introduction to linear programming, solving linear programming: graphic and simplex methods, revised simplex methods, duality theory and sensitivity analysis, integer programming, non linear modeling, transportation and assignment problem, network models including project evaluation and review techniques (PERT) and critical path methods (CPM).

Course Objectives:

At the end of the course, students will be able to:

- ✦ Discuss the basic concepts of operations research and its applications
- ✦ Identify the various types of models in operations research
- ✦ Propose suitable decisions to resolve conflicts of interest among various sections of the organizations by seeking out optimal solution
- ✦ Apply linear programming model for analyzing operational problems in business (particularly in agricultural firms)
- ✦ Solve large system of linear equations using transportation problems model
- ✦ Apply the concept of transportation problem to allocate different resources to activities if the resource requires more than activity
- ✦ Apply the concept of assignment problem to assign different resources to activities on a one-to-one basis
- ✦ Apply the concept of sensitivity analysis to allocate scarce resources efficiently in agricultural firms
- ✦ Explain the basic Concepts of PERT/CPM techniques

Program	BSc in Agricultural Economics / Year II Semester II/				
Course Title:	Operations Research in Agricultural Economics /Course Code/= AgEc2082= 5 ECTS				
Instructor	Office location: Building 034—Room 93				
	Mobile: +251921143194		e-mail: Ethiopiafuture@gmail.com		
	Consultation Hours: any time				
Contact Hours (per week)	Lecture	Tutorial	Lab/Practical	Home Study	Total
	48	20		67	135

COURSE CONTENTS AND SCHEDULE

Week	Hour	Conceptual focus
	4	Chapter 1: Introduction 1.1. Development of operation research 1.2. Definitions and scope of operations research 1.3. Overview of the operations research modeling approach 1.4. Applications of operations research

	14	Chapter 2: Linear Programming 2.1. Basic Concepts in Linear Programming 2.2. Formulations of LPP 2.2. Assumptions of linear programming 2.3. Methods of Solving LP 2.3.1. The Graphic Method 2.3.2. The Simplex Method 2.4. Tie Breaking in simplex method 2.5. The artificial variable (The Big M) technique 2.6. Minimization
	10	Chapter 3: Duality Theory and Sensitivity Analysis 1.1. The essence of Duality theory 1.2. Economic interpretation of Duality 1.3. Primal-Dual relationship 1.4. The role of duality theory in sensitivity analysis 1.5. Sensitivity analysis
	5	Chapter 4: Integer Programming 4.1. Need For Integer Programming 4.2. Gomory's Fractional Method 4.3. Branch- and- Bound Method
	11	Chapter 5: Special types of linear programming

		5.1. Transportation problem 5.1.1. Formulation/construction of the model 5.1.2. Methods of solving Transportation problems 5.1.3. Special Cases in Transportation problem 5.2. Assignment problem 5.2.1. Formulation/construction of the model 5.2.2. Methods of solving assignment problems 5.2.3. Special cases in assignment problems
	4	Chapter 6: Network Analysis with CPM and PERT 6.1. Basic concepts on net work 6.2. The critical path method (CPM) 6.3. Program evaluation and review technique (PERT)

MODE OF DELIVERY

The mode of the delivery of the course combines lectures, class discussion, questioning and answering, readings, assignments, individual and /or group works and presentation.

1. Lecture
2. Reflections:
3. Homework/worksheet:
4. Assignments

ASSESSMENT METHODS

Assignments, quizzes, Tests, attendance and participation and Final Exam

COURSE POLICY

All students are expected to abide by the code of conduct of the University Academic legislation throughout this course. ***Academic dishonesty, including cheating, fabrication, and plagiarism will not be tolerated and will be reported to concerned bodies for action.***

Attendance: Attendance will be observed. A student who has missed more than 20% attendance shall be given a grade of IA (Incomplete Attendance) and be required to provide acceptable reasons for failure to attend classes. Students who notify me in advance of an absence will be treated sympathetically. Cell phones, pagers, and other electronic devices should be switched off or on quiet mode when in the classroom. Anyone observed texting, web-surfing, or otherwise engaged in activities unrelated to the class will be asked to leave the classroom.

Expectations: I expect that every student will prepare for and attend every class session. Students are responsible for everything covered in class. In addition to class time, students are expected to spend at least 67 hours studying course material. Study questions are provided to guide your studying. I am ready and eager to help you individually during office hours or by appointment. Please bring all notes, calculator and other necessary materials with you when you come for classes and exams accordingly.

REFERENCEJ.K. Sharma, 1977. Operation Research, Theory and Application. Macmillan, New Delhi.

Hiller and Lieberman, 1986. Introduction to Operations Research, 4th ed.

Hamdy. A. Taha, 2007. Operation Research-An introduction, 8th ed. Prentice Hall, New Jersey

P.K Gupta and D.S Hira, 2007. Operations Research. Revised and enlarged edition 2007

F.S. Hiller and G.J. Lieberman: Introduction to Operations Research-Concepts and Cases, 9th Edition, Tata McGraw, 2010.

R.K. Ahuja, T.L.Magnati, B. Orlin: Network Flows-Theory, Algorithm and Applications, Prentice Hall, NJ, 1993.

J.D. Weist and F.K. Levy: A management guide to PERT/CPM, 2nd Edition, PHI,1967 (Reprint 2007).