LINEAR & NONLINEAR PROGRAMMING – MATH 474 – TERM 232

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Textbook:

Linear and Nonlinear Programming by E.G. Luenberger & Y. Ye, Spinger, 3nd Edition (2008)

Description:

- Formulation of linear programs.
- Basic properties of linear programs.
- The Simplex method.
- Duality theory.
- Necessary and sufficient conditions for unconstrained problems.
- Minimization of convex functions.
- A method to solve unconstrained problems. Equality and inequality constrained optimization.
- The Lagrange multipliers. The Kuhn –Tucker conditions.
- A method to solve constrained problems.

Student Learning Outcomes:

After completion of the course, the students should be able to:

- Discuss basic properties of linear programs and convex functions.
- Discuss duality theory.
- Discuss necessary and sufficient conditions for unconstrained problems.
- Solve linear programs by simplex method.
- Use Lagrange multipliers method and Kuhn-Tucker conditions to solve constrained problems.
- Apply computational method to solve unconstrained and constrained problems.

Grading Policy:

- 25%: Programming Assignments & Tests (with Julia)
- 40%: Two Major Exams: first 20%, second 20%
- 35%: Final comprehensive exam

Evaluation:

Final grade is according to the scale.

GRADE	RANGE
A+	[90%, 100%]
A	[80%, 90%)
B+	[75%, 80%)
B	[70%, 75%)
C+	[65%, 70%)
C	[55%, 65%)
D+	[50%, 55%)
D	[45%, 50%)
F	[0%, 45%)

Week	Topic	Section
1	BASIC PROPERTIES OF LINEAR PROGRAMS	2.1 & 2.2
2 & 3		2.3, 2.4 & 2.5
3 & 4	THE SIMPLEX METHOD	3.1, 3.2, 3.3, 3.4 & 3.5
5		3.7 & 3.8 **EXAM 1: Week 5 or 6**
6	DUALITY	4.1, 4.2 & 4.3
7		4.4 & 4.5
8	TRANSPORTATION AND NETWORK FLOW PROBLEMS	6.1 & 6.2
9	BASIC PROPERTIES OF SOLUTIONS AND ALGORITHMS	7.1, 7.2, 7.3 & 7.4
10		7.5 & 7.6 **EXAM 2: Week 10 or 11**
11	BASIC DESCENT METHODS	8.6, 8.8 & 10.1
12	CONSTRAINED MINIMIZATION CONDITIONS	11.1, 11.2 & 11.3
13		11.5, 11.6 & 11.8
14		11.9 & 13.1
15	DUAL AND CUTTING PLANE METHODS	15.1, 15.2, 15.4 & 15.4

FINAL EXAM – See Registrar website.