Module: Linear Programming 381

Module name:	Linear Programming 381
Code:	LPR381
NQF level:	7
Type:	Core – Bachelor of Computing (all streams)
Contact time:	48 hours
Structured time:	8 hours
Self-directed time:	54 hours
Notional hours:	110 hours
Credits:	11
Prerequisites:	MAT281,LPR281

Purpose

Linear Programming is a scientific approach to decision making that seeks to best design and operate a system, under conditions requiring the allocation of scarce resources. It is an interdisciplinary mathematical science that focuses on the effective use of technology by organisations. In contrast, many other science and engineering disciplines focus on technology, giving secondary considerations to its use.

Outcomes

Upon successful completion of this module, the student will be able to:

- Demonstrate integrated knowledge of the central areas of linear programming, including an understanding of and the ability to apply and evaluate the key terms, concepts, facts, principles, rules and theories of linear programming; and detailed knowledge of an area or areas of specialisation and how that knowledge relates to other fields, disciplines or practices.
- Demonstrate an understanding of knowledge as contested and the ability to evaluate types of knowledge and explanations typical within linear programming.
- An understanding of a range of methods of enquiry in linear programming, and their suitability to specific investigations; and the ability to select and apply a range of methods to resolve problems or introduce change within a practice.
- The ability to identify, analyse, evaluate, critically reflect on and address complex problems, applying evidence-based solutions and theory-driven arguments.
- The ability to develop appropriate processes of information gathering for a given context or use; and the ability to independently validate the sources of information and evaluate and manage the information.

Assessment

Assessment is performed using a variety of instruments:

- Continuous evaluation of theoretical work through written assignment, formative, and summative test.
- Final assessment through a written examination.
- The assignments or projects collectively will count 20% of your class mark.

- All tests will collectively account for 80% of your class mark.
- Your class mark contributes 30% towards your final mark for the subject, while the final assessment accounts for 70% of your final mark.

Teaching and Learning

Learning materials

Prescribed Book (EBSCO)

 📖 Wayne L. Winston. 2004. Operations Research - Applications and Algorithms. Fourth Edition. ISBN 0-534-52020-0.

Additional Material

 📖 Hamdy A. Taha. 2007. Operations Research - An Introduction. Eigth Edition. ISBN 0-13-188923-0.

 📖 Frederick S. Hillier. 2010. Introduction to Operations Research. Ninth Edition. ISBN 978-9814577205.

 📖 Frederick S. Hillier. 2010. Introduction to Operations Research. Seventh Edition. ISBN 978-9814577205.

Learning activities

The teaching is a combination between presentation of theoretical concepts and exercises and discussions. It is dialogue-oriented with a practical approach, with mandatory assignment and project which must be completed during the course.

Notional learning hours

Activity	Units	Contact Time	Structured Time	Self-Directed Time
Lecture		40.0		21.0
Formative feedback		8.0		
Project				
Assignment	3			9.0
Test	3		6.0	11.0
Exam	1		2.0	13.0
		48.0	**8.0**	**54.0**

Syllabus

- Revised Simplex
- Discrete programming
- Simplex redux with Hungarian flair
- Integer Programming
- Branch and bound algorithms
- Knapsack problems
- The cutting plane algorithm
- Traveling sales person problems
- Machine scheduling problems

- Nonlinear programming

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