

Syllabus for GRA 6035

Mathematics

Course Information

Course code	GRA 6035
Course title	Mathematics
ECTS credits	6
Examination	Midterm 20 % (1 hour individual multiple choice) Final exam 80 % (3 hours individual written exam)

Instructor Information

Instructor	Eivind Eriksen	Dag Einar Sommervoll
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Compulsory Reading

Book	Sydsæter, Hammond, Seierstad, Strøm, <i>Further Mathematics for Economic Analysis</i> , 2nd Edition, ISBN 9780273713289
Handout	Eriksen, <i>Linear Systems and Gaussian Elimination</i> , Available through It's Learning

Lecture Notes

Lecture Notes for each lecture will be made available through It's Learning.

Exercise Problems

A set of exercise problems for each lecture will be made available through It's Learning, and it is part of the course requirements that you work out the problems. Some topics will only be treated in the exercise problems. In fact, the problems are perhaps the most important part of the course. Your final grade will depend mostly on your ability to work out problems. **If you do not solve most of the exercise problems, do not expect to be able to solve the problems on the exam.** A selection of the problems will be explained in the plenary problem sessions.

Prerequisites

We require the following to be known: (1) Methods and techniques from a standard mathematics course at Bachelor level, and (2) Linear Algebra at the level of FORK 1003 Preparatory course in Linear Algebra. The book K. Sydsæter, P. Hammond, *Essential Mathematics for Economic Analysis*, 3rd Edition, ISBN 9780273713241 covers the prerequisites. **It is recommended that you review central topics from the prerequisites.**

In particular, you should know concepts, methods and techniques related to algebra, functions of one variable, derivation with applications, elasticities, exponential and logarithmic functions, series and financial mathematics, integration, functions of several variables, optimization, constrained optimization, Lagrange multipliers, systems of linear equations, matrices and matrix operations, matrix multiplication, the transpose, vectors, and determinants. Aside from Linear Algebra, central parts of the prerequisites are covered in FORK 1005 Preparatory course in Mathematics.

Lectures

Date	Time	Room	Theme	FMEA
Aug 26	08 - 11	C1-060	Linear systems, Rank	1.3 - 1.4
Sep 01	17 - 20	C1-010	Matrices, Matrix algebra	1.1, 1.9
Sep 02	08 - 11	C1-060	Vectors, Linear independence	1.2
Sep 09	08 - 11	C1-060	Eigenvalues, Diagonalization	1.5 - 1.6
Sep 16	08 - 11	C1-060	Quadratic forms	1.7 - 1.8
Sep 23	08 - 11	C1-060	Convex/concave functions	2.2 - 2.3
Oct 07	08 - 11	C1-060	Extreme points, Lagrangians	3.1 - 3.3
Oct 14	08 - 11	C1-060	Kuhn-Tucker problems	3.4 - 3.6
Oct 21	08 - 11	C1-060	Differential equations	5.1 - 5.3
Oct 28	08 - 11	C1-060	First order Differential eq.	5.4 - 5.7
Nov 04	08 - 11	C1-060	Second order Differential eq.	6.1 - 6.3
Nov 11	08 - 11	C1-060	First order Difference eq.	11.1 - 11.2
Nov 18	08 - 11	C1-060	Second order Difference eq.	11.3 - 11.4

Plenary Problem Sessions

Date	Time	Room	Session
Sep 15	17 - 20	C1-060	Plenary session
Sep 29	17 - 20	C1-060	Plenary session
Oct 13	17 - 20	C1-010	Plenary session
Oct 20	17 - 20	C1-060	Plenary session
Nov 03	17 - 20	C1-060	Plenary session
Nov 17	17 - 20	C1-060	Plenary session