MTH1004 *Linear Algebra*

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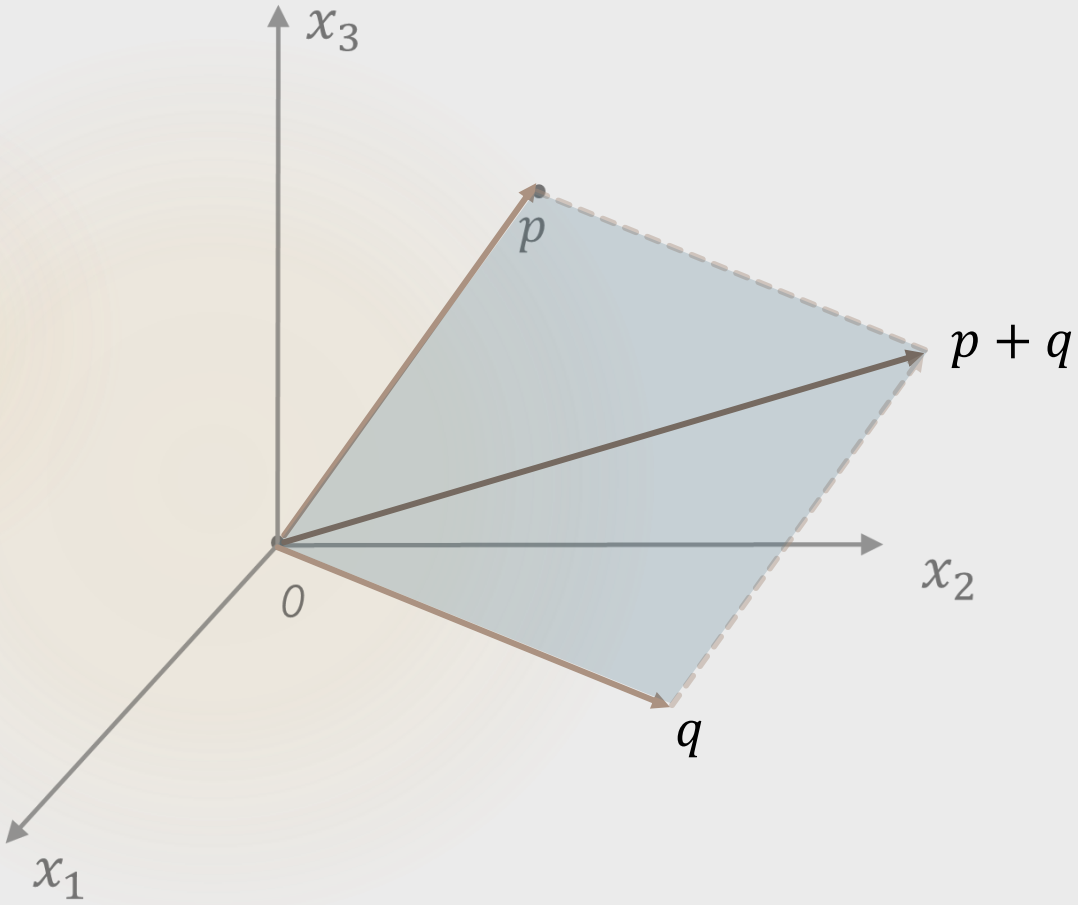
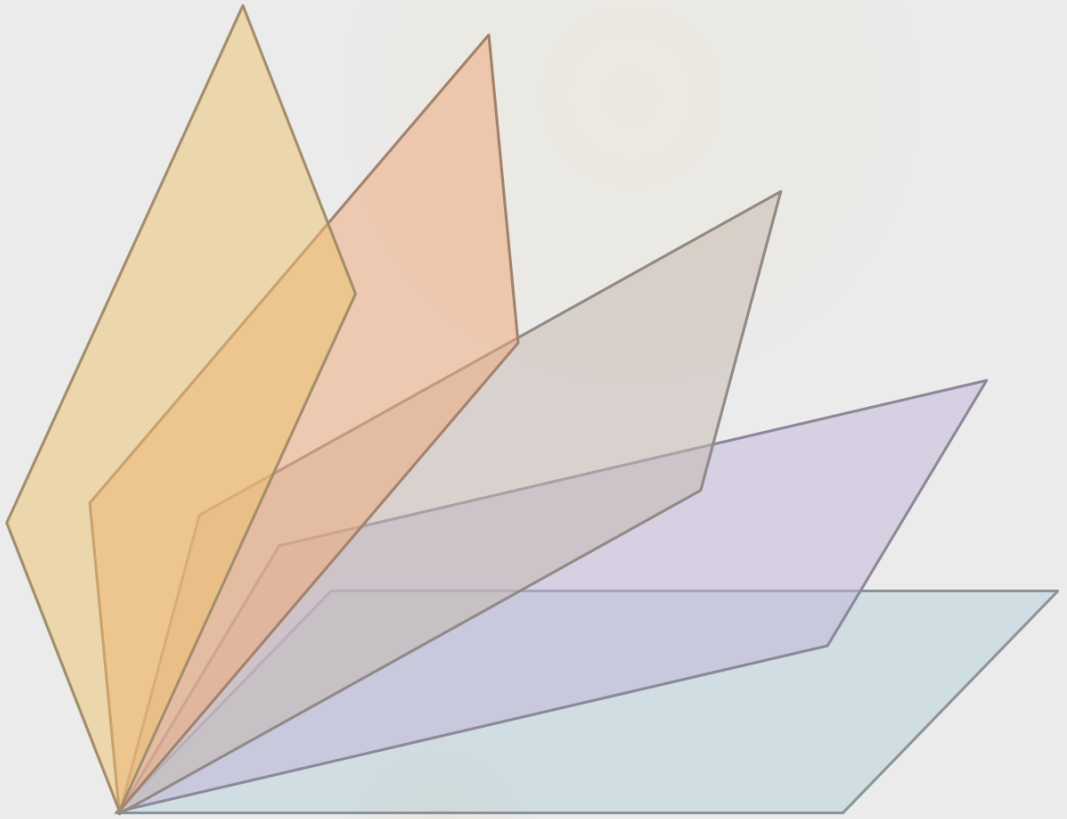
"Eighty percent of mathematics is linear algebra"

Raoul Bott





Meet the Team

Lectures delivered by Helen Christodoulidi

Contact for any specific questions you have regarding the module and its lectures (except for extensions/extenuating circumstances)

hchristodoulidi@lincoln.ac.uk

Practical Classes delivered by Theodoros Kouloukas (Groups A, B, C)

Contact for the practical sessions and their material

tkouloukas@lincoln.ac.uk

Outline Syllabus

- Introduction to vector spaces.
- Linear transformations of vector spaces and their matrices. Matrix algebra; applications to simultaneous equations.
- Eigenvalues and eigenvectors, characteristic equation. Diagonalization of matrices.
- Orthogonal and orthonormal sets, bases and matrices. Orthogonal diagonalization of symmetric matrices.

Learning Outcomes

- LO1 Formulate the connection between linear transformations and their matrices in different bases.
- LO2 Find orthogonal bases and complements; find inverses of orthogonal matrices.
- LO3 Find kernel, range, rank and nullity of a linear transformation.
- LO4 Find eigenvalues and eigenvectors; apply them to diagonalization of matrices and finding functions of linear mappings and matrices.
- LO5 Diagonalize quadratic forms by using orthogonal diagonalization of symmetric matrices

Module Content

Week 19
Vectors in the Plane

Week 20
Vectors in Higher Dimensions (dot product, angle, length)

Week 21
Solving Linear Systems

Week 22
Matrices: Operations and Rank

Week 23
Inverse and Determinant of a Matrices

Week 24
Vector Spaces, Bases and Dimension

Week 25
Eigenvalues, Eigenvectors, Eigenspaces and Diagonalisation

Week 29
Linear Transformations

Week 30
Change of Basis, Orthogonal and Orthonormal Bases

Week 31
Orthogonal Matrices, Quadratic Forms

Week 32
The big picture (overview)

Week 33
Revision

Expectations

The total student effort for this module is around **150 hours**.

These hours include:

Lectures, Practical classes, Assessments and Self-Study.

Students will have access to Blackboard and online resources.

Weekly Routine

❖ Every week you will find on BlackBoard a weekly folder containing:

- The Lesson plan
- Slides of the week and the class notes (to appear afterwards)
- Practical sheets (their solutions to appear afterwards)
- The pre-recorded lectures covering *most* of the material discussed during the in-class lectures

Assessments

Portfolio	Exams
40%	60%

Portfolio (40%)

- 4 *Weekly e-Assessments*, i.e. 4 short components using WebAssign (automatic marking) — 15%
- 1 *In-class Test* — 25%

Exams (60%)

- *Final Exams* — 60%

Using WebAssign

- https://www.webassign.net/index.html

Registering with Cengage

CENGAGE

Dear Students,

Dear Students,

We're excited for you to use *WebAssign* this term! We created this site to provide information and resources to enhance your *WebAssign* experience. Here you'll find tips on accessing your course materials and information on how to troubleshoot any issues.

We're dedicated to your success and are here for you every step of the way. Good luck this term—we know you'll be unstoppable!

- The Cengage Team

CENGAGE
WEBASSIGN

Register for your WebAssign Course

Enroll in your *WebAssign Course Through Blackboard*

Watch the below video to help with this process

Student WebAssign registration via Blackboard ›

Go to the site

https://www.cengage.com/coursepages/UniversityofLincoln_WebAssign

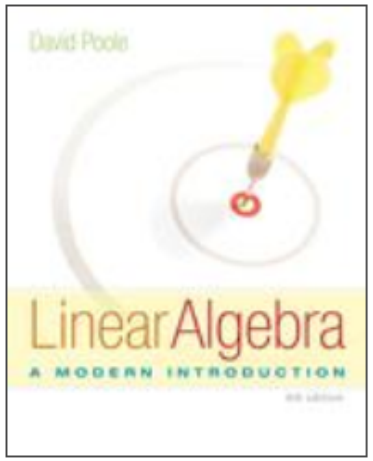
or scan

e-book

Click here or scan

Linear Algebra

Author: David Poole. Pages: 726 Size: 9.15 MB Format: PDF Publisher: Cengage Learning
Published: 08 January, 2014
eISBN-13: 9781473715455 Show more

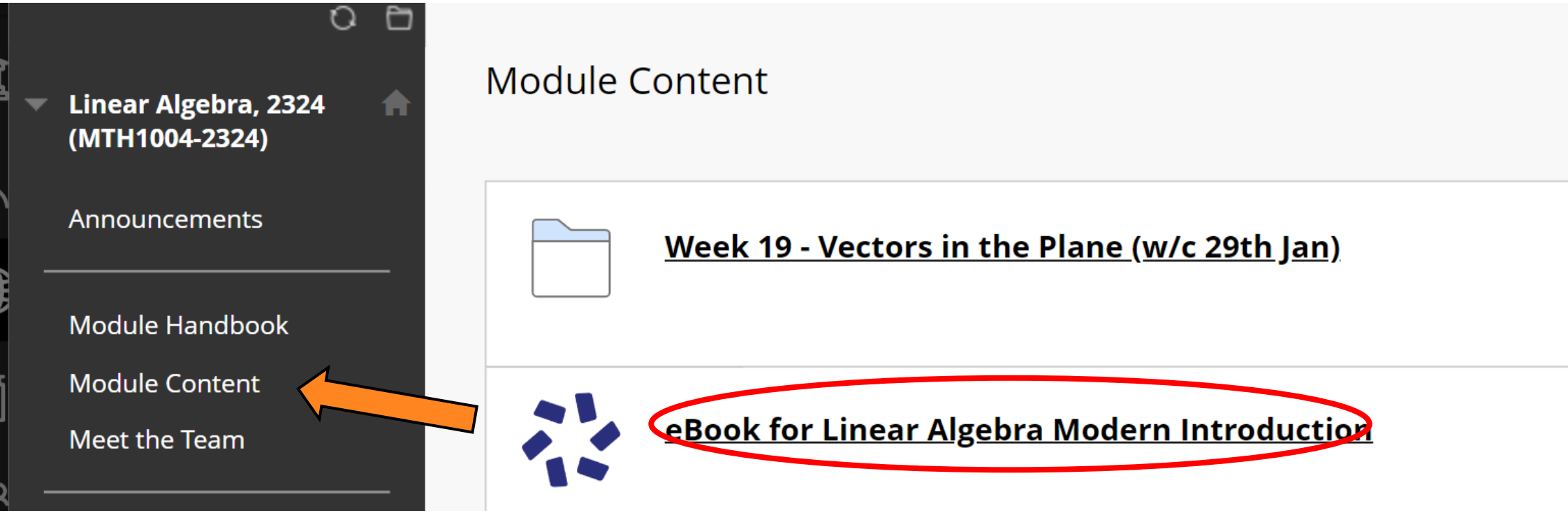


Description

David Poole's innovative LINEAR ALGEBRA: A MODERN INTRODUCTION, 4e emphasizes a vectors approach and better prepares you to make the transition from computational to theoretical mathematics. Balancing theory and applications, the book is written in a conversational style and combines a traditional presentation with a focus on student-centered learning. Theoretical, computational, and applied topics are presented in a flexible yet integrated way. Stressing geometric understanding before computational techniques, vectors and vector geometry are introduced early to help you visualize concepts and develop mathematical maturity for abstract thinking. Additionally, the book includes ample applications drawn from a variety of disciplines to show you that linear algebra is a valuable tool for modeling real-life problems.

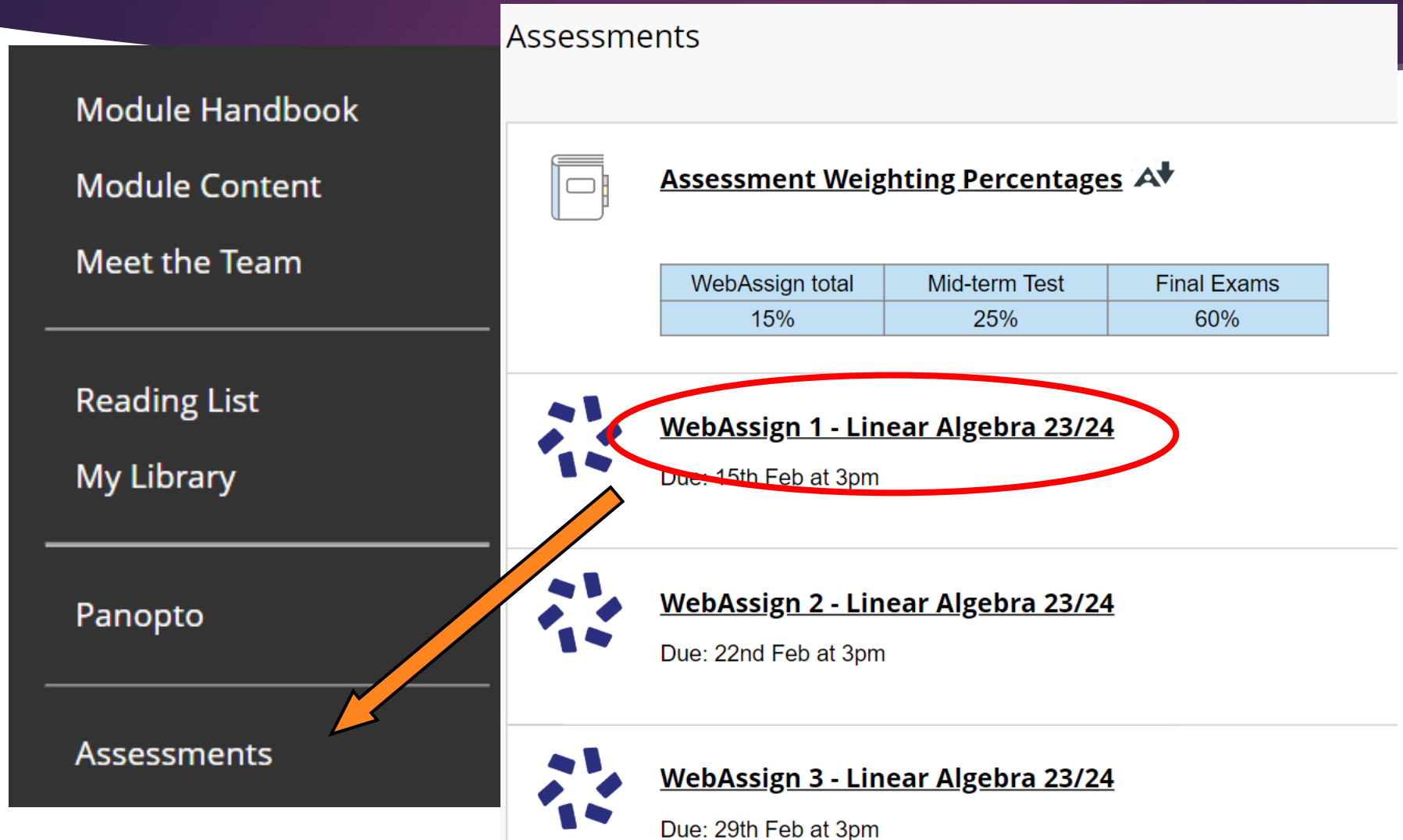
Cengage in Module Content

A link to the online book appears below the weekly folders



In the ‘Assessments’ Section

on BlackBoard every new assignment will appear on top



Remarks about WebAssignments

- You will have **two** attempts per question in all assignments.
- The questions may contain random numbers.
- The values of these will not significantly change the difficulty of the questions.