



Jordan University of Science and Technology
Faculty of Computer & Information Technology
Computer Science Department

CS181 Linear Algebra

First Semester 2021-2022

Course Catalog

3 Credit Hours. This course covers the following topics: matrices, basic algebraic operations, reduced forms, rank and inverse solutions of systems of linear equations. Determinants and their properties. Vector spaces, subspaces, intersection and sum of subspaces, linear independence, spanning set, bases and dimension, line transformations and matrices of linear transformations, eigenvalues and eigenvectors.

Text Book

| | |
|--------------------------|---|
| Title | Linear Algebra And Its Applications |
| Author(s) | David C. Lay, Steven R. Lay, Judi J. McDonald |
| Edition | 6th Edition |
| Short Name | Textbook |
| Other Information | |

Instructor

| | |
|------------------------|--|
| Name | Dr. Alia Madain |
| Office Location | A1 L-3 |
| Office Hours | Sun : 14:30 - 15:30 Mon : 11:30 - 13:30 Tue : 14:30 - 15:30 Wed : 11:30 - 13:30 |
| Email | asmadain@just.edu.jo |

Class Schedule & Room

Section 1:

Lecture Time: Sun : 11:30 - 13:00

Room: N4201

Section 2:

Lecture Time: Sun : 13:00 - 14:30

Room: N4202

Section 3:

Lecture Time: Mon : 10:00 - 11:30

Room: N4202

Section 4:

Lecture Time: Tue : 11:30 - 13:00

Room: N4201

Section 5:

Lecture Time: Tue : 13:00 - 14:30

Room: N4202

Section 6:

Lecture Time: Wed : 10:00 - 11:30

Room: N4202

Tentative List of Topics Covered

| Weeks | Topic | References |
|------------------|------------------------------------|---------------------------------|
| Weeks 1, 2, 3, 4 | Linear equations in linear algebra | Ch1 From Textbook |
| Weeks 5, 6, 7, 8 | Matrix algebra | Ch2 From Textbook |
| Weeks 9, 10 | Determinants | Ch3 From Textbook |
| Weeks 11, 12 | Vector Spaces | Ch4 From Textbook |
| Weeks 13, 14 | Eigenvalues and eigenvectors | Ch5 From Textbook |

| Mapping of Course Outcomes to Program Student Outcomes | Course Outcome Weight (Out of 100%) | Assessment method |
|---|--|--------------------------|
| Solve systems of linear equations using Gaussian elimination to reduce the augmented matrix to row echelon form or to reduced row echelon form [1SO1, 1SO2] | 20% | |
| understand the basic ideas of vector algebra: linear dependence and independence and spanning [1SO1, 1SO2] | 15% | |

| | | |
|---|-----|--|
| apply the basic techniques of matrix algebra, including finding the inverse of an invertible matrix using Gauss-Jordan elimination [1SO1, 1SO2] | 15% | |
| find and apply the LU factorization and the determinants of the matrix to solve the linear system. [1SO1] | 15% | |
| know how to find the row space, column space and null space of a matrix, to find bases for these subspaces and be familiar with the concepts of dimension of a subspace and the rank and nullity of a matrix, and to understand the relationship of these concepts to associated systems of linear equations [1SO1] | 20% | |
| find the eigenvalues and eigenvectors of a square matrix using the characteristic polynomial and will know how to diagonalize a matrix when this is possible [1SO1] | 15% | |

| Relationship to Program Student Outcomes (Out of 100%) | | | | | |
|--|-----|-----|-----|-----|-----|
| SO1 | SO2 | SO3 | SO4 | SO5 | SO6 |
| 75 | 25 | | | | |

| Evaluation | |
|-----------------|--------|
| Assessment Tool | Weight |
| Midterm Exam | 30% |
| Quizzes | 20% |
| Final Exam | 50% |

| Policy | |
|------------|---|
| Attendance | Attendance is very important for the course. In accordance with university policy, students missing more than 20% of total classes are subject to failure. Penalties may be assessed without regard to the student's performance. Attendance will be recorded at the beginning or end of each class |
| Exams | All exams will be CLOSE-BOOK; necessary algorithms/equations/relations will be supplied if required. |

Date Printed: 2021-10-16