Prince Sultan University
Deanship of Educational Services
Department of General Sciences
Academic Year 2017-2018- Term 171

INSTITUTIONAL COURSE SYLLABUS TEMPLATE

Course Code: Math 223	Course Title: Linear Algebra
Course Instructor: Dr. Kamal Abodayeh	Email: kamal@psu.edu.sa
Credit Hours: 3	Lectures: 4
Office Hours: 10-11 on everyday	
Office :A311	

Mission Statement:

The Department of General Sciences is committed to offering a broad high quality education that will lay a durable educational foundation to meet the specialized professional development requirements in PSU degree programs. The department supports the development of student's skills that enables them to perceive patterns in complexity, render reasoned judgments, and seek the highest level of intellectual achievement and personal growth. We also encourage the students to develop personal qualities such as perseverance, initiative, self-confidence and independence.

I. Course Description:

II. Solving linear systems, Matrices and determinants, Vector spaces, Eigen values and eigenvectors, Applications

II. Course Learning Outcomes:

Skills	Course Learning Outcomes	Measured by
Knowledge	Recognize the concepts of vectors, matrices, vector spaces, subspaces, linear independence, span, basis, dimension, linear transformation, inner product, eigenvalue and eigenvector and apply these concepts to various vector spaces and subspaces	Final, Majors, HWs, Quizzes
Cognitive Skills	1.Solve systems of linear equations using various techniques. 2. Analyze vectors in Rn geometrically and algebraically. 3. Use matrix algebra and the relate matrices to linear transformations. 4. Apply theorems on linear spaces and linear transformations to determine bases, compute dimensions, evaluate linear transformations, solve systems of linear equations and compute determinants. 5. Compute and use eigenvectors and eigenvalues of matrices for a diagonalization process. 6. Determine and use orthogonality.	Final, Majors, HWs, Quizzes
Interpersonal Skills & Responsibility	NA	
Communication, Information Technology, Numerical	NA	
Psychomotor (if Applicable)	NA	

III. Course Content or your weekly schedule (Specific course topics to be covered within the semester).

Topics	No. of Weeks	Contact Hours
• System of linear Equations	2	8
• Determinants	1.5	6
• Euclidean Vector Space	2	8
• General Vector Space	4	14
• Eigenvalues and eigenvectors	1	4
• Inner product spaces	1	4
• Diagonalization and Quadratic Forms	1	4
• Linear Transformations	1.5	6

We cover the above topics during this semester as follows:

Week	Date	Sec.	Material
1	Sep 17 – 21	1.1 1.2	- Introduction to Systems of linear Equations - Gaussian Elimination
2	Sep 24 – 28	1.3 1.4 1.5	- Matrices and Matrix Operations - Inverse; Rules of Matrix Arithmetic – Elementary-Matrices and a Method for finding A^{-1}
3	October 01 – 05	1.6 1.7	- More on Systems of Equations and Invertibility - Diagonal, Triangular, and Symmetric Matrices
4	October 08 – 12	2.1 2.2	- Determinant by Cofactor Expansion - Evaluating Determinants by Row Reduction
5	October 15 – 19	2.3 3.1	-Properties of Determinant Function ; Cramer's Rule -Introduction to Vectors (Geometric)
6	October 22 – 26	3.2 3.3 3.4	-Norm of a Vector, Vector Arithmetic , Dot Product; Distance in R^n - Orthogonality - The Geometry of Linear Systems
7	Oct. 29 – Nov. 02	3.5 4.1 4.2	- Cross Product -Real Vector Spaces -Subspaces
Major Exam 1 Ch 1 – 3 on Nov 01			
8	November 05 – 09	4.3 4.4	-Linear Independence -Coordinates and Basis
9	November 12 – 16	4.5 4.6	- Dimension -Change of Basis

10	November 19 – 23	4.9 4.10	-Matrix Transformations from R^n to R^m - Properties of Matrix Transformations
11	November 26 – 30	5.1 5.2 5.4	Eigenvalues and Eigenvectors - Diagonalization - Application : Differential Equations
12	Dec. 03 – 07	6.1 6.2& 6.3	- Inner Products - Angle and Orthogonality in Inner Product Spaces
13	Dec. 10 – 14	6.4& 6.5 7.1	-Best Approximation; Least Squares - Orthogonal Matrices
14	Dec. 17 – 21	7.2 8.1	- Orthogonal Diagonalization -General Linear Transformations
Major Exam #2 On Dec. 17			
15	Dec. 24 – 28	8.3	Inverse Linear Transformations

IV. Course Components (Indicate the total contact hours within the semester).

Component	Contact Hours
Lecture	3
Tutorial	1
Practical/Field	0

V. Teaching Strategies (Indicate the teaching and student activities to be used to develop the kinds of learning involved in each learning domain. See the Faculty Guidelines for Conditions for Different Domains of Learning on Pg. 6 & 7. Also, research specialized Information about Best Teaching Practices for the particular course/field).

Domain	Strategy
Knowledge	Lectures small group discussion
Cognitive Skills	Lectures small group discussion
Interpersonal Skills & Responsibility	NA
Numerical & Communication Skills	NA

VI. Course Requirements (Specify the requirements of the course - reports, examinations, quizzes, projects or recitations. These requirements should be consistent with the Course Specification on file in the particular department)

VII. Student Assessment

A. Assessment Task (Indicate the kind of assessment tasks to be used to measure student learning in each of the learning domain. Example: quiz, oral examination, group work, etc).

Domain	Assessment Task
Cognitive Skills	Major Exams Final Examination Quizzes and Homework

B. Schedule of Assessment:

Assessment	Assessment Task	Week Due	Proportion of Final Assessment
1	Major Exam #1	7	25%
2	Major Exam #2	14	25%
3	4-6 Quizzes	-	10%
5	Final Exam	-	40%

VIII. Learning Resources

A. Textbook: Calculus: **Elementary Linear Algebra, Anton, 11th edition**

Attendance Policy:

1. Students are required to attend all classes starting from the first day of the semester.
2. Attendance will be taken at the start of the lecture. If a student enters the classroom after 5 minutes**,** he will be marked absent.
3. No excuses for missing classes(including medical reasons) are accepted.
4. DN Grade will be issued to a student who misses 16 classes. This means he cannot enter any more classes or exams. (1^{st} warning: 6 absences, 2^{nd} warning: 11 absences).
5. In case a student misses a class, he must contact any one of his classmates to get all information and topics covered in classes he missed.
6. From the past experience, **absence** is the biggest reason for failing. So make sure you attend all classes.