



COURSE SPECIFICATION

Requested by College of Sciences, KKU, Abha

2013

Course Specification

Institution: **King Khaled University**

College/ Department: **College Sciences/ Department of Mathematics**

A Course Identification and General Information

1. Course title and code: MATRIX ALGEBRA (MATH 012)
2. Credit hours: 3
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Faculty of computer Science
4. Name of faculty member responsible for the course:
5. Level/year at which this course is offered: Second level / first Academic Year
6. Pre-requisites for this course (if any): 001 Math
7. Co-requisites for this course (if any)- N/A
8. Location if not on main campus: Faculty of computer science

B Objectives

1. Summary of the main learning outcomes for students enrolled in the course

the course give some methods to solve linear systems using matrix operations, determinants, inverses, Cramer's rule, Gauss-jordan elimination.

2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field):

I- Revision and updating of the course contents.

II- To give more important time to the Mathematics in the engineering formation.

C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

1. Topics to be Covered		
Topics	No of Weeks	Contact hours
Introduction to the system of linear equations. Augmented matrices. Elementary row operations	2	6
Gaussian Elimination Reduced row-Echelon form. Gauss-Jordan elimination. Back-Substitution Homogeneous linear system of equations.	3	9
Matrices and Matrix operations. Matrix form of a liner system. Transpose and Trace of a matrix	1	3
Properties of matrix operations. Properties of inverses and transpose	1	3
A method for finding the inverse of a matrix . Further results on systems of equations and inevitability.	1	3
Diagonal, triangular and symmetric matrices.	1	3
The determinant function - Evaluating determinants by row reduction	1	3
Properties of the determinant function	1	3
Cofactor expansion-Cramer's rule-Inverse of a matrix using its adjoint.	1	3

Vector space, Linear dependent and linear independent , Eigen values and Eigen vectors	2	6
Basis and Dimensional of vector space	1	3

2 Course components (total contact hours per semester):

Lecture:45	Tutorial:	Practical/ Fieldwork/ Internship:	Other:1 h exam
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3. Additional private study/learning hours expected for students per week. (This should be an average: for the semester not a specific requirement in each week):

None

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

a. Knowledge

The course give some methods to solve linear systems using matrix operations, determinants, inverses, Cramer's rule, Gauss-jordan elimination.

(i) Description of the knowledge to be acquired

At the end of this course, the student will be able to:

1. Solve linear systems using matrix operations, determinants, inverses, Cramer's rule, Gauss-jordan elimination.
2. To use the techniques and theorems in the area of speciality and in the all field where it is possible.

(ii) Teaching strategies to be used to develop that knowledge

The strategies used to acquire theses skills through:

<ul style="list-style-type: none"> - Theoretical part: lectures, which may include teaching videos and the use of IT - Discussion groups about the exercises
<p>(iii) Methods of assessment of knowledge acquired</p> <p>Assessment of the theoretical part by attending the following tests</p> <ul style="list-style-type: none"> - Quizz - Midterm exams - Final Exam
<p>b. Cognitive Skills</p>
<p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> - To use the techniques and theorems in the area of speciality and in the all field where it is possible - To develop the spirit of analysis and logic.
<p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> - Discussion groups. - Collect information paper about selected cases or topics through the internet sources and libraries.
<p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> - Interview with students. - - Research projects. - iii- Online / in class group discussions. - iv- Assessment of written reports.
<p>c. Interpersonal Skills and Responsibility</p>
<p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <p>i- Work independently and as part of a team.</p> <p>ii- Manage resources, time and other members of the group.</p> <p>iii- Communicate results of work to others.</p>
<p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <p>i- Writing group reports.</p> <p>ii- Solving problems in groups.</p>
<p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <p>i- Student's behaviour is considered in the continuous assessment marks.</p>

ii- Grading research projects.

iii- Assessing oral discussion of different cases.

iv- Final evaluation of the works.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

i- Use computational tools

ii- Report writing

iii- How to search and use the internet.

iv- How to use power point to present their projects.

v- How to improve their language and writing skills

(ii) Teaching strategies to be used to develop these skills

i- Writing reports.

ii- Incorporating the use and utilization of computer in the course requirements.

iii- Hands on training on different software like Microsoft office and internet.

(iii) Methods of assessment of students numerical and communication skills

i- Direct evaluation of take home projects.

ii- Presentations and live discussion.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- Student should manipulate all the mathematical knowledge in real-life problems.

-Capacity to present and discuss mathematical ideas and to acquire mathematical proof skills.

- Comprehension of the concepts of mathematics as an integral system in the human knowledge and its applications.

(ii) Teaching strategies to be used to develop these skills

- Attending seminars and conferences held in the department.

(iii) Methods of assessment of students psychomotor skills

- Continuous evaluation to perform the student's skills.

5. Schedule of Assessment Tasks for Students During the Semester

Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	First mid term exam	6	25%
2	Second Midterm exam	12	25%
4	Final Exam	16	50%

D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- Office hours (10 hours per week).
- Contacts through university's E-learning system.
- E-mail messages.

E Learning Resources

1. Required Text(s)

Howard Anton, Elementary Linear Algebra, 8th Edition, John Wiley & Sons, Inc 2005

2. Essential References

3- Recommended Books and Reference Material (Journals, Reports, etc)
(Attach List)

4-.Electronic Materials, Web Sites etc

5- Other learning material such as computer-based programs/CD, professional standards/regulations

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

- Lecture room equipped with 30 seats and computer and projecting unit with audio system

2. Computing resources

- Computers with monitors connected to the internet and KKU- e-learning center

3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Feedback questionnaire distributed to the students after midterm.
- Students- faculty meeting
- Department meetings.

2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- Peer consultation on teaching.
- Departmental council discussions.
- Discussions within the group of faculty teaching the course.
- Discussing contributors' reports.
- Discussing the reports of the guest evaluator(s).
- Discussing the evaluation of the quality assurance/academic affairs committee.

3 Processes for Improvement of Teaching

- Conducting workshops given by experts on the teaching and learning methodologies.
- Using different teaching modalities.
- Periodical departmental revisions of the methods of teaching.
- Monitoring of teaching activities by senior faculty members.

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

- Providing samples of all kind of assessment in the departmental course portfolio of each course.
- Assigning group of faculty members teaching the same course to grade same questions for various students.
- Faculty from other institutions are invited to review the accuracy of the grading policy.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Assigning periodical student' questionnaires.
- Follow up of the quality assurance/academic affairs committee.
- The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.
- The head of the department and faculty take the responsibility of implementing the proposed changes.