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**Notre Dame University – Louaize**Faculty of Natural and Applied Sciences

Department of Mathematics and Statistics

**Course Syllabus**

**MAT 215 (3 cr.)**

**Linear Algebra I**

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| **1** | **Course Description** |
|  | This course introduces basic concepts of linear algebra. Linear systems, matrices, and their applications; determinants; vector spaces; subspaces and basis; Linear Transformations, eigenvalues, eigenvectors and diagonalization. |
| **2** | **Student Learning Outcomes** |
|  | How to solve linear systems in an efficient manner.  How to manipulate and use matrices.  Learn how to prove rigorously many theoretical theorems and problems. |
| **3** | **Teaching Methodology and Techniques** |
|  | This course is lecture based. The professor explains and writes the material of every required chapter on the  boards a and solves examples. |
| **4** | **Required Text Book**  Elementary Linear Algebra, Howard Anton, Chris Rorres 10th Edition. Publisher: John Wiley & Sons (Asia) Pte Ltd |
| **5** | **Resources Available to students**   * Library Resources: NDU Library is open to students to help you in all your research and class work.   Qualified personnel are available to help you.   * Blackboard (bb) Software: Students who are not familiar with the Blackboard system are advised to attend   a training session at the University Computer Services.   * Smart Rooms, Design Studios, Photography Studio & Dark Room(s), CAD Computer Workshop,   Mackintosh Lab. (DCS), Textile & Ceramics Labs, Wood/Metal Workshop, Design Office, etc |
| **6** | **Grading and Evaluation**  Class attendance and Participation 10%  Exam I 25%  Exam II 25%  Final Exam 40%  **Total 100%** |
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**7 Course Schedule**

The following table details the dates of material that will be covered in class

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| --- | --- | --- | --- |
| **Weeks** | **Material** | **Required Exercises** | **Homework** |
| **Week 1** |  |  |  |
|  | 1. 1.1 Introduction to Systems of linear equations   1.2 Gaussian Elimination |  | 8c- 10a-11b-14b  -T-F(a,b,c,d,e.h) |
| **Week 2** |  |  |  |
|  | 1.2 Gaussian Elimination *(continued)*  1.3 Matrices and Matrix Operations | 5-11-21-25-27 | 1(c,d,e,g)-2(b,d,e)-7-9-35-T-F(a,c,d) |
| **Week 3** |  |  |  |
|  | 1.3 Matrices and Matrix Operations *(continued)*  1.4 Inverses; Algebraic properties of Matrices | 7(a,c)- 15-19- 20- 21-27 | 2(b,c,f,g)-3(e,j,k)-4(g,i)- 11a- 14a -18-29-30-  T-F(f,h,j,k,i,m) |
| **Week 4** |  |  |  |
|  | 1.4 Inverses; Algebraic properties of Matrices *(continued)*  1.5 Elementary Matrices and a method for finding | 4- 15-16-17- 28- 51-53-54- 55  6b- 7(a,b)-19- 27-31- 37- 41- 42-43 | 8-25  2-10-T-F(a,c,d,e,f) |
| **Week 5** |  |  |  |
|  | 1.6 More on linear Systems of invertible matrices  1.7 Diagonal, triangular and symmetric matrices  2.1 Determinants by Cofactor Expansion | 4-17-19- 21- 22  12-32-33- 37 | 9-T-F(b,d,g)  15-18-22-T-F(a,c,f,g,h,j,k,  l,m) |
| **Week 6** |  |  |  |
|  | 2.1 Determinants by Cofactor Expansion *(continued)*  2.2 Evaluating determinants by row reduction  2.3 Properties of Determinants; Cramer’s Rule | 15- 16- 19(c,d)- 34  15- 24- 28- 33-35  7- 10- 18- 20- 25- 35-36-38-39 | 21-25-30  4-9-11-12  27-T-F(a,c,h,i,j,k,l) |
| **Week 7** | **Exam I** |  |  |
|  | 4.1 Real vector spaces  4.2 Subspaces | 2- 4- 7- 8-9 |  |
| **Week 8** |  |  |  |
|  | 4.2 Subspaces *(continued)* | 1(b,c)- 2(b,c,e) -3(a,c)- 7(a,b)- 9(a,b)- 10(a,c)- 11(a,b,d)- 12a-13 |  |
| **Week 9** |  |  |  |
|  | 4.3 Linear Independence  4.4 Coordinates and Basis | 1-4b-13-16-20e-21 |  |
| **Week 10** |  |  |  |
|  | 4.4 Coordinates and Basis (Continued)  4.5 Dimension | 3b-6-9a-12-15 |  |
| **Week 11** |  |  |  |
|  | 4.5 Dimension (Continued) | 3,6,7a,8b,9,10,12a,15,20 |  |
| **Week 12** | **Exam II** |  |  |
|  | 8.1 General linear transformations | 1- 3-4- 5- 7a- 10- 13- 16- 18- 20a,b – 21a,b- 23- 28- 29a- 31- 35- 38 |  |
| **Week 13** |  |  |  |
|  | 5.1 Eigenvalues and Eigenvectors  5.2 Diagonalization | 6a-7a-8a-23-24-28 | 9a-10a-11a-17-  T-F (b,c,e,f,g) |
| **Week 14** |  |  |  |
|  | 5.2 Diagonalization *(continued)* | 9-11-14-15-19-30-31 | T-F(e,f) |

# 8 Course Policies

* No make up exam should be done under normal circumstances. Consequently, students missing an exam, with no justified reason, will lose the grade value of that exam.
* Justified Make Up

Abnormal circumstances do occur and make up exams take place under the following conditions:

* 1. The student shows that missing the exam was beyond his/her control.
  2. The instructor and the chairperson accept the case presented and approve of the makeup.
  3. The students shall lose 10 points out of 100 of the grade value of the exam in question.
  4. The make up exam shall be done in 10 days after the elapse of the exam date.
* While understanding that we all are busy with school, work, and family, your decision to register for this course is an indication that you have made it a high priority. Thus, extensions of assignment due dates are given only in extreme situations (death of a close family member, hospitalization, etc.) and require documentation on your part. Otherwise, due dates are fixed and non-negotiable. All assignments should be submitted on or before the assigned due date. Assignments past the due date will not be accepted for full credit. Examples of unreasonable extensions for an assignment include frequent computer malfunctions, outside class-work, or job responsibilities that inhibit meeting the required deadlines. If you anticipate missing a deadline on an assignment, you should send an e-mail to your instructor before the deadline. Unexcused assignments submitted after the due date may be returned ungraded or assigned a lower evaluation. Whether an extension is allowed will be at the instructor's discretion.
* Assignments: All work must be typewritten (unless otherwise specified) and submitted in a professional manner. The instructor reserves the right to return, for resubmission, any work that is not neat, legibly, and professionally submitted.
* Mobile phones should be turned off and out of sight (i.e. not face-up on the desk but preferably inside purses, backpacks, briefcases, etc. or face down on the desk). Phones may not be answered.

***9 Attendance policy***

* *“The maximum number of absences for classes that meet on MWF is six, the maximum number for classes that meet on TTh and in the summer is four (or two hours per credit course). Any student whose absences exceed the maximum limits shall automatically fail the course unless the student withdraws”.*

The word “absences” above includes authorized (excused) as well as unexcused (unauthorized) absences. “*Even below the maximum number of absences, a pattern of absences, whether authorized or not, may alter one’s grade substantially”*.

Students who wish to validate their absences have to do so through the SAO, which *“alone authorizes absences”*. Finally, *“no absence absolves a student from the responsibility of acting upon the material presented during his/her absence”*.

*(Excerpts from “Student Handbook 2007-08, p. 59)*

* *“Students registering during the late registration day shall be responsible for all work assigned from the beginning of the semester or the session. They shall be also subject to the requirements of the attendance policy* (see a) above) *as of the first day of classes”*.

*(Excerpt from “Student Handbook 2007-08, p. 25)*

* *Attendance policy applies as of day one of the semester*, *on February 17, 2015.* *For students having joined their classes after the drop/add or the late registration period, the attendance policy applies as of the official time of registration in the course, not as of the student’s first appearance in class.*
* *A student having exceeded the maximum number of allowed absences may ask permission from his/her instructor to keep attending classes. However, he/she shall not be allowed to take any remaining quiz or final exam or to have any graded assignment, and he/she will be assigned an automatic UW. Even if the number of allowed absences has been exceeded after the date of official withdrawal from classes, the student will still get an automatic UW, and will not be admitted in any remaining quiz or final exam.*

**10** **Office Hours**

All instructors at NDU are available for office hours during the week. Please note the office hour that your instructor has dedicated to this course to make an appointment. Just dropping by may not ensure that the professor has set aside time to assist you. Office hours may be used ideally to ask for guidance on an assignment or to ask questions concerning a subject that you were not clear on during class time.

**11** **NDU's Academic Integrity Policy**

Students are expected and encouraged to be honest and to maintain the highest standards of academic integrity in their academic work and assignments at the University. They shall refrain from any academic dishonesty or misconduct including; but not limited to:

* Plagiarism; that is, the presentation of someone else's ideas, words or artistic, scientific, or technical work as one's own creation. Also, paraphrasing, summarizing, as well as well as direct quotations are considered as plagiarism, if the original source is not properly cited.
* Cheating.
* Assisting in cheating.
* Substituting a student in the taking of an examination.
* Substituting examination booklets.
* Submitting the same work for more than one course and the like. o Submitting papers written by others.
* Receiving or providing unauthorized help or assistance in any academic work or assignment. Intentional violation of program and degree requirements and regulation as established by the University.
* Dishonest reporting of computational, statistical, experimental, research, results, or the like.

**12 Use of Original Textbooks in the Classroom**

* *“The University does not allow photocopied textbooks in the classroom”.*
* *“Each course should identify whether or not a textbook is necessary”.*
* *“Students with photocopied textbooks in a classroom are given one week’s notice to use a printed copy”.*
* *“After the one-week notice students with photocopied textbooks are not accepted to be in the classroom”.*
* *“Students who are not accepted in the classroom are reported as absent and the absence policy”* (see “Attendance policy” above) *“is applied to them for that particular course”.*

*(Excerpts from “Faculty Handbook 2007-08, p. 35)*

**13** **Smoking policy**

NDU prohibits smoking in all indoor facilities”. This includes the FNAS premises. Consequently, students are asked to refrain from smoking when entering the FNAS building, and not only the classroom. “Disciplinary measures” against contravening students “may be taken starting from a written warning up to and including freezing student facilities and having a written remark on the student’s transcript of records.

(Excerpts from “Student Handbook 2007-08, pp. 65-66)

## 14 System of Grades

## The University uses the following system of grades. This system consists of letter grades with their corresponding numerical ranges (*i.e.* percentage equivalent, and the 4.0 point maximum).

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| --- | --- | --- | --- |
| **Grade** | **Description** | **Quality Point Value** | **Percentage Equivalent** |
| *A+* | Outstanding | 4.0 | 97-100 |
| *A* | Excellent | 4.0 | 93 - 96 |
| *A-* | Very Good | 3.7 | 89 - 92 |
| *B+* | Good | 3.3 | 85 - 88 |
| *B* | Good | 3.0 | 80 - 84 |
| *B-* | Good | 2.7 | 77 - 79 |
| *C+* | Satisfactory | 2.3 | 73 - 76 |
| *C* | Satisfactory | 2.0 | 70 - 72 |
| *C*- | Passing | 1.7 | 66 - 69 |
| *D+* | Passing | 1.3 | 63 - 65 |
| *D* | Lowest Passing | 1.0 | 60 - 62 |
| *F* | Failure | 0.0 | 0 - 59 |
| *UW* | Unofficial Withdrawal | 0.0  The grade “*UW”* is assigned by the instructor when a registered student has never attended a class or has ceased attending and has not submitted an official course withdrawal request to the Office of the Registrar. This grade is computed as an *F* grade in the grade-point average. | |

**Academic Calender**

**SPRING SEMESTER 2015**

|  |  |  |  |
| --- | --- | --- | --- |
| Feb. 10 | T |  | Orientation Sessions for New Students |
| Feb. 13 | F |  | DCE Session III Ends |
| Feb. 13,16 | F, M | 8:00-12:30/1:30-4:00 | Registration Period |
| Feb. 16-17 | M-T | 8:00 a.m.- 8:00 p.m. | DCE Registration for Session IV |
| Feb. 16 | M | 9:00 a.m. or 6:00 p.m. | DCE English Placement Test |
| Feb. 17 | T | 7:30 a.m. | Classes begin |
| Feb. 17-25 | T-W |  | Application for Sibling Grant |
| Feb. 18 | W |  | DCE Session IV Starts |
| Feb. 19 | Th | 8:00-12:30/1:30-4:00 | Late Registration (Classes are in session) |
| Feb. 24-25 | T-W | 8:00-12:30/1:30-4:00 | Drop and Add (Classes are in session) |
| Mar. 10 | T |  | Tuesday classes do not meet; Friday Classes Meet |
| Mar. 13 | F |  | Open Doors - NLC |
| Mar. 21 | Sat |  | Entrance examinations for Fall semester 2015 |
| Mar. 25 | W |  | Feast of the Annunciation: Holiday |
| Mar. 26, 27 | Th, F | 8:00 a.m. - 5:00 p.m. | Open Doors Main Campus |
| Mar. 31 | T |  | DCE Session IV Ends |
|  |  |  | Easter Mass |
| Apr. 1 | W | 9:00 p.m. | Easter vacation begins |
| Apr. 13 | M | 9:00 p.m. | Easter vacation ends |
| Apr. 14 | T | 7:30 a.m. | Classes resume |
| Apr. 14-15 | T-W | 8:00 a.m.- 8:00 p.m. | DCE Registration for Session V |
| Apr. 14 | T | 9:00 a.m. or 6:00 p.m. | DCE English Placement Test |
| Apr. 14-24 | T - F |  | Advising & preregistration period for Summer and Fall 2015 |
| Apr. 16 | Th |  | DCE Session V Starts |
| Apr. 20-June 16 | M-T |  | Application for Work Study Grant |
| Apr. 21 | T |  | Tuesday classes do not meet; Friday classes meet |
| Apr. 22 | W |  | Open Doors - Shouf Campus |
| Apr. 24 | F | 4:00 p.m. | Deadline for Fall Semester 2014 Incomplete grades |
| May 1 | F |  | Labor Day: Holiday |
| May 8 | F |  | Founder's Day - Main Campus (Classes are not in session) |
| May 15 | F |  | Founder's Day-NLC  (Classes are not in session) |
| May 22 | F |  | Founder's Day- Shouf Campus (Classes are not in session) |
| May 25 | M |  | DCE Session V Ends |
| May 26-27 | T-W | 8:00 a.m.- 8:00 p.m. | DCE Registration for Session VI |
| May 26 | T | 9:00 a.m. or 6:00 p.m. | DCE English Placement Test |
| May 28 | Th |  | DCE Session VI Starts |
| June 12 | F | 4:00 p.m. | Deadline for officially withdrawing from a course |
| June 16 | T | 9:00 p.m. | End of classes |
| June 17 | W |  | Reading Day |
| June 18-27 | Th-Sat |  | Final Examinations Period |
| June 24 | W |  | Reading Day |