Course Syllabus MTH 331 Section 101 Fall 2018

CourseTitle:	LinearAlgebra
CourseNumber:	MTH 331 -- Section 101 -- CRN 3047 -- Credit: 4 Hours
Textbook:	Linear Algebra with Applications, 5E by Otto Bretscher
SectionsCovered:	1.1-1.3, 2.1-2.4, 3.1-3.4, 4.1-4.3, 5.1-5.4, 6.1-6.3,7.1-7.5
Course Description:	Vector Spaces, matrices and determinants, systems of linear equations, linear transformations, eigenvalues, eigenvectors, andapplications.
Calculator:	TI-83 or higher, graphing calculators may not be allowed for some problems in some exams.
Prerequisites:	PR or CR: MTH 300 with "C" or higher
MeetingTime:	MTWR: 11:00 – 11:50AM
Classroom:	Smith Hall 518
Instructor:	Dr. Basant Karna
Office:	Smith Hall 715
OfficeHours:	MTWRF 9:00-10:00 AM, others by appointment
Phone/Email:	Phone: (304) 696-4332, Email: karna@marshall.edu
Webpage:	http://www.science.marshall.edu/karna/
Course Objectives:	Students successfully completing this course will: learn about vector spaces, matrices and their operations, determinants and applying them to solve system of linear equations, linear transformations, eigenvalues and eigenvectors and their applications.
CourseContents:	• Linear Equations • Linear Transformations • Subspaces of R^n and Their Dimensions • Linear spaces • Orthogonality and Least Squares • Determinants • Eignevalues and Eigenvectors
AttendancePolicy:	Attendance is required and you must come with your text. Attendance will be taken every class day either by sign-in-sheet or byquiz/homework. Absences which can be excused include illness, emergencies, or participation in another university activity. Documentation from an outside source must be provided.
Grading Policy:	*Quizzes*: Throughout the semester, there will be 5 quizzes given during the last 15 minutes of the class on every Thursday. Problems in quizzes will be given from assigned homework problems (textbook will not be allowed). *Exams:* There will be 3 exams given in class during the semester. *Homework Problems:* Five homework assignments will be collected. You are responsible for reading the text, working the exercises, coming to office hours for help when you're stuck, and being aware of the dates for the major exams. *Final Exam:* There will be a two-hour final exam on December 11.

Points Distribution:	Attendance 25 Pts 5 Homework Assignments 25 Pts Quizzes 50 Pts 3 Exams 300 Pts Final Exam 100 Pts -- Total Points: 500 Pts
Grades	The semester grade will be based on the percentage of the 500 total possible points, using the following scale. A: 90 -100 % , B: 80 - 89 %, C: 70 - 79 %, D: 60 - 69 %, F: 0 - 59 % Note: The class score will be posted on MUOnline: http://www.marshall.edu/muonline/
Make-ups:	*Quizzes*: For unavoidable missed quizzes with valid documentation, I will give you make up quiz within a week of the original quiz date. *Exams*: Making up a missed exam is possible only if you receive prior permission from me and only for serious and unavoidable circumstances. *Final*: If you don't take final exam, you will receive "F" for the class.
ExamDates:	Exam 1 – Sep 20, Exam 2 – Oct 18, Exam 3 – Nov 17 (Thursdays) Quizzes: Q1-Aug 30, Q2-Sep 13, Q3-Oct 4, Q4-Nov 1, Q5-Nov 29 (Thursdays) Final Exam: December 11 @ **10:15 AM** (Tuesday)
ImportantDates:	• August 27, Monday – "W" Withdrawal period begins • September 3, Monday – Labor Day – No Class • October 26, Friday – Last day to drop • November 19, Monday – November 24, Saturday – Thanksgiving Break • December 7, Friday – Last class day
Disruptive Actions:	If your actions become disruptive or distracting for me or another student, you will be asked to cease your behavior. If you choose to continue, you will be asked to leave. Disruptive behavior may include, but are not limited to the following: cell phone use in class, talking during class, and the use of iPods or MP3 players during class. These will count as **unexcused absences**.
University Policies:	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to http://www.marshall.edu/academic-affairs/policies/ Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment
Disable Students:	For University policies and the procedures for obtaining services, please go to MU Academic Affairs: University Policies and read the section, **Students with Disabilities**. http://www.marshall.edu/academic-affairs/policies/
Coming Late:	Students should come on time and stay in the class for entire class. If you are late by more than 5 minutes, you will be considered to be absent.

TeachingOutline

Week	Sections Covered andtopics
1	Section 1.1 (Introduction to Linear Systems) Section 1.2 (Matrices, Vectors, and Gauss-Jordan Elimination)
2	Section 1.3 (Solutions of Linear Systems; Matrix Algebra) Section 2.1 (Introduction to Linear Transformations and Their Inverses)
3	Section 2.2 (Linear Transformations in Geometry) Section 2.3 (Matrix Products)
4	Section 2.4 (The Inverse of a Linear Transformation) Section 3.1 (Image and Kernel of a Linear Transformation)
5	Section 3.2 (Subspaces of $\mathbf{R}^n$; Bases and Linear Independence) Review for Exam 1, **Exam 1**: Sections: 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1
6	Section 3.3 (The Dimension of a Subspace of $\mathbf{R}^n$) Section 3.4 (Coordinates)
7	Section 4.1 (Introduction to Linear Spaces) Section 4.2 (Linear Transformations and Isomorphisms)
8	Section 4.3 (The Matrix of a LinearTransformation) Section 5.1 (Orthogonal Projections and Orthonormal Bases)
9	Section 5.2 (Gram-Schmidt Process and *QR* Factorization) Review for Exam 2, **Exam 2**: Sections: 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 5.1
10	Section 5.3 (Orthogonal Transformations and Orthogonal Matrices) Section 5.4 (Least Squares and Data Fitting)
11	Section 5.5 (Inner Product Spaces) Section 6.1 (Introduction to Determinants)
12	Section 6.2 (Properties of the Determinant) Section 6.3 (Geometrical Interpretations of the Determinant; Cramer's Rule)
13	Section 7.1 (Dynamical Systems and Eigenvectors) Review for Exam 3, **Exam 3**: Sections: 5.2, 5.3, 5.4, 5.5, 6.1, 6.2, 6.3
14	Thanksgiving Break (No Class)
15	Section 7.2 (Finding the Eigenvalues of aMatrix) Section 7.3 (Finding the Eigenvectors of a Matrix)
16	Section 7.4 (More on Dynamical Systems) Section 7.5 (Complex Eigenvalues) Review for Final
17	**Final Exam**: December 11 @ 10:15 AM (Tuesday)

<u>Homework Problems</u>

-- HW 1 --
Section 1.1:2, 3, 4, 7, 9, 10, 11, **15**, 17, 24, 25, 26, 29, 30, 31, 46,**48**
Section 1.2:3, **5**, 8, 9, 10, 13, **15**, 17, 18, 31, 34, 35, 36, 37, **39**, **42**, 44, 45, 53,**55**,**68**, **72**, 74,76
Section 1.3:1-5, 9, 10, 11, 12, **14**, 17, 18, 19, 20, 22, 30, 32, 35, **36**, 46, **55**, **56**, 57
Section 2.1:1, **2**, **3**, **5**, 9 - 11, 13, 16, **17**, 19, **20**, 21,**22**, 25, **26**, 27 -29
-- HW 2 --
Section 2.2:1, **2**, 4, **5**, **6**, 7, 9, **10**, 11, 13, 15, 18, 19, **20**, **21**, 27, 28
Section 2.3:1, **4**, 7, 14, **17**, 21, **33**, 37, 43, **49**, **55**, 57
Section 2.4:1, 4, **5**, 7, 13, **14**, 16, 17, 19, **20**, 21, 22, 24, **29**, **32**, 33, **55**,**76**
Section 3.1:**1**, 2, 4, **5**, 6, **11**, 12, **15**, **16**, **17**, 18, **19**, 23, 24, 25, 41, 44
-- HW 3 --
Section 3.2:**1**, **2**, **3**, 7, 10, **11**, 14, **15**, 18, **19**, 20, 22, 23, 24, **28**, **29**, **32**, 33, **53**
Section 3.3:1, 2, 3, **6**, 7, 11, **15**, **16**, 19, **21**, **24**, **27**, 28, **29**, 30, 32, **47**, 62, 63, 64, 86
Section 3.4:1, 2, **5**, **8**, **9**, 12, **13**, **17**, 19, **20**, **22**, 25, **28**, 29, **31**, **59**, 60
Section 4.1:**1**, 2, **3**, 4, 6, **7**, **8**, **10**, 13, 14, **16**, 18, **20**, **21**, 25, 30, **31**, 33, **36**
-- HW 4 --
Section 4.2:**1**, 2, **5**, 7, **9**, **13**, 18, **19**, **23**, 28,**30**, 33, **42**, 43, **51**, **56**, 60,75
Section 4.3:**5**, 6, **7**, **9**, 11, **13**, 14, **19**, **23**, 24, **28**, 41, 44, **46**
Section 5.1:2, 3, **5**, 6, **8**, 9, 10, **12**, **15**, **16**, **17**, 22, 26, 27, **28**, 45
Section 5.2:**1**, **2**, **7**, 9, 10, **14**, **15**, **21**, 23, 27, **28**, **32**, 33, **35**, 36, **37**
-- HW 5 --
Section 5.3:1, **2**, **3**, **4**, **5**, **6**, **10**, **11**, **15**, **18**, **19**, **22**, 24, 25, **26**, 33, 34, **35**, 36, **37**, **40**, 41
Section 5.4:5, 9, 20, 21, 22, 25, 30, 31, 32
Section 6.1:1, 4, **5**, **8**, 10, **11**, 12, **17**, 18, **20**, **28**, **29**, **31**, 32, **35**, **38**, **42**, 44, 46
Section 6.2:**1**, **3**, **6**, **7**, **10**, **11**, **12**, 13, **15**, **16**, **17**, 18, **20**, **26**, **29**
-- HW 6 (Optional) ---------------------------
Section 6.3:**1**, **2**, **3**, **7**, 8, **12**, **13**, **14**, **22**, **23**, **24**, 30, **31**, **32**, **35**
Section 7.1:**1**, 2, **3**, **4**, 6, **8**, **10**, **12**, 13, **15**, 16, 18, 20, 24, 25, 26, 29, 30
Section 7.2:**1**, **2**, 3, 4, 6, **9**, 10, **12**, **13**, **15**, 19, 20, 21, **32**, 34, **45**
Section 7.3:1, 2, 4, 5, 6, 8, 10, 12, 14, 15, 17, 19, 21, 35, 36, 41, 45, 48, 49

Turn in at least **boldface** problems.
Due dates are **Mondays** after the Sections are covered.