

SYLLABUS
MAT 280
LINEAR ALGEBRA

SPRING 2009

Faculty Information

Instructor: R. Trent Codd, Jr., AA, BS, BSCS, MA, EASGC
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Office Hours: Monday 04:00-05:00 PM
Tuesday-Friday 11:00-12:00 PM

Course Information

Course Title: Linear Algebra
Course Number: MAT 280
Credit Hours: 3
Contact Hours: 3
Class Location: ELM 342
Class Meeting Time: Tuesday/Thursday 12:00-01:15 PM

Course Description This course provides a study of linear algebra topics with emphasis on the development of both abstract concepts and applications. Topics include vectors, systems of equations, matrices, determinants, vector spaces, linear transformations in two or three dimensions, eigenvectors, eigenvalues, diagonalization, and orthogonality. Upon completion, students should be able to demonstrate both an understanding of the theoretical concepts and appropriate use of linear algebra models to solve application problems. *This course has been approved to satisfy the Comprehensive Articulation Agreement general education core requirement in natural science/mathematics.*

Prerequisite: MAT 271

Textbook: David C. Lay, Linear Algebra and Its Applications, *Third Edition*, Addison Wesley Publishing Company, 2003

Course Goal: Upon completion, students should be able to demonstrate both an understanding of the theoretical concepts and appropriate use of linear algebra models to solve application problems.

Course Specific Competencies: Upon successful completion of the course, the student should be able to:

- solve linear equations in linear algebra.
- solve problems using matrix algebra.
- solve problems in vector spaces.
- evaluate eigenvalues and solve problems using eigenvectors.
- solve problems of orthogonality and least squares.
- solve problems using symmetric matrices and quadratic forms.

Reinforcement Experiences for General Education Cross-Curriculum Competencies

The course encapsulates reinforcement experiences for the general education cross-curriculum competencies:

- Communicate effectively in speaking, writing, reading, and listening.
- Locate, evaluate, and use information to analyze problems and make logical decisions.
- Apply math skills and/or natural science knowledge appropriately to organize, analyze and make information useful.
- Develop the ability to succeed as a self-directed learner.

Grading Policy: The class will operate according to a seminar model; you will play an active role in the teaching/learning process. You will have homework assignments and **6 chapter tests**. *Makeup tests will not be given.* If for any reason it is necessary for you to withdraw from this class, you must complete the appropriate form and submit it to the Records and Registration Office by the deadline. If you quit attending class without completing the appropriate forms your grade will become an "F". The final grade will be $\frac{3}{4}$ the average of your tests and $\frac{1}{4}$ the average of your homework and class participation scores. **A**(90-100), **B**(80-89),**C**(70-79),**D**(60-69), **F**(below 60)

Attendance Policy: To receive course credit, a student should attend a minimum of 80 percent of the contact hours of the class. Upon accumulating absences exceeding 20 percent of the course contact hours, the student may be dropped from the class with a grade of "U" at the discretion of the instructor. A tardy is defined as arriving late for class, leaving early, or being away from class without permission during class hours. Three tardies may constitute one absence.

Activity Schedule:

This schedule will be used for most approved and announced student activities.

Normal Class Time	Activity Day Schedule
8:00 am	8:00-8:40 am
8:30 am	8:20-9:00 am
9:00 am	8:45-9:25 am
9:30 am	9:05-9:45 am
10:00 am	9:30-10:10 am
10:30 am	9:50-10:30 am
11:00 am	10:15-10:55 am
11:30 am	10:35-11:00 am*
11:00 am-1:00 pm	Free for activities
12:00 noon	1:00-1:40 pm
12:30 pm	1:20-2:00 pm
1:00 pm	1:45-2:25 pm
1:30 pm	2:05-2:45 pm
2:00 pm	2:30-3:10 pm
2:30 pm	2:50-3:30pm
3:00 pm	3:15-3:55 pm
3:30 pm	3:35-4:15pm
4:00 pm	4:00 pm

* 25 minute period

Inclement Weather Schedule:

The College will close when weather conditions are such that driving is hazardous.

The following procedure will be observed for inclement weather conditions:

1. Announcements concerning school operation will be made by 6:30 am on local radio and TV stations for day classes. A voice mail message will be recorded on the switchboard. If it appears that ice or snow may be cleared by mid-morning, the schedule below will be followed and all College personnel and students should report by 10am.
2. Closing or delaying the day programs does not automatically close evening classes. Announcements will be made on radio stations and the College switchboard no later than 3pm concerning the evening classes.
3. When weather conditions dictate early dismissal of the day or evening classes, the announcement will be made by telephone to each building on campus.
4. Commuters should exercise personal judgment concerning highway conditions regardless of College announcements, particularly those commuting from outlying areas.
5. Adjustments in the College calendar for days missed because of inclement weather will be made at the end of the semester.

Normal Class Time	Delayed Opening
8 a.m.	10-10:40 a.m.
8:30 a.m.	10:20-11 a.m.
9 a.m.	10:45-11:25 a.m.
9:30 a.m.	11:05-11:45 a.m.
10 a.m.	11:30am-12:10 p.m.
10:30 a.m.	11:50am-12:30 p.m.
11 a.m.	12:15-12:55 p.m.
11:30 a.m.	12:35-1:15 p.m.
12 p.m.	1-1:40 p.m.
12:30 p.m.	1:20-2 p.m.
1 p.m.	1:45-2:25 p.m.
1:30 p.m.	2:05-2:45 p.m.
2 p.m.	2:30-3:10 p.m.
2:30 p.m.	2:50-3:30 p.m.
3 p.m.	3:15-3:55 p.m.
3:30 p.m.	3:35-4:15 p.m.
4 p.m.	4 p.m.

Important: If weather conditions become worse after the 6:30am announcement, an additional announcement closing school for the day will be made no later than 8:30am.

Oak Student Center will open at 8am for early arrivals.

Code of Student Conduct: Academic Dishonesty – You may not deceive any official of the college by cheating on any assignment, exam, or paper. This includes plagiarism, which is the intentional theft or unacknowledged use of another’s words or ideas. Plagiarism includes (but is not limited to) paraphrasing or summarizing another’s words **or works** without proper acknowledgement, using direct quotes of material without proper acknowledgement, or purchasing or using a paper **or presentation** written **or produced** by another. The faculty at A-B Tech **may** also consider presenting as original work a paper written for one class to satisfy a requirement in another class to be academic dishonesty.

Code of Classroom Conduct: Asheville-Buncombe Technical Community College is an institution for adult learning. It is a partnership between instructors with the desire to teach and students with the desire to learn. In order to create an appropriate environment for teaching and learning to flourish, there must be respect for the instructor and fellow students. Listed below are guidelines for classroom behavior which the College has established to ensure that the learning environment is not compromised.

1. **Attendance:** You are expected to be in class the entire class time. Do not enter late or leave early. Rare exceptions may be excused, particularly under emergency circumstances, but you should be prepared to explain your tardiness to the instructor after class. Likewise, the need to leave early should be explained to the instructor before class.
2. **Absences:** Inform the instructor in advance, if you know you are going to miss a class. Also, take responsibility for getting missed assignments from other students. Do not expect that you will be allowed to make up work, such as unannounced quizzes or tests, after an absence. Instructors are not responsible for re-teaching the material you missed because of absence.
3. **Conversation:** Do not carry on side conversations in class.
4. **Other Activities:** You may not work on other activities while in class. This includes homework for other courses or other personal activities.
5. **Internet:** In classes where Internet access is provided, you may use the Internet for valid, academic purposes only. You may not use it for open access to other non-academic sites which are unrelated to the course.
6. **Sleep:** Do not sleep in class.
7. **Attitude:** You are expected to maintain a civil attitude in class. You may not use inappropriate or offensive commentary or body language to show your attitude regarding the course, the instructor, assignments, or fellow students. Keep in mind that all electronic interactions (e-mail, chats, discussion forums, etc.) are extensions of the classroom and should be treated as such. Unacceptable language and behavior will be addressed as if you were sitting in the classroom.
8. **Profanity and Offensive Language:** You may not use profanity or offensive language in class.
9. **Cell phones and beepers:** You may not receive or send telephone calls or pages during class. You are responsible for turning off cell phones and beepers upon entering class.
10. **Guests:** You may not bring unregistered friends or children to class.
11. **Food, Drink, Tobacco Products:** You may not have food or drink in class. You may not use tobacco products in the buildings of A-B Tech.
12. **Personal Business:** You may need to transact personal business with the instructor, asking him or her to sign forms. Plan to do this before instruction begins or after class.

Typically, violations of the Code of Classroom Conduct will be dealt with as minor infractions. However, repetition of minor infractions or other more serious violations of the Code of Student Conduct may lead to removal from the classroom while the matter is resolved and referral to the Vice President for Student Services for disciplinary action.

NETIQUETTE

General

1. **Understand that typed messages lack cues normally associated with face-to-face conversation.**
Without these supporting cues for context, satire or sarcasm can come across in unintended ways.
2. **Use parenthetical explanation to explain meanings that might be misunderstood.**
3. **Do not criticize spelling or grammar but do check your own spelling, punctuation, and grammar.**
4. **Don't use all capital letters. In the online world, this is the equivalent of shouting and it is difficult to read.**
5. **All lowercase letters indicate mumbling.**
6. **Be brief and to the point.**

Subject Lines

1. Keep subject lines short.
2. Make subject lines informative by indicating the content of the message.
3. Make subject lines clear and unambiguous.

Replying

1. If you excessively reply to ongoing discussions and include the original message, your messages will be very long and hard to follow.
2. For simple messages, quoting the original message when replying will clarify your response.
3. Using carets to indicate lines of text that are quoted.

Email

1. Unless you are explicitly given permission, don't publicly post email sent to you in private.
2. Recognize that instant delivery of email does not guarantee an instant response.
3. If you are sending information from another source, pay attention to whether the material is copyrighted and cite sources.
4. For important messages, compose a draft in a word processor so you can spell check it.
5. Be careful when addressing emails. One character out of place, or a ".com" suffix when the person's email really ends with ".edu", and your message won't be delivered.
6. If it is going to take considerable time to reply fully, try to acknowledge receipt of a message promptly and let the sender know that you will answer.

Attachments

1. Do not send huge attachments.
2. When you're replying to a message that has an attachment, do not include the attachment again.
3. Avoid sending attached files that lack filename extensions (that's because some computers won't be able to open them).

Flaming

1. Do not flame! Flaming refers to derogatory, abusive, threatening, sarcastic, rude, or otherwise mean-spirited messages directed at people.
2. If a message provokes a negative emotional response, put it away for a while, then reread it and see if you're misinterpreting it. If you don't understand a particular item, ask the sender for clarification before replying to an incorrect conclusion.

3. Messages are not secure. Remember, it's very easy for someone else to forward messages you thought were confidential.
4. Apologize. If there's been a misunderstanding or miscommunication, you can often nip a flame war in the bud by a brief apology.
5. Don't write anything that you won't want other people to be able to see for a long time (posts can be archived for years).

Discussions

1. Lurk before you leap. Lurking is visiting without participating. While it's rude to make a habit of lurking, a little lurking can acquaint you with rules and procedures, help you get the "lay of the land," and prevent embarrassment.
2. Avoid posting non-informative messages on bulletin boards. Chat is more like a telephone, so saying "Me, too!" or "I don't know" is accepted. But on bulletin boards, people don't like to read postings that aren't substantive.

Chat

1. Remember that chat rooms are "logged" (i.e., a record is kept of conversations).
2. Do not disrupt chat rooms by pasting large blocks of text into the input box (thus causing the screen to scroll faster than other users are able to type) or otherwise act in a manner that negatively affects other users' ability to engage in real time exchanges.
3. If you are having a conversation that is off the main topic, please move to another chat room.
4. If you are a fast typist, please pause occasionally to let slower typists contribute to the discussion.

California State University at Fullerton

Excerpted from Bramucci, Robert. Cal State Fullerton.

Other Information: Additional help in math courses is available in The Learning Center, Laurel Building, Room 118. The hours are from 9am-6:30pm M-Th, and 9am-1:00pm on Friday.

Calculator: A graphing calculator is required for this course. The **TI-86/84** will be the calculator used by the instructor for instruction purposes.

Statement of Right to Make Changes: I reserve the right to make changes in the syllabus. Any changes will be announced in class.

MAT 280
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Content Outline

1. 1.1 Systems of Linear Equations : **exercises # 7, 19 – 22, 25**
 2. 1.2 Row Reduction & Echelon Forms : **exercises # 1 – 4, 7 – 14**
 3. 1.3 Vector Equations : **exercises # 1 – 2, 5 – 6, 17 – 21, 25, 26**
 4. 1.4 The Matrix Equation $Ax=B$: **exercises # 1 – 20, 27, 28**
 5. 1.5 Solution Sets of Linear Systems : **exercises # 1 – 12, 29 – 34**
 6. 1.6 Applications: **to be assigned**
 7. 1.7 Linear Independence : **exercises # 1 – 20**
 8. 1.8 Linear Transformations : **exercises # 1 – 6, 17 – 20**
 9. **** EXAMINATION 1 ****
 10. 2.1 Matrix Operations : **exercises # 1 – 11, 17**
 11. 2.2 Inverse of a Matrix : **exercises # 1 – 7**
 12. 2.3 Invertible Matrices : **exercises # 1 – 10**
 13. 2.4 Partitioned Matrices : **exercises # 1 – 10**
 14. 2.5 Matrix Factorizations : **exercises # 1 – 12**
 15. 2.6 Applications: **to be assigned**
 16. **** EXAMINATION 2 ****
 17. 4.1 Vector Spaces & Subspaces : **exercises # 1 – 14**
 18. 4.2 Null & Column Spaces, and Linear Transformations : **exercises # 1 – 16**
 19. 4.3 Linearly Independent Sets; Bases : **exercises # 1 – 16**
 20. 4.4 Coordinate Systems : **exercise # 1 – 12**
 21. 4.5 Dimension of a Vector Space : **exercise # 1 – 18**
 22. 4.6 Rank : **exercises # 1 – 6**
 23. 4.7 Change of Basis : **exercises # 1 – 2, 7 – 10**
 24. 4.8 Applications: **to be assigned**
 25. **** EXAMINATION 3 ****
 26. 5.1 Eigenvectors & Eigenvalues : **exercises # 1 – 18**
 27. 5.2 The Characteristic Equation : **exercises # 1 – 14**
 28. 5.3 Diagonalization : **exercises # 1 – 14**
 29. 5.4 Eigenvectors and Linear Transformations : **exercises # 1 – 2, 11 – 16**
 30. 5.5 Complex Eigenvalues : **exercises # 1 – 14**
 31. **** EXAMINATION 4 ****
 32. 6.1 Inner Product, Length, and Orthogonality : **exercises # 1 – 18**
 33. 6.2 Orthogonal Sets : **exercises # 1 – 13**
 34. 6.3 Orthogonal Projections : **exercises # 1 – 12**
 35. 6.4 Gram-Schmidt Process & QR Factorization : **exercises # 1 – 14**
 36. 6.5 Least-Squares Problem : **exercises # 1 – 12**
 37. 6.6 Applications: **to be assigned**
 38. **** EXAMINATION 5 ****
 39. 7.1 Diagonalization of Symmetric Matrices : **exercises # 1 – 12**
 40. 7.2 Quadratic Forms : **exercises # 1 – 6**
 41. **** EXAMINATION 6 ****
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Spring Semester - 2009

Registration: Current and Continuing Students	December 1 - 5
General Registration	December 8 - January 2***
Last Day to Pay Tuition and Fees	January 2*
<i>* Unpaid registrations will be deleted from the computer registration system at 4:30 p.m.</i>	
Late Registration	January 5 - 9
Last Day to Pay Tuition and Fees for Late Registration	January 9*
<i>* Unpaid registrations will be deleted from the computer registration system at 4:30 p.m.</i>	
New Student Welcome	January 9, 9:00 a.m.
Classes Begin	12-Jan
Schedule Adjustments	January 12 - 13
Minimester I	January 12 - March 9
Martin Luther King Jr. Day College Holiday	19-Jan
Late Start Semester First Class Day	20-Jan
Last Day to Drop for a Partial Refund (Full term)	22-Jan
Professional Development - 1/2 Day	17-Feb
Last Day to Apply for Spring Graduation	27-Feb
Minimester II	March 10 - May 12
Student Break or Inclement Weather Make-Up	13-Mar
Last Day to Withdraw from a full 16-week class	7-Apr
Spring College Holiday	13-Apr
Student Spring Break	April 13 - April 18
Last Day of Class/Examinations	May 12**
<i>** May 12 will be scheduled as a Friday make-up day</i>	
Spring Graduation	15-May
Total Class Days	80
<i>** Up to three days may be made up at the end of the semester or during spring break for inclement weather.</i>	
<i>***In person when college is open and when online registration is operational.</i>	

Dear Student,

Welcome to the Mathematics Department!

We look forward to working with you and providing you with the very best education in mathematics.

We are a seven-member team that boasts a combined experience of over one-hundred-fifty years in professional education. We are extremely proud of our services and our accomplishments, and we always strive to maintain the best of quality instruction and as well as adherence to high academic standards and goals. Because of this dedication, we enjoy an excellent academic reputation with the surrounding upper-division colleges and universities in the region. It is a high priority to maintain this reputation, and consequently the value of your degree.

In order to be successful in your Math class and to ensure that other students have the learning environment they deserve, we require that you adhere to the Code of Student Conduct located in your Student Handbook, and on your syllabus. A positive learning environment makes it much easier for any student to achieve their goals.

If it is necessary for you to discuss any personal issue with your instructor, it is imperative that you do so during their office hours or during an out of class appointment. We are happy to meet with you to talk about any issue that is relevant to your participation in class, or your grade in the course. We have appropriate and time-proven suggestions that should help you.

As a student at AB-Tech, it is expected that you to keep up with the class, turn in assignments on time, and take responsibility for your education. The instructor will assist you in every way possible that does not compromise the integrity of the course itself. Our reputation depends on it.

Again, Welcome to AB-Tech and have a great semester!

R. Trent Codd, Jr.; Chairman; AA, BS, BSCS, MA, EASGC; 38 years of experience

Jerry L. Ashe; Instructor; AA, BS, MS; 22 years of experience

Jackie Caldwell; Instructor; BS, MA; 20 years of experience

Karma Crouch; Instructor; BS, MA Ed; 23 years of experience

Valerie Martin; Instructor; AA, BA, MS; 8 years of experience

Tammy Pagan; Instructor; AA, BS, MS; 20 years of experience

Robby Webb; Instructor; BA, MA; 23 years of experience

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Your Acknowledgement

I have been provided access to the course syllabus, understand what is expected of me, and agree with the provision set forth in the syllabus.

Your name

Your student I.D. Number

Your signature

Date