Estd 1864

Forman Christian College, Lahore
(A Chartered University)
Department of Mathematics

Instructor Information:

Name: Dr. Wasiq Hussain
Professor of Mathematics
Ph.D. (University of Glasgow, Scotland, U.K., 1999),
M.Phil. (Quaid-i-Azam University Islamabad, 1995)
M.Sc. (Quaid-i-Azam University Islamabad, 1993)

Office: **S 356** Armacost (Science) Building

Office Hours: 03:15 PM to 04:15 PM (Monday), 11:10 AM to 12:10 PM (Thursday)

The **students not on campus** could **contact via WHATSAPP GROUP**: **LINEAR ALGEBRA FALL 2020** preferably during the same office hours.

Email: wasiqhussain@fccollege.edu.pk

Mobile: 03034442239

Course Information: **COURSE TRAILER (https://youtu.be/G9axiq7sepo)**

Title: Linear Algebra **Code:** Math 209 **Credits:** 3

Prerequisites: Math 103 (Introductory Linear Algebra) and Math 102 (Calculus I).

Class Room: **S-413**

Class Discussion Time: Tuesday and Thursday (12:30 PM - 01:45 PM)

Text Book: Elementary Linear Algebra, Applications Version, 8th Edition by Howard Anton and Chris Rorres.

Course Objectives:

Linear Algebra is an important course for mathematics, physics, economics and computer-science majors. Students apply the concepts and methods described in the syllabus and will become capable to solve problems using linear algebra, they will know a number of applications of linear algebra, and they will be able to understand the logic (proof) behind a particular phenomenon. The text and class discussion will introduce the concepts, methods, applications, and proofs; students will practice them and solve problems on graded assignments, and they will be tested in the final. For physics majors this subject has applications in quantum mechanics, economics majors will find it useful in courses like econometrics, computer-science students will see its application in computer graphics.

Learning Outcomes:

1) Understand, read and write the elementary results of Linear Algebra and acquire basic Mathematical knowledge.

2) Apply course knowledge creatively and critically to develop problem-solving skills based on logical and abstract explanation.

3) Students will be able to see the connections between the abstract topics like vector spaces/subspaces and applied topics like inner product spaces which will further help them to see the similarities between Linear Algebra and other courses e.g. Computer Graphics and Quantum Mechanics and feel confident to study those courses in the future.

4) Value the group learning environment by demonstrating ability for working in a group and help each other to develop interest in retaining and using the results throughout the course.

Course Requirements:

Students must arrive at class on time and **those coming after 15 minutes won't be allowed** unless there was an emergency and instructor was informed before the class. If there is a genuine reason for coming late and **not possible to inform the instructor then please stay outside**, class discussion could be done during office hours or by an appointment. **Inside** the **class room Mobile phones** will be **turned off** and **no one will sleep.**

According to the instructions from the higher authorities and COVID-19 situation we are going to **follow BASIC blended model (FLIPPED CLASSROOM)** in which we have **face-to-face sessions** that are **complimented** with **online material**/activities. **All** the **students** will **watch videos** (**My** Online **YOUTUBE LECTURES**) on **WEEKLY BASIS** available at: https://www.youtube.com/c/DrWasiqMathematicsUndergraduateLecturesMULTIMEDIA?sub_confirmation=1 in the **PLAYLIST** "**LINEAR ALGEBRA**".
Then we shall **use class-time** for **discussions** and **questions**.

> **YouTube RECORDED Multimedia Lectures** have been **prepared** with **full detailed calculations** using **power-point presentations** with **animations**. **All** the **students MUST WATCH EVERY LECTURE** on **weekly basis before attending** the **face to face class discussion** or **online discussion**.
>
> In my course **ATTENDANCE** is **NOT Compulsory** for **Class discussions** but it is **strongly recommended** to **attend class sessions** for **discussions** and **questions after watching** the **online lecture seriously. Online lecture** could be **watched more than once** and you **definitely find** it **useful.**

Working regularly, understanding the online lectures, solving problem sets, **doing assignments (to be graded)** will be very helpful to get an overall good grade. **IN FACT IT IS VERY IMPORTANT TO CONCENTRATE ON GETTING THE KNOWLEDGE NOT JUST THE GRADE.**

You are most welcome to discuss the assignments (to be graded) with me (after seriously attempting) but NO CHEATING/COPYING as THREE CHEATING OFFENCES are still applicable. ONLY SOFT COPIES of ASSIGNMENTS will be acceptable. GRADED ASSIGNMENTS should be submitted via MOODLE or EMAIL. I understand that this is really a difficult time but LATE SUBMISSION may RESULTS in GRADE REDUCTION so PLEASE COOPERATE and AVOID LATE SUBMISSION.

(*Read Student handbook* **Pages 25-27** available at http://www.fccollege.edu.pk/wp-content/uploads/2012/09/Final-Bacc-Handbook-2012.pdf)**,** following are the **consequences** for **cheating**:

First offence: a grade of zero will be assigned to the paper, report, quiz or test. The student's final grade for the class must be reduced by *at least* one letter grade. **Case** will be **reported** to **Vice Rector**.

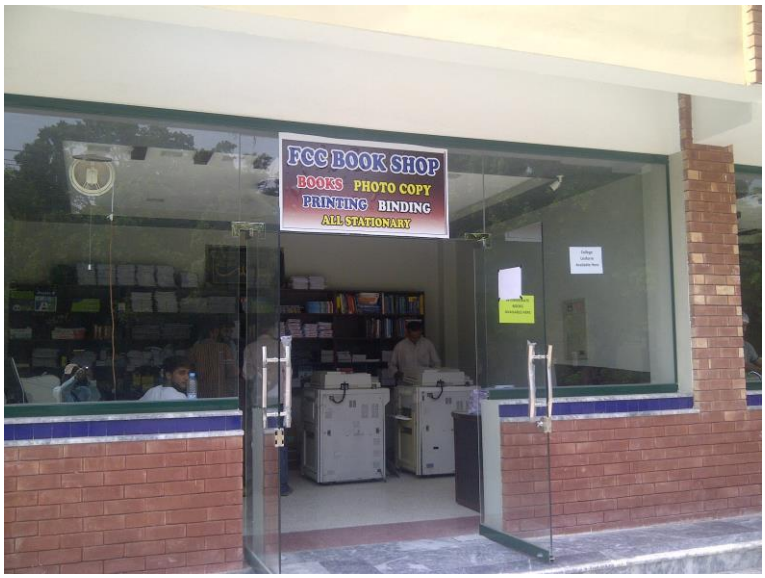
Second offence: an automatic dismissal from the course in which the second offence occurred with a resulting final grade of "F". **Case** will be **reported** to **Vice Rector**.

Third offence: the student will be called before an Academic Integrity Committee to show cause why the University should not suspend him or her. The Vice-Rector will convene such a hearing. **First offence** in **another course** will be **overall 3rd offence**, as **two already recorded before** that.

Technical Facilities:

Teaching will be done with the help of **RECORDED COLORFUL MULTIMEDIA YOUTUBE LECTURES,** for which**, important updates** will be **shared via Whatsapp and MOODLE**. *DUE TO COVID-19 SITUATION* **BUT BEARING IN MIND SAFETY MEASURES** *HARD COPIES* of Lectures and Problems Sets' Solutions *COULD BE OBTAINED FROM FCC BOOKSHOP*.

See the Picture of the bookshop:



Course Evaluation:

Grading will be based on following criteria (PROVIDED WE THROUGHOUT FOLLOW THE **BLENDED MODE**):

3 Assignments (**20% each on MOODLE or EMAIL**) **60%**

VIDEO ASSIGNMENT/PRESENTATION (RECORDED IN YOUR VOICE)
Duration: At least Minutes
(Submit on MOODLE or via GOOGLE DRIVE) 40%

Guidelines to do recording on MICROSOFT power-point 2010:
(Procedure may vary in other versions)
(1) Open PowerPoint Presentation
(2) Click "FILE".
(3) Click "Save and Send"
(4) Click "Create Video"
(5) DON'T click "Don't Use Record Timings and Narrations"
(6) Click "Record timing and Narration" and "START RECORDING".
(7) Once the lecture is complete press "ENTER".
(8) Click "Use Recorded Timings and Narrations" and click "PREVIEW".
(9) If "PREVIEW" is correct then stop which means CLICK "X" and do step "4" and click "Create Video" and save with a different name.
(10) Don't save the actual file (which was made on power-point).

IMPORTANT NOTES:
(1) Never go back to previous slide otherwise recording of previous slide disappears.
(2) Don't speak at the change of slide or going to next slide.
(3) LASER POINTER: CTRL+LEFT MOUSE CLICK
(4) LASER POINTER STOPS as SLIDE CHANGES.

MORE GUIDE-LINES to make the Presentation Understandable:

(1) Information must be presented in a logical sequence.

(2) Introduction is attention-getting, lays out the problem well, and establishes a framework (structure) for the rest of the presentation.

(3) Presentation contains accurate information and must be communicated using correct vocabulary and grammar.

(4) Voice must be clear and audible.

(5) Delivery must be poised (balanced), controlled, and smooth.

(6) Good language skills and pronunciation should be used.

(7) Visual aids are well prepared, informative, effective, and not distracting.

(8) Length of presentation should be within the assigned time limits.

(9) Presentation guarantees that the student clearly understands the topic in-depth and presented his/her information convincingly.

(10) Video must be edited effectively.

NOTE: Power-point presentation could also be **recorded** on **other soft-wares like ZOOM.**

Grades	Quality Points	Numerical Value	Meaning
A	4.00	93-100	Superior
A-	3.70	90-92	
B+	3.30	87-89	
B	3.00	83-86	Good
B-	2.70	80-82	
C+	2.30	77-79	
C	2.00	73-76	Satisfactory
C-	1.70	70-72	
D+	1.30	67-69	
D	1.00	60-66	Passing
F	0.00	59 or below	Failing

WEEKLY SCHEDULE

Week/Weeks (Starting Date)		Reading Material from Book
(1) **1st NOV.**	1) Discussion of Course Plan 2) Vector Spaces (Review)	Pages: 203 - 210

(2) **8th NOV.**	Subspaces and Basis	Pages: 211 - 221 and 231 - 245
(3) **15th NOV.**	*Row* Space, *Column* Space, and *Null* Space. **ASSIGNMENT NO. 1 (DUE DATE: 10th DEC.)**	Pages: 246 - 259
(4) **22nd NOV.**	*Row* Space, *Column* Space, and *Null* Space. (Continuation from week 3)	Pages: 246 - 259
(5) **29th NOV.**	*Rank* and *Nullity*.	Pages: 259 - 273
(6) **6th DEC.**	*Rank* and *Nullity* (Continuation from week 5)	Pages: 259 - 273
(7) **13th DEC.**	Norm, Dot product and Vector Projections **ASSIGNMENT NO. 2 (DUE DATE: 14th JAN.)**	Pages: 126 -135
(8) **20th DEC.**	Inner Product Spaces	Pages: 276 - 286
(9) **3rd JAN.**	*Orthonormal* Bases	Pages: 298 - 302

(10) **10th JAN.**	Gram-Schmidt Process	Pages: 303 - 311
(11) **17th JAN.**	Eigenvalues and Eigenvectors **ASSIGNMENT NO. 3 (DUE DATE: 11th FEB.)**	Pages: 337 - 346
(12) **24th JAN.**	Diagonalization	Pages: 347 - 351
(13) **31st JAN.**	Application of Diagonalization	Pages: 352-356
(14) **7th FEB.**	*Orthogonal* Diagonalization	Pages: 357 - 360
(15) **14th FEB.**	Application of *Orthogonal* Diagonalization	Pages: 361 - 363
(16) **21st FEB.**	**Final exams/assessments start. Date will be announced later.**	

One More Facility: "10 COURSE PACKS" have been made available in the Library, which students can issue for 5 days, which contains all the selected pages of your text book which are indicated in the 15 weeks schedule.