



**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 can also contact via **WHATSAPP GROUP: (Mechanics 302: Spring 2022)**.

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## Course Information:

**Title:** Mechanics                      **Code:** Math 302                      **Credits:** 4

**Prerequisites:** Math 203 (Vector Analysis)    **Classroom:** S-413

**Class Times:** Monday and Wednesday (12:00 PM - 01:15 PM)  
Friday (12:00 PM -12:50 PM)

**Textbook:** Introduction to Mechanics (Edited by Q. K. Ghori) and published by West Pak Publishing Company (PVT.) LTD., Lahore (Revised Edition).

**Reference Book:** Principles of Mechanics (3<sup>rd</sup> Edition, 1959) or *any edition* by John L. Synge and Byron A. Griffith, International Student Edition (McGraw-Hill), Also reproduced by the National Book Foundation and reprinted by Ali Majeed Printers in 1982.

## **Course Objectives:**

This course is to introduce the principles of mechanics with emphasis on their analysis and application to practical problems in Statics (bodies at rest) and Dynamics (bodies in motion). After learning this course, students should have the ability to:

- 1) Solve for the resultants of force systems
- 2) Determine the equivalent force system
- 3) Solve the Statics problems associated with friction forces
- 4) Describe the motion of a particle in terms of its position, velocity, and acceleration.
- 5) Use the equation of motion to describe the accelerated motion of the particle.

## **Learning Outcomes:**

- 1) Understand, read, and write the elementary results of Mechanics and acquire basic Mathematical knowledge.
- 2) Apply course knowledge creatively and critically to develop problem-solving skills based on logical explanation.
- 3) Students will be able to see the connections between the mathematical topics like Vectors, and Differential Equations with applied topics like Composition of forces, equations of motion, respectively which further help them to see the similarities between this course and other courses e.g. Classical Mechanics, 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 10 minutes won't be allowed** unless there was an emergency and instructor was informed before the class. Students should remain in class for the entire class period and could only leave if there is an emergency but instructor must be informed in advance. If there is a genuine reason for coming late and **not possible to inform the instructor then please stay outside, lecture briefing will be given** and **average marks** of a **missed quiz** could be **given**. **Inside the class room Mobile phones will be turned off and no one will sleep.**

There is **no make up for missed quizzes** but **BEST 5 OUT OF 6 WILL BE COUNTED**. In extreme cases average marks for the missed quizzes might be given provided students should submit strong evidence **within 3 days** after missing the quiz. Make up for mid-term and final exam is possible only under extreme cases if student provides strong documentary evidence **within 3 days** after missing the Mid/Final. In case of make-up exam there will be a 0-20% deduction in marks depending upon case to case basis. **Medical Certificate** will be **acceptable** if it is **verified** by the **medical officer (mercy health centre)** of **FCC (A Chartered University)**.

We have **face-to-face sessions** that are **complimented** with **online material/activities**. **All the students** can also **watch videos** (My Online **YOUTUBE LECTURES**) on **WEEKLY BASIS** available at:

[https://www.youtube.com/c/DrWasiqMathematicsUndergraduateLecturesMULTIMEDIA?sub\\_confirmation=1](https://www.youtube.com/c/DrWasiqMathematicsUndergraduateLecturesMULTIMEDIA?sub_confirmation=1) in the **PLAYLIST “MECHANICS”**.

**YouTube RECORDED Multimedia Lectures** have been **prepared** with **full detailed calculations** using **power-point presentations** having **animations** and **pictures**. **All the students MUST WATCH LECTURES** on **weekly basis** in **addition to face to face class sessions** and **online discussion**.

It is **strongly recommended** to **attend class sessions** and **watch the online lectures seriously**. **Online lecture** could be **watched more than once** and you **definitely find** it **useful**.

Working regularly, understanding the lectures, solving problem sets (practice questions), 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.**

These steps have been taken to maintain discipline and making course understandable but not to put pressure on the students and to **avoid** using the illegal ways like **cheating** to pass the exams.

(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**.

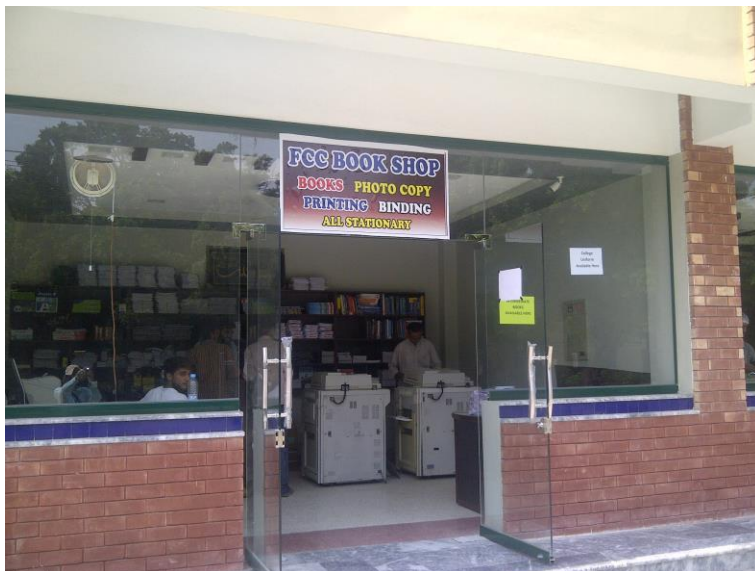
**Third offence:** the student will be called before an Academic Integrity Committee to show cause why the University should not suspend him or her. The Vice-Rector will convene such a hearing. **First offence in another course** will be **overall 3<sup>rd</sup> offence**, as **two already recorded**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

## **Technical Facilities:**

Teaching will be done with the help of multimedia slides and there will be **no** need to copy notes *unless* asked to do so.

Please don't forget to watch the **RECORDED COLORFUL MULTIMEDIA YOUTUBE LECTURES**, for which, **important updates** will be **shared via Whatsapp and MOODLE**. **Soft Copies (Lectures and Problems Sets' Solutions)** will be made **available via 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 (Next to Students' Services and Cafeteria)**.

See the Picture of the bookshop:



Task is that the time spent in writing on board will be saved in explaining the concepts and the time spent to copy from the board must be spent in understanding the concept. Please don't hesitate to ask where you don't understand and try your best to ask intelligent questions (showing that you paid attention). **Students can save all the soft copies of course notes (Lectures and Practice Questions Solutions) on a pen drive.**

## Course Evaluation:

Grading will be based on following criteria (**provided we remain face to face throughout the semester**):

Quizzes (6 and <b>best 5</b> will be counted)	30%
Mid Term	30%
Final Exam	40%

**NOTE: ASSESSMENTS MIGHT CHANGE IF WE GO ONLINE**

<u>Grades</u>	<u>Quality Points</u>	<u>Numerical Value</u>	<u>Meaning</u>
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

Week/Weeks (Starting Date)		Reading Material from Book
(1) 7 <sup>th</sup> March	1) Discussion of Course Plan (Physical and on Moodle)  2) Components of a Force	Pages: 13-14
(2) 14 <sup>th</sup> March	Composition of Concurrent Forces  <b>QUIZ-1 (from First Week Course) on Friday (18<sup>th</sup> March)</b>	Pages: 15-17
(3) 21 <sup>st</sup> March	The $(\lambda, \mu)$ Theorem	Pages: 18-20
(4) 28 <sup>th</sup> March	Equilibrium of a Particle  <b>QUIZ-2 (from 2nd and 3rd Weeks' Course) on Friday (1<sup>st</sup> April)</b>	Pages: 21-24
(5) 4 <sup>th</sup> April	Moment of a Force about a Point	Pages: 25-26
(6) 11 <sup>th</sup> April	1) Friction 2) Laws of Friction  <b>QUIZ-3 (from 4th and 5th Weeks' Course) on Monday (11<sup>th</sup> April)</b>	Pages: 103-104 Pages: 105

<p>(7) 19<sup>th</sup> April</p>	<p>Angle of Friction</p>	<p>Page: 107-108</p>
<p>(8) 25<sup>th</sup> April</p>	<p>Equilibrium of a particle on a Rough Inclined Plane and related applications</p>	<p>Pages: 109-111</p>
<p>(9) 9<sup>th</sup> May</p>	<p>Examples related to “Friction”  <b>MID-TERM (On Friday 13<sup>th</sup> May)</b> <b>Mid-Term Course: Topics covered in first 8 Weeks Lectures</b></p>	<p>Pages: 112-114</p>
<p>(10) 16<sup>th</sup> May</p>	<p>Problem solving related to “Friction”</p>	<p>Pages: 116-117</p>
<p>(11) 23<sup>rd</sup> May</p>	<p>More problem solving related to “Friction”  <b>QUIZ-4 (from 9<sup>th</sup> and 10<sup>th</sup> Weeks’ Course) on Friday (27<sup>th</sup> May)</b></p>	<p>Pages: 118-119</p>
<p>(12) 30<sup>th</sup> May</p>	<p>Velocity and Acceleration</p>	<p>Pages: 138-141</p>
<p>(13) 6<sup>th</sup> June</p>	<p>Motion with constant acceleration  <b>QUIZ-5 (from 11<sup>th</sup>, 12<sup>th</sup> Weeks’ Course) on Friday (10<sup>th</sup> June)</b></p>	<p>Pages: 150-152</p>
<p>(14) 13<sup>th</sup> June</p>	<p>Problems involving “Motion with constant acceleration”</p>	<p>Pages: 167-168</p>

<p>(15) 20<sup>th</sup> June</p>	<p>Motion with variable acceleration</p> <p>Problems involving “Motion with variable acceleration”</p> <p><b>QUIZ-6 (from 13<sup>th</sup>, 14<sup>th</sup> Weeks’ Course) on Friday (24<sup>th</sup> June)</b></p>	<p>Pages: 153-157</p> <p>Pages: 169-170</p>
<p>(16) 27<sup>th</sup> June</p>	<p><b>Final exams/assessments start. Date will be announced later.</b></p>	

**Quizzes/Exams Distribution:** Quizzes/Exams will be distributed in the class but if anyone is going to be absent then he/she should get quizzes from the class representative. Quizzes/Exams will be **discussed** within **first three days only** (after the quiz/exam).