Course Name: **Statistical Packages and Data Analysis**

Course Code: STAT 315	**Course Type:** Elective	**Course Credits:** 3
Class Timings: 12:30 – 01:45 p.m. **(Tue, Thu)**	**Section:** A Room: S – 420	**Office Hours (In-person):** 1100 to 1200 p.m MWF Take appointment for online consultation

Instructor Name: **Muhammad Anwar Mughal *Ph.D.***

A Note from the Instructor:

- *Policy for in-class students*

- *Lectures will be delivered in class face to face*
- *Recorded Lecture and reading Material will be uploaded on Moodle*
- *Quizzes will be accomplished through Moodle during Class time. Dates will be announced in-class as well as on Moodle*
- *Assignments will be posted on Moodle and submissions are also executed through Moodle.*
- *Feedbacks will be uploaded on Moodle.*

-Policy for online students

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Instructor Contact Details

Email: anwarmughal@fccollege.edu.pk

Office Hours (In-person): Monday Wednesday Friday- 11:00 to 12:00 p.m.

Guidelines for contacting instructor:

- For on-line consultation make an appointment via email

Course Description:

Pre-requisites if any:

Mode of Instruction: Asynchronous/ Synchronous

Mode of peer-to-peer Contact Among Students: online discussion forums

Main Mode of Instruction: *Moodle, Google meet*

Technology Requirements:

- Students need to have a computer/ laptop/ **R-4.1.1 for hands-on practice**

Technology Etiquettes

- In scheduled classes Students are recommended to log in at least 10 minutes before the start of the session to do the necessary checks, specifically for students

- Be sure to name yourself for your slot on the screen. It will make it easy to get a report of the students' attendance. If your slot carries a different name, to rename: click 3 dots near your video window OR in the participants' list, hover over your name, and click "rename" to make the change
- Please stay muted when not speaking.
- Please turn off your video during class.
- Be respectful of others' opinion.
- If the session is recorded do not post isolated comments that may be taken out of context.

Considerations for Students with Limited Internet/Technology Access:

- Student with limited internet connections may send an email to instructor with their concern.

OPTIONAL]: Program Objectives Addressed (which goals of the academic program/department does this course address?)

A. Demonstrate knowledge about basic statistical concepts, terms and techniques
B. Analyze various types of data and interpret the results effectively
C. Think critically about applications of Statistics in various fields
D. Practice high moral and ethical values in their personal and professional lives and in their communities

Course objective/learning outcomes

At the end of the course the student will:

1. Enter the data, summarize the data and analyze the data
2. Draw various types of graphs.
3. Construct R codes for any kind of situation

Course Content, Learning Material & Activities Schedule

Wk	Topic/ Title	Teaching-Learning Activities		Assessment & Rubrics
		Synchronous (Simultaneously conducted) *Presentation / Lecture* *Live Video-Audio* *Small Group Discussion/ Breakout Rooms* *In-class quiz* *Q&A/ Live Chat*	**Asynchronous** (postal/ Moodle/ email) *Discussion blogs* *WhatsApp* *Readings* *Moodle Quizzes* *Assignment Submission* *Online Content/ Recordings* *Lecture notes/ Annotated PPT* *Experiential learning*	
		In-Person	Off-campus and offline	

1	Introduction and preliminaries, The R environment, Related software and documentation, R and statistics, R and the window system , Using R interactively, An introductory session, Getting help with functions and features, R commands, case sensitivity, etc., Recall and correction of previous commands, Executing commands from or diverting output to a file, Data permanency and removing objects	In-class lecture	Moodle, Readings, PowerPoint Presentations, Lecture recording	
2	Simple manipulations; numbers and vectors, Vectors and assignment, Vector arithmetic, Generating regular sequences, Logical vectors, Missing values, Character vectors, Index vectors; selecting and modifying subsets of a data set, Other types of objects	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	
3	Objects, their modes and attributes, Intrinsic attributes: mode and length, Changing the length of an object, Getting and setting attributes, The class of an object, Ordered and unordered factors, A specific example: The function tapply(), Ordered factors, Arrays and matrices, Arrays, Array indexing. Subsections of an array.	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	Assignment 1

4	Index matrices, The array() function, Mixed vector and array arithmetic. The outer product of two arrays, Generalized transpose of an array, Matrix facilities, Matrix multiplication, Linear equations and inversion, Eigenvalues and eigenvectors, Singular value decomposition and determinants	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	
5	Least squares fitting of simple and multiple linear regression lines, Forming partitioned matrices, cbind() and rbind(), Frequency tables from factors, Lists and data frames	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	Assignment 2
6	Lists, Constructing and modifying lists, Data frames, Making data frames, attach() and detach(), Working with data frames, Reading data from files, The read.table() function	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	
7	The scan() function, Accessing built in datasets, Loading data from other R packages, Editing data, Probability distributions, R as a set of statistical tables, Examining the distribution of a set of data	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	Assignment 2
8	One-and two-sample tests, Grouping, loops and conditional, execution, Grouped expressions, Control statements, Conditional execution: if statements.	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	
MIDTERMS/Project				

9	Repetitive execution: for loops, repeat and while, Writing your own functions, Simple examples, Defining new binary operators, Named arguments and defaults, Assignments within functions, More advanced examples	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	
10	Classes, generic functions and object orientation, Statistical models in R, Defining statistical models; formulae, Linear models, Analysis of variance, ANOVA tables, Comparison tests	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	Assignment 3
11	Graphical procedures, High-level plotting commands, The plot() function, Displaying multivariate data, Display graphics, Multiple graphics devices, Dynamic graphics	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	
12	Construction of R-codes for control charts.	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	Assignment 4
13	Chi Square test of independence Cont.	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	
14	Programming and Simulation Programs	In-class lecture, hands-on practice on **R**	Moodle, Readings, Lecture recording	Assignment 4
15	**CULMINATING PROJECT DISCUSSION**			
16	**FINAL EXAM/FINAL PROJECT**			

'Out-of-class' Study Required (across all 3 categories of students -- those attending in-person, online, or asynchronously)

1. Quizzes will be online at the time of class
2. Students are expected to study 3 hours a week
3. If you have any questions please join online office hours
4. Assignment submissions will be on Moodle

Textbooks, Materials, Supplies and other Resources

1. Richard A. Becker, John M. Chambers and Allan R. Wilks (1988), *The New S Language.* Chapman & Hall, New York. This book is often called the "*Blue Book*".
2. John M. Chambers (1998) *Programming with Data*. Springer, New York. This is also called the "*Green Book*".

3. John A. Rice (1995), *Mathematical Statistics and Data Analysis.* Second edition. Duxbury Press, Belmont, CA.

- W. N. Venables, D. M. Smith and the R Core Team (2016): *Introduction to R.*
- **Useful Website:** http://cran.r-project.org/

Course Requirements:

Class Participation

Attendance and participation in discussions

Assignments

Note: The topics and numbers of (Assignments and quiz) are tentatively suggested above it may vary according to situation.

Assigned Readings

Practice data /case studies /articles

The breakup is as follows:

Class Participation	5%
Assignments:	30%
Midterm/Project:	25%
Final Project:	40%
TOTAL	**100%**

[OPTIONAL] Missed Assignments/ Make-Ups/ Extra Credit

- No delayed assignments.
-No Make-up class and exam
-No retake exam

Attendance Policy:

If a student does not attend a minimum of 70% of total classes, he/she will not be permitted to take the final examination in the course.

Classroom Participation:

Students must participate in classroom for class activities and may ask questions related to lesson taught.

Grading Legend

Below is the grading legend of FCCU (published in all catalogues and available on the FCCU website) as approved by the Academic Council and applies for Fall as well

Grade	Point Value	Numerical Value	Meaning
A	4.00	93-100	Superior
A-	3.70	90-92	

B+	3.30	87-89	Good
B	3.00	83-86	
B-	2.70	80-82	
C+	2.30	77-79	Satisfactory
C	2.00	73-76	
C-	1.70	70-72	
D+	1.30	67-69	Passing
D	1.00	60-66	
F	0.00	59 or below	Failing

Student Conduct & Other Issues:
- Consider including ground rules for appropriate classroom interactions, as well as a clear statement of expectations that classroom interactions will remain civil, respectful, and supportive.
- If any student faces any issues or has any concerns regarding the classroom climate and interactions, please feel free to contact VR office gloriacalib@fccollege.edu.pk

Changes to the Syllabus:
This syllabus was designed to convey course information and requirements as accurately as possible. It is important to note however that it **may** be subject to change during the course depending on the needs of the class and other situational factors. Such changes would be for your benefit and you will be notified of them as soon as possible.

Student Support Services
- Student Counseling Services
- Writing Center
- Mercy Health Center

Other Useful Policy Documents:
- Sexual Harassment Policy
- Anti-Corruption Policy
- Academic integrity
- Plagiarism Policy
- Academic Calendar

I expect that you will strictly follow the core values of FCCU and put your entire efforts to learn as per the course requirements, attend classes, read the textbook(s)/other assigned reading material and do the assignments in the stipulated time period

Developed by CLT (2020) from:
FCC Policy for Fall Semester 2020
https://www.aascu.org/
https://blended.online.ucf.edu/

Note:
Pl see https://unitguides.mq.edu.au/ for additional options. Macquarie University has their syllabus online (called Unit Guides and are publicly viewable)
See additional information for Syllabus Checklist and for How to Create a Syllabus

Please also consider High Impact Practices for your classes