# Course Outline

| Course Name: | Probability & Probability Distributions | | |
|---|---|---|---|

| Course Code:<br>STAT 102/ MATH 105 | Course Type (elective, major)<br>Major | Course Credits:     3 |
|---|---|---|
| Class Timings: MWF<br>11:00-11:50 A.M | Section:      B | OfficeHours: Tue,Thr<br>10:00 A.M-12:00 NOON |

**Instructor Name:**  Samia Ayub, Department of Statistics FCCU

**A Note from the Instructor:**
- ❖ Lectures will be delivered in class face to face.
- ❖ Lectures and reading Material will be uploaded on Moodle
- ❖ Quizzes will be performed during class time.
- ❖ I will upload the statements of assignment(s) on Moodle and submissions will be considered as hard copy during class timings.
- ❖ Dates for all assessments will be announced during classes.

**Instructor Contact Details**
Email: samiaayub@fccollege.edu.pk
`Office# S-415
Office Hours: 10:00pm-12:00pm Tue,Thr
Guidelines for contacting instructor:  Students can contact me during office hours or can take appointment via email. Students can email during weekdays and wait until I respond.

**Course Description:**
Pre-requisites if any: NA
Mode of Instruction: in-class lectures
Mode of peer-to-peer Contact Among Students: online discussion forums

**Technology Requirements:**
- ❖ During class students should have: a computer/ a laptop/ a smartphone with installed scientific calculator in it/ calculator.
- ❖ During exams scientific calculator is mandatory and smartphone is not allowed.

Main Mode of Instruction: in-class lectures. Reading material, statements of the assignments will be uploaded on Moodle.

**Course Objectives/By the end of the course students will be able to:**

This course is designed to give students, a conceptual knowledge of probability and its applications in various filed of life. Most of the contents included in the course are fundamental to probability theory in the disciplines, such as business and management, the life sciences, the computer sciences, pure sciences, and the social sciences etc. It is expected that after successful completion of course students would be able to concentrate on the many applications of probability theory in their respective disciplines.

**Student Learning Outcomes**:

At the end of the course the student would be able to:
1) understand the basic concepts and applications of counting rules and probability.
2) use probability concepts and laws in decision analysis.
3) Understand the concept and applications of random variables.
4) understand the well-known discrete probability distributions and can find out probability with the help of these distributions.
5) find probabilities using normal distribution.

## Course contents, Learning Material & Activities Schedule

| Week # | Topic/Title | Instructional Material | Assessment |
|---|---|---|---|
| 1 | Concepts of set theory, | | |
| 2 | rules of counting | | |
| 3 | Different approaches of probability and their applications. | | Quiz#1 (Rule of Counting) |
| 4 | Laws of probability and their uses. | Power point presentations, worksheets and reading material | Assignment # 1 (Rule of counting and laws of Probability) |
| 5 | Conditional Probability | | |
| 6 | Multiplicative rule and independence | | Quiz # 2 (laws of Probability and Conditional Probability) |
| 7 | Bayes' Rule | | |
| **Mid-exam** | | | |
| 8 | Concept of Random variable. Probability distributions of discrete RV with Properties | | |
| 9 | Probability distributions of continuous RV with properties | Power point presentations, worksheets and reading material | Assignment # 2 (Bayes Rule, applications of Discrete RV and Continuous RV) |
| 10 | Discrete joint probability distributions. | | |
| 11 | Continuous joint probability distributions. | | Quiz # 3 (Random variable) |
| 12 | applications of Binomial; Hypergeometric distributions in daily life. | | |

| 13 | Applications of Poisson distribution in daily life | | Assignment # 3 (Applications of Binomial, hypergeometric, Poisson) |
|---|---|---|---|
| 14 | Applications of Geometric and negative Binomial Distributions in daily life | | |
| 15 | Normal Distribution with applications | | Quiz # 4 (discrete probability distribution) |
| 16 | **Final Project** | | |
| | **Final Exams** | | |

## Textbooks:

1. Walpole, R. E., Mayer, R. H., Mayer, S. L. and Ye K. E. (2018) "Probability and Statistics for Engineer and Scientists" Prentice Hall, New York. 9th Edition.

2. Hogg, R.M. and Craig, A.T. "Introduction to Mathematical Statistics" Prentice Hall, Engle Wood Cliffs, New Jersey.

3. Mood, A. M, Graybill, F. A. and Boss, D. C. "Introduction to the theory of statistics" Mc Graw Hill, New York

4. Stirzaker, D. "Probability and Random Variables". Cambridge University Press, Cambridge.

5. PETALE, M. D. (2019). Probability and Probability Distribution: Engineering and Mathematics. Copyright © Petale, M. D.

6. Thomopoulos N. T. (2018). Probability Distributions. Springer International Publishing AG, part of Springer Nature**.**

## Course Requirements:

Class Participation: Class attendance; participation in class activities and discussions

**Quiz 1:** Topic: Rules of Counting

**Quiz 2:** Topic: Laws of Probability and Conditional Probability

**Quiz 3:** Topic: Random Variable and its Probability Distributions

**Quiz 4:** Topic: Discrete probability distributions

**Assignment 1:** Rule of counting and laws of Probability

**Assignment 2:** Bayes Rule; applications of discrete RV; continuous RV and their probability distributions

**Assignment 3:** Applications of Binomial, hypergeometric, Poisson distributions

**Assigned Readings:** Practice questions/worksheets and readings.

## 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

| Grades | Quality Points | 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 |
| NS | 0.00 | 0.00 | Did not show up in class |
| W | - | - | Officially Withdrawn |
| AW | - | - | Administrative Withdrawal/Dismissal |
| AU | - | - | Audit/Listener Status |
| I | - | - | Incomplete |
| T | - | - | Transferred credit |

The entire course is worth 100%, the breakup is as follows (for example):

**Class Participation**        **5**%

**Assignments:**        **20**%

| | |
|---|---|
| **Quizzes:** | **10**% |
| **Midterm exam**: | **25**% |
| **Final term exam:** | **30**% |
| **Final Project** | **10**% |
| **TOTAL** | 100% |

## Missed Assignments/Make-Ups/Extra Credit

- No delayed assignments: There will be deduction of 50% marks for late submission of assignments for each day.
- No Makeup mid or final exam.
- No retake mid or final 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 classrooms for class activities and may ask questions related to lesson taught. Class participation is also included in your grade.

## 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

-Students can contact the Campus Counseling Center at 0331-444-1518 or ccc@fccollege.edu.pk.
-Writing Center
- Mercy Health Center

## Other Useful Links:

-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