**Syllabus/ Course Outline Stat-201**

*This template has been made in keeping with the HEC and FCCU policies*

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| **Course Name: Statistical Inference-I** | | |
| **Course Code: Stat-201** | **Course Type: Elective** | **Course Credits: 3** |
| **Class Timings: 2:00-3:15pm T, Th**  **Room: S-424** | **Section: A** | **Student Meeting Hours/ Office Hours: 11:00-12:30 T , Th** |
| **Instructor Name: Dr. Muhammad Anwar Mughal** | | |
| **A Note from the Instructor:**  Students are required to apply themselves diligently to the course of study and to prepare class and homework assignments as given. Lecture slides/Reading Material will be uploaded on Moodle. Class tests and quizzes will be announced in the class. The assignments and Project will have to be completed on time. Regularity and punctuality in the class is essential. All deadlines will be announced in classes. | | |
| **Course Description:**  *Pre-requisites if any:* Stat-102  *Mode of Instruction (Asynchronous/Synchronous):* Face to Face  *Mode of peer-to-peer contact among students:* WhatsApp Discussion Groups | | |
| **Technology Requirements:**  *Technology Usage in the classroom.*   * Students are required to have a computer/laptop and calculator. * During exams scientific calculator is mandatory and smartphones are not allowed.   *Main Mode of Instruction:* Lecture slides, reading material, assignment questions will be uploaded on Moodle | | |
| **Course Objectives/By the end of the course students will be able to:**  This course is intended to provide the student with an understanding of Inferential Statistical-I terminology and techniques. Upon the successful completion of the course the student should be able to apply; 1. basic sampling distributions 2. estimation methods & criteria, 3. Hypothesis testing for mean and proportion for single and to populations. Statistical thinking is essential. Basic mathematical skills are also helpful. Students must know the use of scientific calculator and basic computer skills.  **Student Learning Outcomes**:  At the end of the course the student will:  1) Have knowledge of the sampling distributions and their properties and applications.  2) Be able to use appropriate sampling distributions for interval estimation and hypotheses testing.  3) Be able to use appropriate inferential procedures to handle the practical situations. | | |

**Course contents, Learning Material & Activities Schedule**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week #** | **Topic/ Title** | **Instructional Material** | **Assessment** |
|  | Introduction to Inferential Statistics | PowerPoint Slides, worksheets, activities and Reading Material  PowerPoint Slides, worksheets, activities and Reading Material |  |
|  | Introduction to basic concepts and terminology |  |
|  | Sampling distribution of sample means (with and without replacement) and related properties |  |
|  | Sampling distribution of sample proportion (with and w.o.r) and related properties | Quiz #1 |
|  | Sampling distribution for difference between two sample means and related properties | Assignment #1 |
|  | Sampling distribution for difference between two sample proportions and related properties |  |
|  | Testing of Hypotheses, steps and procedure, related concepts and application |  |
|  |  |
|  | Testing hypothesis about population mean for known σ and large sample | Assignment #2 |
|  | Testing hypothesis about population mean for unknown σ and small sample | Quiz #2 |
|  | Testing hypothesis about difference between two population’s means for known variances and/or large samples |  |
|  | Testing hypothesis about difference between two population’s means for unknown(equal/unequal) variances | Assignment #2 |
|  | **MID TERM** | **MID TERM** |
|  | Testing hypothesis about 1- population proportion |  |
|  | Testing hypothesis about equality of two populations proportion |  |
|  | Testing hypothesis about difference between two population’s proportion | Assignment #3  Quiz # 3 |
|  | Introduction to Point and interval estimations  Estimation by Confidence intervals about mean(s) |  |
|  |  |
|  | Estimation by Confidence intervals about mean(s) under t-test Estimation by CI for proportion(s) |  |
|  |  |  |
|  | Criteria for good point estimators; unbiasedness, efficiency, consistency and sufficiency | PowerPoint Slides, worksheets, activities and Reading Material | Quiz # 3 |
|  | Concept and application of four criteria |  |
|  | Methods of estimation; method of moments, least squares | Assignment #4 |
|  | Method of maximum likelihood estimation |  |
|  | **Final Project** | | |
| **Final Exam** | | | |

**Note:**

* Assessments can be divided into formative and summative:
  + Formative:
    - Students will learn through readings material, lesson notes, group discussions, and lecture slides, etc.
    - Students will practice through worksheets, practice questions and activities etc.
  + Summative:
    - Performance will be assessed through quiz, case study, projects, etc.

**Out-of-Class Study Required:**

*After completion of a topic exercise questions will be provided to the class to prepare for class and/or complete weekly homework. The “best practices” for maximizing their learning is to take notes and review whole work done at the weekend. At least two hours daily study required to pass this course.*

### **Textbooks, Materials, Supplies, and other Resources**

1. Larry J. Stephens, “Theory and Problems of Beginning Statistics” Schaum’s Outline Series, McGraw Hill.
2. Anderson, Sweeney and Williams, “Statistics for Business and Economics” 9e Thomson South- Western
3. Mason, Lind, and Marchal, “Statistical Techniques in Business and Economics” McGraw Hill, New York
4. Prof. Sher Muhammad Ch. And Prof. Dr. Shahid Kamal, Introduction to Statistical Theory Part 2, Ilmi Kitab Khana.

**Course Requirements:**

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

### **Quiz 1 : (marks 10)**

Topic: sampling distribution of sample means and proportions with properties.

### **Quiz 2 : (marks 10)**

Topic: Testing hypothesis about population mean and proportion

### **Quiz 3 :(marks 10)**

Topic: Testing hypothesis about two population means under Z-test and t-test

### **Quiz 4: (marks 10)**

Topic: Criteria about good point estimators

### **Assignment 1: (marks 10)**

Topic: Hypothesis testing about single and two means

### **Assignment 2 : (marks 10)**

Topic: Hypothesis testing about single and two proportions

### **Assignment 3 : (marks 10)**

Topic: Point and Interval estimation

**Assignment 4: (marks 10)**

Topic: Estimation methods

### Assigned Readings

Practice Worksheets/ questions and reading documents

**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:** 10%

**Quizzes:**  10%

**Midterm exam**: 25%

**Final term exam:**  40%

**Final Project** 10%

**TOTAL 100%**

### Missed Assignments/Make-Ups/Extra Credit

* *NO delayed assignments. There will be 50% deduction of marks for late submission after due date.*
* *NO Make-up mid/final exam*
* *NO retake mid/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 the classroom for class activities and may ask questions related to the 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](https://www.fccollege.edu.pk/ccc/campus-counseling-center/) at 0331-444-1518 or [ccc@fccollege.edu.pk](mailto:ccc@fccollege.edu.pk).
* [Writing Center](https://www.fccollege.edu.pk/faculty-of-humanities/writing-center/)
* [Mercy Health Center](https://www.fccollege.edu.pk/mercy-health-center/)

**Other Useful Links:**

-[Sexual Harassment Policy](https://www.fccollege.edu.pk/wp-content/uploads/2018/05/Doc1.pdf)

-[Anti-Corruption Policy](https://www.fccollege.edu.pk/wp-content/uploads/2018/05/Anti-corruption.pdf)

-[Academic integrity](https://www.fccollege.edu.pk/policy-on-academic-integrity/)

- [Plagiarism Policy](https://www.fccollege.edu.pk/wp-content/uploads/2018/05/FCCU-Plagiarism-Policy.pdf)

-[Academic Calendar](https://www.fccollege.edu.pk/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*