FORMAN CHRISTIAN COLLEGE (A Chartered University)
Course Outline and Lesson Plan

Spring 2023 Semester

Course Name: Research Methods in Computer Science		
Course Code: Comp 587	**Course Type :** Major / Compulsory	**Course Credits:** Three (3) Credit Hours
Class Timings: 05:30 pm to 08:15 pm on Monday	**Section:** A	**Student Meeting Hours/ Office Hours:** 04:00 pm to 05:00 pm on MW
Instructor Name: Dr. Saad Bin Saleem		

A note from the Instructor: The learning model for this course is face to face (in person). However, the instructor can adopt either an on-line or blended learning model according to the instructions by the university administration in any special circumstances.

In the face-to-face learning model, the instructor would conduct live lectures / presentations in the assigned classroom in front of the students.
Other than following the live lectures, you are expected to regularly check the Moodle announcements and follow the course's weekly plan given in this course outline. You are expected to do weekly tasks by reading the shared material e.g. lecture slides, book chapters and video tutorials, reading / preparing the assigned tasks e.g. quizzes and assignments. All the reading material and assigned work for assessment will be available under weekly activity or resource link on the Moodle.

Teaching Philosophy: As a passionate practitioner and research in the field of information security, I am committed to your learning. However, I also expect from you to focus on achieving grades through learning rather using unfair means like plagiarism and copy.

Instructor Contact Details:
Email: saadsaleem@fccollege.edu.pk

Office Hours: (face to face and/ or online): 04:00 pm to 05:00 pm.

Guidelines for contacting instructor: For a face to face meeting, you can walk into my office by knocking the door during my office hours. For an online meeting, I will remain online on zoom during my office hours. You can send a request using the Zoom meeting link to join the meeting.
In case of any meeting other than office hours, you are required to book the meeting well-before time through an email. Normally, I try my best to **respond** to any **email** by my students **within** the **twenty four (24) hours.** Therefore, you **do not need** to **resend** the **same email within** the **twenty fours (24 hours).** I encourage students to **contact during** the **day-time** from **09:00 am to 05:00 pm. Please do not expect a reply of email during the holidays e.g. weekends and after 06:00** pm. Any meeting outside of office hours should be booked through my official email ***saadsaleem@fccollege.edu.pk***.

TA Name and Contact Details:
Name: To be decided.
Email:
Office Hours: N/A
Guidelines for contacting TA/s: You can contact the course TA through email, phone or meet him in person.

Course Description: The objective of this course is to introduce the research process and to provide the knowledge of research methods to the computer science students. After taking this course, the students should be able to conduct research and select relevant research methods according to the research problem.

Mode of Instruction: (Asynchronous/Synchronous): The mode of instructions will be synchronous in this course. However, the instructor can choose components of an asynchronous mode where necessary or according to the needs of the students.

Main Mode of Instruction: In the blended model of learning, the mode of instructions will be face to face in the classroom and course material e.g. books, lecture slides, lecture notes, video tutorials, any other tutorials or instructions and recorded lectures (where necessary) will be available on the Moodle. However, all the course material, instructions and announcements will be shared through the Moodle.

In the online model of learning, the mode of instructions will be live classroom sessions on the Google Meet and course material e.g. books, lecture slides, lecture notes, video tutorials, any other tutorials or instructions and recorded lectures (where necessary) will be available on Moodle. However, all the course material, instructions and announcements will be shared through the Moodle.

Considerations for Students with Limited Internet/Technology Access: The course material e.g. books, lectures slides, lecture notes; video tutorials, any other tutorials or instructions and recorded lectures (where necessary) will be available on Moodle.

Program Objectives Addressed:

Course Objectives / Student Learning Outcomes (SLOs)

1. This course severs the purpose of providing basic knowledge to students relevant to conducting research in the field of computer science that includes research problem formation, identifying research questions, conducting literature survey, selecting appropriate research method and techniques to collect, analysis results, answer research questions and select right method of research validation to confirm the meaningfulness of results.

2. After taking this course, the students should be able to form research questions, select an appropriate research method to answer the research question and choose research methodology and conduction literature review for their research study.

Course Content, Learning Material & Activities Schedule

The schedule is tentative because it is not possible to anticipate exactly how much time each topic will require.

Week No.	Topics	Quiz/ Assignment/Course Project
1.	• Introduction to Research	
2.	• Introduction and Overview of Scientific Studies	• Quiz 1
3.	• Research Methods in Computer Science • Analytical vs. Empirical Methods	• Assignment 1
4.	• Surveys, Case • Studies, Controlled Experiments	• Quiz 2
5.	• Ethnography and Action Research • Quantitative Methods.	
6.	• Qualitative and Mixed Methods • Choosing research methods	• Assignment 2
7.	• Validity threats	
8.	• Midterm Exam	
9.	• An Empirical Research Framework	• Assignment 3
10.	• Introduction to Quantitative Research • Study Designs	
11.	• Introduction to Quantitative Research, Study Designs, Controlled Experiments, Elements and Method.	• Quiz 3
12.	• Data Collection Techniques, • Analysis and Interpretation of Quantitative Data,	• Assignment 4
13.	• Descriptive Statistics • Sampling, sampling distribution	
14.	• Statistical Inference. • Confidence interval and Hypothesis Testing	Quiz 4
15	• Experimentation in Software Engineering	Assignment 5
16	• Final Exam	

Textbooks and Reference-books

Course text book: John W. Creswell, J. David Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, sixth edition, SAGE Publications, October, 2022. (Available online to purchase).

Reference book covering research design: C. Wohlin, P. Runeson, M. Höst, M. C. Ohlsson, B. Regnell and A. Wesslén, "Experimentation in Software Engineering", Springer, ISBN 978-3-642-29043-5, 2012.

Reference book covering empirical research: Steve Easterbrook, Janice Singer, Margaret-Anne Storey, and Daniela Damian, "Selecting Empirical Methods for Software Engineering Research," Guide to advanced empirical software engineering, 2008.

Course Requirements:

In this section, the information about each graded component is provided.

Class Participation / Attendance:

The attendance of live course lectures / presentation and class discussions is compulsory. The class participation will help students for better learning and help students to prepare for the course grading components e.g. as quizzes, assignments and exams.

Assignment 1:

In the assignment 1, you will choose a topic of research to conduct in this course and conduct literature review.

Assignment 2:

In the assignment 2, you will be asked formulate the research question to answer during this course.

Assignment 3:

In the assignment 3, you will be asked to develop your framework of solution or collect data according to formulated research question / questions.

Assignment 4:

In the assignment 4, you will be asked to either validate your framework or solution if you proposed one or analyze data to answer the formulated research question / questions.

Assignment 5:

In the assignment 5, you will be asked to form a research report using ACM / IEEE conference template to report your research results and submit to a local conference in Pakistan.

Assignment Due Dates:

All assignments should be submitted till 11:59 pm on the due date. The due dates will be communicated beforehand after the introduction of the topic of assignment.

Test and Quizzes

I will take **four (4) quizzes** in this course as indicated in the lesson plan. In addition to the quizzes, I will take a **midterm exam** and a **final exam** in this course. **There will be no retake of any quiz and exam.**

The breakup is as follows:

Class Attendance	5%
Assignments:	50%
Quizzes:	10%
Midterm exam:	15%
Final term exam:	20%
TOTAL:	100%

Missed Assignments/ Make-Ups/ Extra Credit

In this course, there will be no retakes for any missed quizzes, exams, assignments and course project. In case of late submission of any deliverable e.g. assignments and course project, the instructor will deduct ten percent (10%) marks per day from the obtained marks of the student.

Attendance Policy:

Your class attendance is compulsory. The five percent (5%) of your grading component is allocated to attendance which is indicated in the course requirements' section.

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Classroom Participation:

As a teacher, I not only deliver lectures and provide explanation of concepts and demonstration of technique but also give importance to interactive learning. Therefore, I encourage all students to actively participation in the class discussions and ask questions when they do not understand any concept or part of the lecture. The students are allowed to ask questions any time during the lecture.

Grade Determination & Course Assessment as per FCC Policy:

In this course, I have adopted a **relative grading policy** consistent with the department of computer science and FCC. However, I should mention that the performance of class in terms of **average and standard deviation** will determine the class grades. There should be no confusion on this. In case of late submission of any deliverable e.g. assignments and course project, the instructor will deduct ten percent (10%) marks per day from the obtained marks of the student.

Student Conduct & Other Issues:

- As an instructor, I expect that all the students will use proper language / do not use offensive words / comments and behave according to the norms and to the core values of the FCC during class discussions and classroom lectures. It is also expected that each student will follow the civil norms and will treat the other students and the instructor respectfully.

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

Other Useful FCCU Policy Documents:

- Sexual Harassment Policy
- Anti-Corruption Policy
- Academic integrity
- Plagiarism Policy
- Academic Calendar

Honor FCC Core Values and Academic Honesty:

- 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.
- All work that you submit in this course must be your own.
- Unauthorized group efforts are considered academic dishonesty.
- You may discuss homework (Assignments, Course Project) in a general way with others, but you may not consult anyone else's written work.
- You are guilty of academic dishonesty if you examine another's solution, allows (actively or passively) another student to examine your solution, or you copy from the Internet without complete understanding of what you have done. University policy of plagiarism will be applicable in the case.
- All cases no matter how trivial they are can be reported to Academic Integrity Committee (AIC) of FCCU.
- Cheating or violation of academic integrity in any exam will cause a fail (F) grade.