CS 4381/5381: Topics in Software Engineering
Cross-Platform Application Development
Fall 2022

CRN: 18425 (CS 4381), 18667 (CS 5381)
Lecture: MW 4:30 - 5:50 PM in CCSB G.0208
Instructor: Yoonsik Cheon (x-8028, ycheon@utep.edu); office hours: MW 3:00 - 4:20 PM in CCSB 3.0606
Prerequisite: CS 3331 or instructor's approval

Description

This course is targeted for students who want to start writing mobile applications running on both Android and iOS, so-called cross-platform applications. The course will provide a solid foundation for developing Flutter apps through hands-on learning. Flutter is Google's platform for writing a single code base that works on Android and iOS equally well while delivering native performance and native capabilities. We will get started with a basic understanding of Dart, the language of Flutter, followed by a survey of Flutter widgets. We will then develop three complete Flutter apps incrementally in a step-by-step fashion, starting with a simple one and gradually increasing complexities of the apps. We will learn both the fundamentals and the nuts and bolts of Flutter and have an exciting opportunity to write feature-rich Flutter apps that may be published in the Android and iOS markets.

Textbook

The textbook—Frank Zammetti, *Practical Flutter: Improve Your Mobile Development with Google's Latest Open-Source SDK,* Apress, 2019—should be available at the UTEP bookstore, and students are expected to acquire a copy for their use in this course, as reading assignments will be taken from the textbook. The following books are also recommended for supplementary reading.

Gilad Bracha, *The Dart Programming Language,* Addison-Wesley Professional, 2015.

Marco L. Napoli, *Beginning Flutter: A Hands-on Guide to App Development,* Wrox, 2019.

Fu Cheng, *Flutter Recipes: Mobile Development Solutions for iOS and Android,* Apress, 2019.

Eric Windmill, *Flutter in Action*, Manning, 2020.

Simone Alessandria, *Flutter Projects*, Packt, 2020.

Electronic copies of the required textbook and the recommended references are available to authorized UTEP users through UTEP Library; use VPN from outside the UTEP domain.

There are also quite a few streaming videos on Flutter app development available through UTEP Library, including:

Flutter app development for beginners (5 hours 51 minutes; Packt Publishing, 2019)

Flutter in 7 days (Aman Malhora; 3 hours 57 minutes; Packt Publishing, 2019)

Mastering Flutter (Robert Brunhage; 2 hours 4 minutes; Packt Publishing, 2019)

Examinations

There will be one mid-term exam and the final. The mid-term exam will take place during the regular class session, and the final exam will take place on the date specified by the university. Makeup exams will be given only when you have unusual circumstances, such as incapacitating illness or presenting a research paper at a conference. If you believe that you have an unusual circumstance that warrants a makeup exam, notify us as soon as possible. If you will be attending a conference or other event, you must make arrangements for a make-up exam *in advance*. Under any circumstances, you may be required to provide official documentation before a make-up will be administered

Homework Assignments

There will be several homework assignments, and most assignments will be programming assignments. Some of the assignments may be done in pairs or teams. No late submission will be accepted for homework assignments.

Semester Project

You are expected to do a semester-long class project. The purpose of the semester project is to apply concepts and techniques learned in the course and develop a more realistic Flutter application that is feature-rich and may be publishable in the market. Sample project topics will be suggested by the instructor or you'll have a chance to propose your own project topic. Either way, your project must be approved by the instructor. You are expected to write a project proposal, demo a prototype, submit a final project report, and present the project result. Depending on the size and complexity of a project, it may be done individually, in pairs, or in teams; however, the initial proposals must be written individually.

CS 5381 Presentations

CS 5381 students are required to:

(a) give a mini-lecture or tutorial on additional topics or features of Flutter programming, or

(b) present a technical paper on Flutter or cross-platform app development.

The presentation/lecture should be 15-20 minutes. You may present any tutorial or technical paper related to course topics; however, it has to be approved by the instructor.

Grading

Your grade is independent of anyone else's grade. We do not grade on a curve, and everyone can earn an A in this course. The purpose of grading is not to rank you, but to uphold a standard of quality and to give you feedback. Your final letter grade will be calculated based on a combination of lessons, homework assignments, semester projects, and exams. The approximate percentages are shown below:

Activities	Percent (%)
Lessons (readings, quizzes, exercises, etc.)	25
Homework assignments	25
Semester project	25
Exams	25

There are also up to 5% bonus points for class attendance and participation. To earn this bonus, you must arrive at lectures on time and participate in class discussions in a constructive and prepared manner, e.g., by asking or answering questions that demonstrate that you have read and attempted to understand the material. You should also complete classwork and activities on time. We will monitor, track, and score your participation in the course partly using Blackboard tracking tools, discussions, blogs, chat sessions, and group work.

Be sure to pay close attention to deadlines—there will be no makeup assignments or quizzes, or late work accepted without a serious and compelling reason and instructor approval. All work and assignments for this course will be submitted electronically through Blackboard unless otherwise instructed. They must be submitted by the given deadline or special permission must be requested from the instructor before the due date. Extensions will not be given beyond the next assignment except under extreme circumstances.

Final letter grades assigned for this course will be based on the percentage of total points earned and are assigned as follows. The nominal percentage-score-to-letter-grade conversion is as follows:

Letter grade	Percent (%)	Performance
A	90-100	Excellent
B	80-89	Good
C	70-79	Average
D	60-69	Poor
F	0-59	Failing

The instructor reserves the right to adjust these criteria downward, e.g., so that 88% or higher represents an A, based on overall class performance. The criteria will not be adjusted upward, however.

Attendance/Participation

Class attendance is required; you should understand that your success in the course will improve greatly by attending classes regularly. The instructor reserves the right to penalize unexcused absences; e.g., your final grade may be lowered by one point for each unexcused absence above three.

You should understand that your success in the course will improve greatly by participating/attending classes regularly. The instructor reserves the right to penalize unexcused absences; e.g., your final grade may be lowered by one point for each unexcused absence above three. The following is excerpted from the 2022-2023 Catalog.

"The student is expected to attend all classes and laboratory sessions and attendance is mandatory for all freshman-level courses. It is the responsibility of the student to inform each instructor of extended absences. When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor can drop the student from the class with a grade of W before the course drop deadline and with a grade of F after the course drop deadline."

Standards of Conduct

You are expected to conduct yourself in a professional and courteous manner, as prescribed by the Handbook of Operating Procedures: Student Conduct and Discipline. All graded work (homework, projects, exams) is to be completed independently and should be unmistakably your own work, although you may discuss your work with others in a general way. You may not represent as your own work material that is transcribed or copied from another source, including persons, books, or Web pages. "Plagiarism" means the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the unacknowledged submission or incorporation of it in one's own academic work offered for credit, or using work in a paper or assignment for which the student had received credit in another course without direct permission of all involved instructors. Plagiarism is a serious violation of university policy and will not be tolerated. All cases of suspected plagiarism will be reported to Office of Student Conduct and Conflict Resolution (OSCCR) for further review.

Accommodations

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at http://www.sa.utep.edu/cass.

COVID-19 Precautions

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit http://epstrong.org.

Course Outline

As shown below, the course consists of three main parts: Dart language, Flutter framework, and case studies. Refer to the next page for a detailed, tentative schedule.

Introduction (1.5 weeks)

1. Basic understanding of Flutter
2. Development environment

Lab: Android Studio

Dart language (3 weeks; Chapter 2)

1. Data types
2. Control structures
3. Object orientation
4. Asynchrony
5. Lab demo

Lab: Dart app

Flutter framework (3 weeks)

1. Widgets (Chapters 3-4)
2. Lab demo

Lab: Flutter app

Case studies (3.5 weeks)

1. FlutterBook (Chapters 5-6)
2. Lab demo
3. Optionally, FlutterChat (Chapters 7-8) and FlutterHero (Chapter 9)

Lab: FlutterBook

Semester Project (2 weeks)

1. Project proposal
2. Prototype demo
3. Final presentation

Others (1.5 weeks)

1. Exam
2. CS 5381 presentations

Schedule

The following table shows a planned schedule for the course; refer to Blackboard for an up-to-date schedule.

Dates		Topics	Readings	Assignments
Week 1	Aug. 22, 24	About CS 4381/5381 Introduction	Chapter 1	
Week 2	Aug. 29, 31	Introduction Dart language	Chapter 2	
Week 3	Sep. 5, 7	*Labor Day – no class* Dart	Chapters 1, 3, and 6 [Bracha16]	Lab 1
Week 4	Sep. 12, 14	Dart	Chapters 2 [Bracha16]	
Week 5	Sep. 19, 21	Dart Lab 1 demo	Chapters 4 and 6 [Bracha16]	
Week 6	Sep. 26, 28	Flutter	Chapter 3	Lab 2
Week 7	Oct. 3, 5	Flutter	Chapter 4	
Week 8	Oct. 10, 12	Flutter Lab 2 demo		
Week 9	Oct. 17, 19	*Project proposal* **Exam 1**		
Week 10	Oct. 24, 26	App: FlutterBook	Chapter 5	
Week 11	Oct. 31, Nov. 2	App: FlutterBook	Chapter 6	Lab 3
Week 12	Nov. 7, 9	App: FlutterBook Lab 3 demo		
Week 13	Nov. 14, 16	Project work *Project prototype demo*		
Week 14	Nov. 21, 23	CS 5381 presentations		
Week 15	Nov. 28, 30	*Project presentations*		
Week 16	Dec. 5	**Final** at 4:00 pm – 6:45 pm		

Important Dates

August 22:	Classes begin
September 5:	Labor Day holiday – university closed
September 7:	Census Day
October 19:	Exam 1
October 28:	Course drop/withdrawal deadline
November 24-25:	Thanksgiving holiday - university closed
December 1:	Last day of classes
December 2:	Dead day
December 5:	Final on Monday at 4:00 pm – 6:45 pm