CS 4381/5381: Topics in Software Engineering
Cross-Platform Application Development
Spring 2020

CRN: 28733 (CS 4381), 28734 (CS 5381)
Lecture: TR 1:30-2:50 pm in CCSB 1.0202
Website: http://www.cs.utep.edu/cheon/cs4381/
Instructor: Yoonsik Cheon (x-8028, ycheon@utep.edu); office hours: TR 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.

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 (see the course website for the links to e-books).

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 should 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 app that is feature-rich and may be publishable in the Android/iOS markets. Sample project topics will be suggested by the instructor or you'll have a chance to propose your own project idea. In 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 the complexity of the project, it can be an individual, pair, or team project; however, the initial proposal has to 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 with 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. 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 quizzes, in-class work, homework assignments, project assignments, exams, and class participation. The approximate percentages are shown below:

Quizzes:	10%
Homework:	40%
Semester project:	30%
Exams:	20%

There are also up to 5% bonus points for class attendance and participation. To earn this, you must arrive at classes 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.

The nominal percentage-score-to-letter-grade conversion is as follows:

90% or higher:	A
80-89%:	B
70-79%:	C
60-69%:	D
below 60%:	F

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

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. The following is excerpted from the 2017-2018 Undergraduate Catalog.

> The student is expected to attend all classes and laboratory sessions. 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 the Dean of Students for further review.

Disabilities

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 www.sa.utep.edu/cass.

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

Lab: Dart app

Flutter framework (4 weeks)
1. Widgets (Chapters 3-4)
2. Exam and CS 5381 presentations

Lab: Flutter app

Case studies (5.5 weeks)
1. FlutterBook (Chapters 5-6)
2. FlutterChat (Chapters 7-8)
3. FlutterHero (Chapter 9)

Lab: FlutterBook

Semester Project (2 weeks)
1. Project proposal
2. Prototype demo
3. Final presentation

Schedule

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

Dates		Topics	Readings	Assignments
Week 1	Jan. 21, 23	About CS 4381/5381 Introduction	Chapter 1	
Week 2	Jan. 28, 30	Introduction Dart language	Chapter 2	
Week 3	Feb. 4, 6	Dart		Lab 1
Week 4	Feb. 11, 13	Dart		
Week 5	Feb. 18, 20	Dart (lab demo) Flutter	Chapter 3	
Week 6	Feb. 25, 27	Flutter		Lab 2
Week 7	Mar. 3, 5	Flutter	Chapter 4	
Week 8	Mar. 10, 12	Flutter (lab demo) **Exam 1**		
Week 9	Mar. 17, 19	Spring break		
Week 10	Mar. 24, 26	*Project proposal* 5381 presentations		
Week 11	Mar. 31, Apr. 2	FlutterBook	Chapter 5	Lab 3
Week 12	Apr. 7, 9	FlutterBook Lab demo	Chapter 6	
Week 13	Apr. 14, 16	FlutterChat	Chapters 7-8	
Week 14	Apr. 21, 23	FlutterChat *Prototype demo*		
Week 15	Apr. 28, 30	FlutterHero or project work	Chapter 9	
Week 16	May 5, 7	*Project presentations*		
Week 17	May 14	**Final** at 1:00 pm – 3:45 pm		

Important Dates

January 20:   Dr. Martin Luther King, Jr. holiday – university closed

January 21:   Classes begin
February 5:   Census day
March 12:   Exam 1
March 16-20:   Spring break
March 27:   Cesar Chavez holiday – no classes
April 3:   Drop/withdrawal deadline
April 10:   Study day
May 7:   Last day of classes
May 8:   Dead day
May 14:   Final on Thursday at 1:00–3:45 pm