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.


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:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Homework</td>
<td>40%</td>
</tr>
<tr>
<td>Semester project</td>
<td>30%</td>
</tr>
<tr>
<td>Exams</td>
<td>20%</td>
</tr>
<tr>
<td>Bonus points</td>
<td>5%</td>
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</tbody>
</table>

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.

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