Syllabus and Class Information
Software Construction and User Interfaces
SE/COM S 319, (3-0) Cr. 3.
Fall 2018

Lecture
MWF 2:10-3:00pm, MARSTON 2155
(rooms reserved Pearson Labs 105/109/108/113/158 for Friday classes)

Instructor
Ali Jannesari
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Office hours
M 4-5pm (please send email if you need to see me at some other time).

Course web page on Canvas
Link on Canvas: https://canvas.iastate.edu/courses/52828

Please regularly check the course web page for the latest updates and announcements regarding the course.

Teaching Assistants
Shibbir Ahmed <shibbir@iastate.edu>
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TA office hours
F 3-4pm, Pearson Lab, Room 108

Textbooks
Most of the materials covered in the class will be based on free online textbooks/tutorials/articles.

A few recommended textbooks for references could be:
- Object-Oriented Programming Languages and Event-Driven Programming, Mercury Learning & Information, 2014.
- Software Engineering, Ian Sommerville, Pearson; 10th edition, 2015.

- Designing Interfaces: Patterns for Effective Interaction Design; 2nd edition, 2010.
- Extreme Programming Explained: Embrace Change, 2nd Edition (The XP Series)
- Design Patterns: Elements of Reusable Object-Oriented Software 1st Edition
- Head First Design Patterns: A Brain-Friendly Guide, By Bert Bates, Kathy Sierra, Eric Freeman, Elisabeth Robson
- UML Distilled: A Brief Guide to the Standard Object Modeling Language, 3rd Edition by Martin Fowler
- Designing the User Interface: Strategies for Effective Human-Computer Interaction, 5th Edition

Topics
The catalog description:

Basic theory of grammars, parsing. Language paradigms. State transition and table-based software design. Review of principles of object orientation, object-oriented analysis using UML. Frameworks and APIs. User interface architecture, evaluation of user interface. Design of windows, menus, and commands. Introduction to formal specification and model-based software design. Introduction to domain-specific software engineering.

Some key areas we want to focus and investigate are:

- **User Interfaces**: Design principles for user interfaces, design issues, user interface construction.
- **Event-driven programming**: Introduction to Human Computer Interaction (HCI), web user interfaces, web programming (JavaScript, Node.js, PHP, client/server programming), event-driven architecture, event-driven programming in JavaScript and Node.js, APIs and frameworks, event-driven programming in JavaFX,.
- **Object-oriented analysis using UML**: System modeling, behavioral and structural modeling, UML diagrams, interaction diagrams.
- **Model-based software design**: Object modeling, Object Constraint Languages (OCL), model-driven architecture, design patterns, architectural styles.
- **Test-driven development:** Unit testing, integration and system testing, functional testing, performance testing, eXtreme Programming.
- **Parallel software construction**: Parallelism and concurrency, Threads, multi-threaded programming, Java Threads API, parallel algorithms.
- **Basic theory of grammars and language paradigms:** Regular expressions and grammars, context free grammar, lexical analysis, syntax analysis, parsing.

Outcomes (ABET Outcomes)
At the end of SE/Com S 319, students should have:

- 1. An ability to analyze a complex computing problem, and to apply principles of computing and other relevant disciplines to identify solutions.
- 2. An ability to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

- 5. An ability to function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- 6. An ability to apply computer science theory and software development fundamentals to produce computing-based solutions.

Prerequisites
Com S 228 or permission of instructor (Pre-Req Waiver Form). Contact me if you have questions.

Course Organization
The course includes lectures, lab activities, assignments, a group assignment (portfolio) and project meetings. We will also have quizzes and a final exam. Assignments may depend on course material and lab activities. We start out with web programming assignments, but later assignments will include conceptual parts as well as programming parts. Lab activities involve among others utilities, frameworks and tools for the concepts covered in class. The group assignment involves teamwork and requires students to propose sufficiently complex projects that incorporate programming knowledge and design skills.

- Lectures and lab activities (rooms reserved Pearson Labs 105/109/108/113/158 for Friday classes)
- Homework assignments
- Quizzes (in class)
- A group assignment (portfolio): A project that you work as a team
- Final exam

Homework and Projects
- Individual assignments on relevant topics of lectures and lab activities include both programming tasks and conceptual components**.**
- A group project assignment (portfolio) that involves teamwork and requires students to draw upon one another's knowledge and skills.

Grading
Grades will be based on an overall weighted average with the approximate relative weights:

- Quizzes: **10%**
- Assignments: **20%**
- 1 main programming project (group project): **25%** (individual performance assessed)
    - 5% proposal; 5% final presentation and slides; 15% project content
- Final exam: **40%**
- Attendance, class (lectures & lab activities) participation: **5%** – can bump you up ½ grade, e.g. B+ → A-
    - Random attendance checks

Late homework policy
Except when announced otherwise, late homework will normally be accepted up to 7 days late with a penalty of 5% per day (Saturday and Sunday each count as one day).

Academic Dishonesty Policy
The class will follow Iowa State University's policy on academic dishonesty. All suspected cases of academic dishonesty will be reported to the Dean of Students Office. See http://www.dso.iastate.edu/ja/academic/misconduct.html.

Unless specifically instructed otherwise, the assignments in this course are to be the product of your own intellectual effort and are to be done on your own.

Any violation of this rule will be considered academic dishonesty, otherwise known as cheating. **Anyone guilty of academic dishonesty will receive an automatic F in this course.**

Student Accessibility Services and Accessibility Accommodation
Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to meet with staff in **Student Accessibility Services (SAS)** to establish eligibility and learn about related processes. Eligible students will be provided with a Notification Letter for each course and reasonable accommodations will be arranged after timely delivery of the Notification Letter to the instructor. Students are encouraged to deliver Notification Letters as early in the semester as possible. SAS, a unit in the Dean of Students Office, is located in room 1076 Student Services Building or online at www.sas.dso.iastate.edu. Contact SAS by email at accessibility@iastate.edu or by phone at 515-294-7220 for additional information.

Dead Week
This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook. There will normally be homework due on the last day of classes.

Harassment and Discrimination
Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation
If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information
If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.