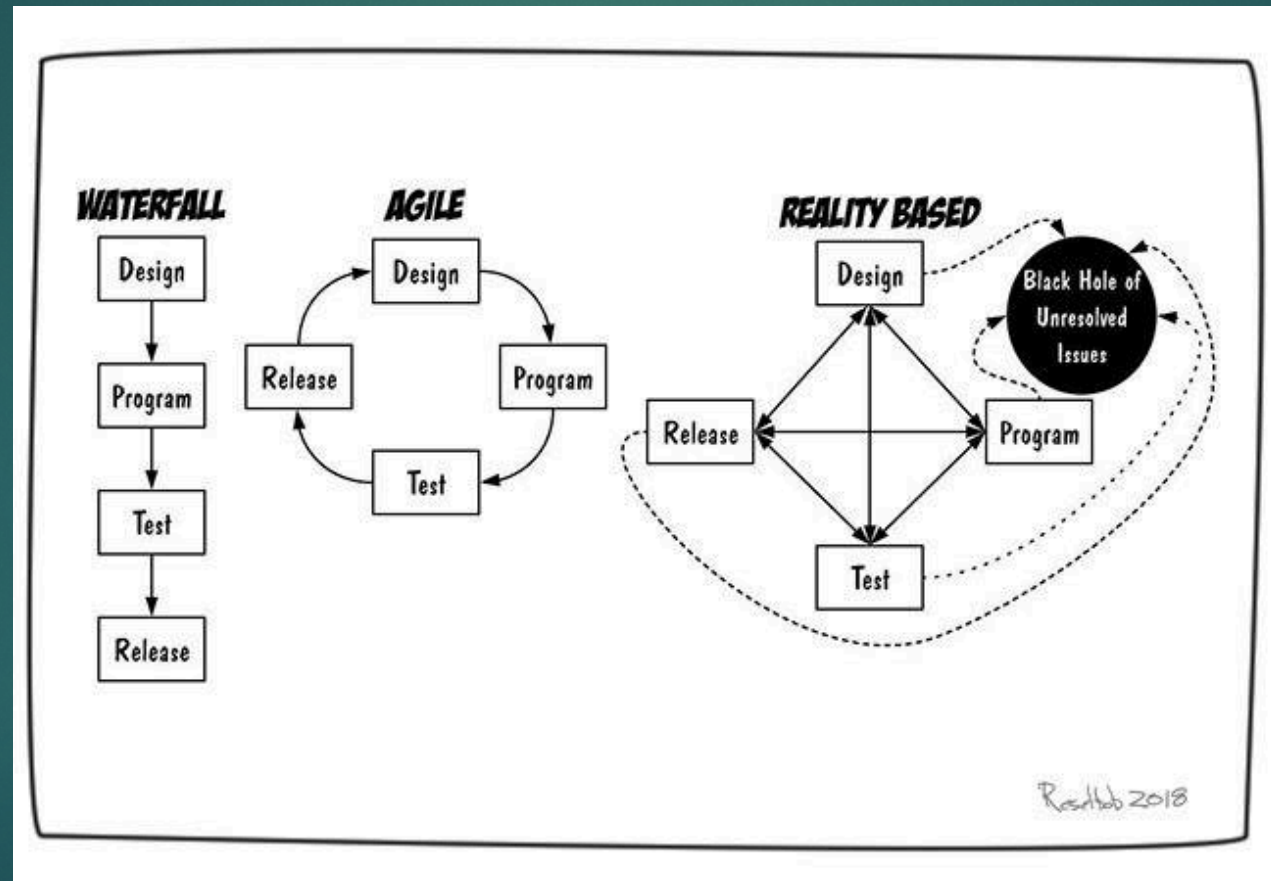# CS 428: *Real-World Software Engineering*

Course overview

WINTER 2020
BRUCE F. WEBSTER

Why this course?

Goals for CS 428

▶ To better understand the root causes of success and failure in real-world software development projects

▶ To gain practical experience with the fundamentals of the software development lifecycle (SDLC), including problem definition, analysis, requirements, architecture & design, implementation, quality assurance

▶ To better understand the sociological and interpersonal nature of software development, including project management, team dynamics, communications, role assignment, and conflict resolution

▶ To learn to self-manage within a dynamic, changing, and inherently ambiguous work environment.

▶ To learn to manage orders of ignorance as a professional life skill.

▶ To help you decide whether you should go work for that company/startup that just made you an offer.

- Class website: cs428.cs.byu.edu
- Slack: cs428-w20.slack.com
- Project Wikis: https://github.com/cs428TAs/w2020/wiki
- Assignments and tests: Learning Suite
- We meet here every Monday from 2 to 4:30 pm
  - Rarely goes that long; unused portion can be used for team meetings
  - We'll typically have a "biology break" during each class
- Attendance counts as 8% of grade (-2% for each missed class);
  - Roll will be taken each class
  - Excused absences can be made up with my approval by watching video of lecture
- NO OPEN PHONES / TABLETS / LAPTOPS DURING CLASS
  - Get used to taking real physical notes
- TA: Taylor Nelson – office hours, cubicle location posted on class website, Learning Suite

How the class runs

- Attendance: 8% (-2% for each class missed)
- Readings: 24%
- Podcasts: 10%
- Midterm: 25%
- Projects: 33%
- Extra credit: up to 8%
  - 8% for addition approved book readings

Grading overview

- Books (you are responsible for obtaining these) – worth 5% each
  - **The Mythical Man-Month** (Anniversary Edition), Fred Brooks (selected chapters)
  - **Peopleware** (3rd ed.), Tom DeMarco & Timothy Lister
  - **Accelerate**, Nicole Forsgren *et al.* (selected chapters)
- Online readings (each worth 1%)
  - "The Five Orders of Ignorance" by Philip Armour
  - Selected sets of readings written by yours truly (Webster #1 through #8)
- Note: these readings will be essential for the midterm
  - Reading schedule for lectures is posted on the class website
  - http://cs428.cs.byu.edu/index.php/class-calendar-winter-2020/
- Reading completions are logged in **Learning Suite**
  - Don't get behind; check **Learning Suite** for actual due dates
  - But you can read ahead as much as you'd like

Readings (24% of grade)

- Starting next week, you will need to watch one (1) online video podcast each week, for a total of 10 podcasts
  - You're choosing from a set of over 20 podcasts, so you can focus on your particular interests
  - However: not a bad idea to pick podcasts on upcoming lecture topics / project deliverables
  - Note that there are a few gaps in the semester schedule where no podcast is due
  - You can certainly work ahead
- Each watched podcast counts as 1% of grade
  - Due by midnight on Saturdays (**first one due Jan 18th**)

Video podcasts (10% of grade)

- Only test for CS 428 (**no final**)
- Open-book, open-note, open-device test (Monday, November 25) via LearningSuite
- Expect it to take 2 to 3 hours (timed with 3 hours max duration)
- Must get at least 60% on the midterm to pass the class
- Sample question:

You have been working for BigCorp for a year or so, mostly doing bugs fixes and feature ad-ons for an existing in-house software system, ROVER. BigCorp now would like to replace ROVER with a new, rewritten-from-scratch system (code name OTTO), which will be hosted on AWS, a cloud service that BigCorp has not used previously. They ask you for your opinion as to both the potential risks of the OTTO project, as well as any recommendations as to how to increase the likelihood of success. At this point, there are no schedule or budget constraints.

For five (5) points each, list at least two (2) major risk factors that you see with this project, as well as three (3) recommendations for how to best approach the project, with at least one citation for each.

Midterm (25% of grade)

- Everything will be run through and submitted to GitHub
  - https://github.com/cs428TAs/w2020/wiki
- Everyone needs to create or join **one or more** project suggestions this week on GitHub
- Everyone needs to vote on three (3) projects on GitHub by start of class next week
- Next class (01/12), we'll narrow list down to final set of projects with 4-7 people on each
- Goal is to iterate through software development lifecycle process
- As a team, you will have to produce SDLC deliverables and two (2) product demos
- Weekly status reports required from each project, with "billable hours" for each team member
- For ideas, templates, and examples, look at prior semesters' wikis:
  - https://github.com/cs428TAs/f2019/wiki
  - https://github.com/cs428TAs/w2019/wiki
  - https://github.com/cs428TAs/cs428_f2018/wiki

Group projects (33% of grade)

Weekly Project Status Reports (starting Feb 1st)

Weekly project status interviews (starting Feb 3rd)

- Taylor Nelson (TA) will talk/DM with each project leader each week (a few minutes) for a check on how each project is going

- Taylor may also occasionally contact other team members for an independent assessment of how things are going

- Key issue: to ensure **all** team members are **actively** participating in and contributing to the project

- **I reserve the right to adjust individual grades to any extent (including failure) based on lack of participation in team projects**

Project Deliverables

- ► #1: Wiki setup (01/18)
- ► #2: Organization chart and role descriptions (01/25)
- ► #3: Requirements document (02/1)
- ► #4: PERT and Gantt charts (02/8)
- ► #5: Architecture & design documents (02/15)
- ► #6: Test plan and specification (02/22)
- ► #7: Code review – **individual signoff** (03/7)
- ► #8: In-class demo of work-in-progress (03/16)
- ► #9: Business pitch and final demonstration (04/13)
- ► #10: Project post-mortem/lessons learned – **individual signoff** (04/15)

Common Class Project Pitfalls

▶ Using a new/unfamiliar technology/language for the project

▶ Not agreeing early on the technology base (OS, language, libraries)

▶ Being overly ambitious in your scope

▶ Individual team members failing to contribute

▶ Not looking for ways to distribute the workload

▶ Not keeping all team members 'in the loop' as to next steps or key decisions

▶ Getting a slow start

Opportunities for extra credit

- [Extra credit books readings](#) (up to 8%)
  - The CS 428 website has a list of pre-approved books for extra credit (2% each)
  - When you have read the book, you must schedule an appointment with me to talk about it
  - If you want to read a book not on the list, you **first** have to get it approved by me

- Me (brucefwebster.com, bfwa.com)
  - BSCS (BYU, '78); graduate work in CS (U of Houston/Clear Lake, 80-81)
  - 45 years of working in the information technology industry
    - Two software startups, contribution to multiple commercial & in-house software systems
  - Since 1995, heavy professional focus on why IT projects succeed and fail
    - Corporate consultant on troubled IT projects (size up to $500 million)
    - Testimony before Congress, presentations at conferences, published books and articles
    - Expert witness in lawsuits involving troubled/failed projects (size up to over $1 billion)
- You
  - Why you're taking this class
  - What you hope to get from it
  - Plans after graduation

Getting to know each other