Welcome

Welcome to:

CSCI 3308 Software Development
Methods and Tools

Instructor:

Alan Paradise
alan.paradise@colorado.edu

Agenda

1. Introductions

2. Overview of Course (Syllabus)

3. Thoughts

Introductions

Teaching Assistants:

Pratima Sherkane,
Pratima.Sherkane@Colorado.EDU
Prasanna Kumar Srinivasachar,
Prasanna.Srinivasachar@Colorado.EDU
Rashmi Shetty
Rashmi.Shetty@Colorado.EDU

Course Assistants:

Kyle Helmick
Kyle.Helmick@Colorado.EDU
Rachel Slagle
Rachel.Slagle@Colorado.EDU

They will post their office hours and locations on Moodle

Syllabus

Course Information

Semester: Fall 2017

Credit: 3 credit hours

Dates: August 28, 2017 through December 15, 2017*

Class Meetings:

Lecture – Monday/Friday 3:00-3:50 p.m., VAC1B20

Labs –

CSCI 3308-101	LAB	TUE 1:00-2:50	ECCE 141	33 (48)	Prasanna Srinivasachar
CSCI 3308-102	LAB	TUE 3:00-4:50	ECCE 141	33 (48)	Rashmi Shetty
CSCI 3308-103	LAB	WED 11:00 am-12:50 pm	ECCS 112C	24 (24)	Pratima Sherkane
CSCI 3308-104	LAB	WED 1:00 -2:50 pm	ECCS 112C	24 (24)	Rashmi Shetty
CSCI 3308-105	LAB	WED 6:00 -7:50	ECCS 112C	24 (24)	Pratima Sherkane
CSCI 3308-106	LAB	THU 5:00-6:50	ECCE 141	33 (48)	Rashmi Shetty
CSCI 3308-107	LAB	FRI 9:00 -10:50	ECCE 141	24 (24)	Prasanna Srinivasachar

*NOTE: Friday December 15 – No Lecture, Lab only

Syllabus

Instructor Information

Name:	Alan Paradise
Email:	alan.paradise@colorado.edu
Office Location:	ECOT 520
Office Hours:	Wed & Thu, 3-5 p.m. - By appointment

Syllabus

Textbooks and Materials

No Text. Readings Posted weekly in Moodle

Moodle

- http://moodle.cs.colorado.edu/
- CSCI 3308 Software Development Methods and Tools
- Enrollment key: methods3308
- Enroll yourself

Syllabus

Course Objectives

- Learn the fundamentals of software development methods
- Gain exposure and practice using common industry tools that are likely to be used in the workplace.
- Acquire useful skills for future programming classes
- Gain familiarity with common industry vocabulary for job applications and interviews.
- Equip you to choose the best software tool for use in a specific situation.
- Apply software knowledge and skills in a small group semester long project.

Syllabus

Component	%	Points		Letter Grade Scale
				930 to 1000 = A
Team Surveys (Each student is required to complete two surveys, 10 points each)	2	20		900 to 929 = A-
Quizzes on Lecture & Readings (10 pts per quiz * 10 quizzes)	10	100		870 to 899 = B+
Homework Assignments (Four Assignments. Points Vary)	20	200		830 to 869 = B
Exams (Two mid-term exams, 100 points each)	20	200		800 to 829 = B-
Labs (12 Labs, Points Vary)	20	200		770 to 799 = C+
Team Project & Presentations 8 graded milestones including the final presentation and final summary report. Points vary by milestone.	28	280		700 to 769 = C
TOTAL	100	1000		0 to 699 = F

Late Submissions

You can receive a three-day extension on any assignment, homework or milestone, for a 20% grade penalty for that assignment.

At the end of the third day past the due date, your assignment is considered past due and cannot be turned in.

In the event of a documented personal, family, or medical emergency, consult your TA about receiving a penalty free extension.

Missing Lab

If you know you will be missing a weekly lab, make arrangements with your TAs before going to a different lab section.

Homework Assignments

The course includes FOUR homework assignments that add up to 20% of your grade. Each assignment must be completed and submitted via Moodle by its due date to earn full credit.

Quizzes

- The course includes10 quizzes which together make up 10% of your grade for the course.
- Quizzes are “open book”
- The quiz questions are based on labs, readings and lecture content.
- The quizzes will be administered and graded by Moodle.
- Each quiz has a due date, and will become unavailable in Moodle when the due date is reached (the end of the week it is given.)

Syllabus

Exams

- There will be TWO midterm exams: during Week 8 and Week 15
- Together the exams make up 20% of your final grade.
- The exams will be administered and graded by Moodle.
- Each exam has a due date, and will become unavailable in Moodle when the due date is reached (the end of the week it is given.)
- During lecture the week of the midterm we will have a review to help prepare you for the exam.

Syllabus

Group Project

- **Groups of 5 or 6 students**
- **Proposing a software project**
- **Developing an application:**
  - Frontend user interface, a backend database, a layer to connect
  - Documenting the design, development, testing process
- **Software development methodology and tools for the project**
- **The final project grade**
  - Progress towards product delivery
  - The difficulty of the project
  - Delivery of the materials required for each milestone
- **All documentation, code, and other materials stored in a GIT repository.**
- **Team Formation**
  - Assigned by teaching staff
  - Survey (link posted on Moodle)
    - Work schedule, work habits, experience with various technologies

Group Project

Milestone 1	40 points	Project Proposal
Milestone 2	35 points	Agile Client demo and write up of milestones and retrospective
Milestone 3	45 points	Database Design
Milestone 4	40 points	Unit Testing
Milestone 5	20 points	Individual Student Meetings (Individual)
Milestone 6	40 points	Project Presentations
Milestone 7	50 points	Final Project Report and Product Functionality
Milestone 8	10 points	Final Reflection (individual)

A note on your development environment:

Your work for this course will be done on a VM that you install on your PC as part of Lab 1.

The VM is a “server” that runs under your PC’s operating system. Your VM will run a version of Linux. Your interface with your VM is through a “command shell” window.

The VM software allocates PC resources to your VM (memory, disk, CPU, network connectivity.)

For our database work, you will install MySQL DBMS software on your VM.

Software Development: (methods and tools)

Project Management

Software is developed within the context of a PROJECT

- There are different methods of managing and executing projects
- Waterfall versus Agile

Version Control

Software is developed within the context of VERSIONS

- Code is kept in a repository and tracked by version
- Developers check out code modules, work on them, then check them back into the repository when ready
- We use software tools to manage repositories and module version control

Software Development: (methods and tools)

Code Analysis and Improvement

- Software must not only work right, but it must be efficient and play nicely
- We use tools to analyze code for performance
- How efficiently does the code use memory, CPU, disk I/O

DBMS (Database Management System)

- Application software processes data
- That data is stored, retrieved, updated via database software
- We use SQL as the programming language to interact with the DBMS

Software Development: (methods and tools)

Presentation

- Application software must interface with users via a presentation layer
- What's the user's platform? Mobile versus PC versus browser

Testing

- Application software must be tested to ensure that it satisfies the customers' features/requirements
- There are many strategies for and levels of testing

Software Development: (methods and tools)

Debugging

- During testing we identify bugs – that is, the software fails to work right
- It may stop, fail, corrupt the data, produce incorrect results, etc.
- We have tools to help us identify the source of those failures within the code

Documentation

- Someday someone will have to read your code in order to modify it or fix it
- We use tools to assist us in thoroughly documenting our code

Concepts

```
SELECT invoice_id,inv_line_id,
  inv_line_description,
  SUM(qty_sum) 'qty_sum1',
  SUM(grossinv) 'grossinv1', ROUND(SUM(grossinv) - (SUM(grossinv) * .01 * (IFNULL(
  (SELECT inv_line_price
   FROM division_invoice_line_item ili
   WHERE ili.invoice_id = Z.invoice_id
   AND ili.inv_line_type_id = 4), 0))), 2) AS 'netinv', Z.*
  FROM
    (SELECT mrstl.sub_type_description, -- Z
    IF(B.inv_line_type_id=1, ipl.description, pac.description) AS 'product_label',
    B.inv_line_id, B.inv_line_num, B.actual_net_names,
    A.invoice_id, A.update_date, drss.select_id,
    CONCAT(drss.request_id,'-',LPAD(drss.select_id,2,'0')) AS 'modelID',
    A.invoice_status_id, DATE(A.invoice_date) AS 'invoice_date',
    YEAR(A.invoice_date) AS 'year',
    MONTHNAME(A.invoice_date) AS 'month',
    A.remail_num,
    A.revision_num,
    A.invoice_comments,
    A.net_pct,
    A.invNum,
    IF(lc.debit_credit = 'D', B.inv_line_qty, CONCAT('-',B.inv_line_qty)) AS 'qty_sum',
    drs.request_id, drs.service_id, drs.wd_product_id, drs.model_id,
    CASE B.inv_line_price_type
     WHEN 'M' THEN ROUND(B.inv_line_qty * .001 * B.inv_line_price,2)
     WHEN 'N' THEN ROUND(B.inv_line_qty * .001 * B.inv_line_price,2)
     WHEN 'F' THEN B.inv_line_price
    END * IF(lc.debit_credit = 'D', 1, -1) AS 'grossinv',
    B.inv_line_type_id,
    drss.member_po_num,
    d.div_id,
    d.division_name,
    d.business_type_id,
    mic.short_description AS 'ind',
    CONCAT(cc.first_name,' ',cc.last_name) AS 'msname',
    IF(A.bill_to_member_name='Y', d.division_name, c1.company_name) AS 'billto',
    A.ms_user_id,
    0 AS 'ordered_by_user_id',
    IF(drs.service_id IN (" . INVOICE_CUSTOMER_SERVICE_TYPE_IDS . "),'C','P') AS 'service',
    DATE(drso.actual_delivery_date) AS 'actual_delivery_date',
    dm.request_id AS 'modreq',
    B.inv_line_description,
    jsc.description AS 'status',
    drs.campaign_id,
    IFNULL(dms.campaign_name,'na') AS 'campaign',
    DATE(dms.in_home_date) AS 'mailDate',
    IFNULL(psc.member_pricing_status_code, 'Standard') AS 'member_pricing_status_code',
    d2.division_name AS 'shipto',
    cc2.first_name AS 'sales',
    dpp.list_price
    FROM -- A
     (SELECT DISTINCT CONCAT(drss.request_id, '-',
                LPAD(drss.select_id,2,'0')) AS 'invNum', di.*, ls.net_pct, ls.sales_user_id
      FROM division_invoice di
      JOIN division_invoice_list_services ls ON di.invoice_id = ls.invoice_id
      JOIN division_invoice_line_item ili ON di.invoice_id = ili.invoice_id
      JOIN division_request_select_segment drss ON ili.inv_line_id = drss.inv_line_id
      WHERE ili.inv_line_type_id = 1
      AND ili.invoice_id IN (" . implode(',', $aInvId) . ")
      ) A
    JOIN
     (SELECT a.*, -- B
      IF(a.inv_line_id = b.inv_line_parent_id
      OR a.inv_line_split_id = b.inv_line_id
      OR a.inv_line_id = b.inv_line_id,
      b.inv_line_id,
      IFNULL(c.ss_inv_line_id, IFNULL(d.ss_inv_line_id, a.inv_line_id))) AS 'ss_inv_line_id'
       FROM
        (SELECT * -- a
          division_invoice_line_item
          invoice_id IN (" . implode(',', $aInvId) . ")
            line_parent_id IS NULL
```

```
    AND inv_line_type_id IN(1,9,16,17,19,20,30, 8)
    ORDER BY inv_line_num
    ) a
  LEFT JOIN -- b
    (SELECT DISTINCT inv_line_parent_id,inv_line_split_id,inv_line_id,invoice_id -- b
     FROM division_invoice_line_item
     WHERE invoice_id IN (" . implode(',', $aInvId) . ")
     AND (inv_line_parent_id IS NOT NULL OR inv_line_parent_id = inv_line_id)
     ) b
   ON a.invoice_id=b.invoice_id AND (a.inv_line_id = b.inv_line_parent_id OR a.inv_line_split_id = b.inv_line_id)
  LEFT JOIN -- c
    (SELECT i.inv_line_id,ia.inv_line_id ss_inv_line_id,i.invoice_id
     FROM division_invoice_line_item i
     JOIN division_invoice_line_item ia ON i.invoice_id=ia.invoice_id
      AND i.inv_line_num=ia.inv_line_num AND ia.inv_line_type_id=1
     WHERE i.invoice_id IN (" . implode(',', $aInvId) . ")
     AND i.inv_line_type_id NOT IN(9,16,17,19,20,30,8)
     ) c
   ON a.invoice_id=c.invoice_id AND a.inv_line_id=c.inv_line_id
  LEFT JOIN -- d
    (SELECT i.inv_line_id,ia.inv_line_id ss_inv_line_id,i.invoice_id
     FROM division_invoice_line_item i
     JOIN division_invoice_line_item ia ON i.invoice_id = ia.invoice_id AND ia.inv_line_type_id=1
     WHERE i.invoice_id IN (" . implode(',', $aInvId) . ")
     AND i.inv_line_type_id IN(9,16,17,19,20,30,8)
     ) d
   ON a.invoice_id = d.invoice_id AND a.inv_line_id = d.inv_line_id
   ) B
  ON A.invoice_id = B.invoice_id
  JOIN division_request_select_segment drss USE INDEX (FK_divReqSelSeg_DivInvLineItem)
      ON B.ss_inv_line_id = drss.inv_line_id
  JOIN division_invoice_line_item ili ON drss.inv_line_id = ili.inv_line_id
  JOIN division_invoice di ON ili.invoice_id = di.invoice_id
  JOIN division_request_select_order drso ON drss.request_id = drso.request_id
      AND drss.select_id = drso.select_id
  JOIN division_request_select drs ON drso.request_id = drs.request_id
  JOIN division_mail_schedule dms ON drs.campaign_id = dms.campaign_id
  JOIN division_model dm ON drs.model_id = dm.model_id
  JOIN division d ON IFNULL(di.bill_to_div_id, drs.div_id) = d.div_id
  LEFT JOIN division_product_price dpp ON d.div_id = dpp.div_id
    AND drso.wd_product_id = dpp.wd_product_id
  JOIN mx_industry_product_label ipl ON drso.wd_product_id = ipl.wd_product_id AND d.industry_id = ipl.industry_id
  LEFT JOIN division d2 ON drso.ship_to_div_id = d2.div_id
  JOIN division dRSTID ON drs.div_id = dRSTID.div_id
  -- JOIN mx_model_request_sub_type_label mrstl ON dm.request_sub_type_id = mrstl.request_sub_type_id
      AND d.industry_id=mrstl.industry_id
  JOIN mx_model_request_sub_type_label mrstl ON dm.request_sub_type_id = mrstl.request_sub_type_id
      AND dRSTID.industry_id=mrstl.industry_id
  LEFT JOIN company_contact cc1 ON di.bill_to_user_id = cc1.user_id
  LEFT JOIN company c1 ON cc1.company_id = c1.company_id
  JOIN company c ON d.company_id = c.company_id
  JOIN company_contact cc ON A.ms_user_id = cc.user_id
  JOIN job_status_code jsc ON A.invoice_status_id = jsc.status_id
  JOIN mx_invoice_line_code lc ON B.inv_line_type_id = lc.inv_line_type_id
  JOIN mx_industry_code mic ON d.industry_id = mic.industry_id
  JOIN company_contact cc2 ON A.sales_user_id = cc2.user_id
  LEFT JOIN mx_product_addon_code pac ON B.inv_line_type_id = pac.inv_line_type_id
  LEFT JOIN mx_member_pricing_status_code psc ON d.member_pricing_status_id = psc.member_pricing_status_id
  WHERE B.inv_line_parent_id IS NULL
  AND B.print_flag = 'Y'
  AND B.inv_line_price_type != 'P'
  GROUP BY A.invoice_id, B.inv_line_num,B.inv_line_type_id
    -- ,mrstl.sub_type_description, ipl.description,
    -- pac.description, A.update_date, drss.select_id, drss.request_id, A.invoice_status_id, A.invoice_date,
    -- A.remail_num, A.revision_num, A.invoice_comments, A.net_pct, A.invNum, lc.debit_credit, drs.request_id,
    -- drs.service_id, drs.wd_product_id, drs.model_id, drss.member_po_num, d.div_id, d.division_name, d.business_type_id,
    - mic.short_description, cc.first_name, cc.last_name, A.bill_to_member_name, c1.company_name, A.ms_user_id,
      drso.actual_delivery_date, dm.request_id, jsc.description, drs.campaign_id, dms.campaign_name, dms.in_home_date,
      .member_pricing_status_code, d2.division_name,cc2.first_name
        .invoice_id, B.inv_line_num

          .id, request_id, inv_line_description
            description, Z.product_label, Z.inv_line_id, Z.inv_line_num, Z.actual_net_names, Z.update_date,
```

Final Thoughts

Why am I Here?

Why are you here?

Final Thoughts

"He who has a why to live for can bear almost any how." **- Friedrich Nietzsche**

Simon Sinek:

"You don't hire for skills, you hire for attitude. You can always teach skills."

"Great companies don't hire skilled people and motivate them, they hire already motivated people and inspire them."

"People don't buy what you do; they buy why you do it. And what you do simply proves what you believe."

- Check out: https://www.youtube.com/watch?v=u4ZoJKF_VuA