COMP 5541 Course Outline

Instructor: Greg Butler, EV-3.219, gregb@encs
`http://users.encs.concordia.ca/~gregb`

Lectures: Tuesdays 17:45 – 20:15 H-523

Scheduled Labs: Tuesdays 20:30 – 22:10 H-???

Office Hours: Tuesdays 16:00 – 17:00 in EV 3.219
and by appointment

- Ask questions at lectures!

Recommended Books

- Roger Pressman, *Software Engineering: A Practitioner's Approach*, McGraw-Hill Education
- Craig Larman, *Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and the Unified Process*, Prentice-Hall.

Evaluation

Quiz 1	22.5%
Quiz 2	22.5%
Project Increment 1	15%
Project Increment 2	15%
Project Increment 3	15%
Project — individual work	10%
Total	100%

Course Outline I

Introduction to Course

Introduction to SE

- What is SE: discipline, systematic, team, budget constraints, includes maintenance; process, products, tools, people, principles
- Lifecycle overview
- Managerial and Technical Perspectives
- Dimensions of SE projects: business context, size, novelty, type of application
- People Issues: Skills needed on a team; Communication, Organization; Phases of team formation; Meetings

Course Outline II

Tying it all together

- Vision/alignment: getting every phase focussed on same priorities
- Traceability: navigating from document to document
- Visibility: concrete description of the process; concrete evidence of the status of project
- Quality control: verification and validation

Requirements and Analysis

- WHAT is required
- use cases, mini-use case/functionality, scenarios
- other constraints
- documents: SRD, user manual, test cases

Course Outline III
Principles of SE

- Major obstacles: complexity, re-work
- Errors will occur: prevention: rigor, models, what-if; Review/Testing: catch errors as soon as possible
- Rigor and Formality
- Abstraction
- Separation of Concerns

Course Outline IV
Lifecycle Models

- What is a phase: project standards, input/info sources, output documents activities, quality/review, audience for output; entry/exit conditions; example on effectiveness of reviews
- Code-and-fix
- Waterfall: an ideal: document-driven
- Incremental, iterative
- Risk-driven

Course Outline V
Design

- HOW to meet requirements
- Activities: iteration, brainstorming, tracing scenarios, issue-resolution
- Information hiding, cohesion and coupling
- architectural design: components, connectors, constraints, how to analyse; client/supplier, peer-to-peer, uses, is_a relationship; example architectures: layers, pipe-and-filter, interactive interface, continuous transformation
- design patterns: observer, mediator, facade; expression tree example
- documents: Design documents

Course Outline VI

Code and Test

- REALISATION of product
- verification and validation
- testing: top-down vs bottom-up: drivers and stubs; black box vs white box; coverage
- reviews, walkthroughs, inspections
- documents: test plan (unit, module, integration), test cases, test results acceptance test

Formal methods

- Pros and cons: mix informal descriptions with formal
- Z example: proofs
- Larch example: rewriting, inductive proofs

Course Outline VII

Quality

- factors-criteria-metrics
- common metrics: function points, McCabe, Halstead
- quality control: record metrics, defect rates from all projects

Project: Simple Spreadsheet Utility

Emphasis is on experiencing a complete software lifecycle (not final product)

- connections/dependencies between phases
- feedback/change request, re-work
- working as a team
- standards, review and testing to ensure quality/consistency of documents and software

Average load approx 10 hours per week (but varies)

Groups of 9-12 students

- 3 roles: Documenter, Coder, Tester
- team responsibilities
- individual responsibilities

Project

Group dynamics are an important part

- minimise conflicts by establishing common goals/workload at start
- be specific about task assignments/deadlines
- allow for mistakes and re-work in schedule
- assign tasks as early as possible, so individuals can schedule their other work

Keep a diary of project activities.
URGENT: get to know your team!!!