

**SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY**

SAULT STE. MARIE, ONTARIO

**COURSE OUTLINE**

Course Title: **SOFTWARE ENGINEERING**

Course No.: **CET305**

Program: **COMPUTER ENGINEERING TECHNOLOGY**

Semester: **SIXTH (6)**

Date: **JANUARY 1997**

Author: **FRANK TURCO**

Previous Outline

Dated: **JAN 1996**

APPROVED:

*Joseph C. Fawcett*  
Dean

97-01-02  
Date

TOTAL CREDITS: 6

TOTAL CREDIT HOURS: 96

PREREQUISITES:

Successful completion of CET311, and CET301 or  
Permission granted by the Professor pending  
completion of CET311 and/or CET301.

LENGTH OF COURSE:

6 Hours per Week comprised of:  
2 - 2 hour lab / theory classes with the Professor  
1 - 2 hour lab unsupervised work period without the Professor

C O U R S E O U T L I N E

I. Course Description

The prerequisite courses and previous courses have prepared the student with the knowledge and exposure to a variety of tools, techniques, methodologies, approaches, programming and database design. This course provides the student with the environment, the necessary tools, and techniques to collectively develop a major software project. This course is a culmination and application of the theory, group work, training and programming skills acquired to date. It is very much a course where students apply themselves in developing software for real software oriented problems as if they were in fact working for a major software development firm.

Communication is the key to success in software development and therefore documentation, oral, written and interpersonal communication will be a main focus of this course. Students will be responsible to be active participants in both their individual and group work.

The role of the professor in this course is primarily to be a facilitator and provide guidance as a project manager in ensuring that targets and milestones are met. When necessary, instruction will be given on specific topics that require clarification, however, for the most part this course will focus on an applied skills orientation in a realistic work related environment.

II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE:

(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

**A. Learning Outcomes:**

1. Establish a team based environment for Software Engineering.
2. Produce effective project plans, estimates and actual activities.
3. Analyse and design a portion of the major project.
4. Produce, program code, test and implement portions of the major project.
5. Test, verify and validate the integrated project in its entirety.

II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE (Continued):

B. Learning Outcomes and Elements of Performance:

Upon successful completion of this course the student will demonstrate the ability to:

1. Establish a team based environment for Software Engineering.

*Potential elements of the performance:*

- Review all the stages in SDLC.
- Define and apply the general system requirements for the term project.
- Review the current project status and determine the immediate short term goals.
- Discuss the tools available to properly do Software Engineering.
- Discuss the individual roles as team members on a major project in Software development.
- Define the specific roles, duties and responsibilities each individual team member has accepted towards the term project.
- Define and document biweekly goals and accomplishments.
- Initiate an individual project log that contains daily activities, issues and milestones.

This will constitute approximately 10 % of the course grade (possible weighting strategy) and take approximately 1 week.

II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE (Continued):

B. Learning Outcomes and Elements of Performance  
(Continued):

2. Produce effective project plans, estimates and actual activities.

*Potential elements of the performance:*

- Describe the concept of planning and its relevance.
- Define project goals and requirements.
- Discuss the relationship of planning with respect to project size.
- Produce a project timing schedule that identifies the plan versus actual time spent on the various tasks of the team's project.
- Maintain and manage the project plans.
- Set benchmarks and assess progress on the project at these benchmarks.
- Revise plans in accordance and consultation with the project team and project manager.

This will constitute approximately 15 % of the course grade (possible weighting strategy) and take approximately 2 weeks.

3. Analyse and design a portion of the major project.

*Potential elements of the performance:*

- Demonstrate communication skills through meetings and user interviews.
- Prepare for a management overview presentation of the system prior to the programming stage.
- Obtain management approval to proceed at various stages in the project.
- Produce design analysis tools such as:  
    milestones charts, structured walkthrus,  
    code inspections, Data Flow Diagrams
- Comply with guidelines, policies and procedures.

This will constitute approximately 20 % of the course grade (possible weighting strategy) and take approximately 4 weeks.

II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE (Continued):

B. Learning Outcomes and Elements of Performance  
(Continued):

4. Produce, program code, test and implement portions of the major project.

*Potential elements of the performance:*

- Produce program specifications based on the Data Flow Diagrams.
- Create and discuss the Pseudo Code that will be used to create the necessary Program Code.
- Produce Program Code based on the Project guidelines and plan.
- Demonstrate standardisation of program code.
- Produce effective documentation related to the program needs and approach taken.
- Perform proper data definition.
- Construct code in a reusable form.
- Participate in structured code walk throughs.
- Develop an effective program testing environment as well as a system testing environment and a production environment.
- Write the program code in a standard and modular fashion.
- Perform unit program testing.
- Implement portions of code as each module has been thoroughly tested.

This will constitute approximately 40 % of the course grade (possible weighting strategy) and take approximately 7 weeks.

B. Learning Outcomes and Elements of Performance  
(Continued):

5. Test, verify and validate the integrated project in its entirety.

*Potential elements of the performance:*

- Discuss the purpose of software quality assurance.
- Verify the project solution has met the quality standards.
- Demonstrate the usefulness of walkthrus and inspections throughout the software life cycle.
- Perform unit testing and debugging.
- Describe software system testings such as:
  - a) integration testing
  - b) acceptance testing
- Produce a system overview document.
- Prepare and present a managerial overview of the project implementation.

This will constitute approximately 15 % of the course grade (possible weighting strategy) and take approximately 2 weeks.

II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE SUMMARY

A variety of tools and techniques are used to accomplish the objectives as set out in the previous sections. The following are some of the major activities that will take place in this course.

Students will be asked to formally and informally do research on specific areas related to the project. These request will be both on an individual and group basis. These questions will reinforce the topics necessary to successfully build the given project.

Students are also required to be team players and work in small groups toward building a solid team atmosphere. It is hoped that students will appreciate that there isn't always a clear cut answer to development and people with different perspectives can improve the results. The students are to bring motivation, participation and good listening skills to the table to help each other come up with a better collective solution.

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(Continued)

Students will produce graphical documentation such as DataFlow Diagrams, Entity Relationship Diagrams and Project Plans. There will be a common repository (dictionary) for software development and the students will maintain internal communication documentation through electronic mail and listservs. They will also be expected to produce and maintain day to day documentation such as the biweekly progress reports, logs, project plans and minutes of meetings to facilitate communication with all of their peers.

III. TOPICS TO BE COVERED

\* NOTE: These topics sometimes overlap several areas of skill development and are not necessarily intended to be explored in isolated learning units or in the order below.

TOPICS	APPROXIMATE TIME
1. Software Engineering Concepts.	1 WEEKS
2. Project Planning and Project Management.	2 WEEKS
3. Project related Systems Analysis and Design.	4 WEEKS
4. Programming, testing and Implementation in a modular mode.	7 WEEKS
5. Verification and validation of the entire integrated project.	2 WEEKS

IV. REQUIRED STUDENT RESOURCES

TEXTBOOKS TO BE USED AS REFERENCE MATERIAL:

1. "Introduction to Systems Analysis & Design" by Kendall & Kendall (the text book from CET311)
2. "Database Management and Design" by Kronke (the textbook from CET301)
3. "Access 2 Developer's Guide" Second Edition by Roger Jennings (new book for the development platform)
4. "Visual Basic 4 Unleashed" by Scott, Shannon et al (new book that can be shared, not absolutely required but strongly recommended).

IV. REQUIRED STUDENT RESOURCES (Continued)

ADDITIONAL RESOURCE MATERIALS

Additional reference material will either be given to the students or placed in the library for the student's use.

Professor's Handouts, Guidance, and Material as it relates to the individual topics.

Use of research modes such as INTERNET, Library Data Base Searches, and articles.

REQUIRED INDIVIDUAL STUDENT RESOURCES

- Participation & Teamwork
- Box of Disks
- Communication
- Previous Course Notes
- Project Work
- Individual Research
- Documentation

V. EVALUATION METHODS:

- Tests and Quizzes 30%
- Assignments and Lab Work 70%

The tentative breakdown is as follows:

- 1 Formal Theory Test at 15 %
- 1 TAKE HOME Test at 15 %
- 1 Major Project broken down as follows:
  - Group Related Documentation at 10 %
  - Individual Biweekly progress reports and results at 10 %
  - Personal Log at 10 %
  - Individual Presentation & Documentation at 10 %
  - Programming, Testing & Documenting of the students individual project tasks at 30 %



V. EVALUATION METHODS (Continued) :

The student's individual tasks will be mutually agreed upon. They will be broken up into 4 to 6 sub tasks.

Some minor modifications to the above percentages may be necessary. The instructor reserves the right to adjust the mark up or down 5% based on attendance, participation, leadership, creativity and whether there is an improving trend.

- \* All Assignments must be completed satisfactorily to complete the course. Late hand in penalties will be 5% per day. Assignments will not be accepted past one week late unless there are extenuating and legitimate circumstances.
- \* Due to the heavy emphasis on group effort and team work, late hand ins will not be allowed for some assignments. Absenteeism and lack of effort will disrupt all members of the group and will not be tolerated. Possible actions taken will be discussed in the following description.
- \* The professor reserves the right to adjust the number of tests, practical tests and quizzes based on unforeseen circumstances. The students will be given sufficient notice to any changes and the reasons thereof.
- \* Mandatory work that is individual and non-impacting in nature will result in an Incomplete with the option of makeup work at the end of the semester.
- \* Mandatory work that is critical to the rest of the team players will be absolutely required within the agreed upon time frame. Failing to comply may result in action taken.
- \* A student who is absent for 3 or more times without any valid reason or effort to resolve the problem will result in action taken.
- \* Non completion of 2 or more tasks without reasonable cause will result in action taken.

NOTE: If action is to be taken, it will range from marks being deducted to a maximum of removal from the course.

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V. EVALUATION METHODS (Continued):

GRADING DETAILS

1. TESTS

Written tests will be conducted as deemed necessary; generally at the end of each block of work. They will be announced about one week in advance. Quizzes may be conducted without advance warning.

2. ASSIGNMENTS

Assignments not completed by the assigned due-date will be penalised by 5% per day late. All assignments must be completed satisfactorily to complete the course.

3. GRADING SCHEME

A+	90 - 100%	Outstanding achievement
A	80 - 89%	Excellent achievement
B	70 - 79%	Average Achievement
C	55 - 69%	Satisfactory Achievement
U	Incomplete: Course work not complete at Mid-term. Only used at mid-term.	
R	Repeat	
X	A temporary grade that is limited to instances where special circumstances have prevented the student from completing objectives by the end of the semester. An X grade must be authorised by the Chairman. It reverts to an R if not upgraded in an agreed-upon time, less than 120 days.	

4. UPGRADING OF INCOMPLETE

When a student's course work is incomplete or final grade is below 55%, there is the possibility of upgrading to a pass when the student's performance warrants it. Attendance and assignment completion will have a bearing on whether upgrading will be allowed. A failing grade on all tests will remove the option of any upgrading and an R grade will result. The highest grade on re-written tests or assignments will be 56%.

Where a student's overall performance has been consistently unsatisfactory, an R grade may be assigned without the option of make-up work.

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V. EVALUATION METHODS (Continued) :

The method of upgrading is at the discretion of the teacher and may consist of one or more of the following options: assigned make-up work, re-doing assignments, re-writing of tests, or writing a comprehensive supplemental examination.

VI. SPECIAL NOTES

1. All students should be aware of the Special Needs Office in the College. If you have any special needs such as being visually impaired, hearing disabled, physically disabled, learning disabilities you are encouraged to discuss required accommodations confidentially with the Professor and/or contact the Special Needs Office, Room E1204, Ext. 493, or 717, or 491 so that support services can be arranged for you.
2. Your professor reserves the right to modify the course as he/she deems necessary to meet the needs of students.
3. It is the responsibility of the student to retain all course outlines for possible future use in gaining advanced standing at other post-secondary institutions.
4. Plagiarism  
Student should refer to the definition of "academic dishonesty" in the "Statement of Student Rights and Responsibilities". Students who engage in "academic dishonesty" will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course, as may be decided by the professor.
5. Substitute course information is available at the Registrar's office.
6. Students must achieve a passing grade in **both** the assignment and the test portions of the course.
7. The topics will not necessarily be covered in the order shown in this course outline.

VII. PRIOR LEARNING ASSESSMENT

Students who wish to apply for advanced credit in the course should consult the professor.