SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: RESEARCH PROJECT and RESEARCH REPORT

Course No.: CET308 AND ELR 311

Program: COMPUTER ENGINEERING

Semester: FIVE and SIX

Date: AUG., 1988

author: GERRY DAVIES / TYCHO BLACK

New:____ Revision:__X_

APPROVED: _____ _____

Chairperson Date

COMPUTER ENGINEERING TECHNOLOGY

CET 308 AND ELR 311

RESEARCH PROJECT AND REPORT

OBJECTIVES

GENERAL

The Research Project and Research Report courses are intended to provide a vehicle for the student to consolidate the technical skills developed in the first two years of the course, and to apply those skills to a hardware or software project of some significance. The student is expected to display a high degree of self-motivation, organization, technical skill, and communications skills during the course, and the culmination of the course is a completed hardware or software project and a technical report.

The analysis and design phases of the project shall be carried out during the fifth semester. During this time the student shall select a project from a list of available projects, carry out the analysis and background study, and design the system. At the end of this semester the student shall submit a technical report describing their work. If the project is a hardware job, the report should include the design of the system including block and circuit diagrams, an analysis of system operation, and a plan for implementing and testing the system. The software description should contain context and data flow diagrams, data descriptions, and program design including structure charts.

The sixth semester is the time for implementing, testing, and completing the documentation of the system. The semester culminates in a technical report describing the project. This report is an extension of the previous report, and should contain complete documentation of the project plus a technical description of it. The student must submit the hardware and software for the system, demonstrate the operation of the system, and, at the request of the instructor, give an oral presentation to a group. The documentation must be complete including program listings, pseudocode, test plans, and results.

RECOMMENDED TIMETABLE

The following timetable should be kept in mind during the project. Since each project is different, some flexibility is allowed. However, no major timetable changes may be made without consultation with the instructor.

FALL SEMESTER

ELAPSED TIME	STAGE OF COMPLETION
2 weeks	Selection of the project complete.
6 weeks	Analysis complete. Data flow, block diagrams.
12 weeks	Design complete. Structure charts, circuit diagrams.
14 weeks	Fall semester report complete.

WINTER SEMESTER

8 weeks	Implementation complete. Coding, wiring.
11 weeks	Testing complete.
14 weeks	Documentation and report complete.

PROJECT METHODOLOGY

The instructor will assume the role of first-line supervisor during the project. As such, he may ask for periodic progress reports; analysis, design, and code reviews; and peer reviews and walkthroughs. Students may be expected to participate in walkthroughs of other student projects. Each student shall keep an up-to-date diary of project activities.

ASSESSMENT

The student shall be assessed by letter grade on the following points:

1. Technical ability.
2. Organizational skill.
3. Level of effort.
4. Communication skills.
5. Project completeness.
6. Documentation and reports.

Each of the above qualities must be acceptable to the instructor for the successfull completion of the course.

RESEARCH REPORT TOPICS 1988-89

Topics for the research project should be taken from this list. Other topics may be used if approved by the instructor.

1. Extend the capabilities of the Feathernet network software to include higher levels of function.
2. Study the operation of the Smartterm software package, and develop some software for the PC that will extend the existing student emulation program of it.
3. Study the operation of the LXY-11 graphics printer, and develop some software that utilizes Regis graphics from Fortran with the printer.
4. Develop some software that combines Fortran, C and/or MACRO, the windowing capabilities of the VMS run-time library, and the Regis graphics system to provide an On-line Software Documentation System.
5. Develop a real-time control system on the PDP-11 using the A/D, D/A, real-time clock, and digital I-O modules. The system should demonstrate the multi-tasking capabilities of RSX-11, and should be able to be used as a model when teaching computer control concepts. Fortran should be used to develop the software.
6. Analyse the MicroLogic software with a view towards emulating it, and enhancing it. Develop some software to implement the design.

7. Study the graphics capabilities of the MC6845 and develop some software on the IBM PC that can be used to demonstrate its capabilities and to teach its programming techniques.
8. Develop a prototype stand-alone MC68000 system and develop software to demonstrate its capabilities, preferably in a real-time I/O application.
9. Study the hardware of the IBM PC, and the way in which the operating system is structured. Write some software demonstrating your knowledge of the methods of writing systems calls, programming I-O devices, and writing device drivers.
10. Build an A/D, D/A and real-time clock interface for the IBM PC and develop some software to use it in a real time control system.
11. Study the hardware and software associated with the Novell/Netware local area network in A40, develop instructional materials to aid in its use, set up a viable environment for student use, and demonstrate all of its functions.
12. Develop some software on the IBM PC that can be used in the generation and maintenance of Software Engineering Documentation.
13. Extend the Laser Printer Software that was written for the VAX to provide a user-friendly graphics environment for the VAX.

14. Develop an Ethernet Local Area Network interface for the IBM PC and write some software to enable its inclusion in an existing Ethernet LAN.
15. Develop an IEEE-488 interface for an IBM-PC and write some software to enable it to function as an instrument controller.
16. Extend the graphics software written in LISP for the IBM PC.
17. Emulate a typical PC-based word processor on the VAX using C and macro.
18. Develop hardware, software and procedures that can be used to provide an integrated approach to maintenance and interfacing training on the IBM PC.
19. Study the use of Prolog on the IBM PC, and develop some software that will demonstrate its functionality in an application.
20. Develop a control system utilizing the Rhino robot system and the IBM PC.
21. Design a microprocessor-based Logic Analyzer that uses the PDP-11 or an IBM-PC as the control and display processor.
22. Study techniques for transferring files between the VAX and a PC and develop software to facilitate it. (Use the VAX as a virtual disk for the PC)
23. Develop a system of interconnecting the network in A20 to the systems in A40, and develop software and procedures to facilitate it.