EMBRY-RIDDLE AERONAUTICAL UNIVERSITY
Department of Computing and Mathematics
COURSE OUTLINE FOR

Course No.: MSE690 **Title: Graduate Research Project**
Cr Hrs: 3

Lecture Hours: 0 **Laboratory Hours: 0**

COURSE DESCRIPTION:

A written document on aviation/aerospace software engineering topice which expojse the sutdent o the technical aspects of writing. The document is an individual work based on student involvement in a team software development activieity representing a significant elemben of the software devello[pment life cycle. It provides the sutdent with a opportunity to pursue a project of special interest at a practical level. This is a required cours for students who choose not to wirtie a thesis

GOALS:

This course is intended to provide students with the measurement foundations and experience necessary for study and research in software engineering, with specific emphasis techinical writing skills and presentation of the project.

PERFORMANCE OBJECTIVES: See attached document
Process Guidelines for Graduate Research Project
Version 1.0
April 1995

All details are included in the attached document which details the Graduate Research Project or GRP.

Department of Computing and Mathematics
COURSE OUTLINE FOR MSE690, Continued

GRADING SYSTEM: Pass/Fail

Embry-Riddle Aeronautical University
Department of Computer Science
Master of Software Engineering

Process Guidelines
for
Graduate Research Project

Version 1.0
April 1995
February 1999

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Document Background

Version 1.0 of this document, the Master of Software Engineering Graduate Research Project Guideline, was produced by Drs. Soheil Khajenoori and Thomas Hilburn with input and collaboration from the Department of Computer Science faculty. Please direct any comment, critique and/or improvement proposals to Dr. Soheil Khajenoori at the Department of Computing and Mathematics, Embry-Riddle Aeronautical University.

1.0 Purpose of Document

The purpose of this document is to describe the elements of a GRP and detail a process that MSE students can use in the selection, design, implementation and completion of a graduate research project

2.0 General Elements of a Graduate Research Project

An individual graduate student carries out a research project that supports the goals and objectives of the MSE program. The research topic is typically in an area incorporated in the MSE curriculum and the research is carried out under the direction of a faculty member that has interest and experience in the area of specialization. The GRP is documented in a technical report that must be reviewed and approved by the faculty.

The GRP provides the student with the opportunity to develop depth in some area of study encountered in the MSE program. It also provide research skills and experience that supports life-long learning in the field of software engineering. In the aggregate, the GRP work by students and faculty provides the MSE program with the ability to develop, focus and sustain research that supports the needs and opportunities of the software engineering community as a whole. More specifically, it is expected that such research will be particularly supportive of the aviation/aerospace industry.

3.0 Types of Graduate Research Project

Expository: A project that consists of the exposition of the knowledge in a particular field of software engineering. Work consists of the collection, evaluation, organization and presentation of knowledge in the area of specialization.

Experimental: A project that consists of the formulation of a hypothesis, the design of an experiment to test the hypothesis, carrying out the experiment, and the assessment of the results.

Evolutionary: The project would be part of a larger project that involves the long-term development of a software engineering entity (e.g., a process, a methodology, or a software product). Work would consist of advancing the development or iterating on some phase of the development.

Technology-Oriented Application: The project would consist of the application of current research in software engineering (e.g. the application of a new methodology to the solution of a problem) or the development of a software engineering tool (e.g. a tool that would assist in the collection and analysis of user input that is part of alpha\beta testing of a software product or analysis and design of user interface tools).

Problem Solving Application: The project would consist of the application of current results in software engineering, e.g., the application of new methodology, method or technique to the solution of a problem.
Although not advocated, it is foreseeable to select a research project that is a combination of the above types. Since there could be a risk of increasing complexity and reducing the cohesion of the research, more care most be taken in dealing with the combination type research.

4.0 Expectations

Students: Throughout the GRP process the student has the primary responsibility for the planning, design and implementation of the GRP. A script for the GRP process is attached.

Faculty Advisor: The faculty advisor has the responsibility for monitoring and approving the GRP work of a student, providing technical knowledge and support in the research area, offering guidance and advice concerning any phase of the GRP process, and coordinating the review and assessment of the GRP.

Caveat: Due the university's requirement, if the Graduate Research Project is not completed within the semester that the student registers for the subject, he or she must register for at least one credit hour during the subsequent semester to complete the work. To minimize the risk of taking additional GRP credit, you should register for GRP after you have completed the first two phases (i.e., planning and design) of your research project. Refer to the GRP Process Scripts in paragraph below.

5. Graduate Research Project Process Script and Forms

	Purpose:	To guide MSE students in completing Graduate Research Project
	Entry Criteria	- Have at least completed 18 credit hours at graduate level
	Input Required	- Research Project Plan Summary - Task Planning Template - Schedule Planning Template - Decision Recording Log - Issue Tracking Log - Time Recording Log - Guidelines for the GRP (from the office of Graduate Studies) - Process Improvement Proposal (PIP) Template
1	Planning	- Identify a general area for the research - Identify a type of research - Select a research advisor - Select a research subject - Select a research review committee - Perform initial knowledge acquisition on the selected subject - Estimate the required time - Estimate the required resources (people, tools, references) - Prepare research proposal - Obtain approval on research proposal, you are not allowed to register for GRP, that is MSE 690 unless you have completed the proposal and obtained all the required signatures - Complete Research Project Plan Summary with the planed time - Complete Planning Form - Complete Schedule Form - Complete Time Recording Log - Complete Issue Tracking Log - Complete PIP Form

2	Design	- Perform detailed knowledge acquisition on the selected subject - Develop a research outline (conceptual design) - Review the outline with the advisor and record all decisions - Develop a detailed outline of the research - Review the detailed outline of the research with the advisor and record all decisions - Track and modify project schedule as appropriate - Obtain advisor approval on any schedule modification - Complete Time Recording Log - Complete Decision Recording Log - Complete Issue Tracking Log - Complete PIP Form

Graduate Research Project Process Script (Continued)

3	Implementation	- Perform the research - Review accomplishments with the advisor and record all decisions - Track and modify project schedule as appropriate - Obtain advisor approval on any schedule modification - Document the results - Obtain advisor approval - Distribute research document to the review committee - Set the date for the research project defense - Present and Defend research results - Complete Time Recording Log - Complete Decision Recording Log - Complete Issue Tracking Log - Complete PIP Form
4	Completion	- Incorporate all the recommended changes - Track and modify project schedule as appropriate - Obtain advisor approval on any schedule modification - Obtain advisor and review committee signatures indicating acceptance and completion of the work - Submit copies of GRP to the Department and the Office of Graduate Studies - Complete Time Recording Log - Complete Decision Recording Log - Track and modify project schedule as appropriate - Obtain advisor approval on any schedule modification - Complete PIP Form
5	Postmortem	- Complete research project plan summary with actual time data
	Exit Criteria	- Completed Graduate Research Project Document - Completed PIP Form - Completed Grade Form

RESEARCH PROJECT PLAN SUMMARY

Student_____ Date
Advisor_____ Project #

Summary	Plan	Actual
Pages/Hour	_____	_____
Reuse%	_____	_____

Time in Phase (Days)	Plan	Actual
Planning	_____	_____
Design	_____	_____
Implementation	_____	_____
Completion	_____	_____
Postmortem	_____	_____

Defects Injected	Plan	Actual
Planning	_____	_____
Design	_____	_____
Implementation	_____	_____
Completion	_____	_____
Postmortem	_____	_____

Defects Removed	Plan	Actual
Planning	_____	_____
Design	_____	_____
Implementation	_____	_____
Completion	_____	_____
Postmortem	_____	_____

TASK PLANNING TEMPLATE

Student_____ Date
Advisor_____ Project #

	TASK	PLAN					ACTUAL		
#	Name	Hours	Planned Value	Cumulative Hours	Cumulative Planned Value	Date	Date	Earned Value	Cumulative Earned Value
Totals									

SCHEDULE PLANNING TEMPLATE

Student _____ Date __
Advisor _____ Project # __

DATE	PLAN				Actual				
Date	Task #	Direct Hours	Cumulative Hours	Cumulative Planned Value	Task #□	Direct Hours	Cumulative Hours	Cumulative Earned Value	Adjusted Earned Value

TIME RECORDING LOG

Student _____ Date _____
Advisor _____ Project # _____

Date	Start	Stop	Delta Time	Phase	Comment

DEFECT RECORDING LOG

Student ____ Date __________
Advisor ____ Project # _______

Date:	Number	Type	Inject	Removed	Fix Time
Description					

Date:	Number	Type	Inject	Removed	Fix Time
Description					

Date:	Number	Type	Inject	Removed	Fix Time
Description					

Date:	Number	Type	Inject	Removed	Fix Time
Description					

Date:	Number	Type	Inject	Removed	Fix Time
Description					

Date:	Number	Type	Inject	Removed	Fix Time
Description					

Date:	Number	Type	Inject	Removed	Fix Time
Description					

DECISION RECORDING LOG

Student _____ Date _____
Advisor _____ Project # _____

Date	Topic:
Discussion Summary:	

Decision:

Date	Topic:
Discussion Summary:	

Decision:

Date	Topic:
Discussion Summary:	

Decision:

Date	Topic:
Discussion Summary:	

Decision:

ISSUE TRACKING LOG

Student _____ Date _____
Advisor _____ Project # _____

Issue #:	Date:	Phase:
Description:		

Resolution: Date:

Issue #:	Date:	Phase:
Description:		

Resultion: Date:

Issue #:	Date:	Phase:
Description:		

Resolution: Date:

Issue #:	Date:	Phase:
Description:		

Resolution: Date:

PROCESS IMPROVEMENT PROPOSAL (PIP)

Student _____ Date _____
Advisor _____ Project # _____

PIP Number	Problem Description
PIP Number	Proposal Description
Notes and Comments	

5. Related Documents

1- "Guidelines for the Graduate Research Project," The Office of Graduate Studies, Embry-Riddle Aeronautical University