Appendix B
Assessment Plan

Program: Ph.D. in Mechanical Engineering
A Ph.D. in Mechanical Engineering (MEE) allows graduates to pursue professional careers at academic institutions, national research labs, federal and state agencies, and private and public corporations. Students enrolled in the program will develop the ability to identify and pursue important research questions pertaining to the field of Mechanical Engineering. Students will also acquire the quantitative, qualitative and methodological research skills needed to advance research findings that contribute to the development of the economy, society and industry, either locally or globally. Training focuses on the engineering process, skills and critical thinking necessary to design and execute scientific and engineering research. Training through research and study of the primary literature endows graduates of the program with enhanced content knowledge, applied skills and a fundamental understanding of the engineering process and technology to prescribe scientific solutions. The overall goal of the program is to train and develop advanced practitioners, researchers and teaching scholars in Mechanical Engineering.

1. Learning Objective/Outcomes
Graduates of the Ph.D. program in Mechanical Engineering will be able to demonstrate the following outcomes:

a a) *Advanced Knowledge.* Master advanced concepts, methods and technologies in core mechanical engineering thrust areas.
b b) *Analysis.* Ability to apply in depth qualitative analysis to relevant mechanical engineering questions, issues, and problems.
c c) *Research.* Conduct independent research that results in an original contribution to knowledge that meets all the standards for responsible conduct of research.
d d) *Ethics.* Demonstrate knowledge and understanding of ethical standards in executing research.
e e) *Communication.* Communicate research to both technical and general audiences in an effective manner through oral and written formats.

2. Methods Method	Description/Target	Timeline	Person/People Responsible	Objectives Assessed
Ph.D. Candidacy Examination (CE)	Students must pass a candidacy exam for the Ph.D. that consists of a written and oral examination based on the core courses. The candidacy exam tests the depth and breadth of the student's knowledge in the field of MEE, covering topics such as: Applied Mechnics, Dynamic systems, materials, manufacturing, and thermal/fluids. Target: over 75% of Ph.D. students admitted to the program are expected	Sometime within one year after completion of the core courses (in year 2 or 3 in the Ph.D. program)	Ph.D. Candidacy Committee	a,b

	to successfully pass this candidacy exam.			
Dissertation Proposal Examination (PE)	The dissertation proposal tests the depth and breadth of the student's knowledge in their area of research, and assesses the student's ability to design and present a coherent, logical and appropriate research plan. Students are also expected to be able to present a coherent, logical and appropriate research plan describing specific experimental approaches that will be carried out to investigate current MEE problems in their area of concentration. Target: 100% of Ph.D. students passing the candidacy exam are expected to successfully pass the dissertation proposal.	After accrual of $\geq$45 and $\leq$ 69 credit hours	Dissertation Research Committee (Graduate faculty members)	a,b,c,d,e
Dissertation Report and Defense (DRD)	Students must write a Ph.D. dissertation that exhibits original research. Students will defend the Ph.D. dissertation in a public seminar and in a comprehensive examination conducted by the	Final Semester of the students' Ph.D. program	Dissertation Research Committee (Graduate faculty members)	a,b,c,d,e

	student's advisory committee. Target: 100% of students receiving the Ph.D. degree are expected to meet this requirement.			
Research Committee Meetings (RCM)	This is a tool of formative assessment. After the candidacy examination, Ph.D. students will meet with their advisory committees once per semester, and every semester thereafter. Students present their project data, progress and proposed plan of research. The committee asks questions, provides feedback and constructive criticism and frames the expectations for the student's final dissertation content. Target: 100% of the students passing into proposal examination will go on to produce a successful dissertation research project	Every semester	Dissertation Research Committee (Graduate faculty members)	a,b,c,d,e
MEEE799-Doctoral Dissertation Research	All Ph.D. students must take at least 27 hours of MEE799. During their execution of their research projects, students typically meet with and present their research to the principal investigator/ dissertation research advisor in lab meetings or individual meetings. The advisor provides advice and direction,	Every semester after successful completion of the candidacy examination	MEE Dissertation Advisor	a,b,c,d,e

	and assesses progress by the student. Target: 100% Ph.D. students will successfully complete 27 hours of MEE 799.			

Outcome-by-Methods

	Summative Assessment			Formative Assessment
	CE	**PE**	**DRD**	**RCM**
a) Advanced Knowledge	x	x	x	x
b) Analysis	x	x	x	x
c) Research		x	x	x
d) Ethics		x	x	x
e) Communication		x	x	x