

WICHITA STATE UNIVERSITY

Program Review Self-Study Template

[Redacted]

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[Redacted]

[Redacted]

Academic unit: Mechanical Engineering

College: Engineering

Date of last review

Date of last accreditation report (if applicable): Fall 2006

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

List all degrees described in this report (add lines as necessary)

[Redacted]

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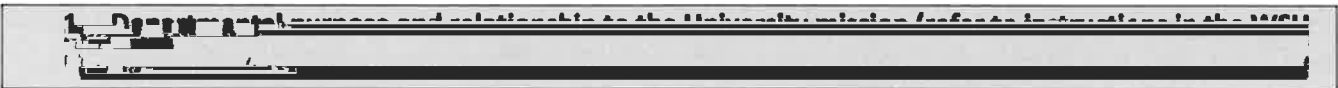
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12

6



a. University Mission:

Wichita State University is committed to providing comprehensive educational opportunities in an urban setting. Through teaching, scholarship and public service, the University seeks to equip both its

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the larger community with the educational and cultural tools they need to thrive in our world, and

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The role and missions of the Mechanical Engineering programs are consistent and in line with those of the College of Engineering and the University's broad mission. These include preparing undergraduate and graduate students to engage effectively and responsibly in the practice of the engineering profession.

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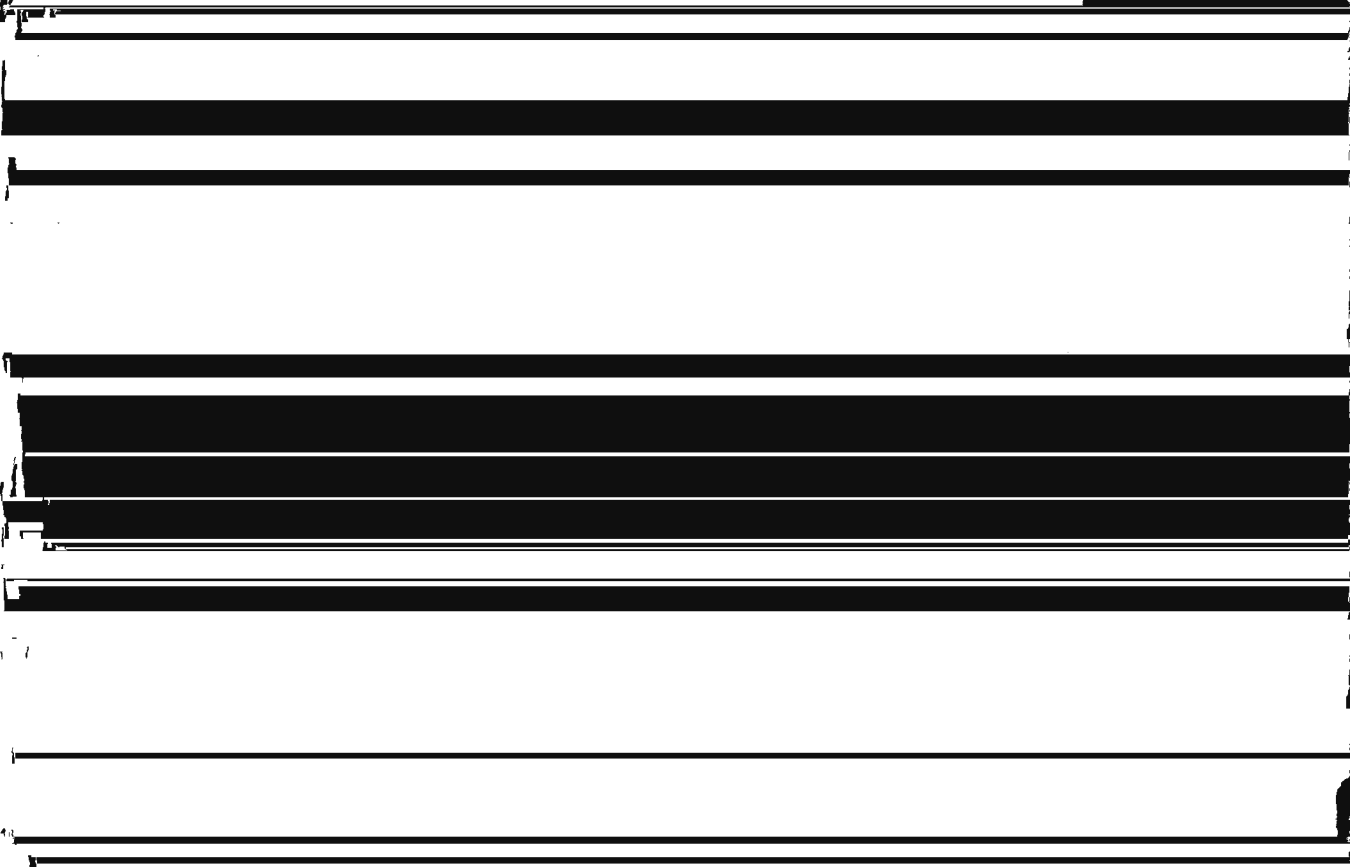
The programs are designed and geared to produce mechanical engineering graduates who can practice their profession within the metropolitan area and beyond. The mechanical engineers of the BOME program will have

[Redacted]

2. Ensure that graduates have the technical knowledge and academic background necessary to be accepted to other advanced degree program, such as a doctoral of philosophy in mechanical engineering.

The Master program (MSME) is assessed through a set of learner outcomes related to competency in core areas, design skills, effective communication, engineering ethics, and ability to self-educate. The course work evaluation, course project effectiveness, and thesis/project work are all part of this assessment. Program effectiveness is gauged by the papers presented by the students at regional and national conferences, including annual graduate school GRASP presentation. The details of the MSME program assessment is provided in Appendix B.

The Doctor of Philosophy in Mechanical Engineering (PhDME) program is directed towards advanced students



2a. Describe the quality of the program as assessed by the strengths, productivity, and qualifications of the faculty in terms of SCH

UG Program - BSME (SCH from entire department)

WSU Program Review document for more information on completing this section). Complete a separate table for each program if appropriate.

Last 3 Years	Tenure/Tenure Track Faculty (Number)	Tenure/Tenure Track Faculty with Terminal Degree (Number)	Instructional FTE (#):			Total SCH - Total SCH by FY from Su, Fl, Sp	Total Majors - From fall semester	Total Grads by FY
			TTF= Tenure/Tenure Track	GTA=Grad teaching assist	O=Other instructional FTE			
			TTF	GTA	O			
Year 1→								
Year 2→								
Year 3→								
			Total Number Instructional (FTE) – TTF+GTA+O			SCH/ FTE	Majors/ FTE	Grads/ FTE
Year 1→								
Year 2→								
Year 3→								



in the number of tenured and tenure-track faculty from 11 to 7 during that same period, the department has

maintained effective teaching and instruction. The teaching laboratories have been expanded and new lab

safety measures have been implemented. More emphasis has also been placed on the experience-based learning and engagement of the students with the mechanical design and development process. The ME faculty

7. Describe the quality of the program assessed by the strengths, productivity, and qualifications of

MS-ME Program

*	*	*	*	*	N/A	84	25
*	*	*	*	*	N/A	93	18
*	*	*	*	*			

N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

the faculty in terms of SCH, majors, graduates and scholarly productivity (refer to instructions in the WSU Program Review document for more information on completing this section). Complete a separate table for each program if appropriate.

0	2	29	5	7	2	1	10	\$2,712,979
17	13	33	11	21	5	1	7	\$1,380,293
35	18	45	18	37	3	2	16	\$2,526,433

Last 3 Years	Tenure/Tenure Track Faculty (Number)		Instructional FTE (#): TTF= Tenure/Tenure Track GTA=Grad teaching assist O=Other instructional FTE			Total SCH - Total SCH by FY from Su, Fl, Sp	Total Majors - From fall semester	Total Grads by FY
	Tenure/Tenure Track Faculty (Number)	Tenure/Tenure Track Faculty with Terminal Degree (Number)	TTF	GTA	O			
Year 1 →								
Year 2 →								
Year 3 →								

*From the table on page 3, indicate number of faculty (and instructional FTE) teaching in the graduate program.

2. Describe the quality of the program assessed by the student.

PhD-ME Program

*	*	*	*	*	N/A	19	2
*	*	*	*	*	N/A	20	3
*		*		*			

N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

9	3	29	5	7	2	1	10	\$2,712,979
17	13	33	11	21	5	1	7	\$1,380,293
35	18	45	18	37	3	2	16	\$2,526,433

in a collection. KRBP data mining for UG programs: Majors=25; Graduates=10; Faculty=3; KRBP data mining for graduate programs: Majors=20; Graduates=10; Faculty=3

From the table on page 3, indicate number of faculty (and instructional FTE) teaching in the graduate program.

3. Academic Program: Analyze the quality of the program as assessed by its curriculum and impact on students. Complete this section for each program (if more than one). Attach updated program assessment plan (s) as an

227 22.7 22.66
 249 22.8 22.72
 22.81

appendix (refer to instructions in the MSU Program Review document for more information)

95	17	3.54	3.33	3.33	3.51	3.48	3.62
85	18	3.41	3.43	3.36	3.57	3.48	3.62
59	18	3.42	3.68	3.40	3.60	3.48	3.67

a. For undergraduate programs, compare ACT scores of the majors with the University as a whole.

Last 3 Years	Total Majors - From fall semester	Majors	ACT – Fall Semester (mean for those reporting)	All University Students - FT
Year 1 →				
Year 2 →				
Year 3 →				

BSMF Assessment Criteria (see Appendix A for Detailed Assessment Plan)

Learning Outcome	Assessment Tool	Target/Criterion	
BSMF graduates will attain:	➤ ME Senior Exit Exam	22% (50%)*	50.4%
(a) An ability to apply knowledge of mathematics, science, and engineering.	➤ ME Senior Exit Survey, Amount of Learning	3.0/5.0	3.68/5.0
BSME graduates will attain:	➤ Capstone Industry Project Score	80%	95.2%
(b) An ability to design and conduct experiments, as well as to analyze and interpret data.	➤ Capstone Industry Project Score	85%	95.2%
BSME graduates will attain:	➤ Capstone Design: Industry Project Qualitative Feedback	100% Positive Feedback	100%
(c) An ability to design a system, component, or process to meet desired needs.	➤ Capstone Design: Team Member Peer Feedback	85%	88.4%

* The first number corresponds to the average passing score from the University of Oklahoma simulated on-line FE Exams. The second number in parentheses is the target set by the BSME program at WSU. The targets and data assessment for the undergraduate program will be further updated.

Learner Outcome	Result	Assessment Tools	Targets/Criteria
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Learner Outcome	Result	Assessment Tools	Targets/Criteria
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

(a) MSME graduates will have an ability to self-educate	➤ Research projects in courses	80%	N/A
(b) MSME graduates will have effective communication	➤ Writing skills - via assignments and projects in the required technical writing class	80%	N/A

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
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PhD Assessment Criteria (see **Appendix C** for Detailed Assessment Plan)

Learner Outcome	Assessment Tool	Target/Criterion	
(a) PhDME graduates will have an ability to self-educate and to conduct independent scholarly research.	➤ Rubric score on dissertation ➤ Research projects in courses	80%	N/A
(b) PhDME graduates will have effective oral and written communication skills.	➤ Writing skills via assignments and projects in the required text-based writing class CESP750D; graduate level courses that have writing component; and dissertation	80%	N/A

d. Provide aggregate data on student majors satisfaction (e.g., exit surveys), capstone results, licensing or certification exam pass-rates by year, for the last three years

Capstone 47.1%
 Capstone 47.7%
 Capstone 50.4% 33%

3.66 3.55 3.07 3.02
 3.68 3.55 3.13 3.12

with the program and whether students are learning the curriculum (for learner outcomes, data should relate to the goals and objectives of the program as listed in 1a)

Student Satisfaction (e.g., exit survey data on overall program satisfaction).* If available, report by year, for the last 3 years
 Year N Result (e.g., 4.5 on scale of 1-5, where 5 highest)

Learner Outcomes (e.g., capstone, licensing/certification exam pass-rates) by year, for the last three years
 Year N Name of Program National Comparison±

1 (2009) Senior Exit Survey on ME Curriculum (see Table below)
 2 (2010) Senior Exit Survey on ME Curriculum (see Table below)
 3 (2011) Senior Exit Survey on ME Curriculum (see Table below)

1 (2009) N/A
 2 (2010) N/A
 3 (2011)

Publications with Graduate Students	2009	2010	2011
Graduate Student Co-Authored Journal Publications	8	17	33
Graduate Student Co-Authored Conference Publications	27	33	44

- f. Indicate whether the program is accredited by a specialty accrediting body including the next review date and concerns from the last review.

The Bachelor of Science in Mechanical Engineering program is accredited by ABET. At the time of last review in Fall 2007, no concern was indicated by the accreditation agency.

g. Provide a brief assessment of the overall quality of the academic program using the data from 2e-2f.

[Redacted content]

4a Analyze the student need and employer demand for the program. Complete for each program if appropriate.

Utilize the table below to provide data that demonstrates student need and demand for the program

Undergraduate - BSME

86	47	54.7%	59	\$62,500
70	36	51.4%	62	\$57,500
73	44	60.3%		

(refer to instructions in the WSU Program Review document for more information on completing this section).

37	3	1	43	2	0	129	0	12	11	2	0	6	0	0	38	0	2
36	5	2	58	2	0	131	0	15	10	0	0	18	0	0	29	0	5

** Go to the U.S. Bureau of Labor Statistics Website: <http://www.bls.gov/oco/> and view job outlook data and salary information (if the Program has information available from professional associations, employers, or other sources, enter that data)

Last 3	No. new	No.	No.	1 Year	Total	Average	Employ-	Employment	Employment:	Employment:	No.	Projected
Years	enroll-	enroll-	enroll-	Addi-	enroll-	enroll-	ment	enroll-	enroll-	enroll-	enroll-	enroll-

Graduates of the BS program in Mechanical Engineering typically find jobs as mechanical engineers, design engineers, stress engineers, systems engineers, manufacturing engineers, etc. A BSME degree is one of the most

[REDACTED]

4c. Analyze the student need and employer demand for the program. Complete the following table if applicable.

Graduate – PhD

12	8	66.7%	2
8	7	87.5%	3
8	6	75.0%	

(refer to instructions in the WSU Program Review document for more information on completing this section).

14	0	1	1	1	0	1	0	2	0	0	0	0	0	0	0	0
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16	Majors	0	0	0	3	0	0	1	0	Employment of Majors†	0
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Last 3 No new No No 1 Year Total Average Emplv- Employment Employment Employment No Projected

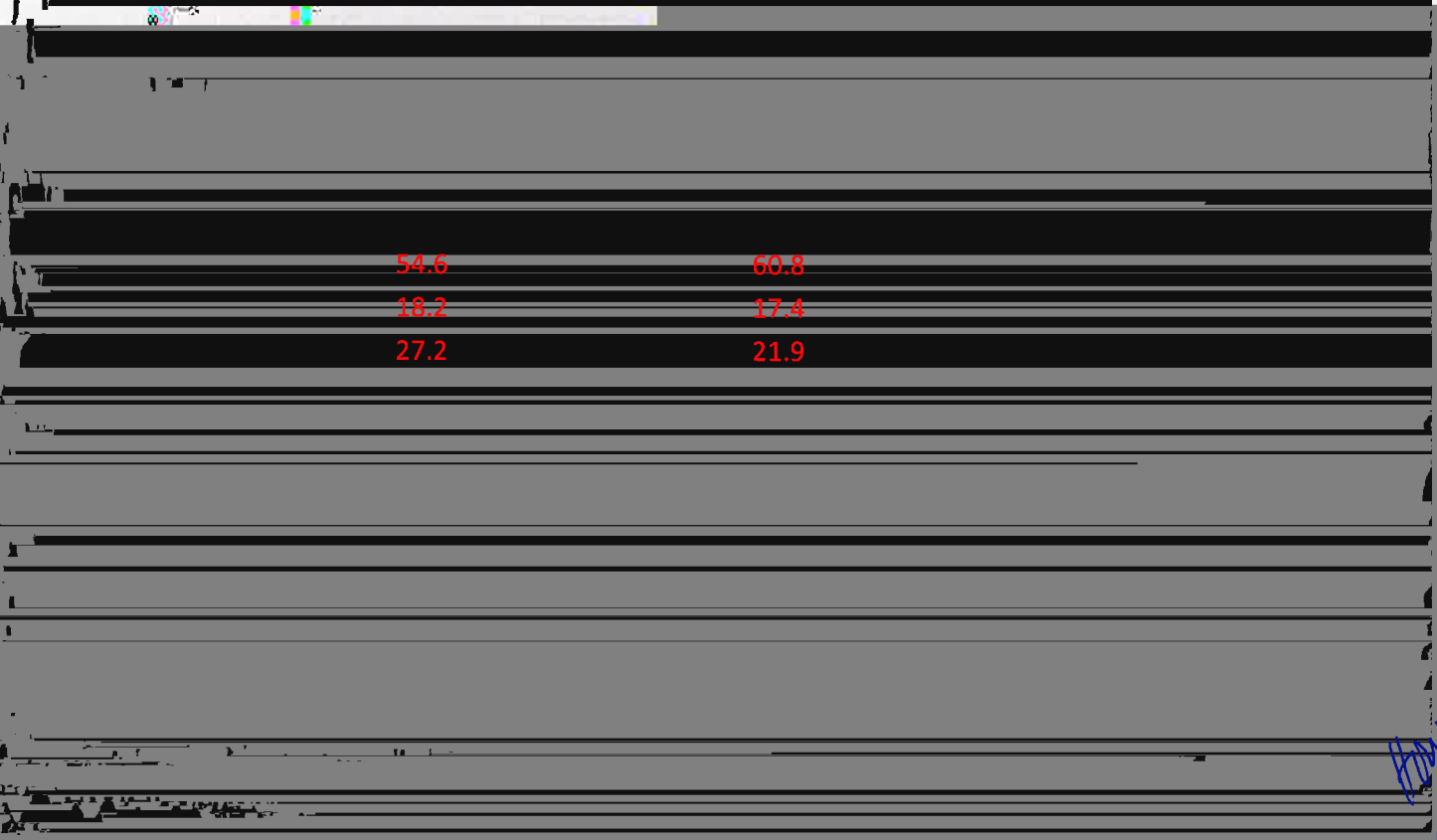
* May not be collected every year

<http://www.bls.gov/oco/>

available from professional associations or alumni surveys. enter that data)

EYE appli who enroll Attri no of Salary ment % in the field % related to % outside the

5 Analyze the cost of the program and revise the Program provide to the discipline other program at the



54.6

60.8

18.2

17.4

27.2

21.9

list

Woo ?

6. Report on the Program's goal (s) from the last review. List the goal (s), data that may have been collected to

[Redacted content]

Program Review document for more information on completing this section).

(For Last 3 EVs)	Assessment Data Applied
[Redacted]	[Redacted]
[Redacted]	[Redacted]
[Redacted]	[Redacted]

szf

Opportunities:

1. Additional funding for road construction in the State and nation.

2. Additional funding for road construction in the State and nation.

3. Additional funding for road construction in the State and nation.

4. Additional funding for road construction in the State and nation.

5. Additional funding for road construction in the State and nation.

6. Additional funding for road construction in the State and nation.

7. Additional funding for road construction in the State and nation.

8. Additional funding for road construction in the State and nation.

9. Additional funding for road construction in the State and nation.

10. Additional funding for road construction in the State and nation.

11. Additional funding for road construction in the State and nation.

12. Additional funding for road construction in the State and nation.

13. Additional funding for road construction in the State and nation.

14. Additional funding for road construction in the State and nation.

15. Additional funding for road construction in the State and nation.

16. Additional funding for road construction in the State and nation.

17. Additional funding for road construction in the State and nation.

18. Additional funding for road construction in the State and nation.

19. Additional funding for road construction in the State and nation.

20. Additional funding for road construction in the State and nation.

*See
a me*

Senate Bill #127.

2. With the improvements in the economy of the State and nation, the demand for mechanical

Appendix A

Detailed Assessment Plan for BS in Mechanical Engineering Program

I. Mission

The mission of the Bachelor of Science in Mechanical Engineering (BSME) program at Michigan State University is

IV. Assessment of (Student) Learner Outcomes

Various assessment tools are utilized for the evaluation of the program.

[REDACTED]

development of the assessment process is shown in Figure A.1. All courses at the undergraduate level have a syllabus that identifies the learner outcomes for the course. However, not all learner outcomes are reported to the assessment team. These learning outcomes are collected by the faculty teaching the course each semester. In addition, the department has mapped specific learning outcomes to be reported to the department.

[REDACTED]

Students who complete the ME program will do the following:

engineering

social issues

temporary issues

PROGRAM EDUCATIONAL OBJECTIVES²⁰
(relating ABET Outcomes and Assessment Tools) →

PEO 1, 3

PEO 1, 2

PEO 1, 3

PEO 1, 3

PEO 1, 2

PEO 1, 3

PEO 1, 3

PEO 1, 3

PEO 1, 2

PEO 1, 2

PEO 1, 2

Curriculum Courses/Outcomes

> ABET Criterion →	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
ME 631 Heat			•		•	•	•		•	•	•
ME 450 Selected Topics—Creative Design and Practice			•						•	•	•
ME 664 Introduction to Fatigue and Fracture	•		•		•		•				•
ME 665 Selection of Materials for Design/ Manufacturing	•		•		•		•				•
ME 667 Mechanical Properties of Materials I	•		•		•		•				•
ME 669 Acoustics	•		•		•		•				•
ME 719 Basic Combustion Theory	•				•		•				•
ME 760 Fracture Mechanics	•		•		•			•			0•
ME 762 Polymeric Composite Materials	•		•		•		•				•

Table A.4 Assessment of Learner Outcomes for the BSME Program

Learner Outcome	Assessment Tool	Target/Crit	
BSME graduates will attain:	➤ ME Senior Exit Exam	33% (50	50.4%
(a) An ability to apply knowledge of mathematics, science, and engineering.	➤ ME Senior Exit Survey, Amount of Learning	3.0/5.0	3.68/5.0
BSME graduates will attain:	➤ Capstone Industry Project Score	80%	95.2%
(b) An ability to design and conduct experiments, as well as to analyze and interpret			
BSME graduates will attain:	➤ Capstone Industry Project Score	85%	95.2%
(c) An ability to design a system	➤ Capstone Design/ Industry Project Qualitative	100% Positive	100%

BSME graduates will attain:

ME Senior Chair Survey

2-015-2

1-2/5-2

(i) A recognition of the need for, and an ability to engage in, life-long learning

BSME graduates will attain:

Engineering 2020 Competency Data

10001

10001

How

(j) A knowledge of contemporary issues

(how often is covered?)

BSME graduates will attain:

Competency Data

0001

0001

Appendix B

Detailed Assessment Plan for MS in Mechanical Engineering

[Redacted]

I. Mission

The mission of the Master of Science in Mechanical Engineering (MSME) program is to provide the graduate students with an in-depth knowledge through advanced mechanical engineering research.

[Redacted]

[Redacted]

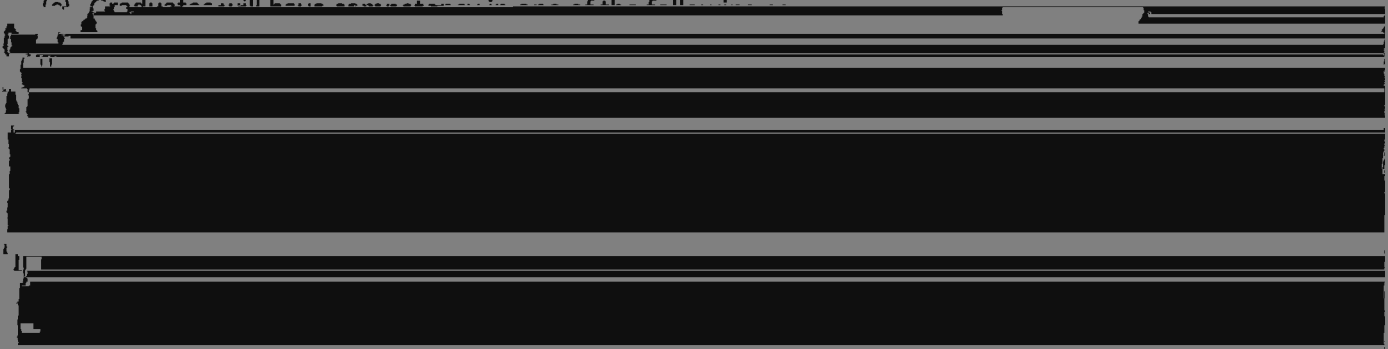
[Redacted]

[Redacted]

students to the process of research through course work to train students in comprehensive research through

- The writing skills will be assessed through assignments and projects in the required technical writing class CESP750D, and graduate level courses that have writing and presentation components.

(c) Graduates will have competency in one of the following:



- Learner Outcome**
- Materials Engineering, Instrument Tool
 - Thermo-Fluid Sciences,



- Graduates will be assessed while taking the core classes in materials engineering, thermo-fluid sciences, and mechanical systems and design.

(d) Graduates will be able to design and improve systems, components, or processes to meet desired needs:

- Graduates will be assessed while taking classes which emphasize design and improvement of



(e) MSME graduates will have ➤ Graduate students will be assessed using 80% N/A

[REDACTED]

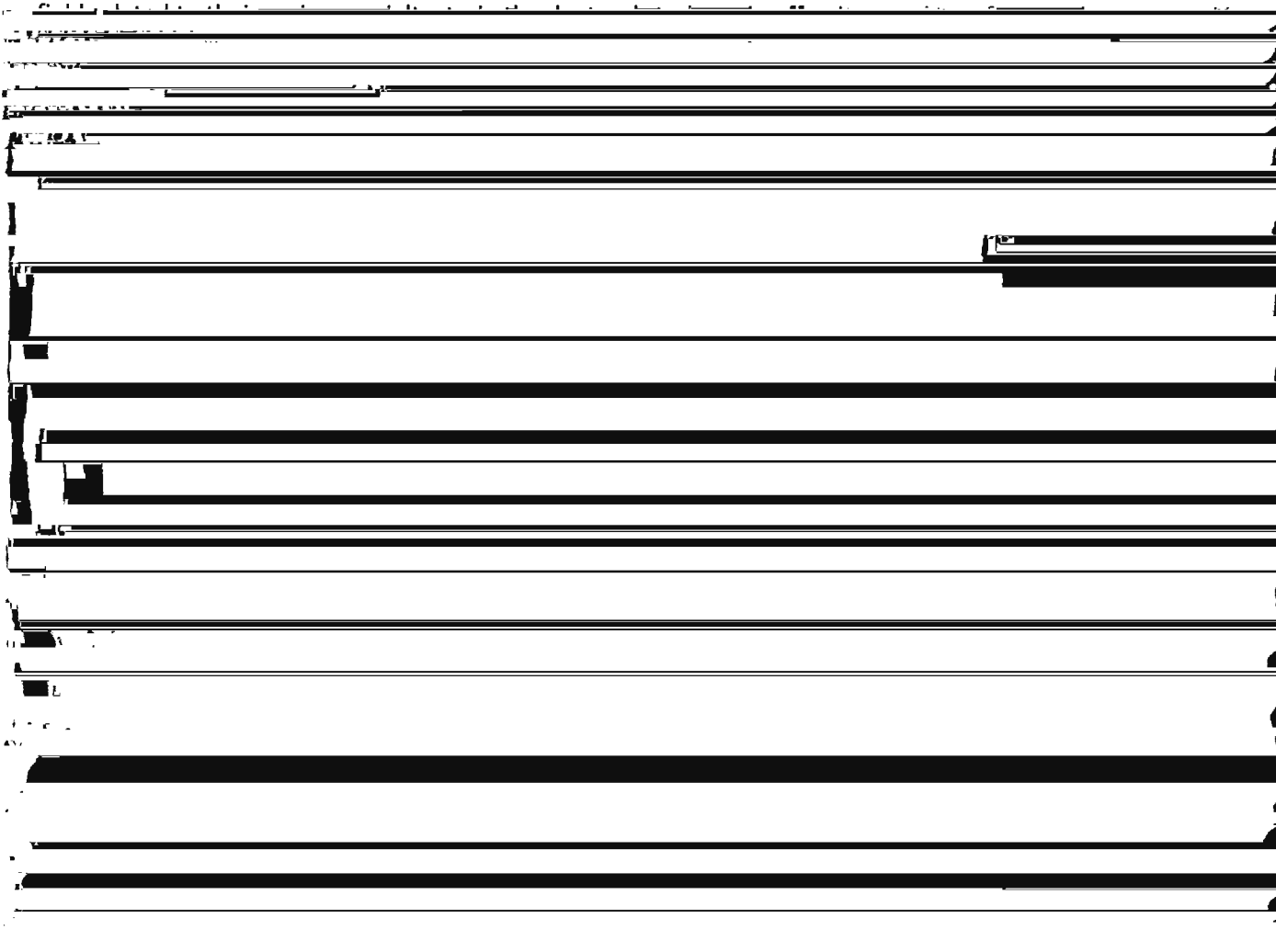
professional and ethical responsibility. reported.

Appendix C

Detailed Assessment Plan for PhD in Mechanical Engineering

I. Mission

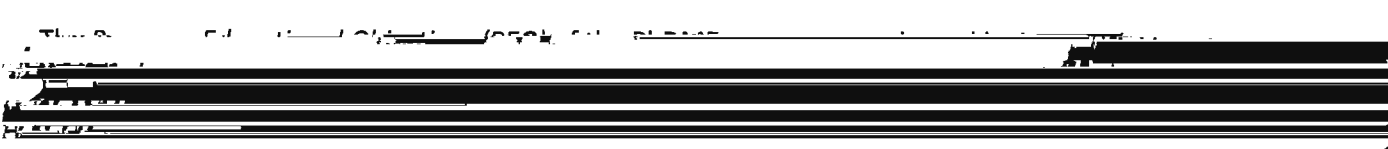
The mission of the Doctor of Philosophy (PhDME) program is to educate and train graduate students in a subspecialty major of mechanical engineering, broaden the knowledge base of the doctoral students in a minor



team of peers, train the students in presentation skills through research paper presentation and publication, and prepare the doctoral graduates to serve the global community in research and/or education.

The mission is in support of the College of Engineering as well as that of the University in teaching, scholarship and service. The constituents of the Mechanical Engineering Graduate program are its graduate students and faculty.

II. Program Objectives



addition, students will be evaluated at the time of the dissertation defense for their writing and presentation skills

(c) Graduates will have competency in one of the core areas of materials engineering at the level of a graduate student. [Redacted]

Learner Outcome	Assessment Tool	Target/Criterion
[Redacted]	[Redacted]	[Redacted]

mechanical systems and design, as well as their major and minor areas:

- Graduates will be assessed via taking PhD qualifying, major and minor exams.

(d) Graduates will be able to design and improve systems, components, or processes to meet desired needs:

[Redacted]

	concepts developed in the core classes.		
(d) PhDME graduates will be able to design and improve systems, components, or processes to meet desired needs.	➤ Graduates will be assessed for course learner outcomes while taking classes which emphasize design and improvement of engineering systems.	80%	N/A
(e) PhDME graduates will have	➤ Graduate students will be	80%	N/A

a knowledge of professional and ethical responsibility.

assessed using CITI integrity modules with average scores reported

V. Feedback Loop

The department has a Graduate Committee composed of the Graduate Coordinator and...

College: Engineering

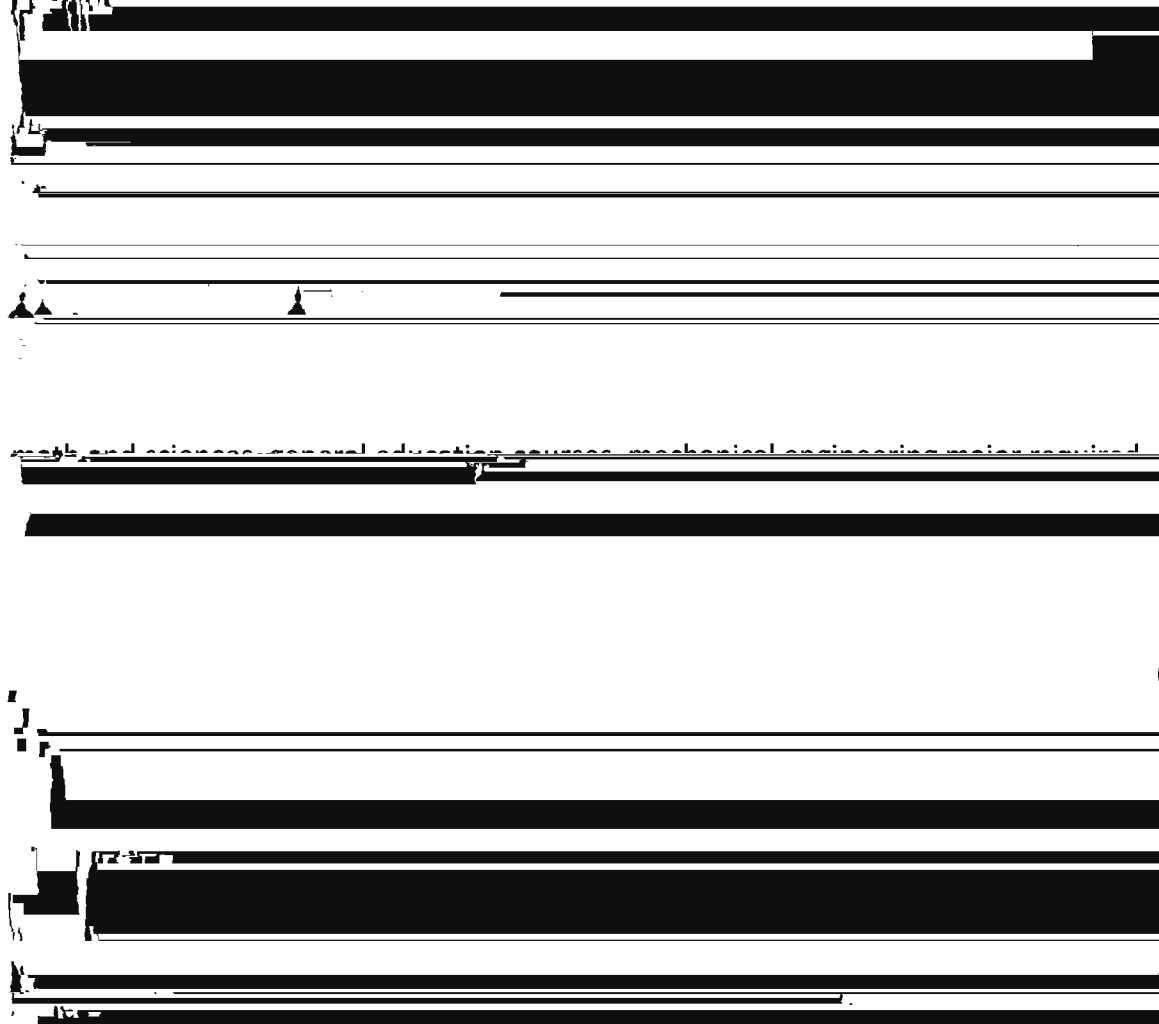
Department/Program (s): Mechanical Engineering

Degree (s) Offered: MS, MS, PhD in Mechanical Engineering

Triggers: None

Brief Description of each degree:

The Bachelor of Science in Mechanical Engineering (BSME) program equips graduates with engineering methods, skills, and experience required to design, to develop, and to produce mechanical components or systems in any industry. The program prepares students for job responsibilities through a broad course of study that covers the basic



Assessment of the Quality of the Undergraduate Students:

[REDACTED]

Undergraduate students have a similar average ACT score to the University average
Graduate student admission GPAs seem to be in line with College and University

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

outcomes.

Assessment of Learning Outcomes:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

By April 1, 2012 (send to the Office of the Registrar):

[Redacted]

[Redacted]

[Redacted]

- Document that the program review process is a part of a continuous improvement approach involving all departmental faculty.
- Document program changes that occurred through assessment of student learner outcomes and other data collected.

[Redacted]

[Redacted]

[Redacted]

• The learning outcomes for all programs (and general education courses)

[Redacted]

[Redacted]