

Financial Engineering Assessment Plan AY 2022-23 through 2028-29

Departments of
Agricultural Economics & Economics
and
Mechanical & Industrial Engineering

Montana State University

The Financial Engineering Program Mission:

To produce graduates well-grounded in financial engineering and data analytics knowledge and skills consistent with the land-grant mission of MSU; and prepare them to be productive citizens and contributors to the economic well-being of employers.

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Introduction

This document details program assessment of the Financial Engineering (EFIN) program.

Program Educational Objectives

In support of the program's mission, the FESC established educational objectives that describe in broad terms what graduates are expected to attain within a few years after graduating.

Financial Engineering graduates will:

- I. Employ financial engineering, risk management and data analysis tools and knowledge in their chosen career paths;
- II. Employ effective communication;
- III. Work in inter-professional teams;
- IV. Engage in life-long learning, including post-graduate education for some graduates;
- V. Contribute to industry and society, including involvement in professional and other service activities; and
- VI. Demonstrate ethical leadership in design and operational activities that contribute to their organization and community.

Student Outcomes

The student outcomes prepare Fin. Eng. graduates to attain the program educational objectives.

Students completing the Financial Engineering program will be able to:

- (a) apply knowledge of mathematics, economics, engineering and computing to identify, formulate, design and assess solutions to complex problems;
- (b) analyze data, interpret results, and draw appropriate conclusions;
- (c) communicate effectively with a range of audiences;
- (d) function effectively on inter-professional teams; and
- (e) recognize professional and ethical responsibilities in the conduct of their work and make informed judgments that consider cultural, societal, and environmental impacts.

Table 1: Map of student outcomes to program educational objectives¹

Student Outcomes	Program Educational Objectives					
	I	II	III	IV	V	VI
(a)	X	X	X	X	X	
(b)	X	X				
(c)	X	X	X		X	X
(d)			X	X	X	X
(e)	X		X	X	X	X

¹ Refer to Appendix A: Detailed Descriptions of Student Outcomes to Program Educational Objectives Map for more information.

Assessment Schedule

The FSCS annual evaluates the Fin. Eng. program as per the schedule below.

Table 2: Evaluation schedule, AY2022-23 – AY2028-29

Data	Academic Year						
	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
Job Placement	X	X	X	X	X	X	X
EAB Review	X	X	X	X	X	X	X
Internship Interviews	X	X	X	X	X	X	X
Alumni Survey	X					X	
Curriculum Review	X		X		X		X
Senior Exit Interviews	X	X	X	X	X	X	X
Course Reviews ²	ECNS 460 ECNS 309 ECNS 301	EIND 364 EIND 300 EIND 457	EFIN 101 EFIN 401 EFIN 405	EIND 468 EFIN 301 EFIN 305	ECNS 461 ECNS 313 EFIN 499	EIND 354 EIND 464	EIND 373 EGEN 325 ECNS 345
Embedded Outcomes Assessment (EOA)	c, d	e	a	b	c, d	e	a
EOA Data Source	EFIN 499	EIND 300	EFIN 401	EFIN 301	EFIN 499	EIND 300	EFIN 401
Assessment and Outcomes Committee Feedback	X	X	X	X	X	X	X

Assessment Administration

The program assessment will be administered by a FESC member, serving as the plan administrator. The Administrator is appointed by the Chair of the FESC. The role involves:

- Initiating annual program assessment each Fall.
- Directing staff to collect required data.
- Directing FESC to evaluate data with relevant rubrics.
- Directing FESC to complete the Assessment Report for submission to the Provost's office.

Changes to Plan

The FESC reviews the assessment plan every seven years. Additionally, students, faculty, and staff may request changes to the FESC, triggering a review. If amendments are approved by the FSCS, the External Advisory Board also reviews and provides feedback. If large changes are made, the FESC will seek input of students through an open forum where they have an opportunity to review the changes and offer comments.

² Course reviews evaluate the syllabi, final exam, and course learning outcomes to identify whether they fulfil the student outcomes as per Table 3 below.

Table 3: Map of Required EFIN Courses to Student Outcomes

Student Outcomes	CSCI	ECNS						EFIN						EIND						
	132 / 232	301	309	313	345	460	461	101	301	305	401	405	499	300	354	364	373	457	464	468
(a)	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●
(b)	●		●	○	○		●	○	●	●	●	●	●		○		●	●		○
(c)				○			○		○		○		●	●						
(d)				○					○		○		●	○						
(e)		○	●	○	○			●	○		○		●	●						

Key: ● - major emphasis
○ - minor emphasis

Appendix A: Detailed Descriptions of Student Outcomes to Program Educational Objectives Map

Objective I: Utilize financial engineering, risk management and data analysis tools and knowledge in their chosen career paths, is supported by all outcomes but one because the financial engineering toolkit and knowledge base include some aspect of each of the student outcomes.

Objective II: Employ effective communication, is most directly supported by Outcome (c), which is an ability to communicate effectively. This objective is also supported by Outcome (a) because students will become better communicators as they understand problems from a systems perspective, and by Outcome (b) because data interpretation is essential to effective communication in this field.

Objective III: work in inter-professional teams, is supported most directly by Outcome (d) which is an ability to function on inter-professional teams. However, it is also supported by Outcome (c) because good communication skills are essential to good teamwork, and by Outcome (e) because being a good team player involves understanding one's professional responsibility and behaving in an ethical manner and understanding the implications of decisions from multiple perspectives. This objective is further supported by Outcome (a) since strong technical and problem-solving skills should enhance their ability to contribute meaningfully in multidisciplinary teams.

Objective IV: engage in life-long learning, including post-graduate education for some, is directly supported by Outcome (a) the ability to engage in life-long learning, especially if one desires to pursue post-graduate education, is significantly enhanced with a strong foundation in the fundamentals of math, economic science, engineering and computing. The objective is further supported by outcome (d) because part of functioning effectively on multidisciplinary teams is the desire and ability to learn from others, especially those from different disciplines. Finally, Outcome (e) further this objective because a learning attitude is necessary for one to effectively consider cultural, societal and environmental impacts that differ based on the situation and that change over time.

Objective V: contribute to industry and society, similar to Objective I, is supported by nearly all of the outcomes. The outcomes noted in Table 1 as supporting this objective together, in concert, support attainment of the objective that our graduates contribute in meaningful ways to the advancement of their industry and of the broader society.

Objective VI: demonstrate ethical leadership in design and operational activities that contribute to their organization and community, is directly supported by communication and teamwork skills (Outcomes (c) and (d)) coupled with good problem-solving ability (Outcome (a)) and strong sense for ethical responsibility (Outcome (e)).