Financial Engineering

Financial Engineering is a multidisciplinary field that emphasizes complex modeling and analysis of new financial economic instruments to manage risk, create strategic business opportunities, and access new markets. Especially in today's highly leveraged domestic markets and fluctuating global business environment, successful management of market, credit, and production risk is essential yet increasingly difficult. This minor equips students with the basic analytical tools to help a business assess and manage financial risks, and can be used to complement a range of majors.

The objective of the program is to provide students with the necessary tools to help manage a business's financial risks. In keeping with this objective, financial engineering majors undertake rigorous training in financial economics, engineering mathematics, and actuarial methods:

- Mathematics similar to engineering but expanded to include more statistics and probability theory
- Financial economics with a solid background in classical economic theory and markets (capital, commodity, and derivative)
- Software engineering and modeling

The financial engineering minor is a joint program of the Department of Mechanical and Industrial Engineering and the Department of Agricultural Economics and Economics.

Undergraduate Programs

- Financial Engineering (p. 1)
- Minor in Financial Engineering (http://catalog.montana.edu/undergraduate/engineering/mechanical-industrial-engineering/financial-engineering-minor/)

The Bachelor of Science in Financial Engineering (FE) is a multidisciplinary major that emphasizes data analytics and the creation of new financial economic instruments as well as the combining of existing instruments to manage risk, create strategic business opportunities, lower costs, and access new markets. Risk management is essential in today's highly leveraged domestic markets as well as the global business environment. Successful market, credit, and production risk management requires complex financial economic modeling and analysis.

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- Mathematics similar to engineering but expanded to include more statistics and probability theory
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Financial engineers are commonly employed in banking, corporate finance, securities, insurance, manufacturing, agricultural businesses, and other industries that require sophisticated analysis skills. To remain competitive, regional industries as well as national and international firms will employ financial engineers because of the increased complexity and sophistication of business risk management.

Due to their rigorous training, the demand for financial engineering graduates is high with a forecasted growth rate of 9% annually over the next seven years, according to the Occupational Outlook Handbook.

The financial engineering major is a joint program of the Department of Mechanical and Industrial Engineering and the Department of Agricultural Economics and Economics.

Freshman Year	**Credits**	
	Fall	**Spring**
CHMY 141 - College Chemistry I & CHMY 142 - College Chemistry I Lab	4	
CSCI 127 - Joy and Beauty of Data	4	
EFIN 101 - Introduction to Financial Engineering	1	
Choose one of the following:	3	
CLS 101US - Knowledge and Community		
COMX 111US - Introduction to Public Speaking (formerly COM 110US)		
M 171Q - Calculus I	4	
ECNS 251IS - Honors Economics*		4
M 172 - Calculus II		4
PHSX 220 - Physics I with Calculus		4
WRIT 101W - College Writing I**		3
Year Total:	16	15

Sophomore Year	**Credits**	
	Fall	**Spring**
CSCI 132 - Basic Data Structures and Algorithms	4	
ECNS 309 - Managerial Economics	3	
Choose one of the following:	3	
ECNS 345 - Econ Org, Finance & Credit		
EGEN 325 - Engineering Economic Analysis		
M 273 - Multivariable Calculus	4	
University Core Elective	3	
CSCI 232 - Data Structures and Algorithms		4
ECNS 301 - Intermediate Micro with Calc		3
M 221 - Introduction to Linear Algebra		3
M 274 - Introduction to Differential Equation		4
University Core Elective		3
Year Total:	17	17

Junior Year	**Credits**	
	Fall	**Spring**
ECNS 313 - Money and Banking	3	
ECNS 460 - Advanced Data Analytics in Economics	3	
EIND 300 - Engineering Management & Ethics	3	
EIND 354 - Engineering Probability and Statistics I	3	
EIND 364 - Principles of Operations Research I	3	
EFIN 301 - Engineering & Economic Financial Management I		3
Choose one of the following:		3
ECNS 403R - Intro to Econometrics		
EIND 457 - Regres & Multivar Analysis		
EIND 373 - Production Inventory Cost Analysis		3
EIND 464 - Prin of Operations Research II		3
Technical Elective		3
Year Total:	15	15

Senior Year	**Credits**	
	Fall	**Spring**
ECNS 461 - Financial Econometrics	3	

EFIN 401 - Engineering & Economic Financial Management II	3	
EIND 468 - Managerial Forecasting & Decision Analysis	3	
Professional Elective	3	
Technical Elective	3	
EFIN 499R - Financial Engineering Design Capstone		3
Professional Electives		6
Technical Elective		3
University Core Elective		3
Year Total:	15	15
Total Program Credits:		**125**

* May substitute ECNS 202 Principles of Macroeconomics and ECNS 204IS Microeconomics

** Students exempt from the MSU writing requirement must still take a college-level writing course. Pre-approved substitutions are WRIT 201, WRIT 221, HONR 201US, HONR 202IH if not used to satisfy another requirement.

Professional Electives

AGBE 321	Economics of Agricultural Marketing	3
AGBE 421	Advanced Agricultural Marketing	3
AGBE 445	Agribusiness Management	3
BFIN 420R	Investments	3
BFIN 435	Corporate Finance	3
BFIN 452	International Finance	3
BFIN 456	Entrepreneurial Finance	3
BFIN 458	Commercial Bank Management	3
BFIN 460	Derivative Securities and Risk Management	3
BFIN 491	Special Topics	3
BGEN 361	Principles of Business Law	3
BMGT 405	Supply Chain Analytics	3
ECNS 303	Intermediate Macro with Calc	3
ECNS 310	Health Economics	3
ECNS 312	Labor Economics	3
ECNS 314	International Economics	3
ECNS 316	Economics of Crime and Risky Behaviors	3
ECNS 317	Economic Development	3
ECNS 320	Public Finance	3
ECNS 332	Econ of Natural Resources	3
ECNS 432R	Economic Policy Evaluation	3
ECNS 451	Behavioral & Experimental Economics	3
ECNS 490R	Undergraduate Research	1-3
ECNS 492	Independent Study	1-3
EFIN 498	Internship	1-3
EGEN 310R	Multidisciplinary Engineering Design	3
EGEN 492	Independent Study	1-3
EIND 425	Technology Entrepreneurship	3
EIND 434	Project Management for Engineers	3

Note: May substitute EIND 373 and ECNS 345 for BFIN 322 prerequisite, and substitute ECNS 313 for BFIN 357 prerequisite. May not double count ECNS 403 as PE and to satisfy EIND 457 substitution.

Technical Electives

CSCI 347	Data Mining	3
CSCI 440	Database Systems	3
CSCI 446	Artificial Intelligence	3
CSCI 447	Machine Learning	3
ECNS 401	Microeconomic Theory	3
ECNS 502	Macroeconomic Theory	3
ECNS 504	Microeconomic Theory II	3
ECNS 561	Econometrics I	3
ECNS 562	Econometrics II	3
EIND 422	Introduction to Simulation	3
EIND 434	Project Management for Engineers	3
EIND 455	Design of Experiments for Engineers	3
EIND 457	Regres & Multivar Analysis	3
EIND 458	Production & Engineering Mgmt	3
EIND 477	Quality Management Systems	3
ESOF 322	Software Engineering	3
ESOF 422	Advanced Software Engineering: Cybersecurity Practices	3
ESOF 522	Empirical Software Engr	3
M 441	Numerical Linear Algebra & Optimization	3
STAT 408	Statistical Computing and Graphical Analysis	3
STAT 421	Probability Theory	3

A minimum of 125 credits is required for graduation; 42 of these credits must be in courses numbered 300 or above.

Financial Engineering students seeking a minor in Economics must complete 3 upper division directed elective courses beyond the requirements for their major.

Financial Engineering students seeking a second major in Economics must complete 5 upper division directed elective courses beyond the requirements for their primary major.