

New Proposal

Date Submitted: 01/24/22 12:34 pm

Viewing: : **Financial Engineering:**

Automated Trading Practices, MS

Last edit: 03/24/22 5:02 pm

Changes proposed by: Lauren Redman

In Workflow

1. **U Program Review**
2. **1422 Head**
3. **KP Committee Chair**
4. **KP Dean**
5. **University Librarian**
6. **Grad_College**
7. **Provost**
8. **Senate EPC**
9. Senate
10. U Senate Conf
11. Board of Trustees
12. IBHE
13. HLC
14. DMI

Approval Path

1. 01/25/22 3:24 pm
Deb Forgacs (dforgacs):
Approved for U Program Review
2. 01/26/22 11:50 am
Jeff Shamma (jshamma):
Approved for 1422 Head
3. 01/28/22 10:21 am
Keri Pipkins (kcp):
Approved for KP Committee Chair
4. 01/31/22 8:53 am
Candy Deaville (candyd): Rollback to KP Committee Chair for KP Dean
5. 02/08/22 1:43 pm
Keri Pipkins (kcp):

- Approved for KP
Committee Chair
- 6. 02/08/22 1:44 pm
Candy Deaville
(candyd):
Approved for KP
Dean
- 7. 02/08/22 1:52 pm
John Wilkin
(jpwilkin):
Approved for
University
Librarian
- 8. 03/03/22 2:33 pm
Allison McKinney
(agrindly):
Approved for
Grad_College
- 9. 03/03/22 2:37 pm
Kathy Martensen
(kmartens):
Approved for
Provost

Proposal Type

Proposal Type:
Concentration (ex. Dietetics)

Administration Details

Official Program Name	Financial Engineering: Automated Trading Practices, MS	
Sponsor College	Grainger College of Engineering	
Sponsor Department	Industrial and Enterprise Systems Engineering	
Sponsor Name	Jeff Shamma & RS Sreenivas	
Sponsor Email	jshamma@illinois.edu & rsree@illinois.edu	
College Contact	Keri Pipkins	College Contact Email
	kcp@illinois.edu	
College Budget Officer	Tessa Hile	
College Budget Officer Email	tmhile@illinois.edu	

List the role for rollbacks (which role will edit the proposal on questions from EPC, e.g., Dept Head or Initiator) and/or any additional stakeholders. *Purpose: List here who will do the editing work if proposal needs rolled back. And any other stakeholders.*

1422 Head: Lauren Redman, lredman@illinois.edu

Does this program have inter-departmental administration?

No

Proposal Title

Effective Catalog Term Fall 2022

Provide a brief, concise description (not justification) of your proposal.

Establish the concentration in Automated Trading Practices within the MS in Financial Engineering

Students concentrating in Automated Trading Practices should expect to learn:

- the fundamental operations of electronic exchange-based trading systems and operations
- a detailed understanding of central limit order books, order types, queue priority, matching algorithms, and data feeds
- exposure to the various technologies and practices utilized for ultra-fast trading
- hands-on experience researching, coding, and backtesting automated and algorithmic trading strategies ("algos") using industry-grade high frequency trading software

List here any related proposals/revisions and their keys. *Example: This BS proposal (key 567) is related to the Concentration A proposal (key 145) and the Concentration B proposal (key 203).*

IE 421 has been submitted in CIM under key 12817. IE 434 has been submitted in CIM under key 12511.

Program Justification

Provide a **brief** justification of the program, including highlights of the program objectives, and the careers, occupations, or further educational opportunities for which the program will prepare graduates, when appropriate.

Many of the University's students are very interested in careers in the financial services industry and especially in the automated and high frequency trading space. Proprietary Trading Firms and Hedge Funds, among others, are continuously searching for new talent with a rare combination of exposure to both finance, quantitative methods, and computer science, seamlessly blended together into automated and algorithmic trading systems. Employers specifically in this space are known to actively seek out new hires from our University, given both the University of Illinois' reputation for excellence and its geographic proximity to one of the major North American trading centers in Chicago. Such firms offer some of the most lucrative starting salaries of any position or industry for those students fortunate enough to be hired. The Automated Trading Practices concentration will uniquely provide the requisite background in numerous critical areas of knowledge coupled with first-hand actual experience of developing trading algorithms using industry-donated commercial grade software and actual exchange market data that will enable students to prepare for success in this ultra-competitive, exciting, and intellectually challenging field.

Instructional Resources

Will there be any reduction in other course offerings, programs or concentrations by your department as a result of this new program/proposed change?

No

Does this new program/proposed change result in the replacement of another program?

No

Does the program include other courses/subjects impacted by the creation/revision of this program?

Yes

Required courses

FIN 554 - Alg Trading Sys Design & Test

FIN 556 - Algorithmic Mkt Microstructure

Explain how the inclusion or removal of the courses/subjects listed above impacts the offering departments.

We do not expect there to be any impact in Finance when this concentration is added. We already see many MS Financial Engineering students taking these courses and that will continue with the creation of the concentration. The approval from finance is attached.

Attach letters of support or acknowledgement from other departments.

[MSFE AutomatedTradingPractices FINApproval 092321.pdf](#)

Program Regulation and Assessment

Briefly describe the plan to assess and improve student learning, including the program's learning objectives; when, how, and where these learning objectives will be assessed; what metrics will be used to signify student's achievement of the stated learning objectives; and the process to ensure assessment results are used to improve student learning. (Describe how the program is aligned with or meets licensure, certification, and/or entitlement requirements, if applicable).

Students concentrating in Automated Trading Practices should expect the following learning outcomes:

- the fundamental operations of electronic exchange-based trading systems and operations
- a detailed understanding of central limit order books, order types, queue priority, matching algorithms, and data feeds
- exposure to the various technologies and practices utilized for ultra-fast trading
- hands-on experience researching, coding, and backtesting automated and algorithmic trading strategies ("algos") using industry-grade high frequency trading software

Data from the instructor of each course will be used to make sure these benchmarks are being met -- exam/assignment scores. This data will be used to improve each course and the concentration as a whole.

Is the career/profession for graduates of this program regulated by the State of Illinois?

No

Program of Study

"Baccalaureate degree requires at least 120 semester credit hours or 180 quarter credit hours and at least 40 semester credit hours (60 quarter credit hours) in upper division courses" (source: <https://www.ibhe.org/assets/files/PrivateAdminRules2017.pdf>). For proposals for new bachelor's degrees, if this minimum is not explicitly met by specifically-required 300- and/or 400-level courses, please provide information on how the upper-division hours requirement will be satisfied.

All proposals must attach the new or revised version of the Academic Catalog program of study entry. Contact your college office if you have questions.

For new programs, attach Program of Study [AutomatedTradingPracticesMSFE v2.pdf](#)

Catalog Page Text - Overview Tab

Text for Overview tab on the Catalog Page. This is not official content, it is used to help build the new catalog page for the program. Can be edited in the catalog by the college or department.

contact Lauren Redman

Statement for Programs of Study Catalog

Course List

Code	Title	Hours
Required:		4
IE 421	High Frequency Trading Technology	
Pick 1 Algo Trading Course:		4
FIN 554	Algorithmic Trading Systems Design and Testing	
FIN 556	Algorithmic Market Microstructure	
Pick 1 Stochastic & Learning Foundations Course Complete 4 hours from the Stochastic & Learning Foundations Course List or choose an additional 4 hours from the Algo Trading Course List.		4
IE 410	Advanced Topics in Stochastic Processes & Applications	
IE 434	Deep Learning: Mathematics and Applications	
IE 518	Queueing Systems	
IE 531	Algorithms for Data Analytics	
IE 534	Deep Learning	
Total Hours These 12 hours may be used toward the major degree requirements.		12

Program Relationships

Corresponding

Program(s):

Corresponding Program(s)

Financial Engineering, MS

Program Features

Academic Level Graduate

Is This a Teacher Certification Program?

No

Will specialized accreditation be sought for this program?

No

Additional concentration notes (e.g., estimated enrollment, advising plans, etc.)

Delivery Method

This program is available:

On Campus - Students are required to be on campus, they may take some online courses.

Enrollment

Number of Students in Program (estimate)

Year One Estimate

15

5th Year Estimate (or when
fully implemented)

30

Budget

Will the program or revision require staffing (faculty, advisors, etc.)
beyond what is currently available?

No

Additional Budget
Information

Attach File(s)

Financial Resources

How does the unit intend to financially support this proposal?

All course offerings across both ISE and FIN are already being offered. No additional
financial resources are expected.

Will the unit need to seek campus or other external resources?

No

Attach letters of
support

Is this program requesting self-supporting status?

No

Resource Implications

Facilities

Will the program require new or additional facilities or significant
improvements to already existing facilities?

No

Technology

Will the program need additional technology beyond what is currently
available for the unit?

No

Non-Technical Resources

Will the program require additional supplies, services or equipment (non-technical)?

No

Resources

For each of these items, be sure to include in the response if the proposed new program or change will result

in replacement of another program(s). If so, which program(s), what is the anticipated impact on faculty, students, and instructional resources? Please attach any letters of support/acknowledgement from faculty, students, and/or other impacted units as appropriate.

Attach File(s)

Faculty Resources

Please address the impact on faculty resources including any changes in numbers of faculty, class size, teaching loads, student-faculty ratios, etc. Describe how the unit will support student advising, including job placement and/or admission to advanced studies.

All course offerings across both ISE and FIN are already being offered. No additional faculty resources are expected. Program administration for MSFE students already exists, and will continue as expected.

Library Resources

Describe your proposal's impact on the University Library's resources, collections, and services. If necessary please consult with the appropriate disciplinary specialist within the University Library.

No additional library resources are expected.

EP Documentation

EP Control Number EP.22.118

Attach Rollback/Approval Notices

This proposal requires HLC inquiry No

DMI Documentation

Attach Final Approval Notices

Banner/Codebook Name

Program Code:

Minor Code	Conc Code	Degree Code	Major Code
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Senate Approval Date

Senate Conference Approval Date

BOT Approval
Date

IBHE Approval
Date

HLC Approval
Date

Effective Date:

Attached
Document
Justification for
this request

Program Reviewer
Comments

Deb Forgacs (dforgacs) (09/28/21 9:52 am): Rollback: requested.

Keri Pipkins (kcp) (01/24/22 9:20 am): Rollback: Rolling back for edits recommended by Subcommittee.

Candy Deaville (candyd) (01/31/22 8:53 am): Rollback: Rollback per Keri Carter Pipkins.

Redman, Lauren

From: Chan, Kuo Chi
Sent: Thursday, September 23, 2021 2:39 PM
To: Redman, Lauren
Cc: Lane, Morton N; Feng, Liming
Subject: Re: Update: MSFE Concentration -- Automated Trading Practices

Follow Up Flag: Follow up
Flag Status: Flagged

On behalf of the Department of Finance, Gies College of Business, I support the addition of a concentration in Automated Trading Practices for the Master of Science in Financial Engineering (MSFE) program. Two courses offered by the department -- FIN 554 and FIN 556 -- will be offered as electives to MSFE students who wish to complete the concentration.

Thanks,
Louis K. C. Chan
Hoelt Professor of Finance and Chair,
Department of Finance
Gies College of Business

From: Redman, Lauren <lredman@illinois.edu>
Sent: Thursday, September 23, 2021 2:07 PM
To: Chan, Kuo Chi <l-chan2@illinois.edu>; Shamma, Jeff <jshamma@illinois.edu>; Feng, Liming <fenglm@illinois.edu>; Lane, Morton N <mlnlane@illinois.edu>
Subject: Update: MSFE Concentration -- Automated Trading Practices

Thank you, everyone, for meeting this afternoon. It was great to see everyone and was also nice to talk through some of the questions/concerns.

Louis, when you're comfortable, can you please reply with your approval of adding IE 554 & 556 (currently 566, but will be 556 effective Fall 2022)? I will attach that approval to the concentration proposal.

Lauren

Justification for concentration:

Many of the University's students are very interested in careers in the financial services industry and especially in the automated and high frequency trading space. Proprietary Trading Firms and Hedge Funds, among others, are continuously searching for new talent with a rare combination of exposure to both finance, quantitative methods, and computer science, seamlessly blended together into automated and algorithmic trading systems. Employers specifically in this space are known to actively seek out new hires from our University, given both the University of Illinois' reputation for excellence and its geographic proximity to one of the major North American trading centers in Chicago. Such firms offer some of the most lucrative starting salaries of any position or industry for those students fortunate enough to be hired. The Automated Trading Practices concentration will uniquely provide the requisite background in numerous critical areas of knowledge coupled with first-hand actual experience of developing trading algorithms using industry-donated commercial grade software and actual exchange market data that will enable students to prepare for success in this ultra-competitive, exciting, and intellectually challenging field.

Impact on faculty/resources/budget:

None – all courses and instructors are already in place. Even those without permanent course numbers are being offered under a special topics course currently. ISE will handle administration of the concentration in terms of allowing students to declare the concentration/any maintenance & updating of course requirements.

Estimated # of students who will complete the concentration on a yearly basis:

15-20

The course structure is as follows:

Required:

- IE 421 – High Frequency Trading (Lariviere)

Pick 2:

- IE 518 – Queuing Systems (Stolyar)
- IE 531 – Algorithms for Data Analytics (Sreenivas)
- FIN 554 – Basics, Analysis, and Testing of Trading Algorithms (Brian Peterson; being proposed)
- FIN 556 -- Algorithmic Market Microstructure (Lariviere; previous FIN 566)
- ~~David's financial technology programming course (not proposed yet, will not be included in the proposal)~~

*all courses are 4 credit hours each

Total credit hours required: 12

Please let me know if you have any questions. We are under a tight deadline so we are trying to move these matters along, while also being cognizant to feedback/discussion. I am hoping we are all able to meet on Thursday for the scheduled meeting at 1:30 pm via Zoom. This should be on your calendar.

Thank you!

Lauren

The Automated Trading Practices Concentration is available for:

Financial Engineering, MS

Course Requirements

Required:	4 hours
IE 421 – High Frequency Trading Technology (4 hours) <i>Has been offered under special topics previously; is currently in the CIM system under key 12817</i>	
Pick 1 Algo Trading Course:	4 hours
FIN 554 – Algorithmic Trading Systems Design and Testing	
FIN 556 – Algorithmic Market Microstructure	
Pick 1 Stochastic & Learning Foundations Course:¹	4 hours
IE 410 – Advanced Topics in Stochastic Processes & Applications	
IE 434 – Deep Learning: Mathematics and Applications <i>Is currently in the CIM system under key 12511</i>	
IE 518 – Queuing Systems	
IE 531 – Algorithms for Data Analytics	
IE 534 – Deep Learning	
Total Hours²	12 hours

¹ Complete 4 hours from the Stochastic & Learning Foundations Course List or choose an additional 4 hours from the Algo Trading Course List.

² These 12 hours may be used toward the major degree requirements.