# Michigan Tech

Office of the Provost and
Senior Vice President for Academic Affairs

**Office Memo**

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**TO:**    Richard Koubek, President

**FROM:**    Jacqueline E. Huntoon, Provost & Senior Vice President for Academic Affairs    *Jacquelin E Huntoon*

**DATE:**    February 21, 2019

**SUBJECT:**    Senate Proposal 22-20

Attached is Senate proposal 22-20, "Minor in Financial Technology," which the Senate passed at their February 19, 2020 meeting. I have reviewed this proposal and recommend approving it.

I concur ___X___    do not concur _____    with this recommendation.

_____    *2/24/20*
Richard Koubek, President    Date

| DATE: | February 20, 2020 |
|---|---|
| TO: | Richard Koubek, President |
| FROM: | Michael Mullins<br>University Senate President |
| SUBJECT: | Proposal 22-20 |
| COPIES: | Jacqueline E. Huntoon, Provost & Senior VP for Academic Affairs |

At its meeting on February 19, 2020, the University Senate approved Proposal 22-20, "Minor in Financial Technology". Feel free to contact me if you have any questions.

# The University Senate of Michigan Technological University

## Proposal 22-20
**(Voting Units: Academic)**

## Minor in Financial Technology

1. December 16, 2019

2. <u>Proposer Contact Information</u>:
   Mari Buche, Professor of MIS and Associate Dean, COB
   Heather Knewtson (knewtson@mtu.edu), Assistant Professor, Finance
   Junhong Min, Associate Professor of Marketing and Chair, COB Undergraduate
   Programs Committee
   Howard Qi, Professor of Finance

3. <u>General Description:</u>

   The College of Business proposes a new minor called "Minor in Financial Technology."
   The minor is intended to assist Michigan Tech undergraduate students to learn and apply
   essential knowledge and practices that combine knowledge in statistics, programming,
   and the emerging fintech area to enhance their future career prospects.

   The proposed program leverages existing faculty and resources in computer science,
   engineering, finance, economics, management information systems, and mathematics to
   create a contemporary and robust concentration in financial technology. This will provide
   undergraduate students with a competitive edge when entering the professional work
   environment. Only one new finance course, FIN 4600 Foundations of Financial
   Technology, is necessary for this minor.

   Learning Objectives:
   Upon successful completion of this minor, students will be able to
   - *Apply statistics, programming, and financial decision-making to the financial
     technology industry*
   - *Assess the breadth and depth of systems used in the financial services industry.*
   - *Identify the interaction between technological innovation and financial services that
     support:*
     - *the conduct of commerce and trade;*
     - *the creation, preservation, and secure storage of value;*
     - *the allocation of capital to support societal goals; and*
     - *the determination of value via markets.*
   - *Analyze, design, implement, and deploy a financial technology application.*

Title of Program: Minor in Financial Technology

4.  Rationale

    A.  The Minor in Financial Technology aligns with the University's Education Learning Goal to "provide a distinctive and rigorous action-based learning experience grounded in science, engineering, technology, business, sustainability, and an understanding of the social and cultural contexts of our contemporary world." It honors all three education goals: student learning, transformative education, and educational programs.

    With respect to Student Learning, the Minor in Financial Technology provides project-based opportunities for undergraduate students, promotes mutual appreciation of multiple academic disciplines (finance, programming, and statistics), and represents an offering in the emerging discipline of financial technology.

    With respect to Transformative Education, the Minor in Financial Technology embraces technologically-rich education in residential and experiential learning environments. With respect to Educational Programs, the Minor in Financial Technology expands existing programs in response to economic needs by enhancing existing undergraduate programs.

    B.  The Minor in Financial Technology aligns with the vision of Michigan Tech's College of Business to produce "business-savvy tech graduates" and "tech-savvy business graduates."

    C.  The integrated nature of financial technology requires students to be familiar with statistics, programming, and financial decision-making. It then leverages these skills to provide domain area knowledge in financial engineering, investments, risk management, and financial technology.

    D.  The financialization of the global economy has increased career opportunities. Additionally, the financial services industry is associated with continued and rapid technological innovation, and is in the midst of a sea change in terms of the representation, exchange, and storage of value. Alumni and recruiters in finance stress the importance of financial technology skills that can be used in financial/business analysis, compliance, risk management, trading, system development, operations, big data analytics, and machine learning. For STEM students, knowledge of financial technology will open careers in blockchain development, application development, quantitative analysis, and cybersecurity as these fields relate to finance.[1]

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[1] https://www.getsmarter.com/blog/career-advice/career-path-financial-technology/

Proposal 22-20                                                        February 5, 2020

E.  STEM students can enhance their undergraduate major with domain area knowledge in finance, which will complement their quantitative skills in statistics and programming. For example, a computer scientist with the Financial Technology minor will gain knowledge of finance and financial technology, and will be prepared for opportunities as programmers or software engineers at financial institutions like Northern Trust in Chicago.

5.  Related Programs: No similar programs could be found at either Michigan Tech or in universities located in Michigan or Wisconsin. This will differentiate Michigan Tech's program and assist with enrollment growth goals. The following is a sample of business schools that offer related programs:

A.  Creighton University, Bachelor Science degree in FinTech: https://ccas.creighton.edu/program/finance-and-technology-fintech-bsba
B.  Fordham University, concentration in FinTech: https://bulletin.fordham.edu/undergraduate/finance/concentration-fintech/?_ga=2.57056814.588858063.1568838163-590292328.1568838163#requirementstext
C.  Georgia Southern University, certificate in FinTech: https://catalog.georgiasouthern.edu/undergraduate/business/finance/financial-technology-certificate/
D.  Lehigh University, minor in FinTech: https://business.lehigh.edu/departments/decision-and-technology-analytics/undergraduate-fintech-minor
E.  Missouri University of Science and Technology, minor in Financial Technology: http://catalog.mst.edu/undergraduate/degreeprogramsandcourses/informationscienceandtechnology/#minortext
F.  Sacred Heart University, minor in Financial Analytics: https://www.sacredheart.edu/academics/jackwelchcollegeofbusinesstechnology/undergraduateprograms/finance/minorinfinancialanalytics/
G.  The University of Central Florida, minor in FinTech: http://catalog.ucf.edu/preview_program.php?catoid=14&poid=7548&returnto=1200
H.  The University of Miami, minor in Financial Technology: http://bulletin.miami.edu/undergraduate-academic-programs/business/finance/financial-technology-minor/

6.  **Curriculum Design**

A.  Catalog Description: Financial technology is the application of information technology to the financial services industry. Students will integrate their skills in finance, programming, and statistics to understand the role technological systems serve in the financial services industry.

B.  List of Courses: A minimum of 9 credits of 3000-level or higher must be completed at Michigan Tech. Students must take at least 18 credits:

Required Courses (12 credits):

*Block I (Financial Decision-making and Financial Technology): choose 6 credits*
EC3400 Economic Decision Analysis - (3 credits)
    -or - FIN3000 Principles of Finance (3 credits)
*FIN 4600 Financial Technology Foundations (3 credits) – new course*

*Block II (Statistics): choose 3 credits*
BE 2110 Statistical Methods for Biomedical Engineering (3 credits)
CEE 3710 Uncertainty Analysis in Engineering (3 credits)
MA 2710 Intro to Statistical Analysis (3 credits)
MA 2720 Statistical Methods (3 credits)
MA 3710 Engineering Statistics (3 credits)

*Block III (Programming): choose 3 credits*
CS 1090 Introduction to Computing (3 credits)
CS 1121 Introduction to Programming I (3 credits)
ENG 1101 Engineering Analysis & Problem Solving (3 credits)
MA 3740 Statistical Programming and Analysis (3 credits)
MIS 2100 Introduction to Business Programming (3 credits)

Elective Courses (6 credits):

*Domain Knowledge in Finance: choose 6 credits*
FIN 4200 Derivatives and Financial Engineering (3 credits)
FIN 4000 Investment Analysis (3 credits)
FIN 4500 Risk Management and FinTech (3 credits)

New Course Description:

FIN 4600 Financial Technology Foundations (3 credits)

Financial technology applies information technology to the financial services industry. Students will learn about the technological foundations of financial technology, including an indepth understanding of distributed ledger technology, messaging, transaction systems, application programming interfaces (API), structured financial data, unstructured data, big data, and machine learning.

*New Course Proposal has been submitted as part of the annual curriculum proposal process (the "binder process").*

Prerequisite Courses:

| BE 2110 | MA 1135 or MA 1160 or MA 1161 |
|---------|-------------------------------|
| CEE 3710 | MA 2160 |
| CS 1121 | MA 1031(C) or MA 1032(C) |
| EC 3400 | UN 1015 and (UN 1025 or Modern Language - 3000 level or higher) |
| ENG 1101 | (MA 1160(C) or MA 1161(C) or MA 2160(C) or MA 3160(C)) and (Spatial Visualization Score >= 19 or ENG 1002(C)) |
| FIN 3000 | ACC 2000 and (MA 1020 or MA 1030 or MA 1160 or MA 1161 or MA 2160 or ALEKS Math Placement >= 61 or CEEB Calculus AB >= 2 or CEEB Calculus BC >= 2 or ACT Mathematics >= 22 or SAT MATH SECTION SCORE-M16 >= 540) |
| FIN 4000 | EC 3400 or FIN 3000 and (MA 2710 or MA 2720 or MA 3710) |
| FIN 4200 | EC 3400 or FIN 3000 and (MA 2710 or MA 2720 or MA 3710) |
| FIN 4500 | FIN 3000 or EC 3400 |
| FIN 4600 | FIN 3000 or EC 3400 |
| MA 2710 | MA 1160 or MA 1161 or MA 1135 |
| MA 2720 | MA 1020 or MA 1030 or ALEKS Math Placement >= 61 or CEEB Calculus BC >= 2 or CEEB Calculus AB Subscore >= 2 or ACT Mathematics >= 22 or SAT MATH SECTION SCORE-M16 >= 540 |
| MA 3710 | MA 2160 |
| MA 3740 | MA 2710 or MA 2720 or MA 3710 or MA 3715 |
| MIS 2100 | None |

7. Restrictions: None

8. Program Costs: We foresee no additional costs with the creation of the minor. The finance courses can support additional students without additional faculty. Many of the non-finance courses are core courses taken by students majoring in computer science, engineering, and mathematics. Therefore, the non-finance courses will not create additional loads on non-COB faculty.

9. Planned Implementation Date: August 2021