

The University Senate of Michigan Technological University

Proposal 7-22

(Voting Units: Academic)

Proposal for a **Minor in Entrepreneurship, Technology, and Innovation**

1. Date of Proposal: 05/05/2021

2. Proposer(s) Contact Information:

Primary Contact: Manish K. Srivastava, Associate Professor of Strategy and Innovation, COB, mksrivastava@mtu.edu

- Elham Asgari, Assistant Professor of Management and Entrepreneurship, COB, easgari@mtu.edu
- Sonia Goltz, Professor of Organizational Behavior, COB, smgoltz@mtu.edu
- Josue Reynoso, Assistant Professor of Entrepreneurship and Management, COB, jreynoso@mtu.edu
- Dean Johnson, Professor of Finance and Dean, COB, dean@mtu.edu
- Mari Buche, Professor of Management Information Systems and Associate Dean, COB, mwbuche@mtu.edu

3. Interdisciplinary Programs: N/A

4. General Description:

The College of Business (COB) proposes the creation of a new minor in Entrepreneurship, Technology, and Innovation (ETI). The minor will provide students with a foundational knowledge about how new technologies, innovations, and ventures are created and managed. Students will work on cases, projects to develop necessary knowledge and skills to learn about creating innovation and capturing value from technologies and innovations.

Catalog Description:

The Minor in ETI provides students with a foundational knowledge about new ventures, innovations, and technologies. Students learn about examining the viability of new business ideas, technologies, and innovations. Students work on case studies and real-world projects to acquire knowledge and competencies related to developing an entrepreneurial mindset, managing technology and innovation, commercializing new technologies, and the overall role of new ventures, innovations, and emerging technologies in transforming firms and industries.

Learning Goals:

Each course in the ETI minor has its own set of learning goals, however on completing the required core courses students will be able to

- Generate and evaluate business ideas, and apply new venture planning tools. (Key learning objectives introduced in MGT 3800 and reinforced in MGT 4300.)

- Identify opportunities and challenges associated with emerging technologies and design business plans to commercialize novel technologies. (Key learning objectives introduced in MGT 4600 and reinforced in MGT 4400.)

5. Title of Program:

Minor in Entrepreneurship, Technology, and Innovation

6. Rationale:

Technology, innovation, and entrepreneurship are at the very core of solving big societal problems and improving the lives of people around the world. Michigan Tech students should have entrepreneurial opportunities to be actively involved in creating and participating in a healthy innovation ecosystem.

7. Related Programs:

The proposed ETI minor is distinct from other minors offered on campus. Currently, the University does not offer any closely related minor. The proposed ETI minor fully aligns with the University's mission of 'creating solutions for society's challenges by delivering *action-based* undergraduate and graduate education, discovering new knowledge through research, and *launching new technologies through innovation*'. The proposed ETI minor also aligns with the University's strategic priorities to 'build' innovative and autonomous intelligent systems, and 'create' technological solutions to enhance human health and quality of life. The proposed minor will also help in achieving the University's educational goal of offering entrepreneurial opportunities to students. The proposed minor also aligns with COB's educational value of driving innovation and vision of making societal impact through integration of business and technology.

Many universities now offer minors (and some offer even majors) in technology, innovation, and entrepreneurship. The minors at these universities serve a very similar purpose as the minor described in this proposal. Below we provide an illustrative list of universities offering such a minor:

- Colorado State University offers a minor in Entrepreneurship and Innovation (<https://biz.colostate.edu/academics/undergraduate-programs/entrepreneurship-minor>)
- New Jersey Institute of Technology offers a minor in Innovation and Entrepreneurship (<https://management.njit.edu/minor-innovation-and-entrepreneurship>)
- Michigan State University offers a minor in in Entrepreneurship and Innovation <https://reg.msu.edu/academicprograms/ProgramDetail.aspx?Program=6098>
- University of Maryland offers a minor in Innovation and Entrepreneurship <https://academiccatalog.umd.edu/undergraduate/colleges-schools/business/innovation-entrepreneurship-minor/>
- Massachusetts Institute of Technology offers a minor in Innovation and Entrepreneurship <http://catalog.mit.edu/interdisciplinary/undergraduate-programs/minors/entrepreneurship-innovation/>
- Ohio State University offers a minor in Entrepreneurship and Innovation <https://fisher.osu.edu/undergraduate/academics/curriculum/minors-specializations/entrepreneurship-innovation-minor>
- University of Connecticut offers a minor in Entrepreneurship and Technology Innovation (<https://catalog.uconn.edu/minors/entrepreneurship-and-technology-innovation/>)

- Boston University a minor in Innovation and Entrepreneurship
<https://www.bu.edu/academics/questrom/programs/minor-in-innovation-entrepreneurship/>
- Cornell University offers a minor in Entrepreneurship and Innovation
<https://business.cornell.edu/programs/undergraduate/minors/entrepreneurship-innovation/>
- University of San Diego offers a minor in Entrepreneurship and Innovation
<https://rady.ucsd.edu/programs/undergraduate-programs/entrepreneurship-and-innovation-minor/>
- Virginia Tech has a major in Entrepreneurship, Innovation, Technology Management
(<https://management.pamplin.vt.edu/Academics/undergraduate-programs/eit.html>).

8. Projected Enrollment:

With our current Management, Entrepreneurship and Innovation faculty, our courses can sustain an additional 25-30 students in the minor given the current number of Management majors.

We foresee no additional costs with the creation of the minor.

9. Curriculum Design:

The following are the required and elective courses for the minor. No courses are offered online. No new courses are being proposed.

The minor will be covered under the COB's AACSB accreditation standards.

Required Courses (12 credits)

Core required courses (12 credits) – complete the four courses from this list.

Course Number	Course Title	Credit(s)	Prerequisites
MGT 3800	Innovation and Entrepreneurship	3	None
MGT 4300	Developing Entrepreneurial Ventures	3	MGT3800
MGT 4600	Management of Technology and Innovation	3	None
MGT 4650	Commercialization of Advanced Technologies	3	MGT4600

Business Elective (3 credits) – select one course (three credits) from this list.

Course Number	Course Title	Credit(s)	Prerequisites
BUS 3000	Business Analytics	3	BUS 2300
EC 3400	Economics Decision Analysis	3	UN 1015 and (UN 1025 or Modern Language - 3000 level or higher)

FIN 3000	Principles of Finance	3	ACC 2000 and (MA 1020 or MA 1030 or MA 1031 or MA 1032 or MA 1120 or MA 1160 or MA 1161 or MA 1121 or MA 2160 or ALEKS Math Placement \geq 61 or CEEB Calculus AB \geq 2 or CEEB Calculus BC \geq 2 or ACT Mathematics \geq 22 or SAT MATH SECTION SCORE-M16 \geq 540
FIN 4600	Financial Technology Foundation	3	FIN 3000 or EC 3400
MGT 3100	Leadership Development	3	None
MGT 3650	Intellectual Property Management	3	UN 1015 and (UN 1025 or Modern Language - 3000 level or higher
MIS 4000	Emerging Technologies	3	MIS 3100 and MIS 3200
MKT 3000	Principles of Marketing	3	None
OSM 3000	Operations and Supply Chain Management	3	(MA 1135 or MA 1160 or MA 1161 or MA 1121) and (MA 2710 or MA 2720 or MA 3710 or MA 3720 or EET 2010 or BUS 2100 or CEE 3710)
OSM 4300	Project Management	3	BUS 2100 or CEE 3710 or MA 2720 or MA 3710 or EE 3180 or BE 2110 or MA 2710

Design Elective (3 credits) – select course(s) for at least three credits from this list.

Course Number	Course Title	Credit(s)	Prerequisites
BE 4901	Biomedical Design Project I	3	BE 3350 and BE 3700 and BE 3701 and BE 3800 and BE 4900
CEE 4900	Engineering Design Project I	3	None
CEE 4905	Engineering Design Project	3	None
CM 4855	CM Process Analysis & Design I	3	CM 3120, CM 3215, CM 3230, CM 3510, CH 2410
CM 4900	Interdisciplinary Design 1	3	None
CS 4791	Senior Software Engineering Project I	3	CS 3712 or CS 4760

EE 4901	EE Design Project 1	2	(EE 3131 or (EE 3130 and EE 3305)) and (EE 3901 or EE 4900) and (EE 3170(C) or EE 3171(C) or EE 3173(C)), ENG 1102 ((MA 1160 or MA 1161 or MA 1121 or MA 2160(C) or MA 3160(C)) and (ENG 1101 or (ENG 1001 and ENG 1100)) and (Spatial Visualization Score \geq 19 or ENG 1002)
EE 4910	EE Design Project 2	2	EE 4901
ENT 3950	Enterprise Project Work III	1	None
ENT 3953	Ignite: Ideate, Innovate, Create!	1	None
ENT 3960	Enterprise Project Work IV	1	None
ENT 3963	Deliver: Explore, Develop, Execute!	1	None
ENT 4950	Enterprise Project Work V Capstone	2	(BE 3350 or BE 3700 or BE 4900) or (CEE 3620 or CEE 3810) or CM 4855(C) or (CS 3712 or CS 4711 or CS 4760) or (ENT 3960 and EE 3131 and EE 3901 and EE 3171(C) or EE 3173(C)) or (GE 3890 and GE 3880) or (ENT 3950 and ENT 3960 and (MA 3710 or MA 2710(C) or MA 2720 or MA 3715) and MEEM 3750 and MEEM 3201 and MEEM 3911) and EE 3010(C) and MEEM 3400 and MEEM 3600(C) or (MSE 3110 and MSE 3120 and MSE 3130 and MSE 3140 and MSE 3190 and MSE 4940) or (CMG 3250 and CMG 4120(C) and CMG 4210 and CMG 3200) or (EET 3281 and EET 4253(C)) or SAT 3812(C) or SU 4100(C) or (ENG 3830(C) or ENG 3505(C) or ENG 4505(C)) or (MET 4200 and MET 3500(C) and MET 3451(C))
ENT 4960	Enterprise Project Work VI Capstone	2	ENT 4950 and (BE 4900 or CEE 3620 or CEE 3810 or CM 4855 or CS 3712 or CS 4711 or CS 4760 or EE 3171 or EE 3173 or GE 3890 or GE 3880 or MSE 4141(C) or CMG 4210 or EET 4253 or MET 4460 or SAT 4541 or SU

			4100 or ENG 3830) or (ENG 3505 and ENG 4505) or (MEEM 3750 and MEEM 3201)
MEEM 4901	Senior Capstone Design I	2	(MEEM 3000(C) and MEEM 3502 and MEEM 3900) or (MEEM 3201(C) and MEEM 3750(C) and MEEM 3911 and MA 3710(C))
MEEM 4911	Senior Capstone Design II	2	(MEEM 4901 and MEEM 3000(C) and MEEM 3502(C) and MEEM 3900) or (MEEM 3201 and MEEM 3750 and MEEM 4901)
MET 4460	Product Design and Development	2	MET 2400 and MET 3451(C) and MET 3500(C)
HU 2645	Graphic and Information Design	3	None
HU 3810	Technology and Culture	3	UN 1015 and (UN 1025 or Modern Language - 3000 level or higher)
MIS 3500	User-centered Design	3	MIS 2000

Total Credits Required = 18 credits

Enrollment Restrictions

The Technology, Innovation, and Entrepreneurship minor will not be available to students majoring in Management with a Concentration in Entrepreneurship.

10. New Course Descriptions:

No new courses are required for the proposed minor.

11. Model Schedule:

The program could be completed in as little as two years, with the ability to be completed at a more comfortable pace over four years.

Year 1		Year 1	
Fall		Spring	
MGT 3800 (3 credits) and Business elective course (3 credits)		MGT 4300 (3 credits)	
Year 2		Year 2	
Fall		Spring	
MGT 4600 (3 credits)		MGT 4650 (3 credits)	

Design elective (3 credits)	
-----------------------------	--

12. Library and Other Learning Resources:

Other than these existing library and lab resources used for the Management degree programs, no other library or lab resources are required for the minor.

13. Description of Available/Needed Equipment:

No additional equipment is necessary.

14. Program Costs:

Management courses have adequate space for additional students.

15. Accreditation Requirements:

Covered under AACSB accreditation.

16. Planned Implementation Date:

We seek to implement the minor as early as Spring 2022.