The University Senate of Michigan Technological University

Proposal 23-25

"Minor in Entrepreneurship"

Basic Program Information

Primary Contact: Elham Asgari
Program/Degree type: 19 Credit Minor
Program Title: Minor in Entrepreneurship
Planned Implementation Date: Fall 2025
Program location/modality: on-campus
Target student population: current students

General description and characteristics of the program

The College of Business is proposing a minor program in entrepreneurship for use in the Essential Education program. This minor is designed to enhance the entrepreneurial skills of Michigan Tech undergraduate students. This minor is 19 credits, is designed to meet the requirements of the Essential Education program, and is being submitted with approval from the Essential Education Implementation Team.

This new minor will be administered by the College of Business and will be advised by COB undergraduate academic advisor. Future changes to the minor requirements will be reviewed and approved by the Essential Education Steering Committee.

Rationale

This minor theme was selected as a priority area by campus working groups and aligns with Michigan Tech's current initiatives. Students are interested in a minor in entrepreneurship to develop an entrepreneurial mindset and practice entrepreneurship. This minor will not only benefit students who choose to become entrepreneurs but will also help them succeed in various professional settings. Employers will also value this minor as it indicates a candidate's ability to effectively identify opportunities, communicate ideas, innovate solutions, lead new projects, solve problems, and show openness to learning and working in teams.

Related programs: within MTU and at other institutions

Our proposed minor is related to the Minor in Entrepreneurship, Technology, and Innovation, which is currently offered through the College of Business. However, this minor provides a pathway for essential education undergraduate students who want entrepreneurially-themed courses within their program.

Many other top Universities have similar minors. For instance, the University of Michigan offers an <u>Entrepreneurship</u> minor, Michigan State University offers a minor in <u>Entrepreneurship and Innovation</u>, Virginia Tech offers a minor titled "<u>Entrepreneurship - New Venture Growth (ENVG)</u>, and Colorado School of Mines offers a minor titled <u>Business and Entrepreneurship</u>.

Projected Enrollment

As a newly proposed minor, the variety of courses offered in the curriculum is expected to support at least 50 students per year. Within the minor, each category (i.e., communication for entrepreneurs, intercultural competency for entrepreneurs, core entrepreneurial skills, complementary entrepreneurial skills, and in-depth contextual experiences) includes a number of courses to ensure that students have the option to choose courses based on their needs. This will also ensure that the capacity is available across the courses.

Specialized Accreditation Requirements

None required.

Professional Licensure Requirements

None required.

Curriculum Details

Learning Goals

Aligned Essential Ed Goals	Program Learning Outcomes
Communicate: Communicate Contextually Foster Collaboration	Creating and delivering presentations and documents that engage diverse audiences, such as stakeholders, while pitching ideas to build teams and attract mentors, advisors, and investors.
Adapt: Welcome Challenge Explore Diverse Perspectives	Learning to unlearn and relearn, being open to negative criticism, understanding and adapting to customer needs, adopting agile processes, becoming comfortable with some level of discomfort and getting challenged.
Contribute/Transform: Innovative Solutions Create Engage in Civic Life	Commercializing new solutions by scoping opportunities, incorporating creative practices, addressing societal and technological needs with innovative solutions to make an impact on society.

Assessment Plan

This minor will be assessed through the ePortfolio submissions. Students will be specifically asked to reflect on the learning goal(s) for the minor.

Curriculum Design

Course	Credits	Semesters offered	Pre-reqs
Communication for Entrepreneurs [Communication Intensive]: 3 cr			
AF3001 Leading People and Effective Communication	3	Fall	"Not freshman, sophomore" UN 1015
HU2830 Public Speaking & Multimedia	3	Fall, Spring, Summer	UN 1015

HU2840 Interpersonal Communication and Technology	3	On Demand	UN 1015
HU3120 Technical and Professional Communication	3	Fall, Spring, Summer	"Not freshman"
HU3694 Grant Writing	3	Fall, in even years	UN 1015 "Not freshman"
HU3832 Virtual Encounters	3	On Demand	UN 1015
HU 4625 Risk Communication	3	On demand	UN 1015, "Not freshman, sophomore"
THEA2310 Drafting for the Entertainment Industry	3	Spring	UN 1015

Intercultural Competency for Entrepreneurs [Intercultural Competency]: 3 cr

BL3970 Current Health Issues	3	Spring, Summer	"Not freshman"
HU3400 Topics in Diversity Studies	3	Spring	UN 1015
HU3710 Engineering Ethics	3	Spring	UN 1015
HU3830 Creativity, Culture, & Change	3	On demand	UN 1015
HU3850 Cultural Studies	3	On demand	UN 1015
HU3855 Power, Activism, and Technology	3	Fall	UN 1015
HU3860 Popular Culture	3	Spring	UN 1015
SS3225 Capitalism and the Modern World	3	Spring, in even years	UN 1015

SS4450 Sustainable Tourism and Planning	3	Fall, in even years	(SS 2450 or SS 2100 or SS 2400 or SS 2700) and UN 1015
THEA3330 Costume Design		Fall, in odd years	"Not freshman"

Core Entrepreneurial Skills [SHAPE Courses]: 6 cr			
MGT3800 Entrepreneurship	3	Fall, Spring	"Not freshman"
MGT4300 Developing Entrepreneurial Ventures	3	Spring	MGT 3800 "Not freshman"
MGT4600 Management of Technology and Innovation	3	Fall, Spring, Summer	"Not freshman, sophomore"
MGT4650 Commercialization of Advanced Technologies	3	Spring	"Not freshman, sophomore" MGT 4600

Complementary Entrepreneurial Skills [Unrestricted Courses]: 3 cr			
ACC2000 Accounting Principles I	3	Fall, Spring	
ACC2100 Accounting Principles II	3	Fall, Spring	ACC 2000
ACC3000 Intermediate Accounting I	3	Fall	ACC 2000
ACC3500 Managerial/Cost Accounting I	3	Spring	ACC 2100
BUS2100 Business Statistics	3	On Demand	MA 1135 or MA 1160 or MA 1161 or MA 1121

Course	Credits	Offered	Prerequisites
BUS2200 Business Law	3	Fall, Spring	
BUS2300 Quantitative Problem Solving	3	Fall, Spring	BUS 2100 or MA 2710 or MA 2720 or MA 3710 or MA 3720
BUS3000 Introduction to Business Analytics	3	Spring	BUS 2300
CS1111 Introduction to Programming in C/C++	3	Fall, Summer	Must be enrolled in one of the following Major(s): Robotics Engineering, Industrial Technology, Audio Production & Technology, Computer Network & System Admn, Electrical Eng Tech, Electrical Engineering, Mechatronics; "Must be Freshman, Sophomore"
CS1121 Introduction to Programming I	3	Fall, Spring, Summer	MA 1031(C) or MA 1032(C) or MA 1120(C)
CS1122 Introduction to Programming II	3	Fall, Spring, Summer	CS 1121
CS3000 Ethical and Social Aspects of Computing	3	Fall, Spring	CS 3141; "Not Freshman, Sophomore"
DATA1200 Data Science with Python	3	Spring	MA 1030(C) or MA 1031(C) or MA 1032(C) or MA 1160(C) or MA 1161(C)
DATA2201 Foundations of Data Science	3	Fall	(DATA 1202 or DATA 1200) and ((CS 1122 or CS 1131) or (CS 2311 and CS 2321)) and (MA 2320(C) or MA 2330(C) or MA 2321(C))
EC3400 Economic Decision Analysis	3	Fall, Spring, Summer	"May not be enrolled in one of the following Major(s): Engineering Management, Marketing, Management, Management Information Systems, Accounting, Finance; "Not Freshman, Sophomore"

Course	Credits	Offered	Prerequisites
EC4050 Game Theory/Strategic Behavior	3	Spring	"Not freshman"
EC4710 Labor/Human Resource Economics	3	On demand	EC 2001
ENG1102 Engineering Modeling and Design	3	Fall, Spring, Summer	(MA 1031 or MA 1032 or MA 1120 or MA 1160(C) or MA 1161(C) or MA 1121(C) or MA 2160(C) or MA 3160(C)) and (ENG 1101 or (ENG 1001 and ENG 1100)) and (Spatial Visualization Score >= 19 or ENG 1002)
ENG2060 Facilitating Group Learning	1	Fall, Spring	UN 1015
ENG3060 Developing Mentoring Skills	1	On demand	"Not Freshman"
ENG4060 Leadership in Group Environments	1	On demand	"Not Freshman"
ENT2950 Enterprise Project Work	1	Fall, Spring, Summer	"Not Freshman"
ENT2960 Enterprise Project Work II	1	Fall, Spring, Summer	"Not Freshman"
ENT2961 Teaming in the Enterprise	2	Fall	"Not Freshman"
ENT2962 Communication Contexts	1	Fall, Spring, Summer	"Not Freshman"
ENT3950 Enterprise Project Work III	1	Fall, Spring, Summer	"Not Freshman, Sophomore"
ENT3953 Ignite, Ideate, Innovate, Create!	1	Fall, Spring	

ENT3958 Ethics in Engineering	1	Fall, Spring	ENG 1101 "Not Freshman"
ENT3961 Building and leading teams	1	Fall, Spring	
ENT3963 Deliver, explore, develop, execute!	1	Spring	"Not Freshman"
ENT3980 Pre-Capstone Enterprise Project Work	1	Fall, Spring, Summer	ENT 3950 and ENT 3960, "Not Freshman, Sophomore"
ENT4900 Senior Enterprise Project Work V Non-Capstone	2	Fall, Spring, Summer	May not be enrolled in one of the following College(s): College of Engineering; "Not Freshman, Sophomore, Junior"
ENT4910 Senior Enterprise Project Work VI Non- Capstone	2	Fall, Spring, Summer	May not be enrolled in one of the following College(s): College of Engineering; "Not Freshman, Sophomore, Junior"
ENT4950 Enterprise Project Work V Capstone	2	Fall, Spring, Summer	(BE 3350 and BE 3700 and BE 3800 and BE 4900 and ENT 3950 and ENT 3960) 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) or (EE 3280 and EE 3261(C)) and EE 3910 and EE 3174(C) or (GE 3890 and GE 3880) or (ENT 3950 and ENT 3960) and (MA 3710(C) or MA 2710(C) or MA 2720 or MA 3715) and (MEEM 3750 or ME 3750) and (MEEM 3201 or ME 3201) and (MEEM 3901 or ME 3901) and (MEEM 3911 or ME 3911) and EE 3010(C) and (MEEM 3400 or ME 3400) and (MEEM 3600 or ME 3601(C)) or MSE 3190 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 3505(C) or (ENT 3950 and ENT 3960) or (MET 4200 and MET 3500(C) and MET 3451(C)) or MET 4210 - Permission of department, Must be a Senior

Course	Credits	Offered	Prerequisites
ENT4960 Enterprise Project Work VI Capstone	2	Fall, Spring, Summer	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 3174 or GE 3890 or GE 3880 or MSE 4141(C) or CMG 4210 or (EET 4253 and EET 3281) or (MET 4460 and MET 4210) or (SAT 4541 and SAT 3812) or SU 4100 or ENG 3830(C) or (ENG 3505 and ENG 4505) or (MEEM 3750 or ME 3750) and (MEEM 3201 or ME 3201) or (EE 3280 and EE 3261)) - Must be a Senior
ENT4961 Enterprise Project Work VII	1	Fall, Spring, Summer	ENT 3950 and ENT 3960 and (ENT 4950 and ENT 4960) or (ENT 4900 and ENT 4910) - must be a Senior
FIN4000 Investment Analysis	3	Fall	EC 3400 or FIN 3000 and (MA 2710 or MA 2720 or MA 3710)
FIN4500 Risk Management	3	Spring	(FIN 3000 or EC 3400) and (MA 2710 or MA 2720 or MA 3710 or MA 3720); "Not Freshman, Sophomore"
FIN4600 FinTech Foundations	3	Fall	EC 3400 or FIN 3000; "Not Freshman"
GE1200 Introduction to Data Science for Earth Resource Applications	1	Fall	MA 1160(C) or MA 1161(C) or MA 1121(C)
HF3850 Human Factors	3	Fall	(PSY 2000 or HF 2000) and UN 1015 "Not Freshman"
HF4015 Cognitive Task Analysis	3	Fall, in even years	(PSY 2000 or HF 2000) and UN 1015 "Not Freshman"

Course	Credits	Semester	Prerequisites
HU2645 Graphic and Information Design	3	Fall, Spring	
MET 4460 Product Design and Development	2	Fall, Spring	MET 3451(C) and MET 3500(C)
MGT2000 Team Dynamics	3	Fall, Spring	"Not Freshman"
MGT3000 Organizational Behavior	3	Fall, Spring, Summer	"Not freshman"
MGT3100 Leadership Development	3	Fall	"Not Freshman"
MIS2000 IS/IT Management	3	Fall, Spring, Summer	
MIS2100 Introduction to Business Programming	3	Fall	"Not Freshman"
MIS2200 Web Programming	3	On Demand	MIS 2100 or CS 1122 or CS 1131; "Not Freshman"
MIS3100 Business Database Management	3	Fall	MIS 2100 or CS 1122 or CS 1131
MIS3200 Systems Analysis and Design	3	Spring	MIS 2100 or CS 1122 or CS 1131
MIS3500 User-Centered Design	3	On Demand	MIS 2000 or MIS 2100 or CS 1122 or CS 1131

Course	Credits	Offered	Prerequisites
MIS4000 Emerging Technologies	3	Fall	MIS 2100 or CS 1122 or CS 1131
MIS4200 Management of Cyber Security	3	Fall, in odd years	MIS 2000 or MIS 2100 or CS 1111 or CS 1122 or CS 1131; "Not Freshman, Sophomore"
MKT3000 Principles of Marketing	3	Fall, Spring, Summer	
MKT4100 Sales and Sales Management	3	Fall	MKT 3000
MKT4300 Global Marketing	3	Fall	MKT 3000
OSM3000 Operations and Supply Chain Management	3	Fall, Spring, Summer	(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); "Not Freshman, Sophomore"
OSM3600 Procurement and Supply Management	3	Fall	"Not Freshman, Sophomore"
SAT1610 Computer and Operating Systems Architecture	3	Spring	SAT 1200 or CS 1111
SAT4283 Information Governance and Risk Management	3	Fall	
SS/MGT3650 Intellectual Property Management	3	Spring, in even years	UN 1015 and (UN 1025 or Modern Language - 3000 level or higher) MGT: "Not Freshman, Sophomore" SS: "Not Freshman"
SS3800 Energy Policy and Technology	3	Spring, Summer	UN 1015 and (UN 1025 or Modern Language - 3000 level or higher) "Not Freshman"

Course	Credits	Semesters offered	Pre-reqs
THEA1130 Costume Technology	3	Fall	

Course	Credits	Semesters offered	Pre-reqs
In-depth Contextual Experiences [Upper Division SHAPE Courses]: 3 cr			
EC4620 Energy Economics	3	Spring	EC 2001
EC4630 Mineral Industry Economics	3	On demand	EC 2001
EC4640 Natural Resource Economics	3	Fall	EC 2001 or EC 3002 or FW 4080
EC4650 Environmental Economics	3	Fall, in odd years	EC 2001 or EC 3002
SS3755 Sustainability and the Private Sector	3	Spring	UN 1015
SS3801 Science, Technology, & Society	3	Fall, Summer	UN 1015 "Not Freshman"
SS3815 Energy and Society	3	Summer, in odd years	UN 1015
SS4390 Seminar in Sustainability	3	On demand	UN 1015 "Not Freshman"
MKT3200 Consumer Behavior and Culture	3	Fall	MKT 3000
PSY3880 Psychology of Social Media	3	On demand	PSY 2000 and UN 1015
ePortfolio Submission: 1 cr			
UN3023 Advanced Portfolio for Essential Ed	1 cr	all	"Not Freshman"

New Course Descriptions

No new courses are required to launch this minor.

Model Schedule

The model schedule below shows an idealized sequence where the minor courses are completed in years 2 and 3, which is a recommended practice.

Semester	Year 1	Year 2	Year 3	Year 4
Fall		[**Communication for Entrepreneurs**]	[**Intercultural Competency for Entrepreneurs**]	
Fall		[**Core Entrepreneurial Skills**]	[**Complementary entrepreneurial skills**]	
Spring		[**Core Entrepreneurial Skills**]	[**In-depth contextual experiences**]	
Spring			ePortfolio submission	
Totals		9 credits	10 credits	

Faculty Qualifications

Courses will be taught by faculty determined to be qualified by their respective home units. Faculty qualifications will be available upon request.

Resources Needed

An additional Instructional Track Faculty (ITF) may be needed to accommodate our estimated target of 50+ students per year. This is based on course need, critical co-curricular programming, and portfolio assessment.

Students will need foundational entrepreneurial skills learned within 4 entrepreneurship courses. Some of the courses offered in the "core entrepreneurial skills" category will require additional teaching support as enrollment grows, as they cover fundamentals of entrepreneurial thinking and practice.

Students engaging in the entrepreneurship minor will benefit from experiential and co-curricular learning opportunities such as those offered by Husky Innovate – Michigan Tech's innovation and entrepreneurship resource hub. These programs offer critical complementary opportunities throughout campus. Like Husky Innovate, this minor is interdisciplinary, and a resource for all students. Additional help would be needed to run Husky Innovate as enrollment grows.

Academic advising demand will increase in the College of Business in order to support this essential education minor. To meet this need, an additional advisor may be needed in the College of Business.

Library and other learning resources needed

No new library resources are needed to support this minor.

Suitability of existing space, facilities, and equipment

Current spaces and facilities are sufficient.

Program Costs

In summary, we may need additional resources for:

- Full-time instructional track faculty for the College of Business to teach entrepreneurship courses and help with Husky Innovate
- Part-time advisor for the College of Business