



# The Enterprise Program

Michigan Technological University

## Operations Manual

Policies, Procedures, and Resources



**Michigan Tech**

Phone: 906-487-3473

Fax: 906-487-2770

Email: [enterprise@mtu.edu](mailto:enterprise@mtu.edu)

<http://www.mtu.edu/enterprise/>

**Pavlis  
Honors  
College**

Revision 5/18/2020

# Enterprise Program Office

**Pavlis Honors College**  
**Minerals and Materials Building**  
**Room #722 and #613**

**Richard J. Berkey**

*Professor of Practice | Director, The Enterprise Program*

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906-487-4309

[rjberkey@mtu.edu](mailto:rjberkey@mtu.edu)

M&M 722E



**Chris Morgan**

*Assistant Director, Educational Partnerships*

---

906-487-2633

[cimorgan@mtu.edu](mailto:cimorgan@mtu.edu)

M&M 613



**Briana Tucker**

*Enterprise Program Coordinator*

---

906-487-3473

[bctucker@mtu.edu](mailto:bctucker@mtu.edu)

M&M 613



**Paige Hackney**

*Director of College Administration*

*Pavlis Honors College*

---

906-487-4371

[phackney@mtu.edu](mailto:phackney@mtu.edu)

M&M 722F



**Becky Barnard**

*Marketing and Content Specialist*

*Pavlis Honors College*

---

906-487-4320

[rbarnard@mtu.edu](mailto:rbarnard@mtu.edu)

M&M 722C



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## Section 1: Terms and Definitions

**Academic Advisor** - the advisor(s) who provide students guidance on degree requirements for completing their major course of study.

**Academic Department** – the degree-granting department for the Enterprise student’s major course of study

**Enterprise or Enterprise Program** – refers to the program itself

**enterprise (lowercase)** – refers to a specific enterprise student team

**Enterprise Advisor** - the Michigan Tech faculty or staff member(s) who is (are) listed as the ‘instructor of record’ for the Enterprise project courses, and are responsible for advising and grading student members of their respective enterprise.

**Enterprise Course Modules** - the series of instructional courses offered through the Enterprise Program that promote the development of technical, business, and interpersonal skills.

**Enterprise Project Courses** - the series of courses students enroll in in order to be an official member of an enterprise. Each enterprise has a unique section Lxx in Banweb.

**EPO** - Enterprise Program Office, the office within the Pavlis Honors College responsible for Enterprise Program curriculum, policy, and administration.

**ESAB – Enterprise Student Advisory Board**

**F&A** – the facilities and administrative charges collected by the University on restricted projects; the current F&A rate for restricted Enterprise projects is 15%.



**Host Department** – academic department(s) which support(s) an enterprise by providing space and/or faculty advising support. Note that an Enterprise may have more than one host department.

**IRAD** - institutional research and development funds.

**PI** - principal investigator; for sponsored Enterprise projects, the Enterprise advisor (and/or in some cases a staff member in the EPO) is listed as the PI responsible for the project.

**Program Sponsor** – an entity who supports the Enterprise Program through any of the following mechanisms: project sponsorship, educational and research grants/contracts, gift in-kind donations, or unrestricted cash donations. Examples include corporations, businesses, entrepreneurs, alumni and individual donors, foundations, government agencies, etc.

**Project Stakeholder** – typically someone external to the enterprise who has an interest in the outcome of an Enterprise project. In addition to industry/external sponsors, stakeholders can be on-campus (internal projects for another department or faculty/staff member, etc.).

**USLG** – University Student Learning Goals; the educational goals associated with the University’s General Education curriculum which is accredited through the Higher Learning Commission (HLC).

## Section 2: Program Overview

### 2.1 Mission Statement

*“Enterprise provides Michigan Tech students from ALL majors an educational experience that enhances their major program of study through open-ended, multidisciplinary, team-based project work over a multi-year timeframe.”*

### 2.2 Background

In the fall of 2000, Michigan Technological University introduced a new undergraduate engineering curriculum option intended to serve the needs of both students and industry. The Enterprise Program, initially funded through an NSF Action Agenda grant ([EEC-9872533](#)), provides organizations of students from multiple disciplines the opportunity to work for several years in a business-like setting to solve real-world problems of importance to industry. The program includes project work (1-2 credits per semester) and instructional courses or ‘modules’ (typically 1-2 credits) in topics that develop technical/professional, business/innovation, and interpersonal skills. While the program’s original focus was to enhance engineering education, Enterprise was designed to benefit students from ALL majors and is available to students from ANY major on campus.

### 2.3 Learning Objectives

Through participation in the Enterprise Program, students will:

- gain hands-on experience solving problems through application of their disciplinary education
- confront the technical, business, and organizational challenges associated with projects whose solutions are open-ended
- learn how to apply critical thinking and problem-solving skills
- practice managerial judgment and project management
- experience the importance of teamwork and the challenges associated with working on a diverse, cross-functional, multi-disciplinary team
- develop effective written and verbal communication skills in varied contexts/situations with diverse constituents and audiences



- integrate concepts such as sustainability, ethics, safety, business processes, innovation, and creativity into their project work
- demonstrate constant curiosity about our changing world and explore a contrarian view of accepted solutions\*
- integrate information from many sources to gain insight and assess and manage risk\*
- identify unexpected opportunities to create extraordinary value and persist through and learn from failure\*

\* KEEN Frameworks

In support of these learning objectives, a major effort with the Enterprise program has been to create a learning atmosphere where faculty serve as mentors and advisors, rather than as instructors, to enterprise members. In addition to the program developed learning outcomes, three additional learning objectives have been introduced from a partnering organization known as KEEN. The last three learning outcomes, a part of the KEEN Framework, address skills that equip students to create personal, economic, and societal value. Learn more about the KEEN Framework by visiting [engineeringunleashed.com](http://engineeringunleashed.com).

Another unique aspect of the Enterprise Program is the multi-year team operation, which facilitates student learning over an extended time frame as compared with traditional team-based student project experiences. A third differentiator for Enterprise is the multi/inter-disciplinary structure where teams are organized not by major or department but rather by an overarching goal, business focus, or technology. This facilitates professional and organizational development as well as a greater understanding of how their disciplinary knowledge and skills can be applied to problems whose solutions are inherently multidisciplinary.

To this end, each enterprise operates much like a company in the private sector and is student-led and managed. Enterprises can range in size from ~10-100 students and typically have multiple project sub-teams in proportion to their overall size. Enterprise members have prescribed responsibilities corresponding to their level of experience, abilities, and disciplinary education. Within project teams, members identify client needs and relevant constraints, design and evaluate solutions, build and realize those solutions, perform testing and analyses, make recommendations, and document and communicate project results. At the enterprise level, students gain valuable experience as part of a larger multidisciplinary organization that manages multiple projects, actively recruits new members, evaluates those team members' performance, and maintains relationships with external clients and project stakeholders. Students are empowered to take ownership of the outcomes achieved in their enterprise, with faculty members and industry sponsors serving as advisors and mentors. Each year, enterprises prepare detailed project reports, create posters highlighting their accomplishments, and deliver oral presentations to Michigan Tech faculty and students, industry sponsors and mentors, and the general public.

## **2.4 Program Success and Recognition**

Enterprise is a financially self-sustaining program that attracts engineering and other STEM-discipline students to Michigan Tech, retains them, and makes them more marketable to employers when they graduate. Enterprise has been benchmarked by many universities over the years as an innovative model for delivering interdisciplinary, team-based, experiential education. In 2012, the National Academy of Engineering (NAE) recognized Enterprise nationally as one of 29 educational programs serving as a best practice in NAE's publication "Infusing Real World Experiences into Engineering Education". More recently, the program received the 2017 Donald N. Zwiap *Innovation in Education Award* through the American Society of Mechanical Engineers (ASME). The program continues to grow and evolve 'beyond engineering', with over 20% of the current enrollment comprised of majors outside of engineering.



Enterprise has a multiyear track record that includes several quantitative and qualitative evaluative results that document the successful outcomes of the program. Some of the quantitative outcomes of Enterprise include:

1. Third-year retention rates<sup>1</sup> averaged 96.4% for Enterprise students and 83.3% for non-Enterprise engineering students, based on four-year averages for engineering and technology majors matriculating 2009-12.
2. Graduation rates<sup>2</sup> for Enterprise students were 94.6% and 74.3% for non-Enterprise students, based on two-year averages for engineering and technology majors graduating 2014-2016.
3. Enterprise students make up about 14% of the undergraduate student body, but they account for 30% or more of the invention disclosures filed by undergraduates.
4. Annual Enterprise participation has grown from 230 students to over 800 students representing 35 distinct majors both within and outside of engineering.
5. The number of enterprises has increased from 11 to 24.
6. Each year, approximately \$600,000 in external funding sustains and grows the Enterprise Program.

<sup>1</sup> the percent of returning sophomores who enroll for their senior year

<sup>2</sup> percent of entering first-time, full-time, degree-seeking freshmen who returned for their second year and subsequently received their degree within five years.

## **2.5 Long Term Strategic Goals**

Through discussions and visioning sessions with various internal and external program stakeholders, the following goals have been identified as critical for the growth and enhancement of the Enterprise Program:

- Maintain and strengthen the ‘capstone-equivalency’ of Enterprise project work for students using Enterprise to replace their departmental Senior/Capstone Design course
- Increase student enrollment in majors outside of engineering and technology
- Evolve the Enterprise experience beyond enterprise-level projects to include more cross-enterprise collaboration and interdisciplinary initiatives
- ‘Institutionalize’ Enterprise by reducing reliance on external sources of financial support

## **2.6 Program Administration**

### **a. Pavlis Honors College:**

The Pavlis Honors College (PHC) is one of seven colleges on campus and the administrative home of the Enterprise Program. The PHC supports highly motivated Michigan Tech students from all degree programs as they seek to achieve their unique goals and prepare themselves for the future. Pavlis serves primarily undergraduate students by providing an academic home for engaging educational programs in leadership, innovation, research, and service, (both domestically and abroad), and the Study Abroad program. In addition to the administration of these high impact programs, the PHC offers a unique honors program called the Honors Pathways Program. Students admitted to the PHC Pathways Program select a “pathway” that aligns with their interests and goals, build their honors experience in that pathway, and, upon completing the program components, graduate with recognition from the Pavlis Honors College on their diploma and transcript.

*Note: While enrollment in Enterprise does not require admission to the PHC Pathways Program, Enterprise students are encouraged to apply to and use their Enterprise experience as a foundation for an honors pathway.*



**b. The Enterprise Program Office:**

The Enterprise Program Office (EPO) is housed within and administered by the PHC. Enterprise Program staff are responsible for direct administration of the program including program funding, support, and general Enterprise related activities. Enterprise program staff are listed [here](#).

**c. The Enterprise Governing Board:**

The Enterprise Governing Board is a committee established to set policy and inform overall program decisions, in consultation with the Dean of the Pavlis Honors College, with regard to the areas defined within the bylaws of the "[Enterprise Governing Board Charter](#)". The current list of board members is maintained [here](#).

## **Section 3: Management of the Enterprise Portfolio**

### **3.1 Forming a new enterprise**

New enterprises can be proposed and developed in consultation with the EPO. The first step to propose a new enterprise begins with a formal enterprise proposal. Proposals to create new enterprises require the review and final approval of the Enterprise Governing Board.

In addition to addressing all sections in the proposal outline, successful proposals are those which align with the long-term strategic goals of the Enterprise Program (see [Section 2.5](#)) and are clearly differentiated from enterprises currently in operation. The proposal format and outline can be found [here](#).

### **3.2 Phasing Out (Sunsetting) an Existing enterprise**

For various reasons, an existing enterprise may need to be phased out of operation, similar to a company in the private sector. Examples of reasons for sunsetting an enterprise include but are not limited to: insufficient enrollment, lack of faculty advising support, lack of sufficient external support to sustain the enterprise's operations, safety violations, enterprise conduct and performance concerns, and/or advisor performance concerns.

Depending on the rationale, the request to phase out an enterprise can be initiated either by the Enterprise Governing Board or by the enterprise and advisor. Once the request has been initiated, the Enterprise Governing Board will work with the enterprise advisor on a phase-out plan that addresses: timing; plans for affected students enrolled in the enterprise; inventory and disposition/transfer of enterprise assets purchased with Enterprise Program funds; transfer of remaining enterprise funding back to the Enterprise Program Office; clean out of enterprise work space(s); updating of Banweb course listings; updating of Enterprise Program website information.



## Section 4: Enterprise Curriculum

### 4.1 Curriculum Overview

The Enterprise curriculum is two-pronged and consists of:

- a.) **project courses** (completing project work as a member of an enterprise)
- b.) **instructional course modules** intended to enhance students' interpersonal and leadership development, technical and professional skills, and business acumen.

Because Enterprise is an optional educational program designed to enhance one's major degree program, academic departments (in consultation with the EPO) have the responsibility for defining how Enterprise integrates into their respective majors/degree programs. This provides for flexibility in the available 'pathway' options for students enrolling in the Enterprise Program. It is **strongly recommended that a student contact their major department's academic advisor(s)** to determine exactly how Enterprise fits into their degree requirements.

The three formalized (and most common) levels of participation in Enterprise include the Minor, Concentration, and 'Capstone' Option, outlined below:

- **Enterprise Minor:** 18 credits total, including 6 credits of enterprise project work, 4-6 credits of interpersonal development coursework, 5 credits of professional development coursework, and 1-3 credits of elective coursework. Degree audits for the Enterprise Minor can be found under Interdisciplinary Minor audits [here](#).
- **Enterprise Concentration:** 9-12 credits total (varies by major), including a combination of enterprise project courses and enterprise course modules. Enterprise Concentrations are available in all engineering majors and represent the alternative capstone option for most engineering majors. Degree audits for the Enterprise Concentrations are noted with an 'Engineering Enterprise' suffix and can be found under the respective school or college [here](#).
- **'Capstone' Option:** Several majors allow students to replace their departmental capstone or senior design experience with 3-4 consecutive semesters of Enterprise project work. Students should contact their major department's academic advisor to learn more.

In addition to the above pathways, many degree programs allow students to use Enterprise to satisfy elective credits. Course and credit requirements for each major can be found by accessing the Michigan Tech Registrar's degree audit website located [here](#).

For more information on enrollment and course specifics of the Enterprise Program see "[Enterprise Enrollment & Registration](#)" section of this manual.

### 4.2 Enterprise Course Modules

An important part of the Enterprise Program is the development and delivery of relevant courses to support students in the operation and management of their enterprises. Enterprise Program funds are used for instructional support of courses that are considered of interest and/or importance to most enterprises and their student members.



*a. Introduction of New Enterprise Course Modules:*

Any faculty interested in supporting the Enterprise Program can propose new course modules. Proposed courses will be submitted to the Enterprise Director for review, consideration, and approval by the Enterprise Governing Board and PHC Curriculum Committee. If approved, the EPO will incorporate the course into the Enterprise curriculum, following the University's annual curriculum (binder) process.

*b. Phase-out of Existing Enterprise Course Modules:*

The elimination of an Enterprise course module will be determined based on instructor availability and student interest, as determined through course enrollment. If an instructor is no longer available to deliver a given course module, the instructor and EPO will first work together to identify an alternate instructor. If a given course cannot be offered either due to the lack of an instructor or insufficient enrollment for three (3) consecutive offerings, the EPO will submit the appropriate paperwork for course deletion through the University's annual curriculum (binder) process.

*c. Delivery of Enterprise Course Modules:*

Enterprise course modules are taught by faculty from across a wide range of disciplinary expertise (i.e., Business, Economics, Communication, Engineering, Ethics, Globalization, etc.) The mode of delivery is at the discretion of the faculty member teaching the course, and innovative, non-traditional formats are encouraged: weekend meetings; accelerated schedules; online or hybrid courses, etc. **so long as they comply with University-wide policies related to course scheduling and delivery.**

*d. Enterprise Course Module Compensation:*

Compensation for teaching Enterprise courses is based on an overload arrangement. The Enterprise Program will provide \$2,500 per **eligible course module**. This compensation can either be deposited into the faculty member's incentive (IRAD) account, or the instructor can be set up on payroll through the Pavlis Honors College.

**Eligible course modules:** eligible course modules are those that support interdisciplinary learning and thus have the potential to benefit students across the Enterprise Program. For new courses that are determined to be specialized to a particular enterprise's interests or to a particular academic department, no compensation for the delivery of the course will be provided through Enterprise Program funds. Such examples include but are not limited to focused modules that are co-listed with a departmental course and taught by the same faculty. Therefore, a successful proposal of this type must include a description of how the course will be supported and who will be responsible for delivering the course on a continuing basis.

## Section 5: Program Assessment and Continuous Improvement

The Enterprise Program is directly linked to external accreditation by the Accreditation Board for Engineering and Technology (ABET), for the various engineering and technology degree programs. Enterprise is also linked to external accreditation by the Higher Learning Commission (HLC), for the University's general education curriculum which includes several University Student Learning Goals (USLG's). Continued growth and expansion of Enterprise may result in linkages to additional accreditations (such as AACSB, SAF, etc.) in the future.



## **5.1 Enterprise Course Syllabi:**

The EPO will maintain general course syllabi for ABET and HLC assessment purposes. Enterprise advisors and course module instructors are expected to develop enterprise and module-specific syllabi, respectively, and provide updated versions at the start of each academic semester to the Enterprise Program Office. These syllabi at minimum should contain the educational learning objectives and grading scale for the course. Additional information on University-level requirements for course syllabi can be found [here](#).

## **5.2 Linkage to ABET Assessment:**

**ENT4950 Registration Permission:** All students working to satisfy major-specific capstone requirements through Enterprise must first get the permission of their major's academic department to enroll in ENT4950. Permission is granted by completing the ENT4950 Registration Permission Form along with submission of a project proposal. The form and project summary templates can be found on the Enterprise Student Resources Page [here](#).

**Enterprise Design Assessment:** Enterprise Advisors are required to assess specific learning outcomes for students upon completion of ENT4960, using an assessment rubric developed by the EPO. This rubric and a list of students to be assessed is provided each semester by the EPO to individual Enterprise Advisors and should be completed and submitted **within 2-weeks of the conclusion of the semester**. Additionally, Enterprise Advisors are required to submit final reports and presentations associated with ENT4950/60 projects to the EPO **within 2 weeks of the conclusion of a student's completion of ENT4960**. These reports are uploaded to a central [Google Drive location](#) upon completion.

**Enterprise External Project Team Assessment:** Enterprise Program sponsors and project stakeholders also support ABET assessment through the completion of Enterprise project assessment rubrics. Enterprise Advisors are responsible for ensuring that program sponsors and project stakeholders have final project reports **no later than 2 weeks after the conclusion of the semester so that timely feedback can be attained**.

**Design Expo Poster and Presentation Judging:** the EPO is responsible for selecting a diverse panel of judges comprised of industry professionals, faculty, staff, and graduate students. These judges evaluate enterprise posters and presentations during the annual Design Expo, using rubrics provided by the EPO. The results are used to evaluate students' communication skills.

## **5.3 Linkage to HLC Assessment of USLG's:**

Instructors of Enterprise courses that are linked to USLG's may be asked to provide course-specific assignments or to complete rubrics in support of USLG assessment. More information on the University's General Education Council and USLG assessment can be found [here](#):

**Table 1.** outlines how the Enterprise curriculum maps to the respective ABET student outcomes and University Student learning Goals (USLG's):



TABLE 1: ENTERPRISE ABET AND USLG COURSE OUTCOMES

| Learning outcome   | ENT course(s) assessed   |
|--|--|
| <p><b>ABET Criterion 5 Curriculum</b><br/>Students must be prepared for engineering practice through a curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints.</p> | Department approval of student's ENT4950 Enrollment Verification Form and Project Proposal |
| <p><b>ABET(1)</b> an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</p>  | ENT4950/ENT4960  |
| <p><b>ABET(2)</b> an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors</p>   | ENT4950/ENT4960  |
| <p><b>ABET(3)</b> an ability to communicate effectively with a range of audiences</p>  | ENT4950/ENT4960<br>Design Expo Posters and Presentations                                   |
| <p><b>ABET(5)</b> an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives</p>   | ENT4950/ENT4960  |
| <p><b>ABET(6)</b> an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</p>  | ENT4950/ENT4960  |
| <p><b>USLG 4: Critical and Creative Thinking</b><br/>4.4 Critical Thinking - Creative problem solving by developing alternative methods or ideas<br/>4.5 Thinking Innovatively - Creating and applying significant ideas</p>   | ENT2961  |
| <p><b>USLG 5: Oral Communication</b><br/>5B.2 Language Choices - Effectiveness and appropriateness to audience; choices support the effectiveness of the presentation</p>  | ENT2962  |
| <p><b>USLG 5: Oral Communication</b><br/>5B.3 Delivery and Composure - Effectiveness and appropriateness to audience; choices support the effectiveness of the presentation</p>  | ENT2962  |



## 5.4 Continuous Improvement:

The EPO uses the above assessment data as well as other information and data sources (course evaluations, advisor feedback, etc.) to drive continuous improvement of the Enterprise Program. Results of continuous improvement may result in changes to policies, rubrics, program initiatives, communication methods, and infrastructure. The EPO will engage Enterprise Advisors and students in such continuous improvement activities.

## Section 6: Enterprise Enrollment and Registration

### 6.1 Enrollment in an enterprise – Project Courses

**Enterprise is a for-credit academic program.** Students must be enrolled in an Enterprise project course in order to be a member of an enterprise. As with any other for-credit course, “volunteers” are not allowed. No exceptions will be made. Students adding and dropping Enterprise courses are subject to the [University Senate Policy 301.1](#).

Students may join an enterprise as early as the **second semester of their first year** on campus. **Incoming first-year students are encouraged to learn about the program and meet the various enterprises but are prohibited from enrolling during their first semester;** this policy is intended to allow students time to acclimate to the University before committing to a program like Enterprise, which can require a significant time commitment.

The EPO recognizes that enterprises often recruit new members by inviting them to enterprise meetings and activities BEFORE they decide to enroll in the Enterprise program. ***Such ‘shadowing’ is acceptable, so long as prospective members are not actively working in Enterprise labs or are being assigned project responsibilities.***

The **Enterprise Advisor is ultimately responsible for ensuring their enterprise is in compliance with this enrollment policy.** A current list of Enterprise Advisors can be found [here](#).

Students can enroll in Enterprise through [Banweb](#), just as they do with any other course. When enrolling in a specific enterprise, students must select the appropriate project course per the guidelines below. Each enterprise is represented by a unique section (Lxx) in Banweb. Also, each Enterprise Advisor may define restrictions on enrollment for their enterprise such as: instructor approval, submission of a resume and statement of interest, conditions for continued enrollment and/or dismissal from the enterprise, etc.

The typical progression through Enterprise is outlined below, where ENT4950/4960 are completed in the fourth year. Most students typically join Enterprise in their second or third year. Also, since many students take more than eight semesters to graduate, academic advisors can assist in selecting the appropriate project course based on factors such as class standing, number of semesters remaining until graduation, senior design/capstone “readiness”, etc.





FIGURE 1: TYPICAL ENTERPRISE COURSE PROGRESSION

TABLE 2: ENTERPRISE PROJECT COURSE CATALOG

| Course        | Credits | Course Description  |
|---------------|---------|---|
| ENT1960 Lxx*  | 1       | Project Course for first-year students in their second semester on campus   |
| ENT2950 Lxx   | 1       | Project course for second-year students   |
| ENT2960 Lxx   | 1       | Project course for second-year students   |
| ENT3950 Lxx   | 1       | Project course for third-year students  |
| ENT3960 Lxx   | 1       | Project course for third-year students  |
| ENT3980 Lxx   | 1       | Project course for students who are not “capstone” ready but have taken previous ENT project courses  |
| ENT4900 Lxx   | 2       | Project course for fourth-year students who are NOT using Enterprise to replace their departmental capstone/senior design course (Typically students not in engineering or technology departments such as CS, Business, Humanities, etc.) |
| ENT4910 Lxx   | 2       | Project course for fourth-year students who are NOT using Enterprise to replace their departmental capstone/senior design course (Typically students not in engineering or technology departments such as CS, Business, Humanities, etc.) |
| ENT4950 Lxx** | 2       | Project course for fourth-years students who ARE using Enterprise to replace their departmental capstone/senior design course (engineering, technology, and software engineering majors).   |
| ENT4960 Lxx   | 2       | Project course for fourth-years students who ARE using Enterprise to replace their departmental capstone/senior design course (engineering, technology, and software engineering majors).   |
| ENT4961 Lxx   | 1       | Project course for students who have completed ENT4900/10 or ENT4950/60 but have not yet graduated and wish to continue working on their enterprise   |
| ENT5950 Lxx*  | 1-3     | Project course for graduate students (variable and repeatable)  |

\*permission of enterprise advisor required to enroll

\*\*permission of enterprise advisor AND academic department of the student’s major required to enroll

## 6.2 Enterprise Course Fees – Project Courses

Each Enterprise project course includes a course fee paid by the student. Project course fees are collected by the EPO and then transferred to the individual enterprise’s course fee (A12xxx) account in order to provide a source of revenue for project and operational expenses.

Consistent with the University’s definition of “official enrollment”, Enterprise course fees are transferred to the enterprises based upon their official enterprise enrollment as of **Wednesday of Week 2** of the given semester. Any course fees for students who enroll after this date will not be transferred to the enterprise. The EPO will process the Enterprise course fee transfers no later than **Friday of Week 3**.



**Note:** Project course fee transfers for summer enrollment are included with the transfers of the Fall semester course fees each year.

### **6.3 Enrollment in ENT4950/4960**

ENT4950 and ENT4960 represent the Enterprise equivalent of the traditional departmental capstone/senior design project course(s). When a student uses Enterprise to replace their departmental capstone/Senior design course, the student's academic department must review and approve the project work proposed in ENT4950 to ensure it meets the departmental expectations of "capstone-equivalent" project work. This approval process is important for the following reasons:

- The department capstone/Senior Design project courses and thus ENT4950/60 are directly associated with the educational outcomes that are assessed to maintain ABET accreditation.
- Since Enterprise is a multi-disciplinary program, students are often working on projects that are multi-disciplinary in nature.
- Since Enterprise is a multi-disciplinary program, students are often enrolled in an enterprise that is advised by faculty or a staff member from a department other than the academic department awarding the student's degree.

Prior to the Banweb registration process, students enrolling in ENT4950 must complete the **ENT4950 Registration Permission Form** as mentioned previously in [Section 5](#).

### **6.4 Enrollment in Enterprise Course Modules**

In addition to the project work (enrolling on an enterprise), the Enterprise Program includes several instructional course modules (typically 1 or 2 credits per course) aimed at developing technical, business, innovation, and interpersonal skills. Depending on the level of participation in Enterprise (concentration, minor, etc.), students have flexibility in selecting which Enterprise course modules they wish to take. The intent is to give students choice in selecting courses which help further their development and are tailored to their individual goals, career interests, and the needs of their enterprise. Enterprise course modules are modeled after professional development workshops/training similar to what employees in a company might take when setting annual goals with their manager for personal and professional development.

The list of ENT course modules offered varies by semester and is maintained in Banweb. Students enroll just as they would any other Michigan Tech course. Enterprise Advisors, Academic Advisors, and the EPO can provide students additional guidance on course selection. Examples of the different courses offered are shown in Figure 2. below:



# Enterprise Instructional Modules



FIGURE 2: EXAMPLES OF ENTERPRISE COURSE MODULE TOPICS

Enterprise course modules can apply to a student's degree requirements in a variety of ways, depending on major. For instance, some Enterprise modules can be used to satisfy HASS credit requirements. **Students should consult their academic advisors to understand how ENT module credits can be applied towards their degree requirements.**

## **6.5 Enterprise Course Fees – Modules**

Some Enterprise course modules have a course fee associated with them. These fees are collected by the EPO and used to support program-level expenses associated with course module delivery. Course fees for module courses can be found on Banweb.

## **Section 7: Guidelines and Expectations of Enterprise Students**

In addition to guidelines and requirements set forth by the University and Enterprise Advisor the EPO has established the following expectations for **ALL** enterprises.

- **Enrollment:** All student members must be enrolled in order to participate on an enterprise.
- **Safety:** All enterprises are required to comply with all University safety requirements including safety polices / training for the labs, shops, and other University spaces in which enterprises perform their project work.
- **Design Expo:** All enterprises are required to present their project materials at the [Design Expo](#), which supports program assessment and serves as an annual showcase for enterprise project work.
- **Sponsorship and Fundraising:** Fundraising and Enterprise sponsorship efforts shall be done in direct coordination with the EPO staff.
- **Organizational Structure:** enterprises shall establish a defined organizational structure for its student members.



- **Recruiting:** enterprises should maintain an active recruiting program that promotes a multidisciplinary composition and sustains the enterprise size at a level that supports the educational goals of the program.
  - While there are no specific requirements for enterprise size, the EPO will monitor enrollment to watch for potential concerns associated with under-enrollment (enterprise viability) and over-enrollment (too large to manage, reduced student mentoring).
  - In addition to any enterprise-specific recruiting activities, the EPO encourages and facilitates program-wide recruiting events (such as Enterprise Day) to assist enterprises in recruiting.
- **Websites:** All enterprises shall maintain a website hosted on MTU's servers and with an mtu.edu URL. Websites should be maintained annually with updated enterprise information and include a link to the [Enterprise Program](#) website. Use of .com websites is prohibited, in order to remain consistent with the fact that enterprises are not companies but rather part of an educational program at Michigan Tech. For enterprises who need assistance creating a website, a WordPress template is available on the **Enterprise Student Resources** page [here](#) (note ISO sign-in is required).
- **Program Initiatives:** enterprise participation in program-level initiatives is highly encouraged and is of benefit to participating students. See [Section 12](#) of this manual for examples.
- **Professionalism:** All enterprises are expected to exhibit professionalism while representing the University and the Enterprise program at University and off-campus events, interactions with external sponsors, and all communications including but not limited to email, social media, websites, etc.
- **Deliverables:** All project deliverables are expected to be provided to program sponsors and project stakeholders in a timely manner. More specifically, final project reports shall be submitted to program sponsors and project stakeholders before the end of the semester, unless other arrangements have been agreed upon.

## Section 8: Enterprise Advising

### **8.1 Enterprise Advising Overview and Philosophy**

Enterprise advisors are responsible for providing their enterprise support and mentorship that facilitates effective student learning through the Enterprise Program. Due to Enterprise's emphasis on team-based project work, advising is much different than teaching a traditional course. A major effort with the Enterprise program has been to create a learning atmosphere where faculty serve as mentors and advisors to enterprise members; that is, they move from the role of imparting knowledge to helping students discover and apply knowledge. We promote a relationship that parallels the one between faculty members and student researchers (or between supervisor and employee), wherein inquiry and innovation are the norms, learning and application go hand-in-hand, and students and faculty advisors work in a team environment to solve problems of significance to industry.

#### **a. Enterprise Advising Expectations and Requirements:**



The Enterprise Program provides flexibility for its advisors to develop practices that are tailored specifically to their enterprise; that is, there is no 'one-size-fits-all' approach to Enterprise advising. However, the following are expectations and requirements of all advisors that have been established by the EPO:

- Enterprise Syllabus: Each advisor will develop, maintain, and publish a syllabus for their respective enterprise project courses (section). At a minimum the syllabus should outline the educational learning objectives and course grading scale. Copies of current syllabi are maintained [here](#).
- Safety: Enterprise advisors shall support compliance with all University safety requirements including safety polices / training for the labs, shops, and other University spaces in which enterprises perform their project work.
- Financial Management: Enterprise advisors are responsible for resource and budget management as defined in the "[Program Funding and Financial Management](#)" section of this manual. While students are encouraged to be actively involved in the financial management of their enterprise's operations (in support of Enterprise Program learning objectives), the enterprise advisor is ultimately responsible for their enterprise's expenditures and financial position.
- Grading: Enterprise advisors are responsible for: 1.) grading each student enrolled in their Enterprise project courses, based upon the grading scale defined in the course syllabus, and 2.) submitting final course grades per deadlines established by the University. While peer evaluations and student input can (and should) be part of this grading, it is ultimately the Enterprise advisor's responsibility as the course instructor to assign grades for their respective enterprise project courses.
- Program Assessment: Enterprise advisors are required to complete assessment of student learning outcomes as defined in [Section 5](#) of this manual. The EPO maintains an assessment plan that defines the rubrics and frequency of assessment. The EPO will communicate assessment needs to Enterprise advisors each semester.
- Inclusive Environment: Enterprise advisors are responsible for promoting an inclusive environment that values diversity and encourages multi/interdisciplinary project experiences within their enterprise.
- Student Leadership and Ownership: Enterprise advisors are expected to foster a culture and environment that promotes student "ownership" of their enterprise. Student ownership in the enterprise can be fostered in many ways, including but not limited to an organizational structure that provides student leadership and decision-making responsibilities, student input on grading and evaluation, and team budget management.
- Sponsor Engagement / Relations: Enterprise advisors play an important role in maintaining positive relationships with program sponsors. Examples of active engagement with sponsors include: attending project meetings/conference calls with sponsors; coaching enterprise students on their professional interactions with sponsors; being responsive to sponsor requests for project information and documentation including delivery of final reports and presentations; inviting program / project feedback from sponsors; and thanking sponsors for their support and involvement in the Enterprise Program.
- Attendance of Enterprise Advisor Meetings: Enterprise advisors are expected to attend advisor meetings scheduled by the EPO. These meetings are intended to foster collaboration and share



information amongst Enterprise Advisors. While it is understood that schedule conflicts may prohibit 100% attendance, routine or excessive absence from these meetings will be viewed as lack of engagement with the program office.

- **Engagement with the EPO:** The EPO manages several program-wide initiatives that support all enterprises. These include: sponsorship solicitations and program fundraising, facilitation of ESAB meetings, recruiting events, industry engagement and sponsor/donor stewardship, Design Expo, scholarships exclusive to enterprise students, and other program level initiatives. Enterprise Advisors are expected to promote enterprise engagement and participation in EPO-driven initiatives. See [Section 12](#) of this manual.

#### *b. Enterprise Advising Resources:*

The Enterprise Program Office maintains a shared google drive with various resources for advisors. The link to this drive is below:

<https://drive.google.com/drive/folders/0AJLU7rIFhICXUk9PVA>

#### *c. Enterprise Advisor (Instructor) Approval on Enterprise Project Courses:*

Per Table 2, enrollment in ENT1960, ENT4950, and ENT5960 require the permission/approval of the enterprise advisor. Beyond this, enterprise advisors have the ability to set 'instructor approval' on their remaining project courses to ensure a positive student experience and smooth enterprise operation. If instructor approval is utilized, advisors may consider any of the following as part of their instructor approval criteria:

- **Limits on overall team size** – enterprise advisors may wish to limit the number of enrolled students, within the constraints of the advisor's bandwidth and available enterprise projects.
- **Composition of the enterprise** – enterprise advisors may wish to limit the number of students from specific majors or class standing in order to successfully support available projects, manage student turnover, and maintain a stable enterprise organization.
- **Conduct and performance issues** – within the guidelines of the advisor's course syllabus and the student expectations outlined in [Section 7](#) of this manual, enterprise advisors may wish NOT to approve a student's enrollment for conduct or performance issues, as long as the conduct/performance issue is clearly documented and communicated. It is recommended that the enterprise advisor meet with the student to discuss such issues before deciding to remove them from the enterprise.
- **Student input in recruiting/enrollment decisions** – enterprise advisors may wish to involve their student leadership when reviewing and recruiting new members. For instance, enterprises may have an application process whereby student leaders review applicant information and discuss prospective where to place new members within the enterprise. However, the decision to approve a student's enrollment rests solely with the enterprise advisor as the instructor of the course.

When utilizing the above criteria, note that student GPA and academic standing can NOT be factors used to restrict a student's enrollment in enterprise.

## **8.2 Enterprise Advisor Compensation**

### *a. Enterprise Advising Compensation Terms:*



**Eligible** faculty and staff who serve as an Enterprise Advisor receive incentive compensation for their advising role. This compensation is intended to supplement any teaching credit provided by the department in which the advisor works. It should be noted that teaching credit for Enterprise advising varies across departments, schools, and colleges and is often a function of the Enterprise Advisor's primary role in their department.

The standard incentive offered by the EPO is \$2,000 per academic semester or \$4,000 total per academic year (incentive is not provided for the summer term).

The total advising incentive includes any PI IRAD returns that the advisor may receive for advising restricted (contracted) Enterprise projects. That is, the PI IRAD returns will be counted towards the \$4,000 annual incentive.

**Example:**

Advisor 'X' has **three restricted projects** that their enterprise is working on with industry for the current academic year. Each restricted project is funded at **\$17,500**.

- Each project has a value (before 15% F&A) of \$15,217.
- The University F&A (15%) collected on each project is  $(15\% \times \$15,217) = \$2,283$ .
- The PI IRAD return to Advisor 'X' for each project is 10% of the F&A, or  $(10\% \times \$2,283) = \$228.30$ .

Advisor 'X' will receive  $\$228.30 \times 3 = \$684.90$  from PI IRAD returns plus **\$3,315.10** from the EPO for a total advising incentive of \$4,000 for the academic year.

If two or more advisors co-advise an enterprise, the total incentive will be divided between the co-advisors. Co-advisors will agree upon how to divide the incentive and inform the EPO.

Advisor use of Enterprise incentive compensation is governed by [University policies](#) and must be for University business purposes only. Typical uses of the Enterprise advising incentive compensation include travel, professional development (I.E. conference registration fees), summer support, lab or teaching supplies, Enterprise space rental, etc.

Advising incentives for eligible advisors are processed by the EPO annually, at the end of the academic year, after confirming that the advisor has completed any required assessment, ENT grades have been submitted, and external sponsors have received project reports/deliverables. Incentive compensation will be transferred by the EPO into the Enterprise Advisor's incentive index (Index to be provided by the enterprise advisor).

**Note: Enterprise advising incentives are funded by external funds and are contingent upon availability of sufficient external funding received from Enterprise sponsorships and donations. In the event of insufficient or reduced external funding, the EPO reserves the right to reduce the incentive in order to maintain a balanced program budget.**

b. Enterprise Advising Compensation Eligibility Criteria:

In order to receive the annual advising incentive, enterprise advisors must meet the expectations as defined in [Section 8.1a](#).

Exemptions from Enterprise Advising Incentive:



Enterprise advisors who are paid off of a grant or contract that is funding their enterprise as well as enterprise advisors whose staff responsibilities include enterprise advising (i.e. advising is built into their compensated staff role) are exempt from the annual advising incentive.

## Section 9: Program Sponsorship, Fundraising, and Financial Management

### 9.1 Enterprise Program Financial Model Overview

Enterprise program and individual enterprise expenses are funded almost entirely by external sources. With the exception of the Enterprise Program Director's position which is supported by the University general fund, all other expenses necessary to operate the program must be covered through non-general funded sources. For this reason, a centralized sponsorship and fundraising model is used for the Enterprise Program. The **Assistant Director, Educational Partnerships** manages all sponsorship for the Enterprise Program and the enterprises operating within the program.

### 9.2 Program Fees and Fundraising

#### a. Fundraising and Sponsorship Roles & Responsibilities:

- EPO – The EPO is responsible for coordinating all program sponsorship. This includes leading the development of all Enterprise funding proposals, often in collaboration with Enterprise advisors and other University staff such as the Offices of Advancement and Industry Engagement. It is the responsibility of the EPO to discuss, coordinate, and to receive program funding from external sources.
- Enterprise Advisors – Enterprise advisors shall coordinate any and all sponsorship and fundraising efforts for their enterprise with the EPO.
- enterprise –enterprises shall communicate all sponsorship opportunities to their enterprise advisor as well as to the EPO. Individual enterprise should NOT solicit external support without the permission of/coordination with the EPO.

**Note: All funding transmittals which include a request for enterprise and/or program support must be signed by the EPO as a PI or Co-PI.**

#### b. Typical Program Expense Breakdown:

External support covers the vast majority of all Enterprise Program and enterprise expenses. Sponsorship funding (including program/project fees and unrestricted donations) received by the program is allocated for use in the following manner, which reflects the approximate breakdown of annual program and project expenses:

- 20% - Enterprise Program Expenses
  - Payment for course module instruction, staff who directly support the Enterprise Program, program space and infrastructure, and various program initiatives (see [Section 12](#)).
- 20% - Advising Incentive Compensation



- Payment of annual advising incentives to eligible advisors
- 60% - enterprise Support
  - Direct project and enterprise-related expenses associated with successful operation of a given enterprise.

The Enterprise Program Director, in consultation with the Enterprise Governing Board, reserves the right to adjust the above allocations as needed to successfully operate the Enterprise Program.

### **9.3 External Sponsorship & Support**

Michigan Tech has two mechanisms for administering sponsored funding both for Enterprise and Senior Design projects; **restricted projects** conducted under a formal contract between Michigan Tech and the Sponsor, and **unrestricted projects** that are conducted without a formal contract. Both mechanisms allow for Sponsor direction and reasonable specification of the project tasks and objectives but differ in the degree of specificity of project scope and the formal disposition of intellectual property resulting from the project.

The Enterprise Program has established **standard per-project fees** associated with each type of project. The use of a standard fee, as opposed to developing a specific budget for each project, simplifies the sponsorship model and reflects the fact that sponsors are supporting a program, not hiring a student team to perform work. Further, these fee levels have been determined based on 1.) the total costs to successfully operate the Enterprise Program, 2.) a desire to have consistency with the fee levels charged for comparable industry-sponsored Senior/Capstone Design projects, and 3.) benchmarking of similar programs across the country

#### *a. Project sponsorships and standard program fees:*

- Example: unrestricted \$15,000 project sponsorship
  - \$15,000 [Total amount collected from the sponsor]
    - \$3,000 [Amount collected by the EPO for program support, 20%]
    - \$3,000 [Amount collected by the EPO for Enterprise advising incentives]
    - \$9,000 [Net amount to the enterprise for project/operational expenses, 60%]
- Example: restricted \$17,500 project sponsorship
  - \$17,500 [Total amount collected from the sponsor; **note the base amount before F&A = \$15,217**]
    - \$2,283 [F&A collected by the University for, 15% x 15,217]
    - \$3,000 [Amount collected by the EPO for program support, 19.7% x 15,217]
    - \$3,000 [Amount collected by the EPO for Enterprise advising incentives, 19.7% x 15,217]
    - \$9,217 [Net amount to the enterprise for project/operational expenses, 60.6% x 15,217]

***Note: In some cases, deviations from the above standard program fees may be justified and shall be coordinated by the EPO and Assistant Director, Educational Partnerships.***

#### *b. Educational and research grants:*

Agency and foundation funding (such as NSF grants, private and corporate foundation grants, etc.) represent additional sources of external support for the Enterprise Program. In these cases, the proposal budgets typically have additional restrictions and guidelines and thus the standard program fees often do not apply.



**Any proposals to agencies and foundations that include support for an enterprise must be coordinated through the EPO with the Assistant Director, Educational Partnerships or Director of Enterprise as a PI or Co-PI on the proposal.**

*c. Gift-in-Kind Donations:*

Gift-in-Kind (GIK) donations are a common way of obtaining materials, software, and other goods. Gift-in-kind donations are tax-deductible, requiring Michigan Tech to provide documentation to the donating entity. For this reason, it is important that **all gift-in-kind donations made to the Enterprise program be coordinated through the EPO**. It is the responsibility of Enterprise advisors and enterprise members to make EPO staff aware of any donated or discounted goods received by the enterprise. The **Enterprise Program Coordinator** will work with students to document the value of all GIK donations by completing the University's [corporate gifts-in-kind submission form](#).

*d. Unrestricted Cash Donations:*

Unrestricted donations are financial donations that are free to be used at the discretion of the EPO and enterprise. All unrestricted donations to the University are received and processed through the [Michigan Tech Fund](#).

Additionally, Michigan Tech maintains a crowdfunding platform and [website](#), Superior Ideas, to facilitate the process of securing unrestricted support for specific projects. **Enterprises interested in posting projects on Superior Ideas must coordinate with the EPO.**

A current list of **Enterprise Program sponsors and donors** can be found [here](#). This list is updated annually.

## **9.4 Financial Management**

Each enterprise has at least one master account or index (E04xxx) and one course fee index (A12xxx). Funds in these accounts can be used for enterprise operating and project expenses, per established University accounting policies. The Enterprise advisor associated with each index is ultimately responsible for financial management of these funds. Enterprise advisors shall actively monitor these funds and work with student leadership to ensure funds are being spent responsibly.

While it is recognized that enterprises may operate with a carry-forward balance from year to year, enterprises are encouraged to develop plans for expenditure of accumulated funds in order to invest in their infrastructure, growth, and success. Conversely, a significant and continued carry-forward balance for a given enterprise can be viewed as 'idle assets' that could be invested in program-level initiatives to benefit more students in the Enterprise Program.

To encourage reinvestment in enterprises and program-level initiatives, enterprise carry-forward funds in excess of the enterprise's annual expenditures (based on a three-year average of the enterprise's actual expenditures from their E04xxx and A12xxx indexes) will be transferred back to the EPO for investment in program level initiatives and support. These funds will be transferred from the enterprise index to the general Enterprise program index at the beginning of each fiscal year (July). Affected enterprises will be notified through a communication from the Enterprise Program Director to the enterprise's faculty advisor(s).

**Example:**

- enterprise 'Y' total carry-forward funds at close of fiscal year (total of enterprise 'Y' funds in their E04xxx index(es) and A12xxx course fee index): \$26,000



- enterprise 'Y's actual annual expenditures (three-year average) out of the above indexes: \$15,000
- Amount in excess of enterprise 'Y's annual operating expenditures that will be transferred to the EPO: \$26,000 - \$15,000 = \$11,000
- Amount retained in enterprise Y's indexes for continued use by the enterprise: \$15,000 (one-year of carry forward)

The Enterprise Program Director will consider requests for waivers of this policy from Enterprise Advisors on a case-by-case basis.

## Section 10: Intellectual Property, Confidentiality, and Commercialization

Enterprise projects can involve the creation of intellectual property, the need to maintain confidentiality, and the potential to commercialize intellectual property (e.g. sell a product or license technology). Important considerations for students and Enterprise advisors relative to each of these terms is outlined below.

### 10.1 Intellectual Property

With respect to Enterprise projects, the University generally defines intellectual property (IP) as “patentable inventions and copyrightable software that arise directly out of a project”. Depending on the project, the IP may be owned by the University, by the people who created the IP, or transferred from the University to a sponsor (via a contract on restricted projects). The University Board of Trustees Policy Manual ([Chapter 14](#)) specifies the framework for deciding who owns the IP. The policy states:

“The University will own any software or invention conceived or reduced to practice by faculty, staff, and students in the course of University employment or research, or through the use of University Facilities and Equipment.”

The definitions of University Employment, Research, and Facilities and Equipment are clarified in a memo distributed by Dave Reed, Michigan Tech’s Vice President for Research in November 2014 (**Appendix A**) as provided below:

- *University Employment* - Outcomes from activities within the scope of employment of an individual on payroll or otherwise within the scope of compensated duties by individuals receiving other forms of financial compensation from the University.
- *University Research* - Outcomes from research activities conducted within the scope of: a) an external agreement such as a sponsored research agreement; b) an employee’s research duties; c) a graduate student’s thesis or dissertation topic; or d) any institutional funding including but not limited to those from public, private, or internal sources.
- *University Facilities and Equipment* - Outcomes which occur as a substantive result of the use of specialized equipment, hardware, or software. As a general principle, facilities available for open use



by the entire student body without conditions for access control other than enrollment status are not considered to be University Facilities and Equipment. In addition, incidental use of University Facilities and Equipment does not constitute grounds for University ownership of intellectual property which results from such incidental use.

In addition to issues related to ownership, **Licensing Terms for software and facilities available to students may have restrictions on their use as defined by the software or facility provider.** Questions about the ownership of outcomes from a specific project or restrictions on software or equipment should be directed to Michigan Tech's **Office of Innovation and Commercialization.**

**Restricted projects:** The project agreement or 'contract' defines ownership rights associated with such intellectual property. This may or may not include a transfer of ownership from the University to the program sponsor. Enterprise advisors and student teams must sign a document confirming that they agree to the terms associated with such agreements. Restricted project agreement terms are negotiated centrally by Michigan Tech's Office of Innovation and Commercialization, and sent to the Enterprise advisor through a notification of award process.

**Note:** Funding for restricted projects will not be awarded until such agreements have been signed by the Enterprise advisor and the specific students working on the project.

**Proprietary Rights Agreement:** Enterprise students working on projects may be required to sign the **Student Patent, Research, and Proprietary Rights Agreement (PRA)**, depending on the circumstances of the project. University procedures are in place to prompt enterprises and advisors when PRA's are required. This agreement provides for the assignment of ownership of student-created intellectual property to the University under certain circumstances which are clarified above. If the intellectual property is owned by the University, the student Patent, Research, and Proprietary Rights Agreement includes provisions for the student inventors to receive a portion of the income from the sale or license of such intellectual property.

## **10.2 Commercialization**

One goal of the Enterprise Program is to foster entrepreneurship and thus encourage and support those students who wish to commercialize technologies they help create. Below, we describe the commercialization process for University-owned projects and student-owned projects. Note there is no 'one size fits all' approach to commercialization and thus it is encouraged that students consult the IIE office to discuss options for licensing technology and/or starting a business that involves the use of such IP.

**University-owned project outcomes:** Commercialization of University-owned intellectual property (defined in 10.1) is managed by Michigan Tech's Office of Innovation and Commercialization.

**Student-owned project outcomes:** Project outcomes that do not result from University Employment, Research, or the use of University Facilities and Equipment (as defined in [Section 10.1](#) and Appendix A) are owned by students, subject to the licensing restrictions referenced above. Students pursuing entrepreneurial activities are encouraged to utilize resources including the **Husky Innovate** (housed in the Pavlis Honors



College). The center serves all of campus and is available as a resource supporting students' individual entrepreneurial activities.

### **10.3 Confidentiality**

In many cases, Enterprise students, advisors, and EPO staff have access to confidential or proprietary information provided by a program sponsor in support of a given project. Further, program sponsors often require the University to agree to terms that prohibit disclosure of such information on a given project.

The two mechanisms by which confidential and proprietary information are protected include the project agreement (see restricted projects above) and/or a separate confidentiality or nondisclosure agreement. Michigan Tech's Office of Innovation and Commercialization negotiates all such agreements and sends any necessary documents to the Enterprise advisors for signature by the advisor and the specific students working on the affected project.

***Note: Confidentiality is not limited to restricted projects, as some unrestricted projects may include a separate confidentiality or non-disclosure agreement.***

## **Section 11: Enterprise Program Infrastructure**

### **11.1 Enterprise Labs, Spaces, and Equipment**

Across campus, many enterprises have been provided dedicated lab, shop, or collaboration spaces by their host department for their use. It is of utmost importance that Enterprise students using these facilities adhere to any University regulations pertaining to the use of University-controlled spaces and equipment. As these spaces are often the focal point of tours for program sponsors and potential Enterprise students, Enterprise spaces should remain clean, orderly, and free of debris and trash at all times.

#### **a. Departmental Spaces:**

Many enterprise spaces are provided by host departments across campus. Use of spaces is subject to policies maintained by the host department.

#### **b. Enterprise Equipment and Assets:**

Equipment and assets purchased using Enterprise sponsorship funding (including Enterprise project course fees) and/or donated in support of the Enterprise Program are considered property of the Enterprise Program, not the host department for the enterprise. Such Enterprise equipment and assets are often managed by specific enterprises for their use, while others may be managed by the EPO for shared use across multiple enterprises.

In the event that an enterprise is phased out, enterprise-specific equipment and assets will be transferred back to the EPO. The EPO will work with the Enterprise advisor and relevant campus stakeholders (such as host department(s)) to determine the best use of such equipment and assets going forward (e.g. maintaining



for shared use by multiple enterprises, transferring to another enterprise, transferring to an academic unit on campus, or dispositioning if no longer useful or needed).

## **11.2 Enterprise Shared Lab Spaces Administered by the Pavlis Honors College**

### **Minerals and Materials Room #614**



Overview: M&M 614 is a flexible project, collaboration, and computing space made available to students through the EPO. The room is secured by a proximity card reader and is accessible to Enterprise students.

Available Equipment: networked computers, whiteboards, movable tables and stools, storage cabinets, and shelving.

### **Minerals and Materials Room #718A**



Overview: A large collaboration/conference room designed to be a flexible meeting space for enterprises to hold meetings, present to on-campus sponsors and faculty, and communicate with off-campus stakeholders. The room is secured by a proximity card reader. Students must reserve the room using the Google Calendar system.

Available Equipment: networked computer with high-powered graphics card, teleconferencing system, webcam, 75" LED screen, conference table, podium, and white board.



**Minerals and Materials Room #718B**



**Overview:** A small collaboration/conference room designed to be a flexible meeting space for enterprises to hold small meetings and communicate with off-campus stakeholders. Room is secured by a proximity card reader. Teams must reserve the room using the Google Calendar system.

**Available Equipment:** networked computer with high-powered graphics card, teleconferencing system, webcam, 55" LED screen, table, and white board.

**Chemical Sciences and Engineering Building Room #SB001**



**Overview:** A project space currently utilized by Consumer Product Manufacturing. This space is 721 square feet



## **Dow Environmental Resources and Engineering Building Room #901**



**Overview:** A project space for Open Source Hardware. This space is 747 square feet.

### **Room Use Policies**

Use of all rooms is subject to room-specific use policies maintained by the EPO.

## **Section 12: Enterprise Program Initiatives**

### **12.1 Program Promotion**

The EPO has undertaken efforts in many areas to seek continuous promotion of the Enterprise Program. These efforts include the following:

- Creation and dissemination of publications in relation to current Enterprise efforts, successes, or other relevant program-related materials.
- Application and receipt of multiple program-level awards.
- Creation of a centralized sponsorship program, solicitation process, and associated marketing and promotional materials targeted to the external sponsor audience.
- A newsletter highlighting successes and accomplishments across the Enterprise program.

### **12.2 Design Expo**

The EPO and Pavlis Honors College, in collaboration with the College of Engineering, plan and hold the [Design Expo](#). The Design Expo is open to the public and serves as an annual showcase for the work of nearly 1,000 students involved in Enterprise and Senior Design teams each year. The event also recognizes the many industry sponsors who provide program and event support. A panel of judges, made up of distinguished corporate representatives and Michigan Tech staff and faculty members evaluate project posters and presentations. Teams compete for cash awards and network with industry and campus visitors to share their successes and experiences.



## **12.3 Enterprise Fundraising & Support**

### **a. Project Sponsorships**

The EPO leads the coordination, solicitation, and receipt of all Enterprise Program sponsorship monies and gifts. For more information see [Section 9](#) of this manual.

### **b. Competitive Grants & Sponsorships**

Multiple competitive grant and sponsorship opportunities are made available by various funding agencies/corporations yearly. The EPO will make applicable enterprises aware of available competitive grant and sponsorship opportunities as well as assist interested enterprises in the application process.

### **c. ArcelorMittal ‘Steel Warehouse’**

In an effort to support student teams and promote the benefits and use of steel as an engineering material, ArcelorMittal, the world’s largest steel producer, conceived the concept of the “Steel Warehouse”. The program is maintained by the EPO and is available to all enterprises as a resource for procuring steel for enterprise projects. Instructions for purchasing and receiving material through the Steel Warehouse can be found [here](#).

### **d. Enterprise Manufacturing Initiative (EMI)**

The Enterprise Manufacturing Initiative, funded by the GM Foundation, aims to increase student awareness of the manufacturing sector, expose students to the breadth of careers available in manufacturing, and provide access to funding and industry subject matter experts for support on manufacturing related projects. The program is targeted to Enterprise students who are interested in learning more about manufacturing while enhancing the manufacturability of Enterprise projects. The Initiative represents General Motors’ continued support of manufacturing education at Michigan Tech and is open to any student enrolled in the Michigan Tech Enterprise program. More information can be found [here](#).

### **e. Enterprise Business Initiative**

The Enterprise Business Initiative is a cross-Enterprise, collaborative group of students interested in applying business processes within their enterprises while enhancing their Enterprise projects. Open to all students enrolled in the Michigan Tech Enterprise program, the initiative allows participating students a forum to discuss business topics with each other, enhance their own analysis, and develop conclusions and recommendations for projects within their enterprise.

## **12.4 The Enterprise Student Advisory Board:**

*The Enterprise Student Advisory Board (ESAB)* is a community of Enterprise students from all enterprises. The ESAB is facilitated by the EPO and is organized to provide a strong, communal voice for Enterprise students and coordination of program-related activities. The primary goals of ESAB are to:

1. Provide a student voice/conduit to the EPO and Enterprise Governing Board
2. Facilitate knowledge sharing and best practices across and among enterprises
3. Support and implement cross-enterprise initiatives that strengthen and enhance the Enterprise student experience



### **12.5 Rewards and Recognition Program:**

The EPO seeks to recognize students, faculty, and staff involved in the Enterprise program for exceptional efforts and positive contributions to the Enterprise program. To bring light to these efforts, the EPO will recognize and reward individuals from the following groups through the development of a rewards and recognition program for:

- enterprises and their students
- Enterprise Advisors
- Enterprise Course Module Instructors

Please see the [Scholarships and Awards](#) section of the Enterprise Program website for details.

### **12.6 Carnahan Enterprise Scholarship:**

The *Carnahan Enterprise Scholarship* is funded by Dr. Robert D. Carnahan, class of 1953. The EPO will award up to two \$500 merit-based scholarships for an undergraduate degree in Business and Economics and up to two \$500 merit-based scholarships for an undergraduate degree in Humanities each year, dependent on availability of scholarship funding. It is envisioned that the key responsibilities of Business and Economics majors will be to guide technology, product, and/or business strategy within the enterprise. Key responsibilities of Humanities majors include the design, development, and production of written and visual communication, both in print and digital environments.

Scholarship details including eligibility, instructions, and the application form are communicated through from the EPO each semester on the Enterprise website blog.

### **12.7 Enterprise ‘Above and Beyond’ Scholarship:**

The Enterprise ‘Above and Beyond’ Scholarship is available to eligible undergraduate and graduate students who are enrolled in the Enterprise Program. The scholarship is intended to recognize those students whose participation in their enterprise goes ‘above and beyond’ the norm.

### **12.8 Pavlis Honors College Industry Speaker Series:**

Throughout the academic year, the Pavlis Honors College hosts representatives from a variety of industries to campus to present on a variety of topics. The presentations are open to all students campus-wide and are announced on the Enterprise website blog.



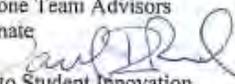
## Appendix A – UNIVERSITY INTELLECTUAL PROPERTY POLICY CLARIFICATION



Michigan Technological University

Innovation and Industry Engagement  
1400 Townsend Drive  
Houghton, Michigan 49931-1295

### MEMORANDUM

To: Deans, Department Chairs, Enterprise and Capstone Team Advisors  
CC: Craig Waddell and Robert Froese, University Senate  
From: Dave Reed, Vice President for Research   
Re: Intellectual Property Policy Clarification related to Student Innovation  
Date: November 3, 2014

Michigan Tech encourages our faculty, staff, and students to be innovative in their research and course activities as they pursue creating solutions for future benefit. Intellectual Property (IP) policies are established to protect both the interests of the University and the creator(s) of the IP. In most cases, IP policies and the circumstances for IP creation provide for a clear and explicit determination of IP rights of ownership. If faculty, staff and students have questions beyond the established policies, they are encouraged to consult the Office of Innovation and Industrial Engagement.

This memo serves to clarify the scope of Michigan Tech's intellectual property ownership rights under Board of Control Policy 14.1 ([www.admin.mtu.edu/admin/boc/policy/ch14/ch14p1.htm#patent](http://www.admin.mtu.edu/admin/boc/policy/ch14/ch14p1.htm#patent)) which addresses the circumstances under which the University has a right to ownership of the intellectual property of students and employees. The policy includes the following statement:

**"The University will own any software or invention conceived or reduced to practice by faculty, staff, and students in the course of University employment or research, or through the use of University Facilities and Equipment."**

The definitions of University Employment, University Research, and University Facilities and Equipment provided below follow established practices and are intended to clarify the scope of the policy, particularly for non-employed undergraduate students.

*University Employment* – Outcomes from activities within the scope of employment of an individual on payroll or otherwise within the scope of compensated duties by individuals receiving other forms of financial compensation from the University.

*University Research* – Outcomes from research activities conducted within the scope of: a) an external agreement such as a sponsored research agreement; b) an employee's research duties; c) a graduate student's thesis or dissertation topic; or d) any institutional funding including but not limited to those from public, private, or internal sources.

*University Facilities and Equipment* – Outcomes which occur as a substantive result of the use of specialized equipment, hardware, or software. As a general principle, facilities available for open use by the entire student body without conditions for access control other than enrollment status are not considered to be University Facilities and Equipment. In addition, incidental use of University Facilities and Equipment does not constitute grounds for University ownership of intellectual property which results from such incidental use.

This policy does not cover undergraduate student activities that happen to occur in a classroom and that fall outside the scope of University Employment, University Research, and/or University Facilities and Equipment as defined above.

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Michigan Technological University is an equal opportunity educational institution/equal opportunity employer.



## Revision History

| <b>Date</b> | <b>Version</b> | <b>Description</b>   | <b>Author</b> |
|-------------|----------------|--|---------------|
| 09/01/2017  | 1.0            | Initial Draft  | Zack Fredin   |
| 09/20/2017  | 1.1            | Updates to Section 10 to reflect IIE feedback  | Zack Fredin   |
| 09/21/2017  | 1.2            | Updates to Section 10 on PRA   | Zack Fredin   |
| 02/26/2018  | 1.3            | Updates to Section 10 per IIE & Advisor Feedback   | Zack Fredin   |
| 07/02/2019  | 1.4            | Updates to Enterprise Program Office staff<br>Updates to Section 5 to reflect changes in Criterion 3 – ABET Student Outcomes<br>Updates to Section 11 to reflect changes in Labs and Spaces  | Briana Tucker |
| 05/21/2020  | 1.5            | Clarified Enterprise vs. enterprise throughout<br>Minor wording and formatting changes<br>Added conduct to 3.2<br>Removed ENT5960 in Table 2.<br>Added clarification for websites and professionalism in Section 7.<br>Added 8.1b and 8.1c<br>Clarified incentive processing timing in 8.2a<br>Added clarification in 9.2b | Briana Tucker |

