ITEM XXX-XXX-XXXX
Certificate of Technical Skills – Recycling Technology

THAT
The Board of Regents of Higher Education authorizes the University of Montana to add a Certificate of Technical Skills of Recycling Technology within the Energy Technology Program.

EXPLANATION
We are requesting to add a Certificate of Technical Skills (CTS) in Energy Technology to accommodate a growing industry demand for individuals qualified to reduce, reuse and repurpose post-consumer waste. This need is especially acute in Missoula, which has an environmentally minded population and a city-wide commitment to sustainability. As part of the DOL TAACCCT SWAMMEI project planning and industry consulting, this is one of the careers originally targeted in the proposal as well as one of the career paths that the Energy Technology Program Director has committed to offering under the ANSI-IREC standards.

ATTACHMENTS
• Level I Program Form
• Curriculum Proposal
• Course List
**Level I Program Form**

### I Summary of Proposed Changes

<table>
<thead>
<tr>
<th>Department/program</th>
<th>Applied Computing and Electronics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary</strong></td>
<td>We propose to offer a new “Certificate of Technical Skills” entitled “Recycling Technician.” This career, associated with CIP codes 15.0506, 15.1503, is expected to increase in demand.</td>
</tr>
</tbody>
</table>

### II Endorsements and Approvals

Please obtain approval from the Program Chair/Director, the Dean, and the Associate Provost.

Requestor: B.E. Layton
Phone: x7865
Sep 16, 2014

<table>
<thead>
<tr>
<th>Program Chair/Director:</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td><strong>Signature</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Date</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Dean’s Signature**
Date

Initial Review in Provost’s Office: Sep 16, 2014

Signature Date

Other affected programs:

Signature Date

Faculty Senate Review: Date

Signature Date

Provost: Date

Are other departments/programs affected by this modification because of:

- (a) required courses incl. prerequisites or corequisites,
- (b) perceived overlap in content areas,
- (c) cross-listing of coursework

**NO**

### III Type of Level I Proposal (please check the appropriate space)

- (a) Re-titling existing majors, minors, options, or certificates
- (b) Eliminating existing majors, minors, or options. (submit with BOR program termination checklist)
- (c) Adding new minors or certificates where there is a major
- (d) Adding new minors or certificates where there is an option in a major
- (e) Departmental mergers and name changes
- (f) Program revisions – for minor modifications use the program modification form
- (g) Distance or online delivery of previously authorized degree or certificate program
- (h) Adding option within an existing major or degree
- (i) Eliminating organizational units such as departments, divisions, and colleges or schools
- (j) Consolidating existing programs and/or degree
- (k) New certificate of 29 or fewer credits

**x** Requires BOR Curriculum Proposal Form submitted to the Provost’s Office (refer to http://www.umt.edu/provost/faculty/catalog/LevelI/default.php)

### IV Catalog Language

If you are proposing a change to an existing program or major, please cut and paste the requirements as they appear in the current catalog below:

www.umt.edu/catalog

Please provide the proposed copy as you wish it to appear in the catalog.

The Recycling Technician Certificate of Technical Skills (CTS) prepares students for employment in the waste management, recycling, and packaging industries.

With an increased demand for workers with advanced skills in materials identification, materials repurposing, and waste reduction, this certificate has the potential to provide a pathway to career opportunities in both post-consumer waste recovery and upcycling as well as repurposing of existing artifacts. Special emphasis is placed on hands-on activities such as developing protocols for collection, transportation, sorting, cleaning, and reprocessing for the purpose of avoiding landfill mass and returning materials to the technosphere. ANSI-IREC
standards will be adhered to throughout the course. Students may be required to purchase tools and books.

Please **explain/justify** the new proposal or change.

We are compelled to offer this new 16-credit certificate under our current $25M Department of Labor Trade Adjustment Act Community College Career Training (TAACCCT) grant entitled Strengthening Workforce Alignment in Montana’s Manufacturing and Energy Industries (SWAMMEI). Please see attached courses for full details.

<table>
<thead>
<tr>
<th>What other programs are affected by your proposal?</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtain signatures as requested below.</td>
<td></td>
</tr>
</tbody>
</table>

**V Department Summary** Required if several proposals are submitted. In a separate document list program title and proposed change for all proposals. See attached.

**VI Copies and Electronic Submission** After all signatures have been obtained submit the signed original, and electronic file to the Faculty Senate Office, UH 221.
1. Overview

SWAMMEI is a $25 million dollar grant project funded by the US Department of Education that helps 13 Montana Colleges augment and enhance occupational training in eight distinct occupational areas. The grant specifies that colleges will adopt “stacked credentials” to serve students in these specific occupational training programs. Stacked credential programs are comprised of industry-driven tiers of training (typically aligning with a semester’s worth of training). Each tier is designed to be commensurate with developing a complete set of skills, considered to add value to potential employees. When possible, tiers have also been aligned with completion of industry-recognized credentials (e.g. ANSI IREC for Recycling Technician). Students completing tiers can choose to enter the workforce upon completion of a tier or continue their education by continuing into additional training tiers. After completion of each tier students will earn a professional certificate from participating colleges and will have had the opportunity to earn industry-recognized credentials as well. The overall intent is to enhance labor market payoffs for students by reducing the amount of time in training and increasing documentation of students’ competencies prior to completion of a two-year degree.

Colleges engaged in SWAMMEI have agreed to identify common learning outcomes that students will gain in order to complete each tier. Upon completion of articulation agreements, students will gain an opportunity to seamlessly transfer between consortium member colleges into subsequent training tiers.

In some cases, adoption of the stacked credential model is possible with small modifications to existing CAS and AAS curricula – in essence, providing more “off-ramps and on-ramps” for these programs. All Energy Technology courses are being offered in online and face-to-face formats to allow students in remote areas of the state to participate, while maintaining a high level of contact for local students.

The SWAMMEI Recycling Technician Tier within the Energy Technology Program serves as mid-level training for students pursuing an occupation in recycling technology. Missoula College serves as the lead institution for SWAMMEI’s sustainable energy technology strategy. The strategy also includes the following 2-year colleges within the MUS: Bitterroot College, City College, Flathead Valley Community College, Gallatin College, Highlands College and Little Big Horn College.

2. Provide a one paragraph description of the proposed program. Be specific about what degree, major, minor or option is sought.

Colleges participating in SWAMMEI Energy Technology have agreed to teach to a common set of learning outcomes. These learning outcomes are well aligned with ANSI-I REC standards, a recently created partnership, providing students an opportunity to earn these credentials as part of their course of study. Students that complete a SWAMMEI Energy Technology Certificate of Technical Skills in Recycling Technology will be awarded a CTS. If they achieve a passing grade on the Recycling Technology course, they will also be awarded this certificate.

3. Need

A. To what specific need is the institution responding in developing the proposed program?

The SWAMMEI grant is aimed at enhancing labor market payoffs for students by reducing the amount of time they spend in training in order to become qualified for jobs in industry. The
Consortium is responding by creating additional off-ramps and on-ramps into existing sustainable energy technology programs by adopting a stacked credential model. The stacked credential model provides students a certificate/professional certificate upon successful completion of each Tier of training which prepares them for entry-level positions that require post-secondary training.

B. How will students and any other affected constituencies be served by the proposed program?

All SWAMMEI partners have and will continue to work closely with business partners to ensure that training programs align with workforce demands. This outreach is expected to more accurately align the skills of our graduates with the needs of local, regional and national industries. This has been designed to be an efficient curriculum programs that employers have participated in creating and condoning. With this tiered model, students gain the benefit having the option of continuing their education by completing successive tiers or electing to join the workforce as opportunities arise.

C. What is the anticipated demand for the program? How was this determined?

Overall, it is anticipated that approximately 20 students will enroll in the Recycling Technology CTS prior to fall semester of 2017. These numbers were derived during development of the SWAMMEI project with each colleges providing best-guess estimates based upon historical enrollment data. Missoula College anticipates serving 10 students per year based upon historical demand in our programs.

4. Institutional and System Fit

A. What is the connection between the proposed program and existing programs at the institution?

The SWAMMEI stacked credential approach essentially breaks our existing AAS program into four certificate components. By completing multiple tiers a student will be completing very similar curricular work and expectations as in existing programs.

B. Will approval of the proposed program require changes to any existing programs at the institution? If so, please describe.

No. It provides students additional opportunities but does not change or limit existing opportunities.

C. Describe what differentiates this program from other, closely related programs at the institution (if appropriate).

This program creates a shorter term training program that prepares students for entry-level jobs in the industry (i.e. Recycling Technologist). Existing programs train students for higher paying wages in that same industry but with no current off ramp prior to completion of the degree program.

D. How does the proposed program serve to advance the strategic goals of the institution?

1. This certificate will strengthen our ties with local waste management service providers as we “Partner for Student Success,” by preparing them for internships, apprenticeships, and careers in the waste management trades.
2. This certificate will also provide a pathway towards “Education for the Global Century” which will see effective, responsible waste management as a necessity for both developed and developing countries.

3. With its many hands-on learning experiences, industry tours, and employer interactions for students pursuing this certificate, we will create a “Dynamic Learning Environment.”

4. By providing this one-semester opportunity for students, it will allow us to fine-tune the Energy Technology Program as part of its “Planning-Assessment Continuum.”

E. Describe the relationship between the proposed program and any similar programs within the Montana University System. In cases of substantial duplication, explain the need for the proposed program at an additional institution. Describe any efforts that were made to collaborate with these similar programs; and if no efforts were made, explain why. If articulation or transfer agreements have been developed for the substantially duplicated programs, please include the agreement(s) as part of the documentation.

The SWAMMEI program intentionally creates parallel program at participating institutions, based around a set of commonly-agreed-upon learning outcomes for each tier. This will allow seamless student transfer between colleges within the tiered system. Articulation agreements are still being developed within the grant’s short implementation timeline, but there a common understanding among consortium members about the benefit for students of articulation between tiers.

5. Program Details

A. Provide a detailed description of the proposed curriculum. Where possible, present the information in the form intended to appear in the catalog or other publications. NOTE: In the case of two-year degree programs and certificates of applied science, the curriculum should include enough detail to determine if the characteristics set out in Regents’ Policy 301.12 have been met.

Attached is the Missoula College Energy Technology CTS in Recycling Technology curriculum document.

B. Describe the planned implementation of the proposed program, including estimates of numbers of students at each stage.

With approval from the Board of Regents, and pursuant to USDOL grant guidelines, implementation of the SWAMMEI Tier I Energy Technology programs will begin Spring Semester of 2015. It is estimated that 5-10 students will enter the training program in Sp15. Subsequent tiers of the SWAMMEI program will be brought to the Board of Regents in time to allow students to continue seamlessly into subsequent tiers. Overall it is estimated that at least 20 students in the MUS will enter energy technology training associated with the SWAMMEI project prior to Fall of 2015. Missoula College anticipates serving 10 students per year based upon historical demand in our programs.

6. Resources

A. Will additional faculty resources be required to implement this program? If yes, please describe the need and indicate the plan for meeting this need.
Montana Board of Regents  
CURRICULUM PROPOSALS

In most cases, SWAMMEI Tiers create an additional training option for students within current programs; and therefore, additional faculty resources are occasionally required. In circumstances where SWAMMEI has catalyzed creation of new programs or where significant additional time and energy was anticipated by colleges, funds were included in the approved SWAMMEI budget for new (initially) grant-funded positions. To agree to common learning outcomes related to the SWAMMEI tiers, faculty have been asked to contribute time and travel (in some cases) to face-to-face meetings with other faculty. Travel has been reimbursed, to this point, through SWAMMEI grant funds.

B. Are other, additional resources required to ensure the success of the proposed program? If yes, please describe the need and indicate the plan for meeting this need.

Integration of industry recognized credentials into programs typically requires an institution and/or faculty to become accredited by the national association governing the credentials in this case the ANSI IREC standards. Our faculty member who will teach NRGY 270 Recycling Technology is being compensated for both professional development and for course development. This expense is being covered by Missoula College's SWAMMEI funds.

7. Assessment
   How will the success of the program be measured?

As part of the SWAMMEI project, grant staff will track the following outcome measures for each program: annual graduation rate for all students by program; employment rate of program completers by program; employment retention rate of completers, one year following program completion, by program; average earnings of completers, one to three years following program completion, by program; transfer rate for program that have facilitating transfers as a substantial part of their mission; total number of participants employed at enrollment who receive a wage increase post-enrollment; total number of participants retained in employment after grant-funded program of study completion; total number of participants employed after grant-funded program of study completion; total number of participants enrolled in further education after grant-funded program of study completion; total number of participants completing credit hours; total number of participants still retained in their program of study or another TAACCCT-funded program; total number of participants who have completed a TAACCCT funded program, and; total unique participants served.

Success for grant purposes will be based upon the number of students enrolling in, completing, obtaining employment and retained in employment as per the outcome estimates included in our approved grant application.

For purposes of long-term success, the newer certificate program data will be compared to previous CAS/AAS completion-rate, placement-rate, wage-rate, employment-retention to assess if the new mechanism is leading to improved labor market outcomes for students.

8. Process Leading to Submission
   Describe the process of developing and approving the proposed program. Indicate, where appropriate, involvement by faculty, students, community members, potential employers, accrediting agencies, etc.
During development of the SWAMMEI grant, significant work was done to engage local businesses across the state in conversations about their workforce needs and specific training that would help meet those workforce needs. Their input helped the state-wide SWAMMEI partners identify target occupations and training programs to include in the project. During development of the project, in the time available, the project’s steering committee engaged faculty and administrators to identify college needs in order to deliver targeted training programs. College CEOs/Deans/Presidents were frequently involved in the project’s direction.

After the grant’s award as announced by USDOL, faculty at participating colleges from around the state met to discuss common learning outcomes. Outreach to business partners and other related businesses has continued with an intention to increase that engagement radically in the coming months through grant-funded workforce navigators that will conduct more specific outreach.

These navigators also work very intimately with Montana Department of Labor One-Stop Centers in their local community. The navigators help identify and recruit individuals that would be well-served by grant-funded programs.

The USDOL grant mandates that grant-funded programs begin by fall of 2014. This timeline dictates a very aggressive approval process that frankly falls out of sync with MUS typical approval processes. In order to meet the $25 million USDOL grant timeline the Missoula College Energy Technology Program must submit Level I approval with Level II documentation requests to UM Provost Office in Autumn 2014 to allow Regents to consider the requests prior to our proposed Spring 2015 roll-out. Colleges in Montana have worked through a fast-track approval process on their own campuses to accommodate USDOL’s timeline. Subsequent to Board of Regents approval, approval requests will be forwarded to Northwest Commission on Colleges and Universities (NWCCU). NWCCU has been apprised of the grant, the potential influx of program approval requests and has expressed that they are prepared to assess these requests quickly. New certificate programs will then be forwarded to US Department of Education to consider each program’s eligibility for financial aid status.

The Missoula College Energy Technology Program will not substantively change, but will have a more “mottled” advising checklist (see attached).
## STACK 3: Recycling Technology

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ITS 221 Project Management</td>
<td>3 cr.</td>
</tr>
<tr>
<td>BGEN 160 Issues in Sustainability</td>
<td>3 cr.</td>
</tr>
<tr>
<td>NRGY 102 Intro to Sustainable Energy II</td>
<td>3 cr.</td>
</tr>
<tr>
<td>NRGY 241 Alternative Fuels</td>
<td>3 cr.</td>
</tr>
<tr>
<td>NRGY 270 Recycling Technology</td>
<td>3 cr.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15 credits</strong></td>
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</table>

### ITS 221 – Project Management

Offered autumn. Prereq., CSCI 172 (CRT 172). Investigation of topics in project management including scope, definition, risk, procurement and the RFP. Management of time, cost, quality, and human resources. Concepts are reinforced with PM software.

3.000 Credit hours; 3.000 Lecture hours; 0.000 Lab hours

**Levels:** Undergraduate  
**Schedule Types:** Lecture

### BGEN 160 – Issues in Sustainability

Offered autumn and spring. Same as CCN 160S. This literature-intensive course is intended to expose the student to a variety of essays addressing the balance of economic development with the principles of sustainability and social equity. The student is offered an introduction to sustainability concepts, natural systems/cycles and environmental economics. Natural capitalism and triple bottom line maximization is explored, along with the role of corporations and small businesses in sustainable development. A survey of issues surrounding corporate social responsibility and sustainability-driven innovation will be conducted.

3.000 Credit hours; 3.000 Lecture hours; 0.000 Lab hours

**Levels:** Undergraduate  
**Schedule Types:** Lecture/Lab

### NRGY 102 – Intro to Sustainable Energy II

Offered autumn and spring. Prereq., NRGY 101. A survey of renewable energy systems and technologies. Addresses physical and technical aspects of wind, solar, geothermal, hydro, tidal, biological, and wave energy systems. Consideration is given to engineering, economic, social, environmental, and political factors that determine implementation and sustainability.

3.000 Credit hours; 3.000 Lecture hours; 0.000 Lab hours

**Levels:** Undergraduate  
**Schedule Types:** Lecture/Lab
**ETEC 241 – Alternative Fuels**

Offered spring. Prereq., NRGY 101 (NRG 101), M 121 (MATH 111/MAT 118). Identifies alternative fuel sources; explores fuel characteristics; identifies and evaluates the infrastructure required to produce, store, distribute, and use them; discusses emission and conversion efficiencies; assesses social, environmental, and economic impacts. 3.000 Credit hours; 3.000 Lecture hours; 0.000 Lab hours

**Levels:** Undergraduate  
**Schedule Types:** Lecture/Lab

**NRGY 270 – Recycling Technology**

Offered Autumn. Provides an overview of recycling opportunities at both the residential and industrial scale. Prepares the student to work with a variety of materials including cellulosic, plastic, metal, glass and electronics waste. Students will be exposed to ANSI-IREC standards as well as LEED standards for repurposing and "upcycling" materials. Local home and industry tours, and hands-on exposure to materials processors such as glass pulverizer, cardboard grinders and plastics extruders will be part of the course. Study of efficiency techniques used for reduction of virgin material consumption and waste management, including materials auditing and accessing international materials reclamation will be included. Career opportunities in a variety of industries related to materials reclamation will be discussed. Possible projects include the building of a solar thermal forge.

4.000 Credit hours; 3.000 Lecture hours; 1.000 Lab hours

**Levels:** Undergraduate  
**Schedule Types:** Lecture/Lab

*After successful completion of the coursework, students would either enter into an apprenticeship, internship, seek employment, or move on to higher education.*