ITEM  XXX-XXX-XXXX

Name: Certificate of Applied Science—Energy Technology

THAT

The Missoula College add a Certificate of Applied Science in Energy Technology to the current program offering of Associate of Applied Science in Energy Technology.

EXPLANATION

This proposal is to add a Certificate of Applied Science in Energy Technology to be delivered by the Missoula College of The University of Montana in response work force needs and will support current program students and program graduates. Specifically, this CAS will support students and graduates who are applying for employment and positions such as Substation Operators. The requirements of this CAS meet the requirements of the Bonneville Power Administration for positions as identified.

ATTACHMENTS

Level I Program Form
# Level I Program Form

## I Summary of Proposed Changes

<table>
<thead>
<tr>
<th>Department/program</th>
<th>Applied Computing and Electronics/Energy Technology</th>
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**Summary**

Based upon results of a recent survey of current Energy Technology Students and Energy Technology alums, one of our primary decisions has been to move forward with the offering of a Certificate of Applied Science (CAS). The impetus for this has been two-fold: The first is a demand from potential students who are applying for jobs such as Substation Operator as offered by the Bonneville Power Administration, which requires a 30-credit certificate that includes at least Algebra, DC electronics, AC electronics, and Writing. A recent conversation with Chief Technology Innovation Officer Terry Oliver, confirmed this need.

In addition to these minimum requirements from BPA, we are proposing to add NRG 101 Introduction to Energy Systems I, NRG 102 Introductions to Energy Systems II, EET 113 Circuits, NRG 298 Internship, CCS 160 Issues in Sustainability, NRG 214 Energy Storage and Distribution, and an Energy Elective.

The second impetus for offering a CAS is to show “completion” for a growing subclass of students who have found employment during their pursuit of an AAS. Many of these students are approaching retirement age and have found themselves in school by default rather than by choice. So for many of these students, school has been serving as a “holding pattern” rather than pursuit of knowledge. Thus the Program Director, Bradley Layton and the Department Chair, Thomas Gallagher have decided that rather than having a large pool of non-degree holding former students, it would be preferable from a “Completion Rate” perspective to have our alums holding a CAS rather than nothing. With the volatile job market, it is our assessment that should these older students again find themselves unemployed, that having the CAS will make them more competitive when seeking a job in the energy technology or related field.

During a recent conversation that the Energy Technology Program Director, Bradley Layton had with James Staub, it became clear that data would be required to support a decision as to whether a Certificate of Applied Science would be an appropriate offering as either a terminal degree, or a “stackable” credential. The results of the survey are given in tables below.

## II Endorsements and Approvals

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

<table>
<thead>
<tr>
<th>Requestor: Bradley Layton</th>
<th>Phone: x1752</th>
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</thead>
<tbody>
<tr>
<td><strong>Signature</strong></td>
<td><strong>Date:</strong> 5-31-12</td>
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<tr>
<td><strong>Program Chair/Director:</strong> Thomas Gallagher</td>
<td><strong>Date:</strong> 9/6/12</td>
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<td><strong>Signature</strong></td>
<td><strong>Date:</strong></td>
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<td><strong>Other affected programs:</strong></td>
<td><strong>Date:</strong></td>
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<td><strong>Signature</strong></td>
<td><strong>Date:</strong></td>
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<tr>
<td><strong>Dean’s Signature</strong></td>
<td><strong>Date:</strong> 9/10/12</td>
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<tr>
<td><strong>Initial Review in Provost’s Office</strong></td>
<td><strong>Date:</strong> 9-17-12</td>
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<tr>
<td><strong>Faculty Senate Review</strong></td>
<td><strong>Date:</strong></td>
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<td>Signature</td>
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<tr>
<td>Are other departments/programs affected by this modification because of (a) required courses incl. prerequisites or corequisites, NO (b) perceived overlap in content areas NO (c) cross-listing of coursework NO</td>
<td></td>
</tr>
</tbody>
</table>

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

(a) Re-titling existing majors, minors, or options
(b) Eliminating existing majors, minors, or options via a 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 delivery of previously authorized degree 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 program and/or degree *

*Requires level II BOR documentation submitted to the Provost’s Office (refer to http://www.umt.edu/provost/curriculum.htm)

### 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](http://www.umt.edu/catalog)

Students in the Energy Technology program are introduced to the full suite of energy sources and technologies. Graduates are general practitioners equipped with skills in design, installation, and maintenance of diverse energy technologies and systems; sales, operations, and management; regulatory compliance; basic electricity and power systems, energy storage and distribution; site assessment; basic energy economics; efficiency and conservation strategies; and project management. Students may enter the program autumn or spring term. Further information can be found at [http://ace.cte.umt.edu/energy](http://ace.cte.umt.edu/energy)

Students in the Energy Technology Program, which offers an Associates in Applied Sciences (68 credits) and a Certificate in Applied Sciences (30 credits) are introduced to the full suite of energy sources and technologies. Graduates are general practitioners equipped with skills in design, installation, and maintenance of diverse energy technologies and systems; sales, operations, and management; regulatory compliance; basic electricity and power systems; energy storage and distribution; site assessment; basic energy economics; efficiency and conservation strategies; and project management. The Certificate of Applied Science in Energy Technology requires completion of the following requirements with at least a “C-” in each course:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NRG 101</td>
<td>Intro to Energy Systems (A/S)</td>
<td>3 cr</td>
</tr>
<tr>
<td>M 121</td>
<td>College Algebra (A/S)</td>
<td>3 cr</td>
</tr>
<tr>
<td>WRIT 101</td>
<td>College Writing (A/S)</td>
<td>3 cr</td>
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<tr>
<td>EET 105</td>
<td>Direct Current (A/S)</td>
<td>3 cr</td>
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<tr>
<td>EET 106</td>
<td>Alternating Current (A/S)</td>
<td>3 cr</td>
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<tr>
<td>EET 113</td>
<td>Circuits Su</td>
<td>1 cr</td>
</tr>
<tr>
<td>NRG 191</td>
<td>Energy Practicum</td>
<td>5 cr</td>
</tr>
<tr>
<td>NRG 298</td>
<td>Internship (A/S)</td>
<td>3 cr</td>
</tr>
<tr>
<td>CCS 160</td>
<td>Issues in Sustainability (A/S)</td>
<td>3 cr</td>
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<tr>
<td>NRG General Elective (A/S)</td>
<td>3 cr</td>
<td></td>
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<tr>
<td>total:</td>
<td>30 cr</td>
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<tr>
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</table>

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

We are proposing to add this one-year certificate in Energy Technology in order to fill the emerging job market of smart grid substation operator. With the pending changes in how our country makes and distributes energy, there will be a growing need for trained specialists in how the smart grid will operate. Additionally, within Montana only Flathead Valley Community College offers a certificate that is acceptable to the Bonneville Power Administration. However, the FVCC Certificate in Applied Science Electrical Technology is only offered in a face-to-face format, thus creating a large commuting barrier for Missoula residents wishing to earn this certificate. By offering the Certificate in Energy Technology at the Missoula College UM we will create practical education and job opportunities for Missoulians wishing to pursue a career in the rapidly evolving energy technology industry.

What other programs are affected by your proposal? Obtain signatures as requested below. | none |

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

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

Revised

11/09
Positive

1. I already have a BS and wish to return to work force as soon as possible. Also, my interest in the field is more focused on solar and wind technology and am not as interested in some of the other disciplines such as biofuel technology.

2. I'm a 32 year old professional returning to school to make myself more competitive. One of the biggest hurdles was finding a way to balance working and an academic pursuit. A 1-yr program could have been a viable option for my situation.

3. Having the option of a certificate would help greatly for those of us who are post graduates, and online delivery students looking to meet the necessary skill competencies for NABCEP exams, etc. For me this is what, I am looking for.

4. I think it is a great start to wonderful things and a perfect way to get your feet in the door.

5. I am and was seeking a degree program from the start, however I do understand how a one-year certificate could help someone in the trades (electrical, etc.) come up to speed on energy applications. W. Stahlman

6. If this program was offered as a fully online certificate, I would attend. Most adults don't have time to take out to complete on-campus courses.

7. Half the classes for the same result? This would also give students a chance to add the certificate to a previous degree in only a year. Many non-traditional students want to get an education and get a job as fast as possible.

8. As a recent graduate of the Energy Technology Program I have considered a few jobs but not been offered what I thought I was going to be. I believe that there are a few positions out there but that if combined with a bachelors degree it could be a better degree to offer new students, not make it less education. If you want a one-year certificate then make it concentrate on one subject.

9. Being a non-traditional student I have struggled getting back into college and learning the material. This may be an appropriate avenue for traditional students that have the aptitude in math and science. The material that I have learned so far, I do not believe could be covered within a two-semester time frame. In addition, I have much more to learn and cover that will be just beginning on the real crux of the program.

10. I think a one-year certificate would be great. Less nonsense and more energy related study. I think a one-year certificate would be ideal for what I'm looking for in the program. I'm all for it.

11. Works well for my welding/engineering studies mostly point towards energy issue or studies. I have completed a minor in appropriate technology and 3rd world, (see HSU transcripts).

12. I think the one-year program would be super for graduates to not only spend less on tuition but also in finding employment in that field. We need to be able to have many new workers available to meet the demand of clean green energy resources.

13. I would like the option of a one-year certificate to speed up my employment process in my ideal career, (photovoltaic installer) as a start. This would show I have a basic
understanding of technology and would increase my employment chances against the average person. I would ultimately continue on with receiving my degree in energy technology. I hope this energy technology program does continue on with the option of a bachelors degree.

14. There is a lot to take in for an energy tech degree, I do think if the one year was specific to an industry such as solar/wind, large scale gen, or retrofitting it would be a good program to push students in one direction and get them in to the industry of their choice quick.

15. I think that this would only make sense if a specific subject were concentrated on, such as solar PV, there was a solid hands-on component, and a professional certification was also possible at the end, such as NABCEP.

16. It has taken me nearly the two full years to really understand conventional and alternative energy systems, and to really narrow down the area of alternative energy I want to be involved with. If a student had a good idea of what career in alternative energy he/she wanted to get into prior to beginning the program, I might say a focused one-year certificate may be a good idea.

17. I am anticipating graduating with an A.A.S. degree in Energy Technology and had a certificate program been available, would remain in the associates program regardless. The certificate could offer me job opportunities in my field while I work for my associates though. A certificate could give students a cheaper opportunity to pursue a career in an energy related job, to see if they enjoy it, then consider the A.A.S. degree or not.

18. It would allow a student to get an entry level certificate, then either continue on with an Associates or Bachelors. Or combining two programs, or switching without feeling like you are too far into a program, so you just stick it out even though you don't like it. More options are better.

19. I am a student working on a four-year degree as well as the two-year energy degree. Perhaps a one-year certificate would have been better suited for my goals as I feel that some of the classes required for the two-year degree are not entirely necessary for me.

20. It would be great to get in and get trained and then get started on a job right away.

21. It would be nice to be rapidly prepared for a job opportunity.

Negative

1. I don't think that a one-year certificate would be a good thing - the field is beginning to be crowded with folks that have "short time" certificated granted from all kinds of sources some more reputable than others. In this field I think more rather than less training is needed! The two-year certificate is more work and more expensive but the better and broader the education the more competitive you will be. Unless the certificate guaranteed a specific narrow area like NACEB certification it will be useless!

2. I fear that a one-year certificate will undermine the work we have done pursuing the Energy Tech. degree and its current curriculum.
3. While it is a certificate, it would hold less credence with employers than would a two-year degree.

4. I have completed all required courses in the present 2-year program except the Internship. I think a one-year certificate would limit the exposure a student should get in this field. Even if it is focused on only a single limited area in Energy Technology, I feel there is sufficient benefit to diverse exposure to what is out there, that a lot would be missed in a one year program.

5. There is way too much material to try to cover in one year.

6. A one-year certificate is only a starting point. I have found that the industry will hire someone with a four-year degree quickly. A two-year degree will often get an entry level position. I perceive little value to a one-year certificate.

7. If I had a degree in a related field and wanted the certificate to round out my degree I might go for the certificate, but without other training I feel a certificate would not equip me with the tools that I need for success in this field.

Neutral

1. My answer is dependent upon the course work being offered.

2. Two years was barely enough time or class to gain a broad understanding of the basics. With two years, we emerge as a generalist in the field with just enough information under our belts to obtain an entry level position. Gosh, a one year certificate? PERHAPS if the cert was for a very focused sector of the energy field, i.e.: wind, solar, geo-thermal, etc...Reckon I would look on it much as I would someone that had completed one-year of diesel mechanics-qualified to change oil but that's about it.

3. I would have been willing to take a one-year program if it was offered, however, the amount of knowledge presented to me so far has been extensive, so I don't believe it would be the greatest of ideas, there is just too much information to be covered.

4. I selected "likely" because I am still trying to figure out what in the hell I am doing with myself. I am searching for the balance between school and keeping my very sensitive child's needs met.

5. I would not have seen a 1-year program at the undergraduate level as carrying any weight for future opportunity, either in a school or employment area. The 2-year program alone provides merely an introduction to the various technologies available and at a relatively non-technical level. However, it (the 2-year program) does provide a starting point to go further into more detailed exposure to specific technologies; I don't see a 1-year program providing this, but I have not seen a prospectus on what it might entail either. Perhaps more specific information could be made available to provide a more informed analysis of whether such a program would be beneficial.

6. It would need to be more hands-on than the energy tech program. I feel a little let down by the program becoming nearly all online classes. I would have thought the classes need more hands on.
7. I would have felt that other similar online 2 year courses would better prepare me for the job market.

8. I am already registered in the Geo Science program.

9. For myself I knew that going beyond the 2-year cert. was the goal, and so the 1-year option I would not have considered. With that said, I feel that even with two years in the program there is still much more to learn and so I'm not quite sure how it could all be crammed into one year.

10. I have two BAs, I would target a masters in energy technology if available online in regards to my career development.

11. I do not know yet if either a one or a two-year certificate would better, I know that of the businesses that I contacted about interning with them only one was willing to take me on. It is also dependent on how many jobs would be available with a one-year certificate, too many people within this area creates a glutton of labor and candidates. This is helpful to employers but hinders students actually working in their field of study...
September 7, 2012
In reply refer to: ST-3

Dear Reviewer:

As Chief Technology Innovation Officer of the Bonneville Power Administration (BPA), it is my pleasure to offer this letter of support for Doctor Bradley Layton’s Project and in particular for his Certificate in Applied Science in Energy Technology. Dr. Layton is the Director of the Energy Technology Program at Missoula College UM.

BPA is a federal nonprofit agency based in the Pacific Northwest. Although BPA is part of the U.S. Department of Energy, it is self-funding and covers its costs by selling its products and services. BPA markets wholesale electrical power from 31 federal hydro projects in the Columbia River Basin, one nonfederal nuclear plant and several other small nonfederal power plants. The dams are operated by the U.S. Army Corps of Engineers and the Bureau of Reclamation. About one-third of the electric power used in the Northwest comes from BPA.

BPA also operates and maintains about three-fourths of the high-voltage transmission in its service territory. BPA’s service territory includes Idaho, Oregon, Washington, Western Montana and small parts of Eastern Montana, California, Nevada, Utah and Wyoming.

As part of its responsibilities, BPA promotes energy efficiency, renewable resources and new technologies. The agency also funds regional efforts to protect and rebuild fish and wildlife populations affected by hydropower development in the Columbia River Basin.

The state of the industry is one in which great changes in energy supply, grid and distribution operations, and end-uses are underway. These promise higher efficiency and reliability, while creating the systems that support the necessary transition to new energy sources utterly different than the traditional. BPA for example is experiencing large amounts of wind. In addition BPA is implementing smart grid technologies such as synchrophasors, and exploring other smart grid technologies through the PNW Smart Grid Demonstration with 11 utility partners, and various industry partners, led by the Battelle Memorial Institute.

We foresee energy delivery reliability and management supported by continuous real time monitoring and management systems (synchrophasors for example collect data 60 times per
second, contrasted with SCADA systems which collect data every two-four seconds). This is but a small part of the changes we see coming. And we will need graduates with the analytical and technical skills to implement and maintain smart grid technologies.

I therefore support the addition of the one-year certificate in Energy Technology that Professor Layton is planning as well as his proposed NSF Program in energy efficiency. I will support his project by serving on his advisory panel, giving a guest lecture in his survey courses, and working with him to place his graduates in appropriate entry-level positions at BPA.

Sincerely,

[Signature]

Terry V. Oliver
Chief Technology Innovation Officer
Technology Innovation