**Level II Form**

Attach to full proposal for level II changes.

### I Summary of Proposed Changes

<table>
<thead>
<tr>
<th>Department/program</th>
<th>Applied Computing and Electronics/Electronics Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary</td>
<td>This proposal is to create a Certificate of Applied Science (CAS) in addition to the existing Associate of Applied Science (AAS) degree in the Electronics Technology Program, to enhance the program with more flexibilities for the students. The outline of the CAS is attached.</td>
</tr>
</tbody>
</table>

### II Preliminary Approval

<table>
<thead>
<tr>
<th>Requestor:</th>
<th>Type/Print Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Steve Shen</td>
<td></td>
<td>9/19/2014</td>
</tr>
<tr>
<td>Phone</td>
<td>406-243-7914</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department/Program Chair</td>
<td>Penny Jakes</td>
<td></td>
<td>9/22/14</td>
</tr>
<tr>
<td>Other affected programs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Dean                     | Barry Good      |           |          |
| Dean of the Library      | Shali Zhang     |           |          |

Library impact statement: Are the resources included in the proposal sufficient to adequately support the new programs library needs?

Initial Review in Provost's Office

### III Type of Program Change (check X appropriate description)

- Create new degree; add new major to existing degree
- Create minor or certificate where there is no major or option in a major **X**
- Change name of degree (e.g. from B.A. to B.F.A.)
- Any other changes in governance and organization as described in BOR policy 218, such as formation, elimination or consolidation of a college, school, department, institute, bureau, center, station, laboratory, or similar unit.

### IV Proposal

(See instructions at http://www.umt.edu/provost/policy/curriculum/default.aspx)

Attach the following:

- √ BOR Item Template Form
- √ BOR Curriculum Proposal Form
- √ BOR Level II Request Form

### V Copies and Electronic Submission

Submit the complete Level II proposal to the Provost’s Office for preliminary approval. After all signatures have been obtained, submit original, one copy, and an electronic file to the Faculty Senate Office, UH 221, camie.foos@mso.umt.edu
Certificate of Applied Science (CAS) in Electronics Technology

Program Director: Dr. Steve Shen

Suggested Sequence of Courses*

First Year:

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Description</th>
<th>Fa</th>
<th>Sp</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 105</td>
<td>Computer Fluency</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ETEC 105</td>
<td>DC Circuit Analysis</td>
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<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>PSYX 100S</td>
<td>Introduction to Psychology</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRIT 101**</td>
<td>College Writing I**</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>17</td>
<td></td>
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<tr>
<td>CSCI 113</td>
<td>Programming with C++</td>
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<td></td>
<td><strong>Total</strong></td>
<td></td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td></td>
<td>31</td>
<td>0</td>
</tr>
</tbody>
</table>

Total Credits: 31

*This recommended schedule may not be appropriate for all students.

**or WRIT 121 (Intro to Technical Writing I)

Course Descriptions

CSCI 105 Computer Fluency, 3 cr. Offered autumn and spring. Introduces the skills and concepts of information technology, both from practical and a more theoretical point of view. During lectures and interactive computer labs, students will explore a wide range of digital and information technologies, including common PC applications, networking, databases, privacy, and security. Credit not allowed for both CSCI 105 and CRT 111 and CS 111.

CSCI 113 Programming with C++, 3 cr. Offered spring. Prereq., M 090 (MAT 005) or equivalent. Object oriented programming using C++. Implementation of structured programming concepts along with construction of classes to create data types for defining objects.

ETEC 105 DC Circuit Analysis, 4 cr. Offered autumn and spring. Prereq., M 090. An introduction to direct current (DC) and analysis of series, parallel, and series-parallel circuits. Topics include electrical quantities, units of measurement, measurement instruments, resistors, current, voltage, power, energy, network theorems, equivalent circuits, magnetism, and electromagnetism. Laboratory experiments include circuit analysis; the proper use of measurement equipment and techniques; and troubleshooting.

ETEC 106 AC Circuit Analysis, 3 cr. Offered autumn and spring. Prereq., ETEC 105. Analysis of alternating current (AC) circuits and the behavior of capacitors, inductors, reactance, impedance, transformers, and signal filters. Laboratory experiments include circuit analysis, the use of proper measurement equipment, and troubleshooting.

ETEC 113 Circuits Lab, 1 cr. Offered autumn. Prereq/coreq., ETEC 105. Covers proper techniques of soldering and tool usage. Electronic technical language, hands on troubleshooting skills and basic electronic measurements are involved.
ETEC 250 Solid State Electronics I, 4 cr. Offered spring. Prereq. ETEC 105. An introduction to semiconductor technologies used in solid state electronics with an emphasis on diodes and transistors. Classroom concepts are reinforced through lab-based experiments.

M 121 College Algebra, 3 cr. Offered autumn and spring. Prereq., M 095 or ALEKS placement >4. Intended to strengthen algebra skills. The study of functions and their inverses: polynomial, rational, exponential, and logarithmic functions. Graphing calculator required.

M 122 College Trigonometry, 3 cr. Offered autumn and spring. Prereq., M 121 or appropriate placement score. Preparation for calculus based on college algebra. Review of functions and their inverses, exponential and logarithmic functions. Trigonometric functions and identities, polar coordinates and an optional topic such as conic sections or parametric functions.

PSYX 100S Introduction to Psychology 4 cr. Offered every term. Introduction to the scientific study of behavior in humans and other animals.

SCN 175N Integrated Physical Science I, 3 cr. Offered every term. Prereq., or coreq., M 095. An introduction to the basic principles of physics, chemistry, environmental and earth sciences with emphasis on the scientific method and process. (Suitable for students with little science background.)

WRIT 101 College Writing I, 3 cr. Offered every term. Prereq., WRIT 095 or passing score on placement test. Instruction and practice in expository writing, argumentation and research processes. Emphasis on the use of specific writing strategies to develop style, unity, clarity, and force of ideas, and structure. Students are expected to write without major errors in sentence structure or mechanics. Grading A-F, or NC.

WRIT 121 Introduction to Technical Writing, 3 cr. Offered every term. Course assumes a basic computer literacy. Passing score on placement test or consent of instructor. Introduction to technical writing situations with appropriate formats. Emphasizing on writing with document design and graphic placement introduced. Students are expected to write without major faults in grammar or usage.

**Electronics Technology**  
Program Director: [Dr. Steve Shen](#)

**Program Description**

Electronic devices are an integral component of our society. Electronics technology systems are utilized worldwide involving communication networks, home and entertainment, industrial automation and controls, medical technology, public safety, satellite communications and security.

The Electronics Technology Program offers students a broad foundation in electricity, electronics, semiconductors, digital logic, control systems, robotics, instrumentation, data communications, and wireless technologies.

The program utilizes a focused hands-on instructional approach with an emphasis on real world applications. The curriculum includes numerous lab courses.

The Electronics Technology Program offers a comprehensive technical foundation for individuals seeking an education involving the entry level skills required of a successful technician in the broad field of electronics.

**Student Outcomes**

Upon completion of the program, a student will:
• Demonstrate a solid understanding of electricity and electrical circuit theory.
• Demonstrate the ability to clearly articulate technical concepts using written language.
• Develop safe workplace practices.
• Effectively utilize information technology as a research and productivity tool.
• Employ logic, critical thinking, and problem solving skills in the troubleshooting of electronic components.
• Solve technical problems involving mathematics at the level of college algebra, trigonometry, and applied calculus.
• Utilize instrumentation to measure, calibrate, test, and repair electronic components.

Related Job Titles

• Computer Control Operator/Programmer
• Electrical Engineering Technician
• Electronics Technician
• Instrumentation Technician
• Home Entertainment System Technician
• Laboratory Technician
• Residential Appliance Technician
• Security System Technician
• Telecommunications/ Radio Technician

Related Occupations (US-DOL Occupations Handbook)

• Precision Instrument and Equipment Repairers: http://www.bls.gov/oes/current/oes499069.htm
THAT

Item info This proposal is to create a Certificate of Applied Science (CAS) in addition to the existing Associate of Applied Science (AAS) degree in the Electronics Technology Program, to enhance the program with more flexibilities for the students. The outline of the CAS is attached.

EXPLANATION

Item Explanation The addition of the Certificate of Applied Science to the Electronics Technology program will provide more options for the students and enhance the program flexibilities.

ATTACHMENTS

Item Attachments The outline of the Certificate of Applied Science (CAS) in Electronics Technology

Certificate of Applied Science (CAS) in Electronics Technology
Program Director: Dr. Steve Shen

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Related Occupations (US-DOL Occupations Handbook)

• Precision Instrument and Equipment Repairers: http://www.bls.gov/oes/current/oes499069.htm
1. Overview

This proposal is to create a Certificate of Applied Science (CAS) in the Electronics Technology program.

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

The Certificate of Applied Science (CAS) is a one-year study in the Electronics Technology program.

3. Need

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

To better meet the needs of the students by providing more options and flexibilities to the program.

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

Students can complete the CAS in Electronics Technology in the first year of study with the completion of technical and general educational courses along with the hands-on training.

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

Certificate of Applied Science is highly recommended by industries and professional organizations. This addition of the CAS to the Electronics program will enhance the program with more flexibilities for the students. There are strong demands for the engineering technology technicians with certificate in electronics technology, according to the US-DOL Occupation Handbook, such as:


4. Institutional and System Fit

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

The CAS is based on the first year study and it can be completed before the students move to the second year study for the AAS degree.

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

No.

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

The AAS degree is the continuation of the CAS.

D. How does the proposed program serve to advance the strategic goals of the institution?
Montana Board of Regents  
CURRICULUM PROPOSALS

Upon the completion of the CAS the students can either proceed to pursue the AAS degree or be ready work in the field as a technician. The creation of the CAS can better meet the needs of the students.

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 CAS is a unique program.

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.

Please see the attachment.

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

The curriculum has been fully developed. Students in Electronics Technology can receive the CAS in their first year study.

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.

No.

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.

No.

7. Assessment

How will the success of the program be measured?

Yes. Please see the program outline attached to this proposal.

8. Process Leading to Submission

Describe the process of developing and approving the proposed program. Indicate, where
appropiate, involvement by faculty, students, community members, potential employers, accrediting agencies, etc.

The CAS is initiated by the faculty and students, and is going through the approval process.