

MONTANA BOARD OF REGENTS

LEVEL II REQUEST FORM

Item No.:	142-1008-R0309	Date of Meeting:	March 5-6, 2009
Institution:	The University of Montana - Missoula COT		
Program Title:	Certificate of Applied Science in Computer Aided Design		

Level II proposals require approval by the Board of Regents.

Level II action requested (check all that apply): Level II proposals entail substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination of personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other campuses within the Montana University System and community colleges. Board policy 303.1 indicates the curricular proposals in this category:

- 1. Change names of degrees (e.g. from B.A. to B.F.A.)
- 2. Implement a new minor or certificate where there is no major or no option in a major;
- 3. Establish new degrees and add majors to existing degrees;
- 4. Expand/extend approved mission; and
- 5. Any other changes in governance and organization as described in Board of Regents' Policy 218, such as formation, elimination or consolidation of a college, division, school, department, institute, bureau, center, station, laboratory, or similar unit.

Specify Request:

The University of Montana – College of Technology Department of Applied Computing and Electronics requests permission to initiate a Certificate of Applied Science in Computer Aided Design.

Computer Aided Design - Certificate of Applied Science
Department of Applied Computing and Electronics, The University of Montana
New Program Proposal - September, 2008

1. Overview

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

The Department of Applied Computing and Electronics at The University of Montana, College of Technology requests permission to initiate the Computer Aided Design (CAD), Certificate of Applied Science program. The proposed program introduces students to graphic communications; computer-aided design and modeling systems; geographic information systems; surveying; written communication; and business practices. Graduates prepare for entry-level, professional careers involving technical support for civil engineering firms, surveyors, and land-use planners.

2. Need

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

The *American Council of Engineering Companies of Montana (ACEC)* reports that its members suffer from a workforce shortage in trained, competent CAD technicians. The shortage is not unique to the state of Montana, rather a trend of national concern. Firms in other parts of the country are responding by importing foreign workers or outsourcing operational elements. The problem is amplified by the workforce exodus of the baby-boomer generation and student enrollment declines in full 4-6 year engineering degree programs.

The 2008-2009 edition of the U.S. Department of Labor Occupational Outlook Handbook predicts employment for Urban and Regional Planners to grow by 15%; Civil Engineering Technicians by 10%; Surveyors, Cartographers, and Mapping Technicians by 21%; and Civil Drafters by 6%. Professionals in all of these fields will rely on a support staff of technicians with skills involving computer-aided design.

Regions throughout the Western United States continue to wrestle with issues involving new development, subdivisions, revitalization projects, appropriate land-use, transportation systems and infrastructure. Individuals involved with planning and design process will rely on accurate data collection, computer generated design models, geographical information systems, and appropriate interpretation processes. Our program proposes to educate individuals with the technical expertise to support these systems.

The need for this program has been brought to the attention of our academic unit by local industry. Civil engineering firms in our region have requested a collegiate program to educate individuals for professional careers supporting engineering-related fields. Our program is responsive to these local workforce demands.

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

Our program will benefit students by providing access to well-paying jobs. Our advisory committee expects wages for graduates to start at \$15-\$16 per hour. The Bureau of Labor Statistics for the state of Montana reports average salaries for Surveying and Mapping Technicians at \$15.65/hour; Civil Engineering Technicians at \$18.90/hour; and Architectural and Civil Drafters at \$18.11/hour.

Other constituencies served by the proposed program include students from the Pre-Engineering Program offered through the Department of Physics at The College of Arts and Sciences and students from The School of Education. Currently, there are limited introductory course offerings in the areas of computer-aided design (CAD) and geographical information systems (GIS) offered through the University of Montana - Missoula campus. Courses in CAD will benefit students pursuing engineering degrees. A strong interest in GIS for students pursuing careers as secondary teachers has been reported by the School of Education. Additionally, demand for professional development in GIS for teachers has been noted in the K12 community. Our proposed program seeks to align with the College of Arts and Sciences and the School of Education to enhance opportunities for students by providing course offerings involving CAD and GIS technologies.

The Welding and Carpentry programs offered through the Department of Industrial Technology currently require students to complete one course in CAD for graduation. Our department currently offers this course as a service to these programs. The benefit of additional CAD training for students involved in Industrial Technology programs has been discussed with faculty in these other related programs.

Students pursuing the Information Systems option of the Computer Technology program do not have the opportunity to study spatial data sets. An introductory course in GIS will enhance the breadth of education for Computer Technology students.

Overall, the courses offered through the Computer Aided Design program have broad-based interest and benefit to all students by boosting educational opportunities in numerous academic disciplines.

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

Student interest in the proposed program is expected to be strong. Currently, Sentinel High School has an enrollment of between 100-140 students involved in computer design and drafting courses each semester. Similar interest exists at other area high schools. The majority of these students do not go on to pursue careers in the areas of engineering or architecture. Programs available in computer-aided design are limited. Our investigation for this proposal includes a visit to an area high school and discussions with high school teachers and career counselors.

It is anticipated that graduates from the proposed program will be in demand by employers in the local economy. Our advisory committee of potential employers has assisted in crafting the learner outcomes and curriculum of this proposal. These employers report demand in their industry for graduates with the educational outcomes acquired from the Computer Aided Design program. Letters of support from potential employers are included in the proposal. Furthermore, research from the U.S. Department of Labor reports that several careers involving computer-aided design are expected to grow at a rate “faster than average” while others at a rate “as fast as the average” for all occupations.

3. Institutional and System Fit

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

Coursework involving computer-aided design currently exists through the Computer Technology Program of the Department of Applied Computing and Electronics. The proposed Computer Aided Design Certificate of Applied Science program will build upon the course offerings found in the Computer Technology A.A.S. degree program. Additionally, the program will partner with surveying coursework offered through the Department of Industrial Technology, business coursework offered through the Department of Business Technology, and the general education offerings of the Department of Applied Arts and Sciences.

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).

No other programs of a similar nature exist at The University of Montana.

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

As the two-year college at The University of Montana, the College of Technology has been charged with establishing and maintaining programs for workforce development. The proposed program attempts to establish new opportunities to enhance the economy of Montana through workforce development.

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.

Programs involving computer aided design exist at the College of Technology at Montana Tech and the College of Technology at MSU Billings. The geographic distance involved in the Billings program does not make it a viable candidate for duplication. Our advisory committee reports current capacity from other programs is insufficient to meet all demands in our state.

The College of Technology at Montana Tech houses a Civil Engineering Technology program. Our advisory committee has recommended the pursuit of a two-year engineering technology degree. As we grow our Computer Aided Design, Certificate of Applied Science program, we plan to actively pursue opportunities for collaboration with Montana Tech.

4. 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.

Program Description:

The Computer Aided Design program introduces students to graphic communications; computer-aided design and modeling systems; geographic information systems; surveying; written communication; and business practices. Graduates are prepared to pursue entry-level, professional careers as technicians supporting civil engineering firms, surveyors, and land-use planners.

Student Outcomes:

Upon completion of the program, students will be able to:

- Utilize graphic technologies to produce engineering documents.
- Employ productivity software to solve technical problems.
- Model field data collected from surveying using geographical information systems.
- Demonstrate clarity, style, force of ideas, and structure in writing.
- Solve technical problems involving mathematics at the level of college algebra
- Describe business organization, management, economics, financing, labor, and management strategies.

Program Requirements and Sequencing:

Courses	Autumn	Spring
CRT 111 Fluency in I.T.	3	
CRT 182T Computer Aided Design I	2	
CRT 195 Special Topics: Computer Aided Design II	3	
CRT 195 Special Topics: Graphics Communication	2	
HEO 140T Basic Surveying	2	
MAT 118 College Algebra	3	
Total	15	
BUS 103S Principles of Business		3
CRT 172 Introduction to Computer Modeling		3
CRT 175 Geospatial Technologies		4
CRT 184 Civil Design Technologies		3
WTS 101 English Composition		3
Total		16

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

Upon approval, we plan to implement the program Autumn Term 2009. We anticipate capacity to support 20 new students. We expect to graduate 50% of the cohort by the end of our first year. Graduation rates at two year institutions range from 25%-40% nationally. Our program seeks to perform at a higher than average rate as a result of the many retention efforts taking place at the College of Technology.

5. 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.

A Perkins workforce development grant has been used to fund tenure-track faculty and faculty affiliates for the development and a first-time "run" of new course offerings. The program will seek to fill limited number of empty seats in current course offerings. Additional sections of existing and new courses will be staffed using the adjunct faculty model. The Perkins workforce grant will be used to continue the funding of additional course development and assist in staffing additional sections of courses for the first year of the program.

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.

Computer-aided design software is a required element for this program. The program will ally with existing campus site licensing agreement to provide access to the ESRI and AutoDesk software products needed for the program.

6. Assessment.

How will the success of the program be measured?

Multiple indicators will be used to measure the success of the program. General interest will be measured by the number of incoming students entering the program. Curriculum programming and delivery success will be measured through student matriculation and graduation. Overall program effectiveness will be assessed through graduate employment and employer satisfaction. Graduate surveys and employer surveys will be used to measure effectiveness.

7. 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.

Work on the program was initiated through informal discussions with individuals from the local engineering community and a request from a Regent through a communication from the President's office. Faculty affiliates from private CAD training organizations, adjunct faculty, and tenure track faculty were all enlisted as content developers, program developers, and program curriculum advisors. Faculty members from the pre-engineering program and School of Education were enlisted in an advisory capacity and as course developers. Teachers from Sentinel High School were consulted. Standards from the Accrediting Body for Engineering Technology were consulted in curriculum development. Community members consisting of engineers and potential employers from local engineering firms were pulled together in an advisory function. Grant funding was obtained to continue development and implementation efforts. Campus I.T. directors provided direction and best practices for obtaining necessary software.

This proposal was reviewed and approved by the affected departments as follows:

Department Name: Industrial Technology Date: 24 Sept. 2008

Department Name: Applied Arts and Sciences Date: 24 Sept. 2008

Department Name: Business Technology Date: 24 Sept. 2008

In addition the deans of the following Schools/Colleges reviewed and approved the proposal:

Dean of: College of Technology Date: _____

The proposal was reviewed and approved by the Faculty Senate at the University of Montana Date: Nov. 2008

[No outside consultants were employed for the development of this proposal.]