University of Alaska Fairbanks

2011 Annual Unit Plan

The information collected in the Annual Unit Plan (AUP) is used in a variety of required reports, including but not limited to institutional accreditation reporting, Performance Based Budgeting (PBB), Alaska Budget System (ABS), Missions and Measures (M&M), and the Annual Operating and Management Reviews. Submission of the AUP is required in August of each year.

Please complete the following information using the format provided, and submit it electronically by August 27, 2010 to Deb Horner, University Planner (dghorner@alaska.edu) with a copy to Ian Olson, PAIR (inolson@alaska.edu) as well as to Susan Henrichs, Provost (fyprov@uaf.edu).

A. General Information

A1. Unit Name: COLLEGE OF ENGINEERING AND MINES

A2. Unit Mission Statement - The mission is a short (no more than one paragraph) statement that describes why the unit exists. Unit mission statements that have been formally approval by the UA Board of Regents should not be changed.

Academic Mission:

The College of Engineering and Mines (CEM) at the University of Alaska Fairbanks advances and disseminates technical and scientific knowledge through innovative teaching, research and public service with an emphasis on Alaska and other high-latitude regions. The College promotes students' self motivation to excel and guides them towards professional careers and entrepreneurship in an environment of life-long learning.

Research Mission:

The Institute of Northern Engineering (INE) is the research arm of CEM. INE faculty and students provide research and engineering solutions for the world's cold regions and beyond. INE conducts research in all areas of engineering, including, but not limited to: civil and environmental, petroleum, mining, geological, electrical, computer, and mechanical engineering. INE fosters opportunities for faculty, post-doctoral researchers, and students to tackle these engineering challenges. INE focuses on basic and applied research and development, as well as research outreach. INE promotes interdisciplinary and collaborative research and

development. INE promotes partnerships within and outside of the University. INE seeks to increase student involvement in research and development so that students at the University of Alaska Fairbanks (UAF) graduate at the cutting edge of engineering and technology.

A3. Core Services - This section identifies the unit's major functions that support its mission. In the interests of brevity, links to websites with additional information on the unit may be included. This section should not exceed two brief paragraphs.

The College of Engineering and Mines includes the academic engineering departments of civil and environmental, electrical and computer, mechanical, mining and geological, petroleum; and the research arm of the college, the Institute of Northern Engineering. INE houses the Alaska Center for Energy and Power, the Mineral Industry Research Laboratory, the Petroleum Development Laboratory, the Alaska University Transportation Center, and the Water and Environmental Research Center (http://www.alaska.edu/uaf/cem/).

The college offers B.S. degrees in Civil Engineering, Computer Engineering, Electrical Engineering, Geological Engineering, Mechanical Engineering, Mining Engineering, and Petroleum Engineering; M.S. degrees in Arctic Engineering, Civil Engineering, Electrical Engineering, Engineering and Science Management, Engineering Management, Environmental Engineering, Environmental Quality Science, Geological Engineering, Mechanical Engineering, Mineral Preparation Engineering, Mining Engineering, and Petroleum Engineering; and the Ph.D. degree in Engineering with concentrations in several areas. The baccalaureate degree programs in civil, electrical, geological, mechanical, mining and petroleum engineering are nationally accredited by the Accreditation Board for Engineering and Technology (ABET).

B. Progress Report

B1. Major Accomplishments

List the significant unit accomplishments for AY09-10 in the areas indicated below. Please include the top three accomplishments in each area. Be brief; use web links to provide additional information if necessary.

- Teaching, research and public service:

1. AY 09/10 saw a 16% increase in undergraduate majors and an increase of 15% in the student credit hours generated by the college over AY 08/09 data. This increase continues the trend seen since AY 06/07 when an increased emphasis was placed on recruiting new students, and is in line with the goal of doubling the colleges' graduation rate by 2012.
2. For FY10, INE witnessed an increase of 3% in research funding over FY09 (see Line 1a in the table on research unit expenditures below). This brings INE to 21% growth (in total expenditures) since 2006. This is short of our goal of 40% growth over 4 years that was set back in 2006, however, still significant growth during the 4 year period.
3. By making permanent the funding for the Alaska Center for Energy and Power (ACEP) the State Legislature recognized that ACEP is a key component in the development of the State's energy policy and meeting the needs for rural power and economic development.

- UAF and CEM hosted the High school State Robotic Championships during engineering week with 45 teams (a 300% growth from year 1 to year 2) from across the State competing for the state title. In its second year the competition sent three teams to compete at national's with a Fairbanks team receiving national honors for design. This program continues to significantly enhance the colleges' K-12 outreach activities.
- The new graduate certificate in Construction Management was approved by the UAF Faculty Senate and the Board of Regents. It continues to gain strength and is strongly supported by both the local community as well as the State.
- The Silver Fox mine was further improved up on this year. Significant in-kind donations from local vendors and mines, and cash from ASUAF, UA system, CEM, and the department, allowed for a full rehab of the mine ventilation system (fan+vent tubes), installation of new roof supports, removal of tracks, acquiring of a large scoop, installation of a check-in/check-out system, installation of a snow plow for our truck, and rehab of the electrical generator. The access road was also cleared of snow in the Spring using donated equipment time. For the first time, we had access to the mine in the winter.

- Faculty, student and staff awards, competencies, regional/national/international recognition:

1. For the fourth consecutive year the UAF MicroMouse team has again placed first in the IEEE NW Area MicroMouse contest.
2. On May 14, 2010, space shuttle Space shuttle Atlantis launched on its final planned mission to deliver an Integrated Cargo Carrier and a Russian-built Mini Research Module to the International Space Station. STS-132 was the 32nd mission for Atlantis. CEM sponsored 3 Alaskan high school counselors who were selected by the NASA and the Alaska Space Grant Program to attend the launch and incorporate what they experienced into the curriculum at their high schools. Robert McClory from Ketchikan High School, Lisa Mounds-Craft from West High School in Anchorage and Tamara Hornbuckle from North Pole High School were the counselors selected to attend an all three agreed that this was truly an amazing and inspiring experience.
3.

- Teaching, research and public service:

- Faculty, student and staff awards, competencies, regional/national/international recognition:

B2. End Results and Strategies

List end results, strategies, targets, etc, in the table below for the period July 1, 2009 to June 30, 2010, based on the 2010 AUP. Add rows as needed.

End Result:	Strategies to Achieve End Result	Target(s):	Measure(s)/Assessment(s):	Status:	Budget Impact
Double the number of engineering graduates.	Place Heavy emphasis on both recruitment and enrollment, coupled with an aggressive campaign of advising and tutoring support to improve student success. Increase outreach to K-12 especially to high school students. Work with the Office of International Programs to develop and support targeted 2+2 exchange programs with selected foreign institutions.	Continue to sustain the current growth rates in new student enrollment and student credit hours. Improve student success and retention rates. Increase college graduation rate to approximately 150 by AY 12/13.	Continue to measure the enrollment, retention and graduations rates for the College.	Sustained growth in the area of new student enrollment. Increasing numbers of UA scholars in CEM programs. Increasing student credit hour generation within the college.	1. As student enrollment for the college continues to increase we will need to hire additional faculty. Over the next few years we anticipate that we will need to expand CEM faculty ranks by about 10% to accommodate increased enrollment. 2. Available classroom/lab space will be insufficient and will not support the increased student load. Additional access to classroom space, particularly large lecture hall space, will be required. 3. Support will be needed for the maintenance of international programs.

Increase research Activity 20% in the four years from FY10	INE is focused on three major areas of growth for the next five years; energy, infrastructure and, and the environment.	In 2006 INE predicted growth of 40% over 4 years. While we grew 21% in total expenditures, that was short of our goal of 40%. We are shooting now for a growth of 20% over 2010 levels in the next 4 years.	Although FY10 was only an 3% growth over FY09 (see line 1a below) and short of our 10% goal, it was close to the target and represents an achievement in an otherwise difficult funding year.	INE has had sustained growth in total F&A generated since FY01.	
Expand space available to energy-related research programs. Progress has been made in the planning and design of a new energy technology building,	The goal was to grow our energy capacity by providing a facility for energy research. This would be done with some reallocation of internal funds and investment in the building planning.	Begin construction of the Energy Technology Facility.	Steps toward design and construction include awarding a pre-design contract to a consultant, followed by a design contract and groundbreaking.	The pre-design award was executed as was the design contract. Design is not complete. Construction has not started but is planned.	INE has been investing in the pre-design/design, development and marketing for the new energy facility.

Expand academic space available to CEM by constructing an addition to the existing Duckering Building. Space in the Duckering Building is inadequate to support significant growth in the engineering research or academic programs. In order to accommodate growth toward a doubling of the graduation rate and expansion of the research enterprise there must be space for faculty, staff and students.	Our goal is to address this issue by working collaboratively with UAF facility services to plan for and begin the construction of a new Engineering and Technology Building to be located adjacent to the existing Duckering facility. Planning money for this building is currently on the capital planning budget sheets for FY11 with construction funds to follow after completion of the life sciences expansion. Work with UAF public relations to raise awareness of the need and garner the support of the BOR and Legislature.	To work within the existing constraints to increase available space for both academic and research programs as soon as possible.	Success will be measured by the capital raised for the project and continued progress with the planning effort.	Continues to be of high priority for the University and is well represented in the FY11 budget request that will be presented to the state legislature	$60,000,000

B3. Analysis of Performance Metrics and Supporting Data

Unit data will be provided by the UAF Office of Planning, Analysis and Institutional Research (PAIR). Respective data reports will be available at http://www.uaf.edu/pair/performance-data/ for your use by July 30, 2010. Units may also include additional unit-specific performance data at the end of the section. Please use the same format in reporting unit-specific performance data. Please write a brief data analysis that incorporates the following aspects, where applicable:

Data Review

- Evaluate the differences in final numbers as compared to your unit targets. Did your unit meet its stated goal? Why or why not?
- Discuss data trends, both positive and negative.
- Indicate whether or not the targets should be adjusted for future years in light of trends.

The first table shown in section F relates to the academic programs of the college and the performance measures related to the student output and success. Trends for the credit hour production, degrees awarded, undergraduate enrollment, and UA scholar enrollment are all upward in FY10 as compared to FY09. The FY10 student credit hours generated exceeded its target of 9,200 hours an increase of 15% from FY09. This increase in student credit hours is a result of the enrollment increases CEM has seen in recent years and the fact that these incoming students have now gotten to the point that they are taking a significant number of engineering classes. The target for FY11 has been adjusted up from 9200 to 12,200 to reflect this increasing trend. The reaming metrics though below target levels all showed continued improvement. The improvement in the other metrics is due to the successful recruitment program that was put into place in FY07. The presence of a dedicated recruiter is helping to attract more undergraduate students and this has had a particularly strong impact on enrollment of UA scholars. Undergraduate student retention was up in FY09 as compared to FY08. We feel this is due in large part to the lack of an academic advisor, the limited availability of student support and tutoring, and the greater number of less well prepared students that are entering CEM programs.
The second table in section F relates to the research performance of INE. INE showed an increase in grant funded research expenditures over FY09. For FY10, INE witnessed an increase of 3% in research funding over FY09 (see Line 1a in the table on research unit expenditures below). This brings INE to 21% growth (in total expenditures) since 2006. This is short of our goal of 40% growth over 4 years that was set back in 2006, however, it is still significant growth during the 4 year period.

Strategies

- Reflect upon key unit strategies initiated over the last year – which ones worked and which ones returned results that did not meet your expectations. Please explain. Take careful note of this critical piece as it plays an important role in the university's overall PBB evaluation.
- If there is a formal plan (e.g., Enrollment Management Plan) that is strongly related to a particular performance criteria, discuss any evidence that the plan is or is not achieving its objectives, and if not, any changes implemented or planned.

The College of Engineering and mines enrollment management plan and targeted recruitment campaign is directed to the future increase in student enrollment, credit hour generation and increased graduation rates. Data indicates that the enhanced recruitment effort begun in 2007 is helping us to achieve our objective and is moving us towards the goal of doubling engineering graduation rates by AY12/13. At the end of FY09 we were successful in hiring an extremely well qualified student advisor who will be responsible for increasing our advising, student support and tutoring activities. We anticipate that a combined effort between this position and a successful engineering tutoring center will be effective at further increasing student success and thereby increasing student retention and graduation rates.

Our strategy for enhancing research productivity is to continue to develop and market the Alaska Center for Energy and Power. A joint effort with the Alaska Energy Authority to incorporating alternative energy into the state's energy policy will produce an increase in funded research opportunities. The successful funding strategy of state funds, federal, and cooperate funds has demonstrated that the center's business plan is well founded. We will also be seeking to provide better organization to certain units within INE to make them more effective and more accessible to external entities and funding agencies.

In order to help support the academic and research initiatives in the college we are working to ramp up our development efforts and outreach to the alumni and friends of the college. While we believe this will be an effective mechanism to increase funding available to the college, this is a relatively new effort and we do not have the experience to gauge the potential success.

Resources and Reallocation

- Were there any resources allocated or reallocated to support achievement of your unit's targets and strategies? If so, please explain.
- Are any areas of achievement suffering from a resource (re)allocation that additionally impacts other metrics?
- Of all your strategies, which is your most critical for unit success and is it in need of additional resources in order to make it successful?

Resources for reallocation within CEM have come from vacant faculty and administrative positions; however when all positions are filled resource reallocation to support CEM's strategic goals will not be possible.

CEM received an FY10 budget increment to support the hiring of an instructor for Engineering Science courses within the college and this has been accomplished. As stated above, we believe this will have a significant impact on student success within the college.

The FY12 budget request addresses some of the more critical needs for the College and our research enterprise. These include additional faculty positions and increased TA funds to support enrollment and research growth and support for the tutoring center. Another critical need within the College that is not addressed in the FY12 budget request is the funding for key staff positions within the college including the Associate Dean, a development/public relations officer. Unfortunately there was very limited staff or administrative funding made available to the college when it was formed in 2004 and that situation has not changed. In addition, staff and administrative support was not deemed suitable for inclusion in the FY12 budget request, so these critical functions remain without an avenue for future funding.

Fairbanks Academic Unit-Level Historical Performance and Targets

Line No.	*Performance Metrics and Supporting Data* Reporting Period: FY10 (July 1, 2009 to June 30, 2010)	*Historical Performance*					*FY11 Target*		*FY12 Target*
		FY06	FY07	FY08	FY09	FY10	Current	New	
1	Student Credit Hours Generated (ex. 500-level)	7,369	6,935	7,036	8,264	9,547	10,500	12,000	12000
2	Grant-Funded Research Expenditures	11,571	12,716	9,363	10,173	10,734	12,309	11,270	11,883
2a	Grant-Funded Research Expenditures per INE (see footnote)					14,306		15,021	15,227
3	High Demand Job Academic Awards	92	75	85	83	101	120	120	135
4	Undergraduate Student Retention	79%	72%	79%	72%	78%	82%	82%	85%
5	Undergraduate Enrollment	456	434	523	579	672	700	820	850
6	UA Scholar Enrollment	96	91	124	137	164	160	175	180
7	Graduate Enrollment	157	161	142	143	146	170	185	190
8	Unit Enrollment Management Plan	n/a	n/a	Yes	Yes	YES	Yes	YES	YES
9	Student Learning Outcomes Assessment	50%	82%	100%	100%	100%	100%	100%	100%

Community Campus Academic Unit-Level Historical Performance and Targets

Line No.	*Performance Metrics and Supporting Data* Reporting Period: FY10 (July 1, 2009 to June 30, 2010)	*Historical Performance*					*FY11 Target*		*FY12 Target*
		FY06	FY07	FY08	FY09	FY10	Current	New	
1	Student Credit Hours Generated (ex. 500-level)								

2	High Demand Job Academic Awards								
3	Undergraduate Student Persistence								
4	Undergraduate Enrollment								
5	UA Scholar Enrollment								
6	Unit Enrollment Management Plan								
7	Student Learning Outcomes Assessment								
8	Non-credit Instructional Productivity Units (NCU) Delivered								

Research Unit-Level Historical Performance and Targets

Line No.	*Performance Metrics and Supporting Data* Reporting Period: FY10 (July 1, 2009 to June 30, 2010)	*Historical Performance*					*FY11 Target*		*FY12 Target*
		FY06	FY07	FY08	FY09	FY10	Current	New	
1	Grant-Funded Research Expenditures	11,571	12,716	9,363	10,173	10,734	12,309	11,270	11,833
*1a	Grant-Funded Research Expenditures per INE (see footnote)	12,468	14,025	11,354	13,817	14,241	16,718	14,953	15,700
2	Indirect-Cost Recovery	1,918	2,369	2,675	2,891	2,486	3,498	2,610	2,741
**2a	/ndirect-Cost Recovery per INE (see footnote)	1,918	2,375	2,685	2,895	2,950	3,502	3,098	3,253
3	Non-General Fund (NGF) Revenue	10,781	11,643	8,626	10,843	9125	13,120	9,581	10,060
***3a	Non-General Fund (NGF) Revenueper INE (see footnote)	12,470	14,055	11,387	13,775	14,237	16,667	14,948	15,695
4	Ratio of NGF Revenue to GF Revenue	6.6	5.5	5.2	6.5	6.3	6	6	6
5	TA/RA Positions	66	55	56	66	75	76	85	95
****5a	Research Expenditures (see footnote)	15,007	17,437	14,751	18,082	18,184	21,879	19,093	20,047

FY10 Target figures for line 1 are not a reflection in decreased research expenditures but a revision in how figures are reported.
*1a. INE grant funded research expenditures are herewith defined as restricted expenditures under “dlevel INE” to include NCHEMS category of outreach, public service, instruction, research and including indirect cost recovery and state funded capital expenditures.
**2a. INE indirect-cost recovery is herewith defined as that ICR generated on all grant funded operating research expenditures to include state funded, capital research expenditures.
***3a. INE non-general fund revenue is herewith defined as the amount of revenue received from grant funded research to include state funded, capital research revenue.
****5a. INE research expenditures are herewith defined as grant funded, general fund, ICR, recharge centers, and UA Intra-agency receipt expenditures within dlevel 6INE and all NCHEMS categories. . FY10 figure represents an additional $423k due to Financial Services giving INE’s carryforward back in the form of a transfer/credit.

B4. Publications in refereed journals/periodicals

Please use EndNote to report publications for CY2008. The download is available at: http://www.alaska.edu/keys/#Windows%20installers, or http://www.alaska.edu/keys/#Macintosh%20Installers. Include the information as an attachment when you submit the AUP.

B5. Occurrences of applied research benefiting Alaska

School, College, or Institute	Project Title	Project Status (complete, active, awarded, proposed)	Description of contribution to the state of Alaska	Indicate if project is collaborative w/ AK Native or rural groups and/or involves tradtional knowledge
ACEP	Assess Direct Use Opportunities for Developing the Granite Mountain Geothermal Resource, or Similar Resource in the NANA Region	completed	The purpose of this project is to better quantify some of the economic and technical opportunities and challenges with various controlled environment agriculture (i.e., greenhouse) configurations. It will compare developments in other parts of the world, including other parts of Alaska, both in terms of direct use of geothermal systems as well as local food production	X
ACEP	Conduct Additional Reconnaissance Study of the Granite Mountain Geothermal Area	completed	The Alaska Center for Energy and Power at the University of Alaska proposes to conduct an additional resource assessment of the Granite Mountain geothermal area in order to estimate the maximum sustainable development that the resource could support.	
ACEP	Eagle Hydrokinetics	Active	This project will focus on a technical and economic evaluation of the 25 kW New Energy Encurrent turbine selected by APC.	
ACEP	Fish Oil Biodiesel Test Run	completed	This project is intended to cover a small testing program to demonstrate and evaluate a small quantity of Fish Oil Biodiesel in the UAF Diesel engine test bed.	

ACEP	HVDC - Data Analysis	Active	The Denali Commission has awarded AVEC a grant to develop and test a high voltage DC transmission system, with the overarching goal of reducing the capital costs associated with installing electric transmission lines in rural Alaska. The Alaska Center for Energy and Power will develop a data collection plan with Polarconsult. The economic data is most critical for this project in order to determine whether this approach should be adopted on a more widespread basis, however efficiency of conversion and performance are also key factors.	
ACEP	Improving Cold Region Biogas Digester Efficiency	Active	Cordova Electric Cooperative's goal for this project is to demonstrate the efficiencies of mesophile (conventional digestor microbes) and psychrophiles on common household and rural Alaska feedstock at various temperatures, and the deployment of digestor(s) in practical household scale project(s) to operate appliances and an electrical generator to evaluate feasibility and sustainability in an applied setting for widespread use in Alaska. ACEP's data collection, analysis, and reporting work on this project will target the development of a cold climate digestor system, with the associated potential for cost effectiveness, applicability, and replicability.	
ACEP	Manley Hot Springs Geothermal Reconnaissance	completed	This project will conduct some interference test between wells to help determine the connectivity of different points within known geothermal field, and make some preliminary determination of how fluid is moving in the shallow sub-surface reservoir at Manley Hot Springs.	

ACEP	PROPOSAL FOR ASSESSING ENVIRONMENTAL IMPACTS RELATED TO THE PROPOSED COALTO-LIQUIDS PLANT AT EIELSON AIRFORCE BASE: PHASE II	Active	A coal-to-liquids (CTL) plant has been proposed for Eielson Air Force Base. The CTL processreleases a significant quantity of CO, as a waste product as well as other potential pollutants. Thus partof the design and construction of a CTL plant at Eielson must take into consideration the options for CO, capture, transport, and sequestration as well as identify other pollutants and/or environmental concerns. After review of the results of the initial study, the USAF has requested additional work related to carbon dioxide capture, transport, and sequestration, and to assess strategies to mitigate other environmental issues associated with the proposed coal-to-liquids project at Eielson Air Force Base.	
ACEP	Test and Evaluate a 5kW Prudent Energy Flow Battery	Active	This project will test and evaluating a 5kW Prudent Energy battery in support of the Chukchi Campus Renewable Energy Training and Education program.	
ACEP	Validation of Innovative Exploration Techniques, Pilgrim Hot Springs, Alaska	Active	The purpose of this project is to determine the potential of the Pilgrim Hot Springs geothermal site for 1) providing power and direct use opportunities for Mary's Igloo Village and 2) whether the geothermal system at Pilgrim Hot Springs, Alaska can be economically developed to provide electric power to communities on the greater Seward Peninsula in Alaska	X
ACEP	VENTILATION OF DEEP OPEN PIT MINES WITH SPECIAL REFERENCE TOAIRINVERSION IN ARCTIC OR SUBARCTIC REGIONS	Active	The objective of this project is to demonstrate the potential for increasing the fuel efficiency of a diesel-fired power-generating engine through the use of an ORC unit that processes recovered heat. The single-phase project features laboratory testing of the ORC unit.	

ACEP	Wales Diesel-Off High Penetration Wind System	Active	Kotzebue Electric Association's overall goal for this project is to demonstrate diesel-off configuration for a remote wind-diesel hybrid power system through the retrofit of existing equipment and controls. ACEP's data collection, analysis, and reporting work on this project will target the design, procurement, installation and commissioning of the project, and holistic analysis, lessons learned, and recommendations for the technology.	X
ACEP	Wind Energy Engineering and Economic Performance Assessment	Active	This project will analyze the engineering and economic performance of existing wind-diesel power systems in Alaska, establish realistic performance parameters in Alaska conditions, and identify potential mechanisms to optimize current and soon to be developed systems	
ACEP	Wood Pellet Boiler Conversion Signature Project	Active	Sealaska's overall goal of this project is to demonstrate that wood heat can be cost effective and feasible for larger commercial, industrial, and municipal buildings, and the change in demand for Southeast Alaska second growth wood fiber. ACEP's data collection, analysis, and reporting work on this project will target analysis of the procurement, installation, and commissioning of the project, and analysis of overall system performance.	
AUTC	A General Review of Slope Stability Problems and Case Histories in Alaska	Active	Engineers continually look for mitigation alternatives to reduce instability of slopes and related hazards in Alaska. There is need to conduct research on alternative slope stabilization technologies in cold climatic conditions. However, to establish a baseline for such research, an extensive literature review and classification of slope stability problems is required.	
AUTC	Alaska Rural Airport Inspection Program	Active	As in any unpaved surface, routine inspection & maintenance is required on these runways, however the remoteness of many Alaskan villages results in infrequent thorough inspections. Consistent with AUTC's 2008 Roadmap theme of maintaining transportation systems, a comprehensive airport inspection program is needed to improve transportation safety and reduce maintenance costs for Alaska's transportation infrastructure.	

AUTC	Assessment of Traffic Congestion in Anchorage Utilizing Vehicle-Tracking Devices and Intelligent Transportation System Technology	Active	Traffic is increasing in most urban cities around the world, with Anchorage being no exception. The exact impact of this increase is not known because the current means of determining congestion in Anchorage is through vehicle counters and sparsely-placed video cameras (that may or may not be monitored).	
AUTC	Attenuation of Herbicides in Sub Arctic Environments	Active	The purpose of this project is to investigate the environmental fate and attenuation of three herbicides currently being evaluated for use along Alaska's transportation corridors. Building upon results obtained in previous studies, this work seeks to contribute to the knowledge base necessary to minimize environmental risks associated with herbicide application in Alaska's sensitive, cold region ecosystems.	
AUTC	Bridges Structural Health Monitoring and Deterioration Detection - Synthesis of Knowledge and Technology	Active	As more and more state DOTs realize the importance of monitoring the performance of their bridges and are developing appropriate structural health monitoring (SHM) programs for their bridges, the Alaska Department of Transportation & Public Facilities (AKDOT&PF) also shows great interest in the potential implementation of SHM and damage detection technologies to Alaska's bridges. Bridges in Alaska are routinely subjected to harsh weather conditions, earthquakes, and usually located in remote areas. Maintenance, rehabilitation and replacement of Alaska's bridges in a cost effective manner depend critically on reliable inspection and condition assessment. Compared with other states in the nation, monitoring bridges in Alaska is more challenging because of the harsh weather conditions and the remoteness.	

AUTC	Climate Change Assessment for Surface Transportation in the Pacific Northwest and Alaska	Active	The states in the Pacific Northwest and Alaska share interconnected travel networks for people, goods, and services that support the regional economy, mobility, and human safety. Regional climate change has and will continue to affect the physical condition and serviceability of these networks, yet the nature of the changes and their potential impacts on the regional transportation system and its use are very poorly understood. The widely diverse topography, climate regimes, and localized variability of impacts within the region complicate efforts to understand and plan for adapting to the potential impacts of climate change on the regional transportation system.	
AUTC	Development of an Alaska Specification for Palliative Applications on Unpaved Roads and Runways	Active	For the past seven years, Alaska Department of Transportation and Public Facilities (ADOT&PF) Northern Region has been applying different palliatives to runways at rural airports in Alaska's northern region. The objective of this proposed project is to write a set of performance based specifications that cover the application of dust control palliatives to unpaved transportation surfaces in Alaska.	
AUTC	Development, Deployment and Assessment of a New Paradigm (Based on Active, Problem-Based Learning) for Transportation Professionals and University Students: A collaboration of the region X Transportation Consortium.	Active	AUTC will develop remote-based training modules for transportation professionals. The proposed curricula is problem-based focused on providing tools for the professional such as traffic simulation, structural analysis or planning modules. Learning in this new environment will build team building and communication skills. This is a new approach which encourages developing both technical and collaboration skills. AUTC will work with the Region X Transportation Consortium comprised of four university transportation centers from Washington, Oregon, Alaska and Idaho. Each center will develop and deliver training modules to the State DOTs and their partners. We are replicating the work environment of the 21st Century.	

AUTC	Dust Measurement to Determine Effectiveness of Rural Dust Strategies	Active	Dust produced from unpaved roads in rural Alaska is impacting the quality of life in many villages in Alaska and other cold regions. Not only does dust emanating from unpaved roads cause respiratory ailments but also impacts subsistence food storage and sources as well as safety as dust impacts visibility on village streets. Loss of fine particles also greatly impacts the quality of road surfaces creating increased maintenance costs.	
AUTC	Economical Analysis of Alaskan Street Lights by using Light-Emitting Diode (LED) Technology	Active	Darkness bothers Alaskans in winter. To overcome this problem depends on creative and energy saving lighting systems. The low temperature environment in Alaska causes a low failure rate and better performance of LED street lights and becomes a competitive advantage for implementation of this system. This research will analyze the process for replacement of the Alaskan street lights based on technological changing of white light LED.	
AUTC	Engineering Techniques to Control Permafrost Degradation under Roads Preservation of the Alaska Highway Phase 2	Active	Road construction in permafrost areas affects the thermal regime of frozen soils which results in permafrost degradation and road damage. In this research project, we will address the problem of permafrost degradation under roads that currently affects extensive regions of Alaska and Northern Canada but also other regions of the world such as Northern Europe, Russia and China.	
AUTC	Evaluation of In-Place MEMS Inclinometer Strings in Cold Regions	Active	The objectives of this study are to compare IMIS against the existing methodology, and to evaluate IMIS for their versatility and accuracy in cold regions, and for their ease of use and recoverability. IMIS will be evaluated for three different applications in Interior Alaska: 1) to monitor creep in frozen ground; 2) to monitor settlement of soft foundation soils under a high embankment; and 3) to identify and monitor a slide shear zone.	
AUTC	Experimental Features in Hwy Construction – WMA	Active	The use of WMA increases the time window between production and final compaction on the road. This would permit increased haul distances and allow paving in to cooler weather than with normal temperature HMA. Research is needed to monitor and evaluate WMA binders and mixes in cold weather conditions to verify that the benefits can be realized without unknown detrimental effects.	

AUTC	Fairbanks North Star Burough Road Upgrading Process	Active	The most frequent budget request from the service areas to the Fairbanks North Star Borough (FNSB) is for surface upgrades to improve drivability and reduce long term maintenance costs. A systematic and effective approach to the selection and design of appropriate road upgrading is thus urgently needed such that long-lasting, cost-effective road improvement solutions can be identified and constructed.	
AUTC	FEASIBILITY STUDY OF RFID TECHNOLOGY FOR CONSTRUCTION LOAD TRACKING	Active	This is a feasibility study, involving fieldwork using at least three trucks in this pilot program, to assess the practicality, cost and modes of use of radio frequency identification (RFID) technology used in construction operations. The goal is to demonstrate potential increases in operational efficiencies and decreases in labor, materials, and equipment cost. The goal of this research project is to determine if RFID technology could significantly contribute to improve quality control as a cost effective methodology (without increasing current costs) compared to the current manual data collection process.	
AUTC	Field Study to Compare the Performance of Two Designs to Prevent River Bend Erosion in Arctic Environments	Active	This proposal focuses on two erosion control projects built in Alaska using different design criteria. The Alaska Department of Transportation & Public Facilities (AKDOT&PF) constructed the Sag River project to protect the Dalton Highway and the Alyeska Pipeline Service Company built the Hess Creek project to protect the Trans-Alaska Pipeline.	
AUTC	Geophysical Applications for Arctic/Subarctic Transportation Planning	Active	The proposed project will describe four case studies in which geophysical surveys are implemented into subsurface investigations along road and bridge alignments being conducted by the Alaska Department of Transportation & Public Facilities (ADOT&PF). The study sites were selected to represent four scenarios where geophysical methods could be applied to identify anomalous zones prior to borehole investigation for arctic/subarctic transportation planning.	

AUTC	Inclusion of Life Cycle Cost Analysis in Alaska Flexible Pavement Design Software	Active	The Alaska Flexible Pavement Design (AKFPD) software has been developed and used since 2004. However, no computerized analysis tool is available to assist pavement engineers for associated LCCA. Including LCCA in the AKFPD software would be of immense benefit to pavement designers to improve the performance of the infrastructure while making more cost effective use of the design effort.	
AUTC	Integrating Climate Change Considerations Into MPO Long Range Transportation Forecasting	Active	The two Metropolitan Planning Organizations (MPO) in Alaska are Anchorage Metropolitan Area Transportation Solutions (AMATS) and Fairbanks Metropolitan Area Transportation System (FMATS). Each of them maintains a travel demand forecasting model for the purpose of long-range transportation plan updates. This study proposes to use the two MPO models as the case studies to first examine the inefficiencies of the two models in terms of meeting data requirements for MOVES.	
AUTC	Model of Alaska Transportation Sector to Assess Energy Use and Impacts of Price Shocks and Climate Change Legislation	Active	The new Obama administration has made climate change mitigation and reduced dependence on imported fossil fuels key goals of energy and environmental policy. Studies to date of fuel use in the Alaska transportation sector confirm a high dependence on petroleum fuels and consequent vulnerability to price shocks and national policy changes. However, no comprehensive analysis of the Alaska transportation system has been conducted that tracks the movement of passengers and freight by mode or major transportation corridors and the energy used by these systems. Consequently, existing studies contain insufficient detail to enable modeling of how fuel price and policy changes might affect transportation costs by various modes, with potential implications for the Alaska economy. Nor does it to permit modeling of how different mixes of transport modes among roads, rail, water, and air, or different fuels for the same mode, might change overall fuel use and associated emissions.	

AUTC	Seismic Performance of Bridge Foundations in Liquefiable Soils	Active	Liquefaction and associated ground failures have been commonly observed in past major earthquakes across the world, and this includes Alaska. In March of 1964, Alaska experienced one of the largest earthquakes in recorded history.	
AUTC	Selection of Preservatives for Marine Structural Timbers in Herring Spawning Areas	Active	This research aims to provide relevant information to the Alaska Department of Transportation and Public Facilities (AKDOT&PF) and other departments of transportation (DOTs) to improve their selection of wood structural materials in the marine environment, especially the selection of wood preserving methods.	
AUTC	Serving Future Transportation Needs: Succession Planning for a State Department of Transportation Organization, its People and Mission.	Active	This project will examine the employment of people who accomplish the work of the Department of Transportation & Public Facilities (AKDOT&PF) – those who will serve the future transportation needs of Alaska. The study will focus primarily on professional personnel within AKDOT&PF, but will include consideration of vital support personnel as well. The proposed research is about getting and retaining a sufficient number of good people.	
AUTC	Stabilization of Erodible and Thawing Permafrost Slopes with Geofibers and Synthetic Fluid	Active	The research will be coordinated between the Alaska University Transportation Center (AUTC) and AK Department of Transportation (DOT)&PF. The proposed research will greatly help minimize the problems & risks posed by thawing permafrost slopes instability in cold regions. The outcome of this research will be useful in ensuring a reliable, safe and economic design.	

AUTC	UTILIZATION OF SCREW PILES IN HIGH SEISMICITY AREAS OF COLD AND WARM PERMAFROST	Discontinued	An alternative to traditional pilings in areas of high seismicity with seasonally frozen ground and permafrost is to utilize screw piles, which provide significant lateral load and uplift resistance with a minimized required embedment depth. Screw piles are relatively light-weight and easier to transport and install than traditional piles. These potential benefits could result in a significant reduction in deep foundation construction costs and make screw piles a cost effective foundation alternative in Alaska. However, current design methods for traditional deep foundations do not address the use of screw piles in seismically active seasonally frozen ground and permafrost areas. The proposed research aims to develop design guidelines for the use of screw piles as a cost effective foundation alternative for the transportation infrastructure in Alaska. The findings from this research will directly benefit the design of transportation infrastructure in Alaska. The proposed research will also stimulate the collaboration between AUTC and private industry, and should result in providing a cost-effective deep foundation alternative with seismic considerations for Alaska and other northern regions. Due to the unknown behavior of frozen and seasonally frozen soils under earthquake loading, current designs of deep foundations tend to be either overly conservative with a huge economic impact or oversimplified with a significant reliability concern. This study has the potential to improve the reliability of transportation systems by producing infrastructures that are seismically safe and economically designed. Additionally, the proposed research will make it possible to: 1) develop guidelines for the use of screw piles in permafrost areas, 2) establish a database for dynamic properties and cyclic behavior of cold region soils under seismic loading conditions, 3) provide seismic design recommendations for deep foundations for the Alaska transportation infrastructure, and 4) complete a master study in the field of cold regions geotechnical earthquake engineering.	

AUTC	Verification of JMF for Alaskan HMA	Active	Hot mix asphalt (HMA) is the major paving material in Alaska, how the quality of this material is assured is a critical issue. It is necessary and important to assess elements related to HMA quality assurance (QA) specifications, evaluate how well contractors meet the requirements of mix designs, and revise current mix design protocols and contractor payment method as appropriate for asphalt paving in Alaska. Hence, this study will investigate the variability of HMA performances due to production, and verify the HMA job mix formula (JMF) by a comprehensive study on field data collection, compilation, and analysis. The research findings from this study will greatly benefit the asphalt paving process from JMF to production and construction to ensure the quality of HMA, which will enhance the long term performance of HMA pavements, and save significant amount of state budget on pavement maintenance and repair.	
INE	Determining Organic Matter Sources for CH4 Production and Bubbling from Alaskan Lakes using Stable Isotopes and Radiocarbon Ages	completed	The project goal is to determine, using stable and radiocarbon isotopes as biogeochemical tracers in field work and laboratory incubation, the relative contributions and production potentials of modern vs. ancient OM sources to methanogenesis in lakes near Fairbanks, AK.	.
INE	Fiber Optic Cable on the Tundra: placement techniques, environmental considerations and equipment longevity	Active	The purpose of this project is to investigate the Feasibility of installing fiber optic cable directly on the ground surface of Arctic tundra.	
INE	Improving the Energy Efficiency of Alaska Seafood Processing Plants	Active	This project will assist the Alaska seafood industry in better understanding the use of energy in their plants.	

INE	Long-term monitoring of the impacts of Climate change pm the Glaciers Rivers	Active	This study will investigate glacier-climate interactions within the Arctic National Wildlife Refuge, including the impact of glacier change on the downstream aquatic and terrestrial ecosystems, using McCall Glacier as the primary research glacier and the Hula Hula River as the primary research watershed. McCall Glacier has been under intensive study since 1957 primarily by researchers, and this project will help integrate USFWS into a direct scientific management role of this project to benefit its resource management goals.	
INE	Measurement of VOC Vapor Intrusion Into Buildings	Active	To support the ADEC's efforts to better understand the movement of volatile organic compounds released to the subsurface into buildings, we propose to conduct monitoring and analysis of two sites in Fairbanks. The objective will be to establish a trend in soil gas volatile organic compound concentrations below building slabs as a function of environmental factors	
INE	Optimizing Heat Recovery Systems	Active	This demonstration project is designed to improve the fuel efficiency of the diesel power plant in a village in the Tanana Chiefs Conference (TCC) region by about 10% through the use of an Organic Rankine Cycle (ORC) system for heat recovery from engine jacket water and exhaust.	
INE	PACMAN	Active	The proposed 3-year project seeks to develop and demonstrate the capability of a Pacific Area Climate Monitoring and Analysis Network (PACMAN). PACMAN will yield a more reliable understanding of the impacts of climate warming on fresh water resources and communities in Alaska and Hawaii.	
INE	Petroleum Cleanup Levels Technical and Policy Research	Active	Conduct technical research on the current status of soil and water petroleum cleanup levels throughout the US and Canada to help the Petroleum Working Group make recommendations to the ADEC regarding current cleanup levels and approaches used to calculate alternative cleanup levels	
INE	Petroleum Hydrocarbons Criteria Scientific Literature Review	Active	UAF editorial and scientific support for AK Department of Environmental Conservation Spill Prevention and Response Program petroleum hydrocarbon toxicity scientific literature review	

INE	Preservation of Traditional Ice Cellars in Permafrost	Active	This project is a collaboration effort between UAF, ExxonMobil, and the North Slope Borough to design an alternative ice cellar that is more robust to environmental and anthropic change while meeting the immediate and future needs of arctic coastal communities.	
INE	Remote sensing of Landscape Change in the Arctic Network of National Parklands	Active	The purpose of this work is to acquire and analyze baseline data that can be used to assess landscape change in the ARCN. Landscape change includes changes in topography and landforms due to thawing of permafrost (thermokarst); erosion and deposition by streams, lakes, and hillslope processes; expansion and contraction of water bodies; and expansion or contraction of major vegetation groups such as forest or shrubland	
INE	Shishmaref Airport Master Plan, Stage II, Wind Study & Climate Data Collection Project	Active	Wind data will be analyzed to evaluate potential runway alignments, climatologic data and trends will be compared to Kotzebue, and a soil model will be developed and used to analyze collected thermal data.	.
PDL	Characterization and Quantification	Active	The overall goal of this project is to characterize to drill and test a dedicated methane hydrate wells in the East Pool of the Barrow Gas Field and updip of the producing sand in the Walakpa Gas Field.	
PDL	Producing light oil from a frozen reservoir: Reservoir and Fluid Characterization of Umiat Field, National Petroleum Reserve, Alaska	Active	The objective of this project is to develop a robust geologic and engineering model for evaluating production methods for the Umiat field to provide important information on production methods for this and similar frozen reservoirs in Northern Alaska and other arctic regions.	
PDL	VENTILATION OF DEEP OPEN PIT MINES WITH SPECIAL REFERENCE TOAIRINVERSION IN ARCTIC OR SUBARCTIC REGIONS	Active	This proposal is aimed at researching the specific problem of air inversion in open pit mines and finding solutions to the health and safety issues associated with air inversion. The results from this research will have wider application in addition to mines in the Arctic or subarctic. The air pollution problem due to air inversion is also evident in many other open pit mines around the world	

WERC	Alaska North Slope Oil and Gas Transportation Support System	Active	Conduct technical research on the current status of soil and water petroleum cleanup levels throughout the US and Canada to help the Petroleum Working Group make recommendations to the ADEC regarding current cleanup levels and approaches used to calculate	
WERC	Application of citrus peel biosorbents in repeated adsorption/desorption cycles for removal of heavy metals from waste waters	Active	This project will evaluate the fesibility of using citrus peel biosorbents to remove heavy metals in packed bed columns with multiple adsorption-description cycles with respect to effluent quality, regeneration and reuse potential, and economic aspects.	
WERC	Characterization of major watersheds draining into Bristol Bay, Alaska using strontium isotopes: a new method for tracking water resources in Alaska.	Active	The ultimate goal of our study is to develop a technique, based on the hydro-geochemistry of otoliths to relate salmon stocks to the rivers they originated from, which will have practical applications in the management of water and salmon resources.	
WERC	Collaborative Research on Carbon, Water, and Energy Balance of the Arctic Landscape at Flagship Observatories and in a PanArctic Network	Active	This proposed research establishes two observatories, in the U.S. and Russia, and forms a PanArctic network of observatories where coordinated measures of landscape-level carbon, water, and energy balance are carried out and results made available in a unified database.	
WERC	Contrinution of Permafrost Degradation to Shrub Expansion in Arctic Alaska	Active	This project will examine lake-sediment cores in catchments where shrub expansion has been identified in the arctic tundra. These cores will be dated and examined on how depositional rate has changed over the last 150 years.	
WERC	Hydrologic Analysis & Support for the Alaska Department of Transportation & Public Facilities Bullen Point Project	Active	This project will produce a guide for AKDOT&PF managers and engineers that will better prepare them for judging project risk and estimating costs.	

WERC	Improving Cold Region Biogas Digester Efficiency	Active	This project will collect lake mud containing active methane-producing methanogens from a Fairbanks lake and deliver to Cordova for the integration of the design and implementation of the biogas reactor experiments.	
WERC	NPR-A Watershed Hydrology and Climate Monitoring Program	Active	CESU Agreement between UAF and BLM for collection of field data on the North Slope/NPR-A. UAF will perform stream guaging and water quality measurements in locations specified by BLM on the National Petroleum Reserve - Alaska (NPR-A). BLM & UAF will work cooperatively to carry out collection of data.	
WERC	STREAMFLOW MONITORING ON UPPER KUPARUK AND PUTULIGA YUK RIVERS	Active	We are proposing to gauge two North Slope streams, one in the foothills and one on the coastal plain, that presently harbor resident fish. We have observed a wide range of streamflows for these drainages that are providing fish habitat. Plus, we have monitored two large floods in the headwaters of the Kuparuk River basin; it is not clear what the spatial coverage of these storm systems are that produced these high runoffs. It is obvious from summer precipitation observations that when drought conditions prevail that the area impacted is quite large. It is presently unknown how climate change may impact the future streamflow regime.	
WERC	USEPA Test & Evaluation Facility, Alaska sites	completed	Rural Alaska has over 200 open dumps. In general, they are simply an area close to a village that was designated as "the dump." Dump sites often develop without site assessment, design or engineering. These open dumps often contain mixed wastes including household hazardous waste, "honey bucket" (i.e. human) wastes, and increasing amounts of electronic waste such as computers. Almost none of the dumps are lined, so leachate travels freely into the local ecosystem. WERC will provide a sampling report for each village visited, describing sampling method, site location, and sampling results for microbial indicator organisms.	

*This information is being collected as an *Indicator* for UAF's NWCCU accreditation reporting.

B6. Comparative scores of students who take professional exams

List examination scores:

School, College or Institute	Examination Type	Test Date	# of UAF Students Tested	UAF Pass Rate	National Pass Rate
CEM	FE EXAM – Civil Engineering	Oct 24, 2009	9	56%	73%
CEM	FE EXAM – Mechanical Engineering	Oct 24, 2009	8	75%	78%
CEM	FE EXAM – Mining Engineering	Oct 24, 2009	1	100%	61%
CEM	FE EXAM – Petroleum Engineering	Oct 24, 2009	1	100%	49%
CEM	**FE EXAM – All Engineering Combined – Sum Total of Above for October 24, 2009 Exam**	**Oct 24, 2009**	**19**	**68.4%**	**73.1%**
CEM	FE EXAM – Civil Engineering	April 17, 2010	8	88%	74%
CEM	FE EXAM – Electrical Engineering	April 17, 2010	9	100%	72%
CEM	FE EXAM – Geological Engineering	April 17, 2010	3	33%	44%
CEM	FE EXAM – Mechanical Engineering	April 17, 2010	14	86%	84%
CEM	FE EXAM – Mining Engineering	April 17, 2010	2	50%	62%

CEM	FE EXAM – Petroleum Engineering	April 17, 2010	18	7%	61%
CEM	**FE EXAM – All Engineering Combined – Sum Total of Above for April 17, 2010 Exam**	**April 17, 2010**	**54**	**68.5%**	**69.8%**
CEM	**FE EXAM – All Engineering Combined – Sum Total of Above for October 24, 2009 and April 17, 2010 Exam**	**October 24, 2009 and April 17, 2010**	**73**	**68.5%**	**70.7%**

C. End Results and Strategies – FY 2011

C1. End Results Table

Complete the table below for the period July 1, 2010 to June 30, 2011. Add rows as needed. For each end result, identify the applicable core theme(s) listed below.

A. Educate: Undergraduate and Graduate students
B. Discover: Through Research, Scholarship, and Creative Activity, including an Emphasis on the North and its Peoples
C. Prepare: Alaska's Career, Technical, and Professional Workforce
D. Connect: Alaska Native, Rural, and Urban Communities through Contemporary and Traditional Knowledge
E. Engage: Alaskans via Lifelong Learning, Outreach, and Community and Economic Development

End Result:	Theme	Strategies to Achieve End Result	Target(s):	Measure(s):	Status:	Budget Impact

Double the number of engineering graduates		A. Continue to push for funding for new faculty positions in areas of student growth. B. Continue to work with the newly hired freshman advisor to develop student support services such as the tutoring lab to facilitate retention. C. Continue targeted recruiting activities and work to engage high school students in engineering-related activities such as robotics competitions. D. Work with the Office of International Programs and UA administration to further strengthen foreign exchange programs. **E.** Continue to expand the Construction Management program	Improve both recruiting and retention. The recruiting officer will increase student staff to proactively call prospective students to help sell the UAF engineering programs. The academic advisor will establish periodic appointments throughout the academic year to insure that freshman are successfully meeting milestones. The tutoring lab will assist with retention by ensuring successful peers are available to provide much needed assistance to all engineering students not just those who are struggling	Continue to monitor recruitment, retention and graduation rates for the College		$70,000 to establish and staff tutoring center.
Increase research activity 40% in four years		In order to achieve this goal we will need to grow at 10% per year. This would be a slight increase over our FY10 growth rate. We believe that activity in ACEP will achieve this goal.	We expect that increases in productive faculty coupled with growth of ACEP will result in a research growth rate of 10%	Research funding increased by $ in fy10.	The Center for Alaska Power and Energy incremental funding was made permanent in FY11.	INE continues to invest funding it receives from ICR into ACEP as well as faculty development in all growth areas (energy, environment, and infrastructure).

D. Long Range End Results and Strategies – FY 2012 and Beyond

D1. Long Range End Results Table

Complete the table below. For End Results with an anticipated start date of 2012, the results should be in line with budget requests for FY2012. Add rows as needed. For each end result, identify the applicable core theme(s) listed below.

A. Educate: Undergraduate and Graduate students
B. Discover: Through Research, Scholarship, and Creative Activity, including an Emphasis on the North and its Peoples
C. Prepare: Alaska's Career, Technical, and Professional Workforce
D. Connect: Alaska Native, Rural, and Urban Communities through Contemporary and Traditional Knowledge
E. Engage: Alaskans via Lifelong Learning, Outreach, and Community and Economic Development

End Result:	Theme	Strategies to Achieve End Result	Target(s):	Measure(s):	Budget Impact	Anticipated start date
Double the number of engineering graduates		Increase academic faculty positions by 10% within the college and increase TA support by 50%. Obtain support for the associate dean position, a development/public relations officer, and support for the student success/tutoring lab. Improve retention through a combined effort of advising and tutoring. Continue to increase enrollment through K-12 outreach including expanded participation in high school robotics programs and ASRA.	Continue to expand enrollment with an eventual goal of ~800 undergraduate and ~300 graduate students (including construction management). Through a combination of expanded enrollment and increased student success double graduation rates to approximately 150 by AY12/13.	Continue to monitor and analyze the recruitment, retention and graduation rates for the college's programs.	$850,000	**Fall 2012**

Double the number of engineering graduates		Examine the possibilities of expanding programs in areas of high demand such as Chemical Engineering building upon the existing infrastructure of the Mechanical and Petroleum Engineering programs	This could not only increase student enrollment and graduation rates in a high-demand workforce area, but also could be used to potentially partner with companies capable of significant contributions to satisfy their workforce needs (such as BP, Conoco Philips, Tesoro, Flint Hills, and others.)		To be determined	Potentially 2012/2013
Continue to see steady growth in research activity and total expenditures		Expand opportunities for energy and mining research both through increased projects as well as increased space through an energy technology building. It is essential that as we continue to grow our energy research venture that we have the facilities to deliver on applied energy research. Mining research, while possessing less growth potential than energy has opportunities. Over the next several years we will be seeking to develop this potential.	We hope to be able to break ground on a new energy building using the WRRB model in 2010 and to start construction in FY 2011. We are currently working with AEA, DOE, DOD and the Denali Commission to greatly expand opportunities for energy research in INE (and UAF more broadly).We are working on a new model for mining research, similar in concept to ACEP.	Increase in overall funding for energy research. Increase in INE funded research by 20% over FY10 within 4 years.	$30,000,000 for the energy facility. We expect this to be partially funded by private and state sources as well as bond dept.	

Expand space available to CEM by breaking ground on a new Engineering and Technology Building		Continued planning effort for a new academic engineering building to be constructed adjacent to the Duckering building.	Work with facility services to finalize plans for a new academic engineering building		**$60,000,000**	
Improve recruiting by offering a significant number of freshman scholarships		Continue to work with private donors to expand the scholarship poll available to CEM	Increased scholarship awards		$50,000 (will provide 50 $1,000 scholarships per year.	

D2. Top three challenges for FY2012

Identify the top three challenges confronting the unit for the period July 1, 2011 to June 30, 2012. These challenges must be directly related to the unit's FY2012 budget request.

Challenge 1: In order to move towards the long-term goal of doubling engineering graduations rates, CEM will need to make additional improvements in student recruitment and retention during FY11 and will need to expand student services to match recent and future increases in enrollment. Specifically these include a modest increase in faculty positions in the college, additional support for teaching assistants, more administrative support, support for the new student success/tutoring center, and expanded funding for K-12 outreach including ASRA. Equally important to recruitment and retention is maintenance of existing equipment. With an equipment inventory of over $10M a dedicated repair and replacement fund of 5% (the industry standard is between 5-10%) will ensure the college continues to provide its students with relevant, up-to-date educational experiences.

Challenge 2: Space, particularly office space, continues to present a pressing challenge for both the academic and research leadership. In many ways programmatic expansion is currently capped by the availability of space within the Duckering building. We have used a variety of innovative tools to maximize the space available, but the options are limited and have been largely exhausted within Duckering. Recent enrollment increases are also pushing the limits of classroom space. The Duckering Building has only a single classroom that can handle more than 40 students, however many of our core engineering courses have now surpassed that

limit. We can only deal with this problem by adding additional sections of classes, thus requiring additional teaching resources and multiple (smaller) classrooms. As we move forward increased space will be needed to achieve our goals related to doubling graduation rates and further increasing research activities.

Challenge 3: The Institute of Northern Engineering was incorporated into the College of Engineering and Mines 1 July 2004 and continues to serve as the research arm of the College. Key growth areas are energy, infrastructure and the environment. Within these areas are the key disciplines of mining/geological, civil/environmental, mechanical, and electrical engineering. In order to participate in a large number of these funding opportunities matching funds are required by the granting agency, identifying and securing permanent funding for these matching requirements is essential to maintain competiveness of the institute.

D3. Use of unanticipated funds
Specify what the unit would do with additional funds, should they be made available later in FY2012. Activities must support the FY2012 budget request.

There are many potential uses for additional unanticipated funding, depending on the amount, timing, and longevity of the support available. Some potential uses are listed below:

1. Expand faculty resources to better handle enrollment increases in core engineering courses. Potential areas of additional faculty support include energy, petroleum, electrical and computer engineering, and water resource engineering.
2. Grow the research faculty model by adding research faculty in critical growth areas.
3. Utilize funding for building planning activities.
4. Faculty and staff support for middle/high school outreach (robotics programs and engineering academy)
5. Hire a development/PR officer for the college
6. Salary for Associate Dean.
7. Equipment maintenance and replacement (the College has over $10M of inventory necessitating an annual R&R fund of approx. $500K.)
8. Expansion of Alaska Summer Research Academy (ASRA) engineering components.
9. Hire an additional staff person to manage equipment.
10. Summer Sessions support for out-of-sequence students and engineering related core curriculum revision.

E. Additional Information

E1. Unit Unmet Needs

Identify unmet unit needs that could be supported through private, non-governmental funding, such as donors, foundations, etc.

Over the past year we have worked to establish a fully functional development activity within the college. These efforts have been hampered by our lack of dedicated personnel, in the form of a development officer, within the college. The appointment of Emily Drygas, by the UAF development office has allowed the college to pursue additional cooperate entities which have resulted in increased donations. Our development priorities are:

1. Funding for new facilities. We envision that as much as 1/3 of the $30M cost of the new energy research building could come from private donations.
2. Funding for endowed faculty chairs. Donations of approximately $5M will allow the college to offer endowed chairs to new faculty with established research programs.
3. Funding for operational needs such as equipment maintenance funds or faculty/student travel.
4. Funding for a visiting scholars program in conjunction with the Alaska Center for Energy and Power (ACEP)
5. Funding for a critical faculty leaders program with ACEP.
6. Funding for CEM recruitment scholarships and other types of scholarships.
7. Funding for undergraduate research projects and related travel to competitions (e.g. ASCE steel bridge, SAE clean snowmachine, NASA student rocket project and microgravity project, etc.).

E2. Major Capital Investment Priorities and Space Needs

In order to better connect academic and research priorities with capital investment planning, identify the unit's highest priority facility needs, if any, for consideration in the six-year capital plan. Units should also describe any other significant facility or space management issues in this section. Be sure to show the linkages between facilities needs and unit End Results.

In order to double the number of engineering graduates, space is desperately needed for teaching laboratories, classrooms, faculty offices, tutoring space, and graduate student space. The college is currently facing numerous issues due to overcrowding, which will only multiply exponentially as we approach our goal over the next few years of doubling the graduation rate of engineering students. As a result, a very high priority for the college and the campus is the planning activity

for the expansion of academic engineering space at UAF. During 2011 we will work with UAF facilities to plan for a new engineering building (approx 50,000 square feet) to be constructed on a site adjacent to the existing Duckering Building and financed with state funding. As we understand it, this is currently the third priority for UAF capital funds behind R&R and the Life Sciences initiative.

Energy and power research are critical not only to the State of Alaska but also for ensuring that the goal of increasing research by 20% in the next four years is achieved. Without adequate research space millions of dollars in research opportunities may be lost. Planning and design are underway for a new energy building to the west of the power plant. Funding for this facility is currently envisioned to come from a combination of bond debt, private donations, and the state general fund.