

## Departmental Base Budget Overview

Department **Engineering Accreditation**

Executive **Provost**

Index **414003**

Program **01**

**Base Budgets:**

Base Budgets:										10-Year % Change
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
265,342	255,518	339,396	255,518	265,557	395,398	347,151	300,121	334,343	217,562	-18.01%
									179,661	Payroll Benefits
									397,223	Total

**College Mission Statement:** The College of Engineering will serve the State of Montana and the nation by: supporting student achievement; integrating learning and discovery; and developing and sharing technical expertise.

**Overview:** Engineering Accreditation (a.k.a. Program Modification) monies were authorized by the state legislature in the early 1990's to help offset the considerably higher per student costs related to ABET accredited programs (mandated for professional employment and licensure). These costs include faculty/staff time required to manage the assessment process associated with accreditation, as well as costs associated with maintaining modern teaching labs (also a significant accreditation requirement), much of which cannot be augmented by research equipment.

**Relation to University:** Maintaining professional accreditation for engineering and computer science programs is arguably the most vital on-going function performed by our faculty as it reflects all aspects of the relevance and quality of our undergraduate offerings. Failure to meet accreditation standards would have serious effects upon the College. For example, our students would no longer be eligible for professional licensure in most states which would have an immediate and devastating impact upon recruitment and enrollment. In addition, several sources of federal funding would be at risk including student loans and faculty education initiatives.

**Measures of Quality:** All engineering, engineering technology and computer science programs are professionally accredited and have been since their initial review decades ago. The College is in a current accreditation review cycle. All programs submitted a self-study in June of 2009 followed by a site visit from the three ABET Commissions in September of 2009. A final report will be available in July, 2010.

## Departmental Base Budget Overview

Department **Chemical Engineering**

Executive **Provost**

Index **414100**

Program **01**

**Base Budgets:**

									10-Year % Change	
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
545,777	545,127	584,052	591,965	594,904	615,440	651,889	710,709	767,412	774,765	41.96%
									239,628	Payroll Benefits
									1,014,393	Total

The **Chemical and Biological Engineering Department** is facing new stresses as we continue to build our research component even as enrollments in our undergraduate programs are increasing. Our new faculty members are continuing our commitment to quality education while building strong research programs. External research funding is growing but facility limitations are being felt more and more, and traditionally high teaching loads are in danger of going higher as increased enrollments force us to consider additional sections.

The Department contributes to the University's mission by providing the following degrees:

- BS/MS/PhD – Chemical Engineering
- BS – Bioengineering
- MS/PhD – Environmental Engineering (with Civil Eng.)

The Department contributes to cross-disciplinary research through the Center for Biofilm Engineering, the Thermal Biology Institute, the multi-disciplinary Environmental Engineering program, Fuel Cell program, ZERT program, and Wind Energy program.

### Quality/Productivity

Our **faculty** is committed to educational excellence and quality research. Department faculty are being recognized nationally and internationally, and research expenditures have increased by over 600% since 2003. Even as our research programs grow, we continue to strengthen our undergraduate program in chemical engineering, and have created a new program in bioengineering.

We have excellent **students**. Half of our 2007 graduating class graduated with honors or high honors. Many of our students (approx. 30 in AY08) participate in undergraduate research, and in recent years ChBE students have received the following fellowships: 3 Goldwaters, 1 Whitaker, 3 INRA, 2 BRIN and 1 NSF, and 3 IGERT Fellowships. Average starting salaries of our BS graduates exceed 65K/year.

Our **productivity** is high. Enrollments have been increasing dramatically in the chemical engineering program, and many students are choosing to double-major in bioengineering as well. The Dual Degree Program in Bioengineering with the Istanbul Technical University has maxed out freshman enrollments at 40, and we will be seeing nearly 40 Bioengineering graduates from Turkey in the next few years, in addition to the graduates who spent all four years at Montana State. Our graduate program has become a predominantly PhD emphasis. Department personnel in the last two years published over 30 reviewed research articles, a new text, and new editions of two texts used by engineering programs across the country.

Our **graduates** continue to play leading technical and managerial roles in Montana as well as across the nation.

## Departmental Base Budget Overview

Department	<b>Civil Engineering</b>					Executive	<b>Provost</b>				
Index	<b>414200</b>					Program	<b>01</b>				
<b>Base Budgets:</b>										<b>10-Year % Change</b>	
<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>		
1,306,666	1,319,128	1,359,612	1,432,479	1,440,928	1,489,407	1,612,540	1,674,023	1,750,131	1,784,080	36.54%	
									447,786	Payroll Benefits	
									2,231,866	Total	

Our *Mission Statement* is two-fold:

- Foremost, we will provide undergraduate education founded on a rigorous treatment of engineering fundamentals coupled with modern engineering tools. We see competency in mathematics, physical science, and engineering mechanics, as crucial to our mission.
- Provide graduate education opportunities in a majority of traditional civil engineering areas. The department will maintain sufficient breadth to provide post-baccalaureate education focused on professional practice. The department will provide graduate opportunities in a subset of focus areas coupled to vibrant research programs with sound external funding.

During the fall 2009 semester, 647 students are earning degrees awarded by the Civil Engineering department. Approximately one out of every three engineering students, and one out of every 20 MSU students is a major in the CE department. FY 2007 Delaware Study data indicates that the department is one of the most efficient (or most under-funded) departments at MSU, with instructional expenditures per student credit hour being only 64% of the study average for research universities. The department administers the 12 credit-hour course sequence in engineering mechanics (EM). Most of MSU's engineering students are required to take the EM sequence, a service that the department provides to the College of Engineering. The largest demand for engineers in Montana is in the Civil and Construction ranks. Many Montana engineers attend the CE department hosted annual Spring Engineering Festival. Department faculty members are also extensively involved in other outreach activities. Both the Center for Biofilm Engineering (CBE) and the Western Transportation Institute (WTI) were born in the Civil Engineering department and department faculty members are integrally involved in the activities of these centers. The department has recently opened the Sub-zero Science and Engineering Laboratory. This \$2 million laboratory greatly enhances the University's facilities for conducting research in cold environments. FY 2007 Delaware Study data indicates that annual research expenditures of the department's faculty were \$8,901,211 (\$529,834 per FTE T/TT faculty x 16.8 FTE T/TT faculty). Many of these expenditures were by faculty members affiliated with the CBE and WTI. Measured in contributions to economic development and infrastructure, engineering talent production, research, or outreach, the department is central the University mission.

The department has benefited from one base budget adjustment since the 2001-2002 AY.

1. 2002-2003 base adjustment - \$59,500 – salary for additional Transportation Engineering faculty member to support growing educational and research program in Transportation Engineering.

## Departmental Base Budget Overview

Department **Electrical Engineering**

Executive **Provost**

Index **41 4300**

Program **01**

**Base Budgets:**

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10-Year % Change
1,034,034	999,878	1,056,341	1,068,438	1,073,805	1,109,336	1,193,356	1,233,935	1,275,157	1,256,898	21.55%
									349,125	Payroll Benefits
									1,606,023	Total

**Purpose** The Department of Electrical and Computer Engineering (ECE) serves MSU and the State of Montana by providing academic programs leading to ABET-accredited Bachelor of Science degrees in Electrical Engineering (EE) and in Computer Engineering (CpE), a Master of Science degree in Electrical Engineering, and a Ph.D. with an option in Electrical and Computer Engineering.

**Productivity** The ECE Department serves nearly 300 majors, including over 50 graduate students participating in both the academic and research missions of the Department. In the past year, ECE awarded 37 BS EE and CpE degrees, 18 MSEE degrees, and 2 PhD degrees. The ECE Department awarded 67 special academic scholarships for deserving undergraduate students in the program. Of the 13 tenured and tenure track ECE faculty, 12 are supported by the Departmental Base Budget and one additional faculty member is supported by the endowed Gilhousen Telecommunications Chair. ECE research expenditures in FY09 were \$2.73M, or roughly twice the expenditure of the Base Budget. The faculty collectively produced 50 professional publications during the past year and submitted more than 40 proposals seeking new research funding. ECE faculty members are key contributors to multidisciplinary research projects involving electro-optic systems, communication systems, fuel cells, and carbon sequestration.

The Montana Microfabrication Facility (MMF) clean room continues operations housed within the MSU Engineering Complex. The EPS facility comprises a 1500 sq. ft. lab consisting of a class-100 lithography area and a class-1000 general processing area. The EPS facility complements the 500 sq. ft. class-10,000 MMF lab on the fifth floor of Cobleigh Hall. ECE Professor David Dickensheets is the MMF Director.

The Gilhousen Telecommunications Program continues its expansion under the direction of Dr. Richard Wolff. The Program has received significant funding from the National Science Foundation, Advanced Acoustic Concepts, and the Western Transportation Institute. The Program operates an NSF-sponsored Research Experience for Undergraduates (REU) telecommunications program for summer students.

**Challenges and Opportunities** (a) The Department faces stress due to eroded faculty headcount (12 in 2009, vs. 17 in 1997), yet with increasing expectations for research and teaching productivity. (b) Erosion of operating budget and curtailment of indirect cost (F&A) returns hamper day-to-day operations. (c) The lack of quality research space limits research growth and flexibility. (d) Additional GTA positions are required to staff fully the 30+ ECE undergraduate laboratory sections and to aid grad student recruiting for the research program. (e) The undergraduate program remains strong and sustainable due to innovative new course offerings and upgraded instructional lab equipment supported by student fees and corporate donations.

**Look to the Future** By providing a stimulating and supportive environment for scholarly activity, ECE strives to maintain excellence in both undergraduate education and graduate/research programs, consistent with MSU's strategic planning goals.

## Departmental Base Budget Overview

Department **Industrial & Management Engineering**

Executive **Provost**

Index **414400**

Program **01**

**Base Budgets:**

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10-Year % Change
497,895	539,949	543,142	549,994	553,543	575,030	593,643	465,424	568,356	215,623	-56.69%
									0	Payroll Benefits
									215,623	Total

The 414400 index was closed in FY10 and the funds were combined with 414500.

## Departmental Base Budget Overview

Department **Mechanical Engineering**

Executive **Provost**

Index **414500**

Program **01**

**Base Budgets:**

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10-Year % Change
932,238	962,469	1,039,278	1,062,232	1,066,959	1,097,943	1,148,718	1,319,082	1,317,377	1,941,770	108.29%
									431,372	Payroll Benefits
									2,373,142	Total

The 414500 account includes the Industrial Engineering (IE), Mechanical Engineering (ME), and Mechanical Engineering Technology (MET) programs in the Mechanical & Industrial Engineering Department (M&IE). The Department currently offers the B.S. and M.S. degree in IE and ME, and the B.S. in MET. Students may also obtain the Ph.D. in Engineering with IE or ME Options. No graduate degrees are offered in the MET program. The IE program currently serves about 110 undergraduate and 12 graduate students; the ME program currently serves about 450 undergraduate and 25 graduate students. The Mechanical Engineering Technology program is one of the larger technology programs nation-wide, currently serving over 140 undergraduate students. Therefore, the 414500 base budget serves over 6% of the total university student population. The IE, ME, and MET programs are fully ABET (Accrediting Board for Engineering and Technology) accredited. There are 16 tenure-track faculty members (and two T-T vacancies) involved in the three programs, including the Department Head. Several adjunct faculty members are currently required to support both programs. The M&IE Department is one of the largest departments in the University.

According to the Delaware study, the M&IE Department is one of the more efficient departments on campus. For example, instructional expenditures per SCH for M&IE are about 60% of peers, well below the MSU average of 74%. Our students continually score above the national average on the national Fundamentals of Engineering examination and are actively sought by employers. Current research expenditures in M&IE Department are approximately \$1M annually. The department has continued to provide exceptional service with funding provided, and is well positioned for future research and economic development activities.

However, all three programs are facing significant challenges. Six professors retired during the last few years; other retirements are approaching. Several new tenure-track faculty members have been recently hired, in addition to a new Department Head. The workload of the retiring faculty was 100% instructional for several years, while the new tenure-track faculty members have been hired with significant research expectations and a reduced teaching load in order to be successfully tenured, while at the same time continue the excellent instructional offerings for our students. The Department has been making a focused effort to grow enrollments, further stressing faculty resources. These changes put the department in a very challenging position, while at the same time presenting great opportunities for future development.

While our enrollments have increased in the recent past, the associated services required to meet our commitments have also increased but our operations budget has not changed significantly for a number of years. Our research expenditures are also increasing and these require additional support as well, particularly in physical space for research laboratories. State support for GTAs and equipment is insufficient.

The IE, ME, and MET programs have excellent growth potential in the near term if adequate resources are provided by the University. The Department's capacity to add value to the state and nation is significant.

## Departmental Base Budget Overview

Department **Computer Science**

Executive **Provost**

Index **414604**

Program **01**

**Base Budgets:**

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10-Year % Change
746,585	753,380	821,501	872,896	942,067	976,831	1,013,929	1,067,224	1,037,546	988,214	32.36%
									296,371	Payroll Benefits
									1,284,585	Total

**Role of the Computer Science Department:** To provide Ph.D., M.S., and ABET-accredited B.S. degrees, to perform research, to teach service courses in computer literacy and programming, and to provide service and outreach.

**Enrollment:** The department serves 168 B.S. students, 22 M.S. students and 19 Ph.D. students. After following a nationwide trend of declining enrollments during the early part of this decade, enrollments are once again growing as the job outlook for CS graduates is bright. The department currently has 9 tenure track faculty members (including the RightNow Technologies Distinguished Professor who was hired in Fall 2008), 1 full-time adjunct, 1 half-time associate research professor (funded on soft money), 2 administrative assistants and 1 system administrator. The department is well positioned to attract a significant number of international students.

**Research:** Research expenditures are growing and have more than doubled from 207K in FY 2007 to 428K in FY 2009. Faculty members are PIs or co-PIs on grants and contracts from various sources including NSF, NASA, the M&T Company, the National Center for Genome Research, Advanced Acoustic Concepts and NREL. Interdisciplinary research collaborations and research groups within computer science are flourishing and are likely to expand further with new faculty hires.

**Industrial relations:** Our industry advisory board includes representation from RightNow Technologies, Zoot Enterprises, Fast Enterprises, Computers Unlimited, Golden Helix, SRI, Security Innovation and 8 others. The first three companies are members of our Industry Affiliates Program. We receive significant scholarship support from RightNow Technologies, Zoot Enterprises and TeleSoft. In addition, the department received a generous gift of \$240,000 from RightNow Technologies to assist with a salary start-up for the RightNow Technologies Distinguished Professor. This gift began in Fall 2008.

**Student recognition:** Justin Krohn received a Defense Department SMART scholarship in 2009. Jeff Sharkey was one of 10 grand prize winners in the Google Android Programming Contest in 2008.

**Student placement:** The job market offers CS graduates a wide variety of jobs both locally and nationally. Recent Ph.D., graduates are finding tenure-track positions at institutions such as Utah State University, Winston-Salem State University and Indiana University of Pennsylvania.

**Budget note:** In 2010, benefits were added to the departmental budget. Excluding benefits, the budget declined by about \$70,000 from 2009 to 2010.

## Departmental Base Budget Overview

Department **Computer Science Distance Learning** Executive **Provost**  
 Index **414605** Program **01**

**Base Budgets:**

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10-Year % Change	
24,797	36,919	37,725	0	0	0	0	0	0	0	-100.00%	
										0	Payroll Benefits
										0	Total

This budget was merged with 414604, the main Computer Science budget, effective July 1, 2003.

When this budget was created in 1997, it made sense to separately fund distance learning efforts: Distance learning was a new, time-intensive endeavor and was thus tackled as a distinctly separate thrust in the Department and funded through this separate budget (414605). Currently, Web-based courses are still offered (CAPP 120), but these efforts are now fully integrated with the curriculum and on-campus classes.

The result is that although the design and development of web-based, distance-learning resources is still a time-intensive effort, the administration of this effort is inextricably entwined with the administration of regular instructional efforts. The division of the budget between “regular” and “distance learning” components has become an artificial and unnecessary complication to the budgeting process.

## Departmental Base Budget Overview

Department	<b>Aerospace Studies</b>					Executive	<b>Provost</b>				
Index	<b>414800</b>					Program	<b>01</b>				
<b>Base Budgets:</b>										<b>10-Year % Change</b>	
<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>		
27,616	27,768	28,999	30,532	30,839	32,046	26,636	27,609	28,622	34,353	24.40%	
									5,722	Payroll Benefits	
									40,075	Total	

**Mission Statement:** Air Force ROTC/Aerospace Studies is a non-degree awarding instructional department that receives its organizational support from the College of Engineering. Their mission is “develop quality leaders for the Air Force.” The Air Force ROTC Program is designed to “recruit, educate, and commission quality officer candidates”, while fostering the tradition and spirit of excellence unique to Detachment 450 and Montana State University. This mission is achieved through a combination of coursework emphasizing leadership and decision-making skills (including many “hands-on” leadership opportunities within the cadet wing) and a physical training program designed to lay the foundation for life-long fitness. Students successfully completing the Air Force ROTC program leave college with both a degree and a commission as a second lieutenant in the United States Air Force.

**Overview:** Air Force ROTC both attracts and retains exceptional high school graduates through the High School Scholarship Program and rewards college excellence through a number of scholarships aimed at students already attending college. The program at MSU maintains an average annual enrollment of approximately 50+ cadets, who provide Air Force Scholarship monies of approximately \$400K annually and an additional \$150K annually in monthly stipends and textbook reimbursements that go directly to the students. Students are taught by a world-class military faculty supplemented with distinguished speakers that bring policy and history to life through firsthand experience. Each instructor is an active-duty Air Force officer usually accorded the academic rank of assistant professor. The unit commander has an academic rank of full professor and acts as the Department Head of Aerospace Studies. Our scholarship programs allow us to offer immediate financial assistance to students in academic majors targeted as high priority by the Air Force, and to reward the top-performing students currently in our program who do not have high school scholarships. Air Force ROTC scholarships are designed to cover a student’s entire academic career (ranging from two-year scholarships awarded at the end of a cadet’s sophomore year to four-year scholarships awarded when a student leaves high school...and scholarships may be extended to five years in certain academic majors). We also bring a limited number of outstanding Air Force enlisted personnel to campus through three different enlisted commissioning programs. These candidates are all very high-quality students and bring valuable real-life experience and knowledge with them to MSU classrooms. Our combination of academic standards and active involvement in the performance of our students is not unlike that required for student-athletes by the NCAA, and the leadership that our cadets bring to the student body at MSU is of an equally high caliber.

**Relation to University:** Air Force ROTC receives a very small departmental budget, most of which is committed to supporting a classified staff member salary (which falls under the MPEA contract). The operations budget is used for non-programmed, on-campus charges and supplies that cannot be billed to the Air Force. Variances in the overall budget are primarily reflective of changes to the classified staff position over time.

**Measures of Quality:** All Air Force ROTC scholarship cadets must maintain a GPA of at least 2.5 on a 4.0 scale to remain eligible for the program; and 73% of our current scholarship cadets have earned term GPAs of 3.0 or higher. Many students join Air Force ROTC with the dream of becoming pilots, and our rated selection rate in the past five years has been an astonishing 86%, which greatly exceeds the national average! These are some of the most competitive positions in the Air Force, and the average selection percentage for a university detachment is around 50%. In addition, one of our AY 08-09 seniors secured an Air Force medical school scholarship, an elite competition which requires a cumulative 3.5 GPA or better just to apply. We have commissioned an average of ten cadets per year since 2001, with our peaks and dips running in line with enrollment figures at MSU.

## Departmental Base Budget Overview

Department	<b>Military Science</b>					Executive	<b>Provost</b>				
Index	<b>414900</b>					Program	<b>01</b>				
<b>Base Budgets:</b>										<b>10-Year % Change</b>	
<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>		
23,706	23,801	24,742	27,828	28,179	29,329	30,464	31,393	32,387	34,275	44.58%	
									9,913	Payroll Benefits	
									44,188	Total	

Army ROTC is a non-degree awarding instructional department that receives its organizational support from the College of Engineering. Our mission is “to commission the future officer leadership of the U. S. Army and motivate young people to be better citizens.” We achieve this mission through our classes--emphasizing leadership, management, decision-making and patriotism as well as the benefits of building physical fitness and character. Those emerging from Army ROTC not only have a college degree but a commission as a second lieutenant in the U.S. Army.

In the role of attracting and retaining quality students, the scholarship programs offered by Army ROTC are many. MSU is a member of the Army ROTC Partnership in Nursing Education program. MSU has a three or four-year scholarship allocation of 3 that can be awarded to students to become Army Nurses. Army ROTC’s “Green-to-Gold” program offers scholarships to soldiers that have completed 2 years of active Army service; these scholarships are limited only by the students seeking them. In addition to these, MSU Army ROTC has a three or four year scholarship allocation of 10 to award to incoming freshmen. We have a base number of scholarships each year but we can request an increase to that base for quality MSU students that apply. We work with the U.S. Army Reserves and the Montana Army National Guard seeking ways for students to get money for their college education at MSU. The scholarship and citizen-soldier opportunities provided by Army ROTC benefit the recruitment and retention of students to MSU. Through these scholarships and student benefits, along with faculty pay and allowances (Active Army professors, assistant professors and instructors) the Army invests between \$1.3 and \$1.7 million with the cost to the university being \$29,329 that the department is allocated for operations and salary.

MSU Army ROTC is ranked in the top 15% of all Army ROTC programs in the nation. In addition, two of MSU Army ROTC’s cadets were ranked in the top 10% of ROTC graduates nationwide.

Key performance indicators for Army ROTC for AY05 were:

Ranking of cadet’s nationwide through the accession process: Two cadets in the top 10% and 3 in the top 20% of the nation out of 4800.

Program retention rates: (this is whether or not a student remains in Army ROTC, it must be remembered that this program is not only academically selective but also physically selective. Students may not meet the physical qualifications to remain in the program.) Our retention rates are: Seniors 100%, juniors 85%, sophomores 85%, and freshmen 60%.

Meeting our commissioning goal: We have exceeded our commissioning goal of 13 for the last several years and are poised to commission 17 this year.