

ACTIVE LEARNING OPPORTUNITIES

The College of Engineering and Applied Science at the University of Colorado at Boulder is a strong advocate of experiential education, which we refer to as ‘active learning’. Students who engage in active learning are challenged to apply knowledge and skills taught in the classroom to a variety of situations encountered in the engineering profession and to understand the role of an engineer from a wider perspective. The result is a richer and broader educational experience for our students, better prepared and more experienced workers for employers, and better prepared applicants for graduate schools. Additional information can be found on the College’s Active Learning website, located at: <http://engineering.colorado.edu/activelearning/>.

Active Learning is grouped into three main categories:

Discovery Learning (also known as Research Learning) engages the student in a research project with a faculty member and his/her graduate team. Topics of research are unique to each discipline, but all projects teach students the basics of formulating a hypothesis, performing original investigative work and analyzing the outcome of their research. There are several ways to get research experience – here are a few examples:

- Independent study (for credit, not pay)
- Undergraduate Research Opportunities Program (UROP)
<http://www.colorado.edu/Research/UROP/>
- BURST: Bioscience Undergraduate Research Skills and Training (formerly Undergraduate Research Assistantship Program, URAP)
<http://www.colorado.edu/Outreach/BSI/undergrad/burst.html>
- Discovery Learning Apprenticeship
(<http://engineering.colorado.edu/activelearning/Discovery.htm>)
- NSF Research Experience for Undergraduates (REU)
http://www.nsf.gov/crssprgm/reu/reu_search.cfm
- NIH Howard Hughes Medical Institute (HHMI) Scholar (see BURST site)
- Research experience with Space Grant <http://spacegrant.colorado.edu/>

Service Learning may take a wide variety of forms, from service to the college such as serving as a course assistant or website designer, to service to the wider community, utilizing engineering to address local, national or even global challenges such as adequate sanitation and water quality. Examples of service learning opportunities include:

- Completion of an elective course with a required service learning component
- Completion of an optional service learning component within a required course
- Completion of an Earn/Learn Apprenticeship
<http://engineering.colorado.edu/activelearning/earnlearn.htm>
- Participation in Engineering Fellows Program for at least one academic year
<http://fellows.colorado.edu/>
- Service through Dean’s Office and/or Engineering Ambassadors
http://engineering.colorado.edu/students/engineering_ambassadors.htm
- INVST Community Studies participation <http://www.colorado.edu/communitystudies/index.html>
- K-12 Outreach (e.g., through the ITLL <http://itll.colorado.edu/itll/index.cfm?fuseaction=K-12Outreach>)
- Student society/group leadership (AIAA, ASCE, ASME, SWE, EWB, UCEC, etc)
http://engineering.colorado.edu/students/engineering_societies.htm
<http://ucec.colorado.edu/main.htm>
- Outreach through Space Grant, Women in Engineering, or Multicultural Engineering programs
- Participation in the western Colorado K-12 outreach program in conjunction with the Western Colorado Math and Science Center

Professional Learning requires that the student be involved in some type of relevant work experience via an internship or co-op experience with a non-campus employer. What is the difference between an internship and a co-op experience?

- ❖ An internship is a paid or unpaid work position for a company, full or part-time during the school year or summer, that is not administered by the college and results in no academic credit. Internships may be arranged with the help of CU-Boulder's Career Services or independently.
 - ❖ A co-op experience takes place in the context of a program administered by the college that integrates work experiences into a student's academic experiences. Co-op work experiences are always paid, have academic requirements, and result in academic credit not necessarily applying towards the student's degree. A student participating in the co-op will receive a certificate of participation or written acknowledgement and an official transcript entry for each experience in which the student participates. While participation in a co-op program may add up to a full year to students' time in college, students graduate with a host of marketable skills and professional contacts.
- Internship experience (must be relevant work experience with an engineering focus) Career Services can help students find internships. <http://careerservices.colorado.edu/>
 - Co-op experience (must be relevant work experience with an engineering focus) <http://engineering.colorado.edu/activelearning/co-op.htm>
<http://www.colorado.edu/che/undergrad/coop.html>
<http://www.colorado.edu/aerospace/info/current/AESCo-opProgram.pdf>
 - Certificate in International Engineering <http://engineering.colorado.edu/academics/international.htm>
 - Certificate in Engineering Entrepreneurship <http://eship.colorado.edu/>
 - STEM-TP participant <http://www.colorado.edu/education/centersoutreach/stem.html>
 - NIST Professional Research Experience Program (PREP) <http://surf.boulder.nist.gov/>
 - INROADS co-ops <http://www.inroads.org/>
 - Participation in the western Colorado K-12 outreach program in conjunction with the Western Colorado Math and Science Center

Active Learning Award: Undergraduate students who have participated in all three forms of active learning (discovery, service, and professional) are recognized at graduation with the Active Learning Award. Students must apply and provide evidence of all three experiences to receive the award. Students may petition on their application for consideration of other experiences (beyond those mentioned above). The Active Learning Award application can be completed online at <http://engineering.colorado.edu/activelearning/award.htm>. The submission deadline is approximately five weeks prior to graduation: November 1st for December graduates, April 1st for May graduates, and July 1st for August graduates. When employers and prospective graduate schools see the Active Learning Award on a job applicant's resume, they can be assured that this applicant will bring a wealth of education and experience beyond what is received in the classroom.

What's in it for students?

- Acquiring new skills and abilities while exploring their interests;
- Connecting with faculty, professionals, and other students who share their passion;
- Taking pleasure in knowing that they are making the college, the community, or the world a better place;
- Improving their opportunities for graduate school or a career;
- Validating their career choice and gaining insights about their chosen field;
- Earning money, course credit, or an Active Learning Award at graduation.

Questions about Active Learning can be directed to Terry Mayes at terry.mayes@colorado.edu, on (303) 735-6446, or in person in ECAD106.

Advisors can help steer students to these opportunities, and also nominate students to be featured on the Active Learning website: <http://engineering.colorado.edu/activelearning/>.

A chart follows explaining the difference between Discovery Learning Apprenticeships and Earn-Learn Apprenticeships, which are often confused by faculty and staff, not to mention students.

Type of Apprenticeship → Characteristics ↓	Discovery Learning Apprenticeships	Earn-Learn Apprenticeships
Length of appointment?	One academic year long	One semester long
Ability to serve multiple times?	May not serve more than one year	May serve as many semesters as the department or program deems appropriate
Is the program open to graduate students?	No	Yes, but the number of graduate students is limited and is roughly proportional to undergrad/grad ratio in college
Is this program open to students from other colleges?	No, even if they are planning to IUT into the college; they must be students in the college	No, even if they are planning to IUT into the college; they must be students in the college
Is this program offered in the summer?	No	Generally not, except under rare circumstances
What type of work may be included?	Any type of research work appropriate for an undergraduate student	Any type of work needed by the department or program that is NON-research in nature and suitable for a graduate or undergraduate student
How and when are the positions to be offered determined?	Faculty members submit “position descriptions” in February and March each year to Terry Mayes. All of these positions will be posted.	Faculty must negotiate with their Department Chair or Program Director for access to allocated slots – slots allocated by Dean, generally based on size of department/program and need. Positions are offered each semester at the beginning of the semester
How and when are the positions advertised to students?	Advertised on Active Learning website and posted on big Active Learning Board in lobby in April each year	Advertised on Active Learning website if requested by departments or programs; advertised by departments before or at the beginning of each spring/fall semester.
How and when do students apply?	Students apply online; they provide a cover letter and resume and select their top 4 choices of projects; applications are due end of April for following academic year	Students apply to each department or program; each runs their program a bit differently; positions are generally filled by 2-3 weeks into the semester. Students must submit a cover letter and resume and the department or program must provide these documents and a submission form to Terry Mayes
How and when are the students selected?	Terry Mayes proposes student matches to faculty based on applicant pool and their match with stated requirements; faculty members approve the candidates in May; faculty may request certain students be assigned and every attempt is made to honor these requests	This varies by department and program; each runs their program a bit differently, but most positions are filled by 2-3 weeks into the semester; Terry Mayes reviews all applications to ensure that requirements for the program are met
How and when are the students notified that they have a position?	Terry Mayes notifies students they are accepted in June	This varies by department and program; each runs their program a bit differently, but most positions are filled by 2-3 weeks into the semester

Must apprentices attend Discrimination and Harassment Awareness training?	Yes, all of them must attend, unless they have attended in the last 5 years and this is documented in PeopleSoft	Yes, all of them must attend, unless they have attended in the last 5 years and this is documented in PeopleSoft
What are apprentices paid?	\$10/hour for the first semester (maximum of \$750 for semester); \$11/hour for the second semester, pending satisfactory performance (maximum of \$825 for semester);	Up to departments and programs to decide; the college will pay \$5/hour (50%) for undergrads (maximum of \$750 for semester); and \$6/hour for graduate students (maximum of \$900 for semester);
What percent is paid by the college?	50% paid by college; other 50% paid by researcher	50% paid by college; other 50% paid by department or program
Is this program supported with donor funding?	To a very limited degree.	Yes, many of the apprentices are supported by donor funds; the rest are supported by the Dean (donors and the Dean fund only 50%)
What additional requirements must students fulfill besides doing their work?	<p>- Apprentices are required to attend the following meetings:</p> <ul style="list-style-type: none"> • Introductory meeting in fall semester • 3 of several seminars offered in the spring and fall semester • Meeting to discuss Discovery Learning Research Symposium in the spring semester <p>- For those apprentices with donor funding, write a thank-you letter</p> <p>- Write a 2-3 page paper re: their research plans due in October</p> <p>- Create a poster and participate in the Discovery Learning Research Symposium in April; prizes awarded!</p> <p>- Complete 3 online surveys (mid-fall, late January, end of spring semester)</p>	<p>- Apprentices are required to attend one meeting each year explaining the program</p> <p>- Write a thank-you letter to the donor or Dean</p> <p>- Complete 1 online survey at the conclusion of each semester</p>
What if my apprentice has not used all of his/her hours? Can he/she continue to work?	Apprentices who are not graduating at the end of their semester of work may continue through winter break, but not into spring semester (for fall semester apprentices); or through Maymester, but not into summer term (for spring semester apprentices)	Apprentices who are not graduating at the end of their semester of work may continue through winter break, but not into spring semester (for fall semester apprentices); or through Maymester, but not into summer term (for spring semester apprentices)
How can the apprentice continue work?	After one year, they may not participate in this program, but may be supported by REU, UROP or BURST funding, or may choose to participate in an independent study	The hiring manager must resubmit the apprentice each semester with appropriate submittal form; forms must be signed by the appropriate Department Chair / Program Director
How many apprentices are there?	About 35 per year	About 75-80 per semester, depending upon donor funding
Is there a GPA requirement?	Not exactly, but it is a competitive program, so those with GPAs above a 3.3 are more likely to be accepted	Yes, GPA must be above 2.3 for undergraduates and 2.7 for graduates.
Who to call if questions?	Terry Mayes (5-6446)	Terry Mayes (5-6446)
Administrator(s) of Program	Terry Mayes and Victor Bright (Faculty Director)	Terry Mayes with assistance from Robyn Sandekian