

# **Learning Centered (Tipping Point) Plan Update: Cal Poly Pomona College of Engineering Project Lead the Way (PLTW)**

## **Overview**

Project Lead the Way (PLTW) is a nationally recognized program that has been in existence since 1997. With a focus on teacher training and project based student classrooms, PLTW supplies its curriculum to participating schools free of charge, makes available initial and refresher training to teachers, and provides structure for affiliates to support the program. In contrast to an after school program or occasional campus visits, the PLTW curricula is delivered as part of the regular school day as an elective course. Currently, several courses are pre-approved by the California Department of Education for use at the high school level as part of the “a-g” requirements. The “a-g” requirements are college preparatory courses required for admission to either the California State University or the University of California.

Our country’s lack of engineers is putting us in a serious crisis. According to recent US Bureau of Labor projections, approximately 76 million baby-boomers are scheduled to retire over the next decade. Additionally, some 55 million new jobs will be created before 2014, and approximately 13.9 million of these positions will require College graduates. For years to come, the demand for engineers and other technical professionals is projected to far outstrip the supply.

Despite the increasingly urgent need for engineers, the number of U.S. graduates in engineering and related disciplines is dropping. The nation’s colleges and universities are simply not producing near enough engineers to meet current and forecast demands for this expanding technical workforce. This national crisis is further exacerbated by the press for more radically efficient energy resources, growing concern about global warming, the major infrastructure repair and upgrade projects currently underway all throughout the country, and many other engineering intensive initiatives which all require significantly more engineering expertise in the workforce.

Cal Poly Pomona has one of the largest engineering programs in the western United States and has a longstanding reputation for the hands-on learn by doing philosophy. Cal Poly Pomona is on the border of three large population centers – Los Angeles County, Orange County, and San Bernardino County. Cal Poly Pomona also graduates the largest number of underrepresented students in engineering BS programs in California. The MEP (Maximizing Engineering Potential) Program was recognized as the Outstanding Advising Program at Cal Poly Pomona for 2007-08.

On April 9, 2008 President J. Michael Ortiz convened a summit with high level industry executives about the challenge of recruiting and retaining effective, diverse engineering students. Project Lead the Way (PLTW) was a key point in this discussion.

## **Regional Center**

Cal Poly Pomona was selected to become a regional coordinating/teacher training campus for the Project Lead the Way (PLTW) program. Regional Center services and functions include the following:

- Participate in PLTW curriculum development and revisions

- Provide support to existing PLTW schools within the region
  - Collaborate with District and School leadership
  - Help with guidance and growth, mentor towards certification
  - Help with establishing and running advisory boards
  - Help find funding
- Recruit new schools to PLTW
  - Develop collaboration with District and School leadership
- Hold informational (counselor) conferences
- Conduct certification visits
- Conduct summer training
  - Create a master teacher/affiliate professor pool
- Facilitate scholarships
- Create preferred admissions
- Professional development workshops for PLTW teachers
- Support for Gateway Academy camps in region
- Establish graduate credit for teachers
- Establish college credit for students
- Extra-curricular support programs such as design competitions, robotics club, internships, etc.
- Create a teacher pipeline
  - Opportunities for new teachers to receive training
  - Teacher education credit for courses

### **Informational/Counselor Conferences**

Informational conferences on Project Lead the Way (PLTW) were held on campus in January and April 2008. Attendance totaled more than 70 including high school teachers, counselors, and principals, plus Cal Poly Pomona faculty and administrators. Pomona Unified School District has signed on with Project Lead the Way to begin offering classes in Fall 2008. Several other high schools in our local area already offer PLTW courses. Cal Poly Pomona College of Engineering will continue outreach to other schools in our area to enhance the academic preparation of students.

### **Summer Training Institute in 2009**

Cal Poly Pomona will be a site for the 2009 Project Lead the Way (PLTW) Summer Training Institute. Participating teachers will be taught by trainers who have been certified by the national PLTW organization. A group from Cal Poly Pomona visited San Diego State University to observe 2008 summer teacher training, to be prepared to offer PLTW summer teacher training beginning in summer 2009.

### **Continuity between the Project Lead The Way (PLTW) High School curriculum and the First Year Experience (FYE) program in the College of Engineering**

The College of Engineering is immersed in launching a First Year Experience (FYE) program on a grand scale. The First Year Experience Program, having already been highly recommended and supported by several different groups at Cal Poly Pomona, will enhance First Year engineering students' opportunities for success and retention in our highly demanding curriculum. For students who participate in Project Lead the Way, the First Year Experience program will build on their experience and enhance their transition to University.



# Project Lead the Way

## *Forging New Generations of Engineers*

Project Lead The Way (PLTW) is a not-for-profit organization that offers pre-engineering and science curricula for middle and high school students. PLTW forms partnerships with public schools, higher education institutions, and the private sector to increase the quantity and quality of engineers and engineering technologists graduating from our educational system. The PLTW curriculum was first introduced in 12 New York State high schools in the 1997-98 school year. Today, the programs are offered in over 2,000 schools in more than 45 states.

PLTW has developed five modules for middle schools and a four year sequence of high school courses which, when combined with college preparatory mathematics and science courses in high school, introduces students to the scope, rigor and discipline of engineering and engineering technology prior to entering college. Students participating in PLTW courses are better prepared for college engineering programs and more likely to be successful, thus reducing the attrition rate in these college programs, which currently exceeds 50% nationally.

## *PLTW Middle School Modules*

Design and Modeling  
The Magic of Electrons  
The Science of Technology  
Automation and Robotics  
Flight and Space

## *PLTW High School Courses*

Foundation Courses: Introduction to Engineering Design, Principles of Engineering, and Digital Electronics  
Specialization Courses: Computer Integrated Manufacturing, Civil Engineering and Architecture, Biotechnical Engineering, and Aerospace Engineering  
Capstone Course: Engineering Design and Development

## *Plans at Cal Poly Pomona*

During 2008, Cal Poly Pomona will recruit school districts to participate in PLTW. Training will be offered in San Diego in Summer 2008, for teachers who will then teach PLTW courses at their schools beginning in Fall 2008. Cal Poly Pomona plans to offer this training on our campus beginning in summer 2009. We will partner with the Colleges of Science and Education, to enhance high school math and science education by providing professional development opportunities for teachers.

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