Polymer Specialty Certificate Program Expanded Due to Popular Demand

Due to the high popularity of the Polymer Certificate Program amongst both undergraduates and graduates alike from a vast variety of fields, PTC has made an expanded amendment to the program. After approval of the amendment, the program will include three additional undergraduate and four new graduate core courses as well as additional elective courses.

Scratch Behavior of Polymers Consortium

The scratch consortium will be held in Detroit, MI in hopes of attracting involvement of the automotive industry. PTC is excited to introduce cutting edge research findings. The agenda is below, contact Isabel Cantu at icantu@tamu.edu or call 979-458-0918 to reserve your spot.

Polymer Technology Industry Consortium

The PTIC meeting reveals cutting edge research presented by PTC faculty members. This is a place where the Polymer Industry, PTC faculty, and students come together to interact and present/share research information, ideas, etc. See agenda below, and reserve your spot contact Isabel Cantu at icantu@tamu.edu or call 979-458-0918.

Students will Compete at the PTC Student Poster Session

PTC plans to present three awards to students participating in the student poster sessions for the PTC semi-annual meetings. The semi-annual meetings take place in the Spring and in the Fall each year. The PTIC members will serve as the committee to award the posters presented. The selection will be based on the following criteria: technical content (50%), presentation (30%), and relevance to the industry (20%). The awards will consist of first place $500, second place $300, and third place $200. The award will go to the first author of each awarded poster.
Mechanical Engineering Senior Design Program at Texas A&M University

For twenty years the Department of Mechanical Engineering, in conjunction with the Institute for Innovation and Design in Engineering (IIDE), has pioneered the senior capstone design classes. These have traditionally worked to build on students’ classroom learning in Mechanical Engineering and develop their skills in the engineering design process. The capstone courses provide an opportunity to work with an industrial sponsor applying students’ prior engineering education to work toward creative design solutions of the sponsors’ design challenge. The first semester emphasizes product innovation where teams develop more than one conceptual design based on the sponsor’s product needs, followed by a second semester of detail design of proposed concept(s). Students work as teams during both semesters guided by design studio faculty and interactions with sponsors.

The interaction with sponsors provides engineering reality for students through conversations with experienced professional engineers, and the design studio experience along with interaction with faculty and fellow team members provides experience in scheduling the completion of necessary tasks during the conceptual and design processes. Sponsors and faculty guide but do not initiate or perform engineering tasks.

Approach: In the Capstone Mechanical Engineering Design courses, students are exposed to three different but closely related processes in a teamwork environment. Initially, students are taught the innovation process that is required to create a new product starting with a “blank sheet of paper.” Then, each team is assigned to an industry sponsor that not only provides a “real world” problem, but also provides periodic “real world” review and criticism. The solution to this design project requires two semesters, where concepts are reduced to an embodiment during the first semester. In the second semester, students are taught the more generic product design and development process that apply to existing product variations, or improvements, as well as to product innovation. The sponsor’s design project, continued to completion in the second semester, includes product drawings, prototypes, test procedures, and, time permitting, actual testing.

As novices, the students on each team develop the ability to derive (through repeated iteration) a need statement that defines an unfamiliar industry problem provided by the company sponsor. The need statement is then divided into numerous independent functions that the design must ultimately perform. These independent functions are further broken down into many sub-functions. Through brainstorming, three or more conceptual designs are derived that each meet the functional requirements. With a rigorous down-select evaluation process the student teams each select a final concept with which to proceed further into a preliminary design. Teams typically present formally to the sponsor (at the company location) the Need Statement, Function Structure, Concepts, and Down-Select, as well as the final concept selected by the sponsor for the Preliminary Design. Once a preliminary design is chosen, each member of the multi-disciplinary team identifies, formulates, and solves the engineering problems required to satisfy themselves (and the sponsor) that the selected design will perform as originally conceived.

The final design phase is then initiated. In this phase the detailed design (complete with a full set of detailed drawings) and the detailed analysis (including hand calculations as well as sophisticated computer analyses) are completed. Each team is then required to write a complete report (typically 150-200 pages) on the final, detailed design and prepare a final presentation that depicts the results of each step in their design process. Reports are delivered to the sponsor a day prior to the presentation. The final design presentation lasts for approximately an hour and is usually conducted at the sponsor’s site with upper management in attendance.

Program Objective: The objective of the capstone design courses is to teach senior engineering students a top-down systems design process that enables and encourages innovation and have them apply this process to a challenging design project to help them internalize the process. The challenging projects and mentoring provided by project sponsors is invaluable in the learning process. Sponsor’s financial support supplements the resources provided by the collaborating departments to support excellence in the senior design program. Projects are of current interest to the participating sponsors. Sponsors are expected to commit engineering resources to direct and mentor groups of highly motivated and innovative students often of multidisciplinary background.

Faculty Member’s Expertise: IIDE, of which Dr. C. Steve Suh is the Director, has twelve faculty members with individual specializations that cover a very broad spectrum of engineering topics including innovation design methodology, manufacturing, product cost modeling and analysis, environmental impact, energy systems, automotive engineering, biomimetic design, carbon form, nano-composites, tribology of polymers and polymer-based components, dynamic instability diagnostics and prognostics, laser thermometry, CAD/CAM/CAE, and material processing technology. Several have past industrial experiences, and most teach both undergraduates and graduates in Mechanical Engineering. Information about the IIDE Faculty may be found at the website: http://www1.mengr.tamu.edu/iide/. Additional information for Department of Mechanical Engineering Faculty is available at http://www.mengr.tamu.edu.
The course will cover a number of topics relevant to anyone working with polymers with an interest in surface issues. Such fields include final-form polymer manufacturing, solid lubrication, coatings, composite structures, polymer formulation, filler and reinforcement suppliers, product designers, and new product development. The course will present key theories behind scratch and wear as well as illustrative examples.

**Presenters are:**
- Klaus Friedrich, Dr. Ing. Dr. H. C. Institute for Composite Materials, University of Kaiserslautern
- Cris Schwartz, Ph.D., PE, Polymer Technology Center Dept. Of Mechanical Engineering, Texas A&M University
- H.-J. Sue, Ph.D., Polymer Technology Center, Dept. Of Mechanical Engineering, Texas A&M University

To register, please visit:  
http://engrevent.tamu.edu/event/100493  
Reserve your spot as space is limited
Jennifer A. Carvajal Diaz, Chemical Engineering,
Internship Experience with BASF

In my opinion, an important and efficient way for a student to establish a link between academic knowledge and practical applications is through a professional internship. An internship can provide additional skills to graduate students interested in a professional career in the industry sector as well as a broad vision of career possibilities.

I had a great and valuable experience during my internship at the High Temperature Polymerization group at BASF (Wyandotte, Michigan). This group focuses on polymer research and I had the opportunity to work in an interesting and innovative project.

During this internship, I enjoyed and learned a lot and it has given me a better perspective about how the research and development works in the Industry sector. Additionally, I had the opportunity to meet excellent people and work with a very enthusiastic and dynamic team. This experience has been very important for my professional development and I am very thankful to my advisor Dr. Tahir Cagin, Dr. Volker Schaedler (HTPG manager) and BASF for giving me the opportunity to expand my vision and acquire a more diverse background for my scientific formation.

Jennifer Carvajal