



## Community College Faculty Externships

### How Faculty Externships in the Gulf Coast/Houston Area are Preparing the Future Petrochemical Workforce

---

Community colleges in the Gulf Coast/Houston region are partnering with local petrochemical companies to host faculty externships so that faculty members can gain hands-on, relevant industry knowledge that they can apply in their classrooms. Additionally, the externship program has provided several benefits to companies seeking skilled graduates to fill their growing workforce needs.

#### Why Faculty Externships?

By nature, workforce programs are rapidly changing, particularly in terms of technology and workforce instructors' primary focus to prepare students for entry into their occupational areas.<sup>1</sup> Therefore, occupational instructors must simultaneously present academic and occupational instruction that integrates theoretical and hands-on knowledge.<sup>2</sup> To ensure that students are adequately prepared for these technically-enhanced work environments, faculty must ensure that their own technical knowledge and skills remain current. Thus, providing relevant, quality professional development for faculty presents challenges for both secondary and postsecondary institutions.

#### Developing Externships Through Partnership

The Community College Petrochemical Initiative (CCPI) is a collaboration between nine regional two-year colleges to increase student access and success in fields related to the petrochemical industry. Meanwhile, the East Harris County Manufacturers Association (EHCMA) is a consortium of 130 manufacturing companies in Greater Houston dedicated to providing jobs, upholding environmental standards and enhancing the quality of life in Greater Houston.

The CCPI began discussing the differences between the theory taught in classrooms and the realities of working in the Petrochemical industry, acknowledging the changes in technology and new trends in the workforce. This resulted in two areas of focus for CCPI:

##### 1. Faculty Recruitment

In 2014, there were 26,555 middle-skill petrochemical job postings in greater Houston, with an additional 11,000 projected jobs per year.<sup>3</sup> On average, 25% of incumbent, middle-skill petrochemical employees

---

<sup>1</sup> Panella, J. (2007, April). *CNC skills help carpentry students snare high-paying jobs*. Tech Directions, 66 (9), 11-13.

Cho, D. & Imel, S. (2003). *The future of work: Some prospects and Perspectives. A compilation*. Columbus: OH. ERIC Clearing House on Adult Career and Vocational Education. (ERIC Document Reproduction Services No. ED 482 360).

<sup>2</sup> Kerna, K.D. (2012). Help wanted: Professional development and training for career and technical education faculty. *International Journal of Vocational and Technical Education*, 4(3), 38 - 45.

<sup>3</sup> Burning Glass Labor/Insight: October 2013 to September 2014

are 55 or older.<sup>4</sup> Therefore, even if 100% of students currently entering petrochemical pathways join the workforce, large numbers of jobs will remain unfilled. As a result, CCPI colleges focused on recruitment of new faculty by developing and implementing strategies for recruiting industry professionals into teaching.

## 2. Industry Content Expertise of Faculty

It can be challenging for incumbent faculty to keep their technical skills up to date. As the workplace changes and new technology is introduced, faculty must balance curricula and pedagogy with current knowledge of the workplace. In addition to developing training materials, partners encouraged co-teaching and sought to provide faculty with opportunities to maintain hands-on industry knowledge.

In order to address these topics, CCPI partnered with the East Harris County Manufacturer’s Association with the goal of designing several programs, including faculty externships, aimed at closing the gap between industrial education and real-world application. Industry partners were eager to provide more than just plant tours. They wanted faculty to be immersed in the actual daily operations of their facilities. Through 40-hour externships, faculty have had opportunities to receive intensive hands-on training and to learn about new equipment and procedures.

### Faculty Externship Pilot

In 2016, the Texas Regional STEM Degree Accelerator grant helped CCPI prioritize faculty externships by focusing more on this initiative and providing additional funding to offer stipends. With Lee College and its partnering colleges working together to build awareness of the initiative, an increasing number of faculty now have opportunities to participate in externships.

The faculty members who participate in the externship are asked to agree to the following requirements:

- Work with industry to update curricula and learning activities.
- Connect with employers to build an ongoing relationship.
- Share experiences and resources with other faculty.
- Expand programs and initiatives to be able to serve as many students as possible.
- Provide feedback and participate in evaluation activities to determine the impact of the externships.

The externship partnerships developed to date are as follows:

Community College	Petrochemical Company Partner(s)
Alvin College	INEOS Olefins & Polymers USA in Alvin
Brazosport College	BASF Chemical Plant in Freeport and Phillips 66 in Old Ocean
Houston Community College	Shell Deer Park Refinery and Chemical Plant
Lee College	Chevron Phillips Chemical Company in Baytown
Lone Star College	Dianal America, Inc. in Pasadena

---

<sup>4</sup> Preparing Houston to Skill Up, Jobs For the Future, 2014

## Lessons Learned

After a year-long pilot, participating faculty from the various community colleges reflected on their experiences, resulting in the following lessons learned:

- **Even Faculty Recently Employed in Industry Can Benefit from Externships:** Houston Community College learned that faculty members benefited from the externships even if they had recently worked in the industry. They particularly benefited from experiencing different sizes and types of companies. For example, faculty learned about the differences in culture between various employers; they observed that employees in a large facility may become subject matter experts in specific skill sets, whereas employees in a smaller facility may need skills across many areas. Additionally, the faculty externs, many of whom had extensive industry careers, learned how their skills could be applied in different settings; one extern described the power of “working” inside a refinery as compared to a chemical plant.
- **Identifying and Addressing Legal Requirements is Critical:** Lee College worked with their college attorney to navigate legal details when setting up externships with companies. They created a planning document identifying critical issues to consider and address when developing a partnership; including age requirements, workplace safety and liability. In this process, Lee College also learned that other departments and institutions may seem different but still have similar issues and lessons learned. For example, medical programs that create student internships have to consider issues of liability and safety that are similar to those in creating Petrochemical externships and internships. Therefore, departments that are creating new programs for faculty and staff to gain hands-on experience in the workforce can adapt best practices from other institutions and apply them in their own context.
- **Colleges and Faculty Benefit from the Externship Experience:** Brazosport College and BASF have developed a mutually-beneficial partnership, in which both organizations have received feedback that enhances their curriculum and training. At BASF, the Learning and Development Coordinator used feedback from faculty externs to enhance the training program for new employees. Faculty externs helped identify gaps between college curriculum and on-the-job training. Meanwhile, BASF employees now provides Brazosport feedback on courses and curriculum at Brazosport to ensure that students are learning the most updated and relevant knowledge and skills. Other participating colleges report that the curricular advisory function was enhanced as a result of the externships.
- **Scheduling Externships Can Be a Challenge:** All participating colleges experienced initial challenges identifying times for faculty to commit 40 hours to the externship and were creative in identifying times of the year, such as the summer or academic breaks, to host the externships.
- **Benefits Extend Beyond Updating Faculty Content Knowledge:** Faculty externs described the experience as educational, fun, and beneficial. In addition to directly observing individuals on the job, externs networked with individuals from all levels (management, engineers, and program graduates) and departments (training, human resources, health and safety). As a result, they received feedback from different perspectives on *all* aspects of how students perform once they enter the workplace. Training managers even provided faculty with pedagogical advice on how to effectively present topics in the classroom. As a result of the initial success with faculty, Lee College and Exxon Mobil are exploring ways to adapt the program to include college administrators.

## Setting up Faculty Externships

Preliminary planning between colleges and industry partners can help identify and address potential challenges while ensuring the program achieves its goals. To get started, partners should work together to answer the following questions prior to starting the internship:

Participants
<ol style="list-style-type: none"><li>1. <b>Select Target Program/Area</b><ol style="list-style-type: none"><li>a. Why was this program or area selected? Consider high wage/high-demand fields growing in the region.</li><li>b. How are underrepresented populations included?</li><li>c. How does this align to other institutional priorities or grant projects?</li></ol></li><li>2. <b>Identify Internal Planning Team Members</b><ol style="list-style-type: none"><li>a. Who needs to be included from the institution?</li><li>b. They could include department heads, CTE coordinators, lead faculty, grant coordinator, legal team, etc.</li></ol></li><li>3. <b>Identify External Planning Team Members</b><ol style="list-style-type: none"><li>a. Who needs to be included from the partnering company?</li><li>b. Consider advisory committee members, other industry representatives at different levels of the organization, their legal teams, community organizations, etc.</li></ol></li></ol>
Operations & Logistics
<ol style="list-style-type: none"><li>1. <b>Payments: Will the externships be paid?</b><ol style="list-style-type: none"><li>a. What is appropriate compensation?</li><li>b. Are there implications for payroll, overload, substitutes, etc.?</li><li>c. What budget(s) can support this activity?</li><li>d. Are there other grants or institutional funds?</li><li>e. What other costs will be incurred at the externship, such as uniforms or equipment?</li></ol></li><li>2. <b>Timing: When is the “best” time for externships to occur – for both institutions and industry partner(s)?</b><ol style="list-style-type: none"><li>a. Are there natural breaks in the semesters?</li><li>b. Will teaching substitutes be required?</li><li>c. Are there events to consider, such as plant shutdowns, holidays, academic testing, etc.?</li></ol></li><li>3. <b>Employer Requirements: Are there any conditions of employment required by the industry partner different from the institution? If so, how will these be handled?</b><ol style="list-style-type: none"><li>a. Items may include safety training, drug testing and legal documentation.</li><li>b. Who needs to be involved from the institution and company to complete these?</li><li>c. How long does this take to complete?</li></ol></li><li>4. <b>Documentation: Will an MOU be required?</b><ol style="list-style-type: none"><li>a. What must be included?</li><li>b. Who will need to review?</li><li>c. How long will review take?</li><li>d. What other documentation is required?</li></ol></li><li>5. <b>Recruiting Faculty: How will instructors be identified/recruited?</b><ol style="list-style-type: none"><li>a. Which faculty will participate: CTE/workforce faculty, or academic/core instructors, or both?</li><li>b. How many can participate in an externship at once?</li></ol></li><li>6. <b>Evaluation: How will you evaluate/assess the externships?</b><ol style="list-style-type: none"><li>a. How will you evaluate the effectiveness of teaching and student learning?</li><li>b. What will be your evaluation instrument(s) – i.e. one for instructors and one for the company?</li><li>c. Are there implications for working with instructors?</li></ol></li><li>7. <b>Benefit to Students?</b><ol style="list-style-type: none"><li>a. Will there be any tools or resources shared with students?</li><li>b. Can students visit and/or tour the facilities during the semester?</li><li>c. Are there opportunities for students to work with mentors from industry?</li></ol></li></ol>



ExxonMobil

Community College  
Petrochemical Initiative

## Faculty Externship Evaluation

Thank you for your participation in the externship. Please take a moment to give us your feedback on the experience.

	5 Strongly Agree	4 Agree	3 Neutral	2 Disagree	1 Strongly Disagree
<b>ORGANIZATION</b>					
I was informed of the goals of the externship.					
I was clearly informed of the responsibilities of each party involved in the externship.					
The amount of time spent at the industry site was appropriate.					
There was adequate time to complete all required portions of the externship. (Lesson plans, evaluation, presentation.)					
<b>EXTERNSHIP SPONSOR</b>					
The sponsoring organization was prepared to have a faculty extern.					
The experiences at the host site enabled me to meet my learning goals.					
I was able to observe / discuss safe start procedures.					
I observed strategies utilized in creating an effective safety culture.					
I was exposed to new technology used in performing tasks and responsibilities.					
I was able to observe processes for permitting/ /lockout/tag out procedures					
<b>OVERALL</b>					
The externship gave me a realistic experience of my program field.					
I was able to observe and ask questions throughout the externship.					
The externship experience was challenging and stimulating.					
I would recommend this externship site to other faculty.					

1. What is your evaluation of the externship/preceptorship experience, i.e. did it meet your expectations?
2. How was the Externship helpful? What would have been more helpful?
3. What were the most significant things you gained in this externship?

## Houston Community College & Shell Externship Schedule

Day	Time	Items	Location
<b>10/3</b>	07:00	Welcome to Shell Deer Park, Safety Orientation / Confidentiality Agreement	SDPC – 1022
	08:00	Tour the ROCC (Refinery Operations Control Center)	ROCC
	09:00	Get Loaner FRC's & Safety PPE	FRC Trailer
	09:30	Plant Driving Tour & Control Rooms	Plant
	11:00	Lunch	SDPC - 1022
	11:30	Interview HCC Graduate & Training on job in Hydro	Hydro CR
	1:30	Olefins Console Board Duties, Proactive Monitoring	Olefins CR
	3:00	Dismiss	

Day	Time	Items	Location
<b>10/4</b>	05:00	Meet at SDPC to go to Olefins	SDPC - 1022
	05:30	Observe Shift Turnover, Start of Shift Orientation, Shift Team Meetings, HSSE Tour, 1 <sup>st</sup> Start Job Permitting, 1 <sup>st</sup> Opening by Maintenance	Olefins CR & BRM
	11:00	Lunch & Interview SME's (Subject Matter Experts) training Operators	SDPC-1022
	1:00	Dismiss	

Day	Time	Items	Location
<b>10/5</b>	07:00	Docks Operation, Utilities Operation, Truck and Railcar Loading	Docks, Utilities, Phenol Loading Rack
	10:45	Travel for Lunch	
	11:00	Lunch with Production Managers	SDPC - 1026
	12:00	Field Operator Activities - Intelatrac Rounds, Operator Maintenance, LOTO, Troubleshooting, GSAP, Preparing Equipment for Maintenance, Housekeeping, End of Shift Reports, Proactive Monitoring (Field)	Coker
	3:00	Dismiss	

Day	Time	Items	Location
<b>10/6</b>	07:00	SOU, Procedures, SDS, GROW, Simulator, Console Screening, Operator Training	SDPC - 1022
	09:00	Turnarounds	CCG If Possible
	11:00	Lunch	
	12:00	Interview other P-Tec Grads, Open Agenda (anything we missed)	Phenol
	3:00	Dismiss	

## Brazosport College & BASF Externship Schedule

**Date of Externship:** Week of October 10

**Participants:**

**From the organizer's perspective:**

**From the extern's perspective:**

	10-Oct	11-Oct	12-Oct	13-Oct
7:30 AM	Morning	Morning	Morning	Morning
8:30 AM	Shift Meetings	Shift Meetings	Shift Meetings	Shift Meetings
9:00 AM	Watch safety video	HDO & NEOL Tour	Incinerator & Boilers Tour	Loading Area Tour
9:30 AM				
10:00 AM	Shift Discussions			
10:30 AM				
11:00 AM	<b>LUNCH</b>	<b>LUNCH</b>	<b>LUNCH</b>	<b>LUNCH</b>
11:30 AM				
12:00 PM	Site Tour	Lab/Sampling	Instrumentation & Maintenance	Distillation Exchangers Reactors
12:30 PM				
1:00 PM				
1:30 PM				
2:00 PM	SDS Discussion	LOTO, and MIP's	Emissions Discussion	Supervisor Discussion
3:00 PM				
3:30 PM	<b>JOURNAL ENTRIES</b>	<b>JOURNAL ENTRIES</b>	<b>JOURNAL ENTRIES</b>	<b>JOURNAL ENTRIES</b>
4:00 PM				

## Brazosport College & Phillips 66 Externship Schedule

**Date of Externship:** 5 Fridays beginning September 30 - October 30.

**Participants:**

**Summary:**

	30-Sep	7-Oct	14-Oct	21-Oct	30-Oct
8:00 AM	Watch safety video				
8:30 AM	New Hire Training Overview	Physics/Lab/Sampling	Instrumentation	Distillation	Heaters
9:00 AM					
9:30 AM	EID, LOTO, and Safety				
10:00 AM					
10:30 AM					
11:00 AM	<b>LUNCH</b>	<b>LUNCH</b>	<b>LUNCH</b>	<b>LUNCH</b>	<b>LUNCH</b>
11:30 AM					
12:00 PM	ULSD Unit Tour	CAT Tour	Midstream Tour	Aromatics Tour	Coker Tour
12:30 PM					
1:00 PM		Lab Tour			
1:30 PM					
2:00 PM	Supervisor Discussion				
2:30 PM					
3:00 PM	New Hire Discussion				
3:30 PM					
4:00 PM	<b>JOURNAL OPPORTUNITY</b>				
4:30 PM					