

Application Date
June ??, 2006



California Community Colleges

APPLICATION FOR APPROVAL—NEW OCCUPATIONAL PROGRAM

Process Technology PROPOSED PROGRAM TITLE	Kiran Kamath CONTACT PERSON
Los Medanos College COLLEGE	Dean of Occupational Education TITLE
Contra Costa Community College District DISTRICT	(925) 439-2181 x 3285 PHONE NUMBER
January, 2007 PROJECTED PROGRAM START DATE	kkamath@losmedanos.edu E-MAIL ADDRESS
<input type="checkbox"/> CERTIFICATE <input type="checkbox"/> A.A. DEGREE <input type="checkbox"/> A.S. DEGREE <input type="checkbox"/> LIMITED DURATION, until _____	

PLANNING SUMMARY

Recommended T.O.P. Code	0956.00	Estimated FTE Faculty Workload	2.5
Units for Major—Degree	33	Number of New Faculty Positions	1 full-time, ~ 4 adjuncts
Total Units for Degree	60	Est. Cost, New Equipment	\$0 for State and District
Required Units—Certificate	33	Type of New/Remodeled Facility	Lab will be remodeled
Projected Annual Completers	25-30	Est. Cost, Library Acquisitions	\$1000
Projected Net Annual Labor Demand	>300		

APPROVAL CRITERIA

Approval Criterion	Pg. # in App.	Section	Chancellor's Office Use
MISSION		1. Statement of Program Goals and Objectives	
		2. Catalog Description	
		3. Program Requirements	
		4. Background and Rationale	
NEED		5. Enrollment and Completer Projections	
		6. Place of Program in Curriculum/Similar Programs	
		7. Similar Programs at Other Colleges in Service Area	
		8. Labor Market Information	
		9. Job Market Analysis	
		10. Employer Survey	
		11. Explanation of Employer Relationship	
		12. List of Members of Advisory Committee	
		13. Minutes of Key Meetings/Recommendations	
		14. Recommendation of Regional Consortium	
QUALITY		15. Display of Proposed Sequence	
		16. Outlines of Record for Required Courses	
		17. Transfer Applicability	
		18. Program Evaluation Plan	
FEASIBILITY		19. Library and/or Learning Resources Plan	
		20. Facilities and Equipment Plan	
		21. Financial Support Plan	
		22. Faculty Qualifications and Availability	
COMPLIANCE		23. Model Curriculum	
		24. Licensing or Accreditation Standards	
		25. Student Selection and Fees	
		26. Programs Provided by Contract	

SUBMIT THREE COPIES OF THIS FORM

AND ALL ATTACHMENTS

REQUIRED SIGNATURES

Program Process Technology College Los Medanos College

LIBRARY AND LEARNING RESOURCES

Library and learning resources needed to fulfill the objectives of the program are currently available or are adequately budgeted for.

DATE SIGNATURE, CHIEF LIBRARIAN/LEARNING RESOURCES MANAGER TYPED OR PRINTED NAME

VOCATIONAL REQUIREMENTS

Program fulfills the requirements of employers in the occupation, provides students with appropriate occupational competencies, and meets any relevant professional or licensing standards.

DATE SIGNATURE, DEAN OF OCCUPATIONAL EDUCATION TYPED OR PRINTED NAME

DATE SIGNATURE, CHAIR, OCCUPATIONAL ADVISORY COMMITTEE TYPED OR PRINTED NAME

Program was recommended for approval by Regional Occupational Consortium on _____ (date).

DATE SIGNATURE, CHAIR, REGIONAL CONSORTIUM TYPED OR PRINTED NAME

LOCAL CURRICULUM APPROVAL

Program and courses within the program have been approved by the curriculum committee and instructional administration, and satisfy all applicable requirements of Title 5 regulations.

DATE SIGNATURE, CHAIR, CURRICULUM COMMITTEE TYPED OR PRINTED NAME

DATE SIGNATURE, CHIEF INSTRUCTIONAL OFFICER TYPED OR PRINTED NAME

DATE SIGNATURE, PRESIDENT, ACADEMIC SENATE TYPED OR PRINTED NAME

COLLEGE PRESIDENT

All provisions of Title 5, Section 55130(b) have been considered. All factors, taken as a whole, support establishment and maintenance of the proposed instructional program.

DATE SIGNATURE, PRESIDENT OF THE COLLEGE TYPED OR PRINTED NAME

DISTRICT APPROVAL

On _____, the governing board of _____
District approved the instructional program attached to this application.

DATE SIGNATURE, SUPERINTENDENT/CHANCELLOR OF DISTRICT TYPED OR PRINTED NAME

MISSION

1. *Statement of Program Goals and Objectives*

The purpose of the Process Technology, (PTEC) program at Los Medanos College is to prepare students to become process technicians/operators, which are in great demand by the local petro/chemical industries. This program has been developed in response to industry demand. The curriculum has also been developed in collaboration with industry. The industries that hire process operators include the chemical, refining, oil and gas exploration and production, power generation, pharmaceutical, and related manufacturing industries. PTEC graduates will also be well prepared to work in the food production industry and in water treatment plants.

The Strategic goals are;

Focus On Learning:

- Hire PTEC instructors with a strong, hands-on industry background. Hire many adjunct instructors to assist with instructional development and delivery.
- Hire personnel able to maintain and keep all equipment inventoried and fully operational.
- Seek professional development opportunities for faculty.
- Continue to seek and acquire equipment and materials to support the learning process.

Student Access and Success:

- Improve student retention by developing a technology learning lab that will assist in early intervention by obtaining baselines on science, math and PTEC courses. Can be accomplished through the use of industry internships, hands-on “mini-plant” operations, simulators, increased tutoring and CBT (computer based training) exercises to reinforce learning outcomes.
- Increase enrollment by working with enrollment services, counseling and area high schools to promote a PTEC pipeline from high school to LMC to industry. Work with the Industrial Association of Contra Costa County to promote linkage with local industrial partners.
- Assess student learning outcomes of individual courses and the program in collaboration with industry standards and needs.

Economic Development:

- Develop and gain approval for new degree concentrations or program exit options that address the next critical training needs identified by local industry.
- Work with external resources and examine facilities to develop needed training unit designs in order that it will be ready when funding becomes available.

The Program Student Learning Outcomes require that the student who completes this program will be able to:

1. Demonstrate the typical tasks of a process technician during plant commissioning, startups, normal operations, shutdowns, and turnarounds.
2. Defend how a process technician should protect plant personnel, nearby communities, the environment, and equipment, in addition to complying with applicable regulations.
3. Illustrate how to operate a plant economically and maximize the efficiency of plant processes.
4. Demonstrate the proper use of (safety, processing, and lab) equipment.
5. Identify plant equipment, explain their functions, explain the interrelationships between components of a system, analyze the overall processing systems, and diagram how they are controlled.
6. Analyze information and generate well-reasoned conclusions.
7. Recognize abnormal situations, such as equipment malfunctions, and implement an appropriate response.

2. *Catalog Description*

The Process Technology program prepares students to become process technicians/operators in the chemical, refining, oil and gas exploration and production, power generation, and pharmaceutical industries. PTEC graduates will also be well prepared to work in the food production industry and in water treatment plants. Processing plants for most of the above mentioned industries can be found locally in Contra Costa County and adjoining counties. These are high-skill, high-wage jobs.

The student who completes this program will be able to perform the typical tasks of a process technician. These include operating a processing plant in a manner that protects plant personnel, surrounding communities, the environment, and equipment, operating the plant economically, recognizing abnormal situations, and responding appropriately. In order to accomplish these tasks, the student will be taught how to identify plant equipment, explain their functions, explain the interrelationships between components of a system, analyze the overall processing systems, and diagram how they are controlled. The student will also

be trained in the proper use of (safety, processing, and lab) equipment and will be taught how to analyze information to generate well-reasoned conclusions.

High school students preparing for the PTEC program are encouraged to take courses in chemistry, physics, English, and at least one year of algebra. There are also certain physical demands required of a process technician; students will be expected to climb ladders to the top of processing units, wear and carry safety equipment, and work in confined spaces.

3. *Program Requirements*

The core curriculum for the PTEC major and certificate course requirements are:

PTEC 10, Introduction to Process Technology	3 units
PTEC 12, Petrochemical Safety, Health, and Environment	1 unit
PTEC 24, Process Instrumentation	3 units
PTEC 25, Process Tech. I—Equipment	3 units
PTEC 27, Applied Instrumentation	1 unit
PTEC 35, Process Technology II—Systems	3 units
PTEC 45, Process Technology III— Operations	3 units
PTEC 48, Process Troubleshooting	4 units
MATH 30, Intermediate Algebra*	4 units
CHEM 6, Introduction to Inorganic and Physical Chemistry*	4 units
PHYS 15, Introduction to Physics*	4 units
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Total PTEC major and certificate units:	33 units

*The equivalent course may have been taken in high school, in which case these courses would be replaced with GE requirements and/or electives for students working toward an A.S. degree.

The remaining general education and other requirements for an A.S. degree are given on the following page.

Below is a sample schedule for a student who has completed his/her high school requirements through one year of high school algebra and the equivalent of ENGL 90. This schedule meets all of the remaining requirements for the A.S. degree in Process Technology. The number of units for each course is shown in parentheses.

- First Semester
 - PTEC 10, Introduction to Process Technology, (3)
 - MATH 30, Intermediate Algebra, (4)
 - CHEM 6 , Introduction to Inorganic and Physical Chemistry, (4)
 - PTEC 12, Petrochemical Safety, Health, and Environmental, (1)
 - BUS 35 (3), or computer literacy requirement

- Second Semester
 - PHYS 15, Introduction to Physics, (4)
 - PTEC 24, Process Instrumentation, (3)
 - PTEC 25, Process Technology I—Equipment, (3)
 - PTEC 27, Applied Instrumentation, (1)
 - ENGL 100, College Composition, (3)
 - PE (1)

- Third Semester
 - PTEC 35, Process Technology II—Systems, (3)
 - ANTHR 7, The Anthropology of Cultural Change (3)*
 - DRAMA 15, Principles of Dramatic Art: A Multicult. Perspective (3)*
 - PHIL 2, or ethical inquiries requirement, (3)*
 - SPCH 40, or another communications/critical thinking req., (3)

* *Double counts*

- Fourth Semester
 - PTEC 45, Process Technology III— Operations, (3)
 - PTEC 48, Process Troubleshooting (4)
 - POLSC 10, or Soc. Sci./Amer. Inst. & Ideals, Group A (3)
 - PE (1)
 - ECON 5, or Soc. Sci./Amer. Inst. & Ideals, Group B (3)
 - Degree applicable elective (1)

This sample schedule demonstrates how a student can complete the program in four semesters, by taking 15 units each semester, for a total of 60 units. This is the minimum number of units required for an A.S. degree at LMC. The total number of units may increase if the student must take developmental courses, such as MATH 25 or ENGL 90. The total could also increase if the student chooses not to take general education requirements that do not double count. On the other hand, if a student has already taken high school physics, for

example, but needs to take ENGL 90, she/he could still complete the program within 60 units.

4. *Background and Rationale*

Petroleum refineries and chemical plants are among the largest employers in Contra Costa County and adjacent counties. Due to the increasing number of baby boomers retiring from the industry, these companies have recruited many new employees from schools that have PTEC programs. Since there is no local PTEC program, the new employees are hired primarily from PTEC programs from states along the Gulf Coast (Texas and Louisiana).

Unfortunately, the local companies often expend large amounts of funds relocating families and training new employees, only to see them leave within a couple of years. The new employees generally leave to return to their families and to avoid the high cost of living in the Bay Area.

As a result, local industries approached LMC with a request to develop a home-grown pool of labor. Locally trained process technicians are more likely to remain in the Bay Area, among their families and friends. They are also more accustomed to the Bay Area's relatively high cost of living.

The industry collaboration includes: The Dow Chemical Company, Shell, Tesoro Corporation, Conoco-Phillips Inc., Chevron Corporation, USS POSCO, the Contra Costa County Board of Supervisors, the Workforce Development Board of Contra Costa County, and Los Medanos College.

All these partners serve on a very active advisory board contributing to curriculum design, the faculty pool, student recruitment, training materials, labs, internships and job placement, and raising funds. The Dow Chemical Company has also "loaned" to LMC one of its gifted engineers to help with the project management responsibilities while the PTEC program is under development for 6 to 12 months.

The advisory board has recommended using the PTEC curriculum that was developed by the Center for the Advancement of Process Technology (CAPT), an organization that is recognized both nationally and internationally for the model curriculum that it has developed for Process Technology programs through an NSF grant.

The Contra Costa County Workforce Development Board (WDB) has recently received a grant to recruit, train and place displaced workers such as airline mechanics in high-skill, high-wage jobs. LMC's PTEC program will be the provider of the training for these workers.

The Process Technology program will be part of the Vocational Technical department at LMC, which includes programs such as Electrical/Electronic Technology, Appliance Service Technology, Automotive Technology, and Welding Technology. We will be working with community/industry partners, our feeder high schools, the ROP, to create career pathways that feed into this certificate and associate degree program. We plan to establish a pipeline from middle school to LMC and beyond into the local industry.

Local industries want these high wage jobs to go to local residents and the college is gearing up to provide the technical education that will make program graduates the candidates of choice for jobs that are expected to be in high demand for years to come.

NEED

5. Enrollment and Completer Projections

We intend to offer 6 to 8 of the core courses each year during the first 2 years. We anticipate a headcount of 25 to 30 students per course.

There will be no program completers at the end of the first year, because even the certificate program requires 3 semesters. We do expect to have about 25 program completers at the end of the 2nd year. We expect another 25 to 30 program completers by the end of the third year of the program. Beyond the third year, it is possible that the number of program completers could rise to 60 to 90 per year, once the program has become established and our high school outreach programs are fully implemented.

Industry representatives on the advisory board have indicated that they could hire as many as 100 to 150 program completers per year.

These enrollment projections are based on industry demand and information from the workforce development board. 30 students per year is a conservative estimate given the job market and the high starting salaries (between \$45,000 and \$65,000 annually). The salaries can increase to \$90,000 to \$100,000 annually within 5 years with overtime. More details are given in sections 8 through 10 below.

Outreach for recruitment will be conducted by the college, local industry, the Contra Costa County workforce development board, the Contra Costa Industrial Training Institute (established by Supervisor Federal Glover of Contra Costa County), the program advisory board and local high schools. It should also be noted that Contra Costa County is home to about 930,000 residents, and that there are three high school districts in LMC's service area.

6. *Place of Program in Curriculum/Similar Programs*

The closest program to Process Technology is the existing Electrical/Electronic Technology program, which are both in the area of manufacturing but are very different from each other. Both programs will be housed in the Vocational Technical department at LMC. This program is intended to expand LMC's offerings in manufacturing in order to respond to local industry demand for training employees. Few colleges in California offer this curriculum. The industry has had to recruit graduates from colleges in the gulf states.

This program will have a positive impact on enrollments in our existing Physics, Chemistry and Math courses since Physics 15, Chemistry 6 and Math 30 are part of the core curriculum in Process Technology.

This program will not pull students from other programs other than the general experimentation that students may do in order to select a major and a career.

The Chemistry department will also be involved, as some of its instructors may be included in teaching one or more of the courses, and the students in this program will be required to enroll in Chem 6 or the equivalent. Other curricular areas that offer required courses for this program are Physics and the Math department. In addition, this program is intended to lead to an A.S. degree in Process Technology, so all other programs offering courses that meet LMC degree requirements (English, Physical Education, Social Sciences, etc.) are expected to benefit from increased enrollments due to this program. Existing LMC staff will teach these courses.

Computer training will be provided in existing computer lab/s. Other computer labs, such as those currently under construction for LMC's new Engineering Program, might also be available for use by this program. A lab will be remodeled for hands-on lab work in Process Technology; it will be equipped by grant funds and industry donations.

7. *Similar Programs at Other Colleges in Service Area*

There are no similar programs in LMC's service area. In fact, no similar programs exist anywhere in Northern California. Two similar programs are currently under development or are being restarted at Los Angeles Trade Technical College and at Los Angeles Harbor College. We have been communicating with representatives of the Process Technology programs at both of these institutions.

Members of our advisory board and LMC faculty have toured and met with the members of the PTEC program at Brazosport College in Lake Jackson, Texas. Brazosport College is recognized nationwide as one of the premier institutions offering curriculum in Process Technology. Our advisory board members have

also visited other successful PTEC programs at both the College of the Mainlands, in Texas City, Texas, and Bellingham Technical College in Bellingham, Washington.

8. *Labor Market Information*

Combined Labor Market Information for Alameda County and Contra Costa County is displayed on the following page. Similar information for adjacent Solano County, is displayed on the next page. The tables show Employment Projections from 2002 through 2012 for the Occupational Titles that we have identified as needing the training provided by the PTEC program. The Total columns indicate the average yearly needs for each Occupational Title over the ten year period. The total of these gives the total needs for PTEC trained workers as 274 openings per year in Alameda and Contra Costa Counties alone. Solano County contributes an additional need for 36 workers in the closest related fields, increasing the total need to 310 workers per year. Other Production Occupations in Solano County could add another 108 workers per year to the possible demand, especially if the PTEC program eventually expands to include courses related to food processing.

We believe that demand is far in excess of our initial class sizes of 25 to 30 students per year. Our graduates are expected to be preferred over any competing workers who will require up to one year of on-the-job training.

Occupational Employment Projections 2002-2012
Alameda and Contra Costa Counties

SOC Code	Occupational Title	Annual Average 2002	Annual Average 2012	Employ. Change Numerical	Employ. Change %	Av. Ann. Jobs – New jobs	Av. Ann. Jobs – Net replace.	Total	Median Hourly Wage	Edu. & Training Levels
51-8000	Plant & System Operators	3,770	3,850	80	2.1	8	111	119	N/A	
51-8013	Power Plant Operators	410	420	10	2.4	1	11	12	\$30.88	12-MO OJT
51-8021	Stationary Engineers & Boiler Operators	610	620	10	1.6	1	11	12	\$31.01	12-MO OJT
51-8031	Water & Liquid Waste Treatment Plant & System Operators	890	910	20	2.2	2	31	33	\$29.03	12-MO OJT
51-8091	Chemical Plant & System Operators	310	330	20	6.5	2	10	12	\$22.97	12-MO OJT
51-8093	Petroleum Pump System Operators, Refinery Operators, & Gaugers	1,150	1,160	10	0.9	1	36	37	\$24.26	12-MO OJT
51-9011	Chemical Equipment Operators & Tenders	170	170	0	0.0	0	5	5	\$20.82	1-12MO OJT
51-9012	Separating, Filtering, Clarifying, precipitating and Still Machine Setters, Operators, Tenders	1090	1,180	90	8.3	9	35	44	\$16.14	1-12MO OJT

**Occupational Employment Projections 2002-2012
Solano County**

9/01

SOC Code	Occupational Title	Annual Average 2002	Annual Average 2012	Employ. Change Numerical	Employ. Change %	Av. Ann. Jobs – New jobs	Av. Ann. Jobs – Net replace.	Total	Median Hourly Wage	Edu. & Training Levels
51-8000	Plant & System Operators	520	490	-30	-5.8	0	16	16	N/A	
51-8021	Stationary Engineers & Boiler Operators	50	60	10	20.0	1	1	2	\$27.13	12-MO OJT
51-8031	Water & Liquid Waste Treatment Plant & System Operators	120	120	0	0.0	0	4	4	\$26.66	12-MO OJT
51-8093	Petroleum Pump System Operators, Refinery Operators, & Gaugers	280	230	-50	-17.9	0	9	9	N/A	12-MO OJT
51-8099	Plant & System Operators	30	30	0	0.0	0	1	1	\$22.83	12-MO OJT
51-9000	Other Production Occupations	2,430	2,930	500	20.6	50	58	108	N/A	
51-9012	Separating, Filtering, Clarifying, precipitating and Still Machine Setters, Operators, Tenders	60	70	10	16.7	1	2	3	\$16.24	1-12MO OJT
51-9023	Machine Setters, Operators, & Tenders	50	50	0	0.0	0	1	1	\$14.03	1-12 MO OJT

9. *Labor Market Analysis*

As the Labor Market Information from the previous section indicates, the demand for workers with PTEC training is far in excess of the supply of the graduates from LMC to the local labor force. We will initially offer enough sections for 25 to 30 graduates per year, and we will prepare to eventually triple the size of our program, as enrollment trends, available equipment, and available faculty permit. Even with the expanded program, it has been estimated that there may be a need for up to three separate PTEC programs in the San Francisco Bay Area community colleges to meet the anticipated demand in the area.

We are very confident that the local industry is committed to hiring from our PTEC program. They have indicated their preference to hiring a local workforce from a local community college. Local companies have committed to hiring students who have earned a PTEC certificate or an A.S. degree in PTEC from Los Medanos College. Work on developing this PTEC program began as a result of a request from the local industry, and they are playing a crucial role by providing advice on the advisory board, contributing to the instructor pool, and contributing financial support and material to the program. The Dow Chemical Company has donated a project director 20 hours a week for up to one year to develop and establish the program at Los Medanos College.

We expect the demand by local industry for PTEC trained workers to remain strong for the foreseeable future. Most of the crude oil refined in the local area originates from Alaska and other sources around the Pacific Ocean that are not subject to supply disruptions due to either hurricanes or political turmoil. Other local industries where PTEC workers could be employed are in the chemical industry, in food, waste disposal and water processing, to name a few.

PTEC graduates have a very favorable earning potential:

- Starting salaries range between \$45,000 and \$65,000 annually.
- With overtime hours, salaries are usually near \$90,000 to \$100,000 annually within five years.

Our PTEC graduates will learn theory and analysis skills in addition to their knowledge of applications. This is crucial for understanding how processing systems work. This understanding will enable our graduates to work with the highly technical systems that allow local industries to remain competitive with similar industries around the world. Local industries expect their costs to decrease, as mistakes due to a lack of understanding decrease. This will of course increase the financial viability of the companies where our graduates will work, which will also maintain the industry demand for PTEC trained students.

Our program intends to serve several types of students. We intend to provide retraining and job placement to displaced workers, to provide outreach to local

high schools and recruit students into high-skill high-wage careers, and training to adult, re-entry students.

10. *Employer Survey/Other Evidence of Need*

From December 1, 2005 to March 2, 2006, face to face interviews were held by Vera M. Knowles of The Dow Chemical Company and project director for the PTEC program loaned to LMC from The Dow Chemical Company, with the following hiring managers in local industry:

Marianne Smith, HR, USS POSCO, Pittsburg, Ca.
 Rulon McKay, HR Manager, Martinez Shell Refinery, Ca.
 Mike Hinchcliff, Training Leader, Martinez Shell Refinery, Ca.
 Randy Schultz, HR Manager Conoco Phillips Company, Rodeo Ca.
 Bill Tanner, G&PA Leader, Conoco Phillips Company, Rodeo Ca.
 Charles Wiseman, HR Manager, The Dow Chemical Company, Pittsburg, Ca.
 Jim Ambrose, Operations Training, Chevron Refinery, Richmond, Ca.
 Kip Cantonese, HR Manager, General Chemical Corp., Bay Point Ca.
 Rick Rios, HR Manager, Tesoro Corp., Avon, Ca.
 Dennis Laniohan, Plant Manager, Delta Diablo Sanitation, Pittsburg, Ca.
 Mario DiGiovanni, Plant Manager, MECS, Martinez, Ca.

The survey specifically addressed hiring prospects for the job title "Process Technician".

The following questions were asked:

What science skills are required of your new, entry level process technicians?
 What are the math skills required in your new, entry level process technicians?
 What type of problems do they face and give me an example of how they use math to solve the problem?
 What are the oral communication skills required in your new, entry level process technicians?
 What are the written communication skills required in your new, entry level process technicians?
 What type of process control problems do your new, entry level process technicians face?
 What other skills or knowledge are desirable for your new, entry level process technicians?

Additional questions and hiring projections follow. The hiring projections are summarized in aggregate to maintain the confidentiality of each of the nine employers surveyed.

How many employees do you currently have in the process technicians' role?
175

How many process technician employees do you currently plan to hire in 2006?
168

How many process technician employees do you currently plan to hire in 2007?
129

How many process technician employees do you currently plan to hire in 2008?
120

How many process technician employees do you currently plan to hire in 2009?
119

How many process technician employees do you currently plan to hire in 2010?
119

A second survey was completed via e-mail in early May to confirm 2006 numbers. Candidates confirmed the need to hire an aggregate of 175 process technicians for the 2006 year.

All of the employers listed above have indicated that the PTEC program proposed here would qualify our students for their job opening. The employers also stated that they would preferentially hire students who have completed the proposed LMC PTEC program. The Dow Chemical Company has already listed its preference for the LMC PTEC program completers in its latest employee searches.

11. *Explanation of Employer Relationship*

The LMC PTEC program has been developed at the request of chemical and refining industries in the region. These companies serve on the LMC PTEC advisory board, have provided advice on adapting the national CAPT curriculum to regional industry needs, have offered assistance in cash and kind, and have offered internship opportunities, job shadowing, and site visits to students. The first group of students will have the hands-on lab component of their classes taught by LMC faculty at USS Posco and The Dow Chemical Company, which are located within a mile of the college. The first group will help to build the PTEC lab which will be relocated to the LMC campus. Subsequent students will have their hands-on lab instruction at LMC.

As mentioned above, the fast track program is geared to displaced workers screened and enrolled at LMC through the Workforce Development Board. The regular PTEC program will be open to all students just like any other community college course.

12. *List of Members of Advisory Committee*

The list of advisory board members follows: David Gruber and Caz Pereira represent Gruber & Pereira Associates and are workforce development consultants.

NAME	ORGANIZATION	COMMENTS
Linda Chandler, Strategic Planner	Workforce Development Board of Contra Costa County	Outreach Support
Linda Collins, Director	Career Ladders Project	Outreach to high schools
Kurt Crowder Physics & Engineering Instructor	LMC	Faculty member
Ed Diokno, County Supervisor Federal Glover's office, Policy Analyst	Supervisor Glover's Office	Outreach support
Ruth Goodin, Grants and Economic Development	LMC	Grant writer for program funding
David Gruber	Gruber & Pereira Associates	Workforce Development Consultant
Mariane Huber-Smith, HR and Training	USS Posco	Will provide access to labs at USS Posco and will hire graduates.
Alan Ichikawa, Training Leader	The Dow Chemical Company	Will hire graduates
Kiran Kamath, Dean of Occupational Education	LMC	Manager responsible for PTEC program at LMC
Vera Knowles, Project Manager	The Dow Chemical Company	Project Manager for the start-up of the LMC PTEC program. Will hire graduates.
Bob Lanter, Executive Director	Workforce Development Board of Contra Costa County	Outreach Support
Rulon McKay, HR Manager	Shell Refinery	Will hire graduates. Also serves on the Contra Costa County Workforce Development Board.
Caz Pereira	Gruber & Pereira Associates	Workforce Development Consultant
Mitch Schweickert, Chemistry Instructor	LMC	Faculty member

13. *Minutes of Key Meetings/Recommendations*

Enclosed as attachment #1 are 7 pages on an Excel spreadsheet tracking the discussions of the meetings of the Contra Costa Process Technology (CCPT) Advisory Committee. Sections of the minutes that are particularly relevant to this application are highlighted. The Action Item Register in particular gives a good summary of the actions taken by the CCPT Advisory Committee.

Minutes from the May 3, 2006 meeting of LMC's Curriculum Committee are also included as attachment #2. Highlighted areas pertain to the PTEC program. Discussion regarding a possible Technical Writing course is also highlighted. All 8 new PTEC courses were unanimously approved.

14. *Recommendation of Regional Consortium*

Enclosed as attachment #3 are the minutes of the Bay Area Community College Consortium of Occupational Programs (BACCCOP). The program was unanimously endorsed at the May 18, 2006 meeting.

QUALITY

15. *Display of Proposed Sequence*

The proposed sequence of courses for an AS Degree in Process Technology is:

- First Semester
 - PTEC 10 (3)
 - MATH 30 (4)
 - CHEM 6 (4)
 - PTEC 12 (1)
 - BUS 35 or computer literacy (0-4)
 - Second Semester
 - PHYS 15 (4)
 - PTEC 24 (3)
 - PTEC 25 (3)
 - PTEC 27 (1)
 - ENGL 100 (3)
 - PE (1)
 - Third Semester
 - PTEC 35 (3)
 - ANTHR 7 (3)*
 - DRAMA 15 (3)*
 - PHIL 2 (3)*
 - SPCH 40 (3)
- * *Double counts*

- Fourth Semester
 - PTEC 45 (3)
 - PTEC 48 (4)
 - POLSC 10 (3)
 - PE (1)
 - Degree applicable elective (1)

Attachment #4 shows a flowchart indicating the order in which courses for the PTEC program should be taken. It demonstrates how a student who has completed one year of high school algebra would be able to complete the sequence in four semesters to satisfy the major requirements for an A.S. degree in Process Technology.

This sequence would also be followed by a student seeking a Certification of Completion in Process Technology. In order to complete the program in three semesters instead of four, we plan to offer PTEC 35 as a 'short term', half semester length course. We would then offer both PTEC 45 and PTEC 48 as short term courses over the second half of the semester. Students could also complete the certificate requirements in less than two years if we offer PTEC 35 over the summer.

- First Semester
 - PTEC 10 (3)
 - MATH 30 (4)
 - CHEM 6 (4)
 - PTEC 12 (1)
- Second Semester
 - PHYS 15 (4)
 - PTEC 24 (3)
 - PTEC 25 (3)
 - PTEC 27 (1)
- Third Semester
 - PTEC 35 (3)
 - PTEC 45 (3)
 - PTEC 48 (4)

16. *Outlines of Record for Required Courses*

Outlines are attached (attachment #5) for all of the following courses, which are required for both the Certificate of Achievement in Process Technology and the AS degree in Process Technology.

PTEC 10, Introduction to Process Technology
 PTEC 12, Petrochemical Safety, Health, and Environment
 PTEC 24, Process Instrumentation
 PTEC 25, Process Tech. I—Equipment
 PTEC 27, Applied Instrumentation
 PTEC 35, Process Technology II—Systems
 PTEC 45, Process Technology III— Operations
 PTEC 48, Process Troubleshooting
 MATH 30, Intermediate Algebra
 CHEM 6, Introduction to Inorganic and Physical Chemistry
 PHYS 15, Introduction to Physics

17. *Transfer Applicability*

The PTEC program is not intended to be a transfer program. We have not been able to identify a single program in the state that uses PTEC courses for transfer.

Much of the content of PTEC courses overlaps the content of Chemical Engineering courses, and a student in Chemical Engineering would undoubtedly benefit from the knowledge presented in the PTEC program. However, LMC's Engineering faculty has determined that none of the PTEC courses are appropriate for preparing a student for transfer into a Chemical Engineering program. None of the PTEC courses resemble the courses required for transfer to local four-year Engineering programs. Furthermore, the course content that is common to both PTEC and Chemical Engineering is introduced by four-year programs in Upper Division courses.

18. *Program Evaluation Plan*

Los Medanos College has a standard program evaluation process known as "Instructional Program Review and Planning". A detailed review is undertaken by each program at the college every 3 years. In addition, programs undertake annual updates. A sample of the planning document is included as attachment #6.

In addition to Program Review, and to ensure the success and credibility of the Process Technology program, the Process Technology Advisory Board will;

- Maintain a partnership between Los Medanos College, local industry, and County Board of Supervisors to ensure the program meets the needs of industry.
- Actively recruit quality, diverse students into the program.
- Provide preparatory guidance for potential students.
- Provide internships and mentorship for students with industrial partners.
- Promote industry support in hiring of program graduates.
- Promote participation and support with local school districts.
- Promote participation and support from local unions.
- Review instructor's industrial qualifications.
- Advise training materials and aids.
- Make program accessible and beneficial to incumbent technicians.
- Advise on evaluation system for determining effectiveness of the program.
- Maintain an information sharing network with institutions having similar programs.

The Process Technology Advisory Board will meet at least quarterly during the first two years of the program, and then at least annually after that.

Furthermore, it is our intention that Los Medanos College be recognized by the Center for the Advancement of Process Technology (CAPT) as a Member Educational Institution. Part of the Member institution requirements includes giving the CAPT exit exam for all of our 2 year program graduates. These results will also be used to evaluate the PTEC program at LMC.

FEASIBILITY

19. *Library and Learning Resources Plan*

Two sets of the PTEC textbooks are currently being purchased and will be kept at LMC's Learning Resources Center (LRC). Other texts, videos, and other media will be identified and purchased on a regular basis through a collaborative effort between PTEC instructors and LMC's Head Librarian. These media will be purchased through the normal LRC budget.

20. *Facilities and Equipment Plan*

The PTEC program will require the use of a wet chemistry lab, a computer lab, and two PTEC labs with physical experiments including a scaled down version of a processing system.

LMC already has a wet chemistry lab which is heavily utilized currently by the Chemistry Department. A new Science Building, now under construction, is expected to make a wet chemistry lab available in the fall of 2008. The new lab is expected to meet the needs of both the Chemistry and the PTEC departments.

Computer lab space is available on campus and will be shared with other programs. At least one more computer lab will become available and could be shared with the PTEC program when the new Science Building is completed.

A lab area will be renovated and equipped to create the two PTEC labs.

The tentative initial budget is:

Remodel and equip lab space for two PTEC labs	\$125,000 (one time)
Purchase software for PTEC computer simulations	\$40,000 (one time)
Prorated annual expense for upgrading equipment	\$10,000
Equipment repair	\$5,000

The program may eventually triple in size in future years, requiring the budget items above to increase accordingly. Facilities currently funded or currently under construction will be able to accommodate much of this increase.

New facilities plans will be added to LMC's Master Plan if enrollment trends point to the need for additional space.

21. *Financial Support Plan*

The one time costs listed above (Total: \$165,000) have already been provided through a combination of industry support and grants.

Continuing costs will be covered through a combination of apportionment and industry donations. We will also continue to apply for grants to supplement these sources to develop the program.

22. *Faculty Qualifications and Availability*

The minimum qualification to teach in the Process Technology program is an AS degree along with 6 years of relevant industry experience or a BA degree along with 2 years of relevant industry experience.

With the support of the local industry and members of the advisory board, we have already held several faculty information and recruitment open houses to discuss the PTEC program and have determined a good pool of qualified instructors. Resumes have been collected and are on file in the Office of Instruction.

We plan to begin the program with 5-8 adjunct faculty. We expect to hire one full-time instructor to manage the success of the program and to teach up to 4 of the courses once the program is established. The rest of the core PTEC instructors (3 - 4) will probably continue to be adjunct faculty with industry experience. The instructors for the rest of the curriculum (Math, Chemistry, Physics, etc.) will be the existing LMC faculty.

COMPLIANCE

23. *Model Curriculum*

Our program largely follows the model curriculum developed by the Center for the Advancement of Process Technology (CAPT) in Texas. We have largely used the same course titles in our program.

CAPT was created and developed eight core courses as the model curriculum with the support of a grant from the National Science Foundation. In 2002, CAPT was designated an NSF ATE National Center of Excellence for Process Technology Education and awarded a three-year grant for \$3,000,000.

The titles of courses used in the model curriculum can be inferred from the attachment #7 (Course Objectives). More detailed information can be found at www.capttech.org.

- The CAPT curriculum is:
 - Offered at 41 colleges in 20 US States (including the Virgin Islands)
 - Offered in 2 international colleges

- Graduates actively hired by 23 companies
- Based in Texas City, Texas

Our curriculum was modified and adapted by local industry consultants, members of the advisory board, and LMC faculty to suit local industry needs. The only major change to the model curriculum is that we do not include a course in Quality (but it might be included as an elective in the future). Instead, we offer PTEC 27, Applied Instrumentation, to meet the needs of local industry. CAPT has been informed of this change and has no objection to it.

24. *Licensing, Accreditation, or Professional Certification Standards*

As mentioned earlier in section 18, LMC will become a Member Educational Institutional of the Center for the Advancement of Process Technology, which will hold LMC to the high standards necessary for a high quality program. We also intend to become an active member of the California Chemical & Process Technology Alliance (CCPTA), which is associated with CAPT.

All of our students will take CAPT's PTEX examination as an exit exam for the PTEC program. Students passing this test will be recognized by employers as having successfully completed their PTEC training.

25. *Student Selection and Fees*

The only required entry criterion for this program is MATH 25, Elementary Algebra (the equivalent of one year of high school algebra). The program also lists ENGL 90, Integrated Reading, Writing, and Critical Thinking, as an "advisory" to establish a baseline of English reading and writing.

The English department at LMC has indicated an interest in developing a Technical Writing course in response to some of the discussion at LMC's Curriculum Committee meeting. When this course is offered, we may change the English advisory from ENGL 90 to the Technical Writing course. Please see the Curriculum Committee minutes (Attachment # 2).

26. *Programs Provided by Contract*

We are planning to offer a grant-funded version of the program in collaboration with the Contra Costa Workforce Development Board.