

## CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

### NEW CERTIFICATE PROGRAM PROPOSAL

#### PROGRAM AREA BIOLOGY

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1. **Title:** Clinical Training Certificate Program in Clinical Laboratory Science
2. **Objectives:** To meet the critical shortage of licensed clinical laboratory scientists (CLS) in the region, the State of California and the nation, the Clinical Training Certificate Program in Clinical Laboratory Science at CSUCI will provide one year clinical training at the partner hospitals to students with an educational background in CLS to allow graduates of the Certificate program to become licensed clinical laboratory scientists.
3. **Program Description:** The Clinical Training Certificate Program in CLS consists of twelve-months learning of the specialties of each individual department in a clinical laboratory at a partner hospital, including blood bank, chemistry, urinalysis, flow cytometry, immunohistochemistry, hematology, microbiology and parasitology. Emphasis will be placed on the importance of safety, quality control and quality assurance.

Prerequisites: BS in Biology with an Emphasis in Clinical Laboratory Science or equivalent educational credential.

Required Courses:

The curriculum for the Certificate Program includes the following components:

Orientation (1 week)

Students will spend their first week in orientation, including an overview of hospital-wide programs, policies, benefits, reviewing the general policies for the training program, safety policies, program schedules, and expectations.

General Laboratory Techniques (3 weeks, 1 unit)

The majority of lectures during the first three weeks of the program are in a workshop format and cover general laboratory techniques. Topics include: computers, QC/QA/PT, CQI, accreditation, educational methods, management, instrumentation/method evaluation, body fluids/cell counts, use of the microscope, making and staining smears, lab math, troubleshooting skills, and point-of-care testing. Objectives will be met through exams, exercises, and student projects.

Blood Bank (5-week rotation, 2 units)

The Blood Bank rotation will cover all phases of pretransfusion testing including ABO/Rh typing, antibody screening/identification, and compatibility testing. Students will have the opportunity to process various blood components for transfusion and receive an introduction to the responsibilities of the Blood Bank during emergency and trauma situations.

Chemistry (20-week rotation, 6 units)

The Chemistry rotation consists of routine and special chemistry procedures, therapeutic drug monitoring, and serological testing. Students will learn about test analysis, clinical significance, and

testing methodologies and have the opportunity to participate in a method evaluation. Using the laboratory's state-of-the-art instrumentation, students will become familiar with the automation and computerization of the modern clinical laboratory. Quality control reports will be used to troubleshoot and problem solve.

#### Flow Cytometry and Immunohistochemistry (2 weeks)

Flow/IMPX will also be part of the Chemistry training. Students will spend time in this area learning about the applications of flow cytometry to quantitate T and B cell populations, identifying leukemia markers, and determining DNA content. They will also learn about the applications of immunoperoxidase techniques to identify tissue and tumor markers.

#### Urinalysis (3 weeks)

Urinalysis will be part of the Chemistry training. Students will spend one week in a workshop that introduces basic urinalysis techniques. Students will learn about physical, chemical, and microscopic evaluation of urine samples and about special procedures done at the urinalysis workstation.

#### Hematology/Coagulation (8-week rotation, 3 units)

The Hematology rotation will include the study of whole blood components with emphasis on automated and manual procedures for the diagnosis of leukemias, anemias, and infectious diseases. Students will gain proficiency at evaluating peripheral smears and performing manual differentials. Students will also study coagulation process and coagulopathies.

#### Microbiology (9-week rotation, 4 units)

The Microbiology rotation will develop and enhance the student's awareness of diagnosing and treating infectious diseases. The rotation will include training in routine aerobic and anaerobic bacteriology, mycology, mycobacteriology, and virology. Students will be introduced to basic andrology procedures, including semen analysis. Susceptibility testing and clinical relevance of patient samples will be discussed to foster student's decision-making skills. In this rotation, students will be introduced to various automated microbiology systems, as well as standard manual techniques used to identify microorganisms.

#### Parasitology (3 weeks, units include in Microbiology)

Parasitology will be part of the Microbiology training and will provide students with the opportunity to apply their diagnostic skills. The Parasitology rotation will be conducted in a workshop format and will include lectures, multimedia presentations, introduction to specimen processing, and the microscopic evaluation of prepared smears.

#### Enhancement Sites (1 week)

During the Chemistry rotation, students will be scheduled for several field trips to local facilities to observe the variety of applications of clinical laboratory science. Students will spend one day at the local donor center to observe donor and component processing. They will also visit a reference laboratory, a technology firm, a physician's office laboratory, and a small hospital laboratory.

#### Central Processing and Phlebotomy (ongoing)

Phlebotomy skills on adults and adolescents will be developed throughout the year. An introduction to infant and pediatric phlebotomy will also be provided. Students will be assigned to year-long morning phlebotomy rounds so that they can develop their phlebotomy skills. Assignments will depend on where students are in their department rotation schedule. Instruction will emphasize the importance of proper specimen collection and processing as the first step in quality testing and quality patient care.

Review (2-week rotation)

At the end of the year, two weeks are to be provided to review all areas of the laboratory and complete program objectives.

4. **Program Advisor:** Ching-Hua Wang

5. **Justification:**

California is currently experiencing critical workforce shortages in many health professions. During the past 10 years, shortages in the nursing profession have been widely known, leading to efforts resulting in a significant reduction of these shortages. A gap in the nursing workforce remains, However. The less publicized shortages in other allied health fields also threaten access to quality healthcare. Allied health includes over 200 health professions, one of which is clinical laboratory science.

A recent study by the California Budget Project reveals that California's population is expected to increase by 10 million, with over 6 million residents projected to be 65 years of age or older by the year 2020. This growth in the 65 and over population represents a 75.4% increase since 2000. This change in population growth and aging will undoubtedly generate an increased demand for healthcare services and thus exacerbate the current shortage of allied health workers.

In addition, according to the same study, California has the most ethnically diverse population in the nation, with future projections indicating more diversity in the next decade. From the years 2000 to 2020, California's Latino population is projected to rise from 32.4% to 41.4%, and its Asian population is expected to grow by 46.9%. These statistics underscore the need to develop a culturally competent healthcare workforce that is representative of California's ethnically diverse population.

Challenges to developing, training, and educating an adequate supply of allied healthcare workers to meet current needs and projected demand in the next decade include, a lack of formal, accredited educational programs, limited clinical training sites, and a severe faculty shortage.

In December 2007, the California Hospital Association (CHA) conducted a survey of its hospital and health system members to determine which positions have the greatest adverse impact on patient care and hospital efficiencies when vacancies exist. The results indicate that the top three positions, aside from nurses, are clinical laboratory scientists, imaging professionals and pharmacists. The recent pandemic outbreak of the swine flu has further highlighted the looming risk for hospitals and their patients, reflected by the severe shortage

of technicians to run critical lab tests.

The shortage of clinical laboratory scientists is one of the most pressing workforce issues currently facing hospitals. Hospitals indicate that they currently can take as much as a year to fill some CLS job openings. The American Society for Clinical Pathology, which certifies lab professionals, indicates average job vacancy rates currently top 50% in some states. The Campaign for College Opportunity recently conducted a study funded by Kaiser Permanente and the California Wellness Foundation. The study analyzed 15 allied health positions and found that the annual projected shortfall for clinical laboratory scientist positions in California is at an alarming rate of 85%.

The CLS workers are an integral part of the patient care delivery team, conducting a wide range of diagnostic tests; from routine blood tests, specialized genetic testing, to vital tests as diagnosing heart attacks and identifying cancerous tumors. Their daily execution of lab tests is responsible for about 70% to 80% of all diagnostic and treatment decisions made by physicians. Delays in diagnosis and treatment caused by the shortage limit access to care by increasing length of stay, delaying surgeries or other procedures and increasing emergency room wait times. In sum, without the CLS professionals, health care would grind to a halt.

The CLS supply versus projected need ratio is at critical levels. With 13 programs in California, 4 academic and 9 hospital-based, producing approximately 119-125 graduates annually, California will be unable to fill the annually projected openings of 390 CLS positions for years 2006-2016.

To help ameliorate the impact of the CLS workforce shortage, California passed legislation in 2002 to introduce licensure for medical laboratory technicians (MLTs). These workers generally possess an associate degree from community colleges and can perform phlebotomy and less to moderately complex laboratory testing, and supervise lower level laboratory workers. However, even with the addition of the MLT classification, the CLS workforce shortage continues to be severe as MLTs cannot perform more complex testing and California has only one formal, accredited MLT training program.

6. **Other Fiscal Support Required:** The program will be offered through Extended University. The partner hospitals offer a tuition loan forgiveness program of \$12,000 per student enrolled in the program to cover the cost of tuition and educational expenses.
7. **Faculty Available to Teach:** Clinical staff to be hired by CSUCI
8. **Procedure: The total credit units for the Certificate program is 16.**

Upon completion of the required courses, the student wanting a certificate shall bring an official transcript to the Certificate Program Advisor. If each required course has been completed with a grade of B or better, the Advisor shall request a certificate to be issued through necessary channels.

**Ching-Hua Wang**

Proposer of Certificate

**10-21-09**

Date

## Approvals

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Program Chair

Date

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Curriculum Committee Chair

Date

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Dean

Date