

CLINICAL SCIENCE

Clinical Science Program Learning Outcomes (<https://catalog.csudh.edu/program-learning-outcomes/health-human-services-nursing/bachelor-science-clinical-science-learning-outcomes/>)

College of Health, Human Services, and Nursing

Division of Health Sciences

Bachelor of Science

Degree Roadmaps

Cytotechnology Option

Medical Technology Option

Certificates

Clinical Science- Cytotechnology

Clinical Science- Medical Technology

Faculty

Cheryl Jackson-Harris

Paula D'Amore

Payman Nasr

Program Office: WH A-330, (310) 243-3748

Program Description

Undergraduate

The rapid expansion of basic medical information, methodology and technology in recent years has increased the demand for highly trained professional personnel in the clinical, research, and teaching laboratories. The training of such specialists as medical technologists (medical/clinical laboratory scientists), and cytotechnologists is all within the broad scope of the field of clinical science.

The Bachelor of Science Degree in Clinical Science is designed to provide baccalaureate level preparation in the clinical science professions. A strong preclinical curriculum is combined within the science and liberal arts focus of the University. All eligible BS grads will need to apply to the Post Baccalaureate Certificate for the clinical internship program in either Medical Technology or Cytotechnology.

Post-Baccalaureate Certificates

The Post Baccalaureate Certificate Program options in Cytotechnology and Medical Technology (Medical/Clinical Laboratory Scientists) provide an academic and clinical route to professional certification and California state licensure. All applicants must apply to the University through Cal State Apply and be admitted to the Post Baccalaureate Certificate in Clinical Science. Refer to the Graduate/Postbaccalaureate Admission Requirements in the University Catalog for detail.

Graduates of the program, upon passage of the appropriate certification examination(s), are considered to be medical laboratory scientists and professionals armed with the technical skills and knowledge theory necessary to meet current and future standards of quality laboratory and health care services practice. The clinical or internship components of both options are offered under the supervision of university faculty, in affiliation with approved, accredited diagnostic health care facilities. Students admitted to the certificate program and who are planning to apply to a clinical option internship must meet the entry and prerequisite requirements specified in the Supplemental Criteria.

Pre-Admission Disclosure for Academic Programs Leading to Licensure or Credentialing

Admission into programs leading to licensure and credentialing does not guarantee that students will obtain a license or credential. Licensure and credentialing requirements are set by agencies that are not controlled by or affiliated with the CSU and requirements can change at any time. For example, licensure or credentialing requirements can include evidence of the right to work in the United States (e.g., social security number or tax payer identification number) or successfully passing a criminal background check. Students are responsible for determining whether they can meet licensure or credentialing requirements. The CSU will not refund tuition, fees, or any associated costs, to students who determine subsequent to admission that they cannot meet licensure or credentialing requirements. Information concerning licensure and credentialing requirements are available from **Cheryl Jackson-Harris: WH 330 - (310) 243- 3899**.

Features and Accreditation

The Medical Technology program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) located at 5600 N. River Rd., Suite 720 Rosemont, IL 60018. Phone: (773) 714-8880

The Cytotechnology clinical program is accredited through The Greater Los Angeles Consortium by the Program review Committee of the American Society of Cytopathology, sponsored by the Commission on Accreditation of Allied health Programs (CAAHEP) located at 25400 US Highway 19 N, Suite 158, Clearwater, FL 33763 , phone (727) 210-2350.

Graduates of each program are eligible for the certification examination of the American Society of Clinical Pathology (ASCP) Board of Certification (BOC) and for licensure by the California State Department of Health.

Academic Advisement

Careful and comprehensive advising is a key to student success in the University and entails student, faculty and University support services. Clinical Science majors are required to consult with an advisor upon admission and each semester before registration. Students must provide the program with copies of transcripts from all institutions attended. Each student should review the University Catalog and become familiar with the academic program and relevant policies and procedures before his/her first advising session. Students in their clinical year meet regularly with an assigned university education coordinator or liaison. Students in the clinical year meet periodically with the Committee for Clinical Laboratory Experience (CCLE) to monitor progress.

Preparation

High school students are encouraged to take chemistry, biology and physics in addition to English, a foreign language, fine arts and computer science courses.

College transfer students should contact their counseling office, the CSU Dominguez Hills' Clinical Science Office and College of Health, Human Services and Nursing Student Services Center to identify appropriate lower division major/minor preparatory courses. Courses in general and quantitative chemistry, anatomy and physiology, physics, general biology and statistics are recommended.

Students with foreign degrees must have their transcripts evaluated by an approved external foreign transcript evaluation service and comply with the University's policy on the Test of English as a Foreign Language (TOEFL).

The evaluation must document an acceptable baccalaureate degree before consideration for clinical placement may be made. The California State Department of Public Health Laboratory Field Services will accept the evaluation from "Current Members" of the National Association of Credential Evaluation Services (NACES) or "Endorsed Members" of the Association of International Credential Evaluators, Inc. (AICE)

Graduation With Honors

An undergraduate student may be a candidate for graduation with Honors in Clinical Science provided he or she meets the following criteria:

1. A minimum of 36 units in residence at CSU Dominguez Hills;
2. A minimum grade point average of 3.5 in courses used to satisfy the upper division requirement in the major; and
3. Recommendation by the Clinical Science faculty.

Students who achieve Honors in Clinical Science will have the information recorded on their transcripts and diplomas.

Practicing Professionals in the Clinical Options

Cytotechnologists are skilled in examining human cellular material in search of abnormalities that are the warning signs of cancer. They perform a variety of diagnostic and research procedures in the cytology laboratory including basic cytologic examinations, staining and processing tissue specimens which have been removed by non-invasive techniques, surgery or fine needle aspiration. Advanced techniques include the use of the digital and immunofluorescent microscopy, cytogenetics and molecular markers. The cytotechnologist is capable of developing a differential diagnosis based upon cellular evidence in conjunction with pertinent cognitive knowledge and other clinical data.

The Medical Technologists is also known as a Clinical Laboratory Scientist (CLS) and/or Medical Laboratory Scientist (MLS), depending on the certification obtained. Medical Technologists perform or supervise the performance of clinical laboratory testing in the general and specialized areas of clinical biochemistry, hematology, medical microbiology, immunohematology, immunology, serology and clinical microscopy. Data collected is correlated to pathophysiology and used by health professionals in the diagnosis, treatment and prevention of disease. Medical Technologists review and conduct research activities.

Student Organizations

All Clinical Science Majors and other interested students are encouraged to join and become active in the Clinical Science Club. For application and other information, contact the club president or advisor by calling the program.

Supplemental Admission Criteria and Policies for Clinical Internships

All applicants must first be admitted to the University. However, Admission to the University does not constitute automatic admission to the clinical internship. The clinical application is available in the Department.

Application Dates for Clinical Internships

Clinical Application	Clinical Component	Dates Beginning
Cytotechnology	March 1-31	Summer Class
Medical Technology	October 1-31	Summer Class

For all clinical training internships, i.e. Cytotechnology and Medical Technology, Supplemental Admission Criteria apply.

Because clinical facilities in each of the options have a limited number of positions, a limited number of students are admitted to a given option. In addition, clinical positions may not be available to International student visa holders or students not proficient in English. For any clinical class there may be more qualified applicants than can be accommodated, thereby designating the program as "impacted."

Applicants for clinical placement must have been fully admitted to the University and must have been in residence for two semesters prior to the beginning of the clinical component. BS degree applicants must have completed all graduation requirements with the exception of clinical requirement.

From among the applicants for a Clinical Option, the Committee for Clinical Laboratory Experience (CCLE) will determine those applicants who are accepted to the clinical internship on the basis of the following Supplemental Admission Criteria:

1. Academic success as reflected by:
2. Grade point average in required "pre-clinical course work" (minimum 3.00 on a 4.00 scale).
3. desirable "pattern" of academic performance (i.e., consistency and/or improvement);
4. completion of the General Education Requirements.
5. Evaluation by the Committee for Clinical Laboratory Experience of the student's potential to succeed in the program and the profession (appearance, attitude, interest, enthusiasm, poise, motivation, expectations, career planning, maturity, social understanding and involvement, flexibility, and stability).
6. Physical, professional and emotional fitness for the demands of the job as verified by a physician and three letters of recommendation. At least one of these letters should validate relevant work experience and/or knowledge of the field. Accordingly, it is recommended that one be from an employer and the others from faculty teaching for the pre-clinical course work at CSU Dominguez Hills or other colleges and universities. Recommendations should address recent activities.
7. Completion of two semesters in residence prior to beginning the clinical training.
8. Clarity of expression (oral and written) and relevant extracurricular activity (e.g. active member or officer of a social club, Clinical Science Club, Science Society, etc.).
9. Have no felony convictions.
10. Other factors that will be considered, but which will not guarantee selection are: prior qualified application, efforts to seek psycho-social balance in the program, and veteran status.

Applicants to the clinical who have repeated three or more designated pre-clinical classes may have their ranking reduced in the selection process. Repeating a single course more than once is discouraged. After 3 unsuccessful attempts, the applicant is no longer eligible for internship.

The CCLE is composed of university faculty and adjunct faculty from each clinical facility. One or more oral interviews will be required on campus and/or at the clinical facilities.

The program director will notify the applicant of the admission decision in consultation with the Committee for Clinical Laboratory Experience (CCLE). The program coordinator, in consultation with the officials of the affiliated program, determine to which affiliate the student will be placed. Student preference is considered as one factor in the decision. In order to retain admission status, students must communicate their intention to the program coordinator, in writing, within 15 working days following notification of admission. Final placement assumes continued eligibility under supplementary and basic admission criteria. In some cases, the CCLE may require additional course work or performance levels prior to placement consideration. Failure to satisfy such requirements may disqualify the student from entering the clinical component.

Academic Regulations

For pre-clinical courses, a grade of "C-" is the minimum acceptable grade. In the clinical component, a grade of "C" is the minimal acceptable grade. Students in the clinical internship who receive a grade or grades below the acceptable minimum or who show lack of reasonable progress may be requested to appear before the Committee for Clinical Laboratory Experience at the clinical affiliate. The committee also considers disciplinary cases. Continued lack of progress, in the opinion of the committee (and with the approval of the division chair), may result in Administrative or Academic Dismissal from the clinical program.

Transportation

Students are required to furnish their own transportation to and from the clinical facility and in those pre-clinical courses that require field trips.

Uniforms

Uniforms or laboratory coats are required in the clinical and for most pre-clinical courses.

Essential Functions

A combination of psychomotor and sensory abilities is needed by students to successfully achieve professional entry-level competencies in the clinical sciences. These "Essential Functions" fall into the categories of visual, motor, communications, behavior and computational:

Essential Functions: Visual

The CLS student must possess sufficient visual acuity to recognize, perform and analyze findings from clinical procedures, including the necessary skills to:

- Observe clinical demonstrations.
- Differentiate color reactions.
- Characterize physical properties of biologicals and solutions.
- Distinguish numbers, characters, decimal points, and graphs on an electronic screen.
- Distinguish numbers, characters, decimal points, and graphs on a hard copy report.
- Identify stained and unstained structural features of specimens using a binocular bright-field microscope.
- Match figures, lines, structural and spatial configurations with or apart from each other.
- Read calibration marks on measuring devices.

- Observe signs of distress from clients during phlebotomy, injections, or imaging.

Essential Functions: Motor

The CLS students must possess sufficient motor ability to perform clinical diagnostic tests and to manipulate laboratory equipment, including the necessary skills to:

- Travel to numerous clinical sites for assigned clinical rotations.
- Position patients for diagnostic procedures.
- Deliver assistance to clients in distress during phlebotomy, injections or imaging.
- Control and adjust switches, dials, keypads, and/or touchpads on equipment used for laboratory tests and diagnostic procedure.
- Manipulate equipment used for phlebotomy, injections or fine needle biopsies.
- Control and adjust devices used for measuring biologicals, chemicals, or radiation.
- Move about a clinical facility in a safe manner.

Essential Functions: Communications

- Read, write and verbalize in English.
- Read and comprehend technical policy and procedure manuals and test inserts.
- Follow verbal and written instructions.
- Instruct clients prior to specimen collection, in preparation for and/or during diagnostic procedures.
- Take written, computer and practical examination.
- Investigate and prepare a research paper and/or project.

Essential Functions: Behavior

The CLS student must possess sufficient behavioral skill to:

- Adapt to changes in schedule and/or assignments.
- Show flexibility and adjust to instruction from multiple clinical practitioners and Adjunct Faculty.
- Comply with the health, safety and liability policies listed in the University Catalog.

Essential Function: Computational

The CLS student must possess sufficient computational skills to perform mathematical calculations needed for laboratory data analysis and quality assurance.

Health Insurance

Student health and accident insurance is required during clinical training. It is the responsibility of the student to secure acceptable insurance and present evidence of health insurance before entering the clinical. For additional information, contact the Student Health Center or the affiliate.

Liability Insurance

Clinical affiliates require students to carry professional liability insurance during the clinical component. In those cases, it is the responsibility of the student to provide evidence of such coverage prior to entering the clinical class. An information packet on insurance requirements is included in the Application Packet for Clinical Placement.

Health Requirements

Immune Status

Students selected for internships in the clinical options will be required to demonstrate immunity to rubella, rubella and mumps (MMR), must know their immune status to varicella (immunity is not a requirement), must show that they are free from tuberculosis by PPD or chest X-ray, and must know their immune status to hepatitis B and DPT. The influenza shot and additional requirements may be required by specific sites. Students must provide proof of all the above to the Clinical Sciences office before beginning training at any affiliated facility.

Hepatitis B Vaccination

Clinical Science students will be offered, at their own expense, vaccination against Hepatitis B at the CSU Dominguez Hills Student Health Center. Students may refuse the vaccine using the approved waiver form. The record of waiver or vaccination must be provided to the clinical facility and on file in the Clinical Sciences department. Students may be vaccinated by their own health care provider or by the Department of Public Health. All students are encouraged to consult with their health care provider for information on possible adverse affects before being vaccinated.

Physical Examination

Successful applicants will be required to obtain a physical examination including a tuberculin skin test. Additional information on these procedures may be obtained by contacting the program office. The physical examination may be done by the student's family physician or, for a nominal fee, at the Student Health Center. An appointment is advised well in advance of the beginning of the clinical class.

Trainee License

For the clinical year in medical technology, students must obtain a California Clinical Laboratory Technologist Trainee's license before entering the clinical year. The Trainee license is requested on line through the LFS web site and official transcripts sent by the registrar's office, directly to:

State of California Department of Health Services
Laboratory Field Services Section
Attn: Personnel Licensing
850 Marina Bay Parkway
Richmond, California 94804

Mission and Goals

The mission of the Clinical Sciences programs is to provide high quality education and professional preparation in cytotechnology and medical technology for a diverse student population, to prepare them for traditional and emerging roles as clinical science professionals. The goals of each of the programs, in addition to preparing entry-level clinical practitioners are to:

- Produce clinical scientists who can research, develop, evaluate and implement clinical skills and procedures utilizing a high degree of independent judgment and applied cognitive knowledge;
- Consult, where appropriate, with other members of the health care team; and
- Instill within graduates a sense of professionalism, dedication, and commitment to healthcare and their profession that will stay with them throughout their careers.

Bachelor of Science in Clinical Science

Total Course Requirements for the Bachelor's Degree

See the "Requirements for the Bachelor's Degree (<https://catalog.csudh.edu/general-information/baccalaureate-degrees-undergraduate-studies/>)" in the University Catalog for complete details on general degree requirements. A minimum of 40 units, including those required for the major, must be upper division.

Elective Requirements

Completion of elective courses (beyond the requirements listed below) to reach a total of a minimum of 120 units.

General Education Requirements (49 units)

See the "General Education (<https://catalog.csudh.edu/general-information/double-counting-general-education-courses/general-education/>)" requirements in the University Catalog or the Class Schedule for the most current information on General Education requirements and course offerings.

Graduation Writing Assessment Requirement

See the "Graduation Writing Assessment Requirement (<https://catalog.csudh.edu/general-information/graduate-writing-examination/>)" in the University Catalog.

Major Requirements (72-76 units)

The following courses, or their approved transfer equivalents, are required of all candidates for this degree.

Single Field Major - no minor required

Cytotechnology Option (72 units)

A. Lower Division Requirements (38 units)

BIO 120 Principles of Biology I (3)
BIO 121 Principles of Biology Lab I (1)
BIO 122 Principles of Biology II (3)
BIO 123 Principles of Biology II Lab (1)
BIO 124 Principles of Biology III (3)
BIO 125 Principles of Biology Lab III (1)
BIO 250 Elem Hum Anat & Physiol (3)
BIO 220 Molecular Biology (3)
CHE 110 General Chemistry I (5)
CHE 112 General Chemistry II (5)
CHE 230 Quantitative Analysis (4)
HEA 201 Healthcare Systems and Perspectives (3)
MAT 131 Elementary Statistics and Probability (3)

B. Upper Division Requirements (34 units)

BIO 324 Microbiology with Clinical Applications (3)
BIO 325 Microbiology with Clinical Applications Laboratory (1)
CHE 316 Survey of Organic Chemistry (3)
CHE 317 Survey of Organic Chemistry Laboratory (1)
CLS 301 Intro Clin Lab Proced Lec (2)
CLS 304 Introduction to Urinalysis and Body Fluids (3)
CLS 306 Clin Immun & Immunochem (4)
CLS 307 Clinical Hematology (4)
CLS 308 Pathophys for Hlth Professions (3)
BIO 320 Cell Biology (3)
BIO 340 Genetics (3)
BIO 422 Histology (3)
BIO 424 Histology Laboratory (1)

CLS 301 Intro Clin Lab Proced Lec (2), CLS 304 Introduction to Urinalysis and Body Fluids (3), CLS 306 Clin Immun & Immunochem (4), CLS 307

Clinical Hematology (4), CLS 308 Pathophys for Hlth Professions (3), BIO 320 Cell Biology (3), BIO 340 Genetics (3), BIO 422 Histology (3) and BIO 424 Histology Laboratory (1): These are pre-clinical courses from which grade point averages are calculated to determine clinical placement eligibility. They must have been taken within the last five years in the United States. Exceptions may be granted by the Program Coordinator.

Medical Technology Option (76 units)

A. Lower Division Requirements (34 units)

BIO 120 Principles of Biology I (3)
 BIO 121 Principles of Biology Lab I (1)
 BIO 122 Principles of Biology II (3)
 BIO 123 Principles of Biology II Lab (1)
 BIO 250 Elem Hum Anat & Physiol (3)
 BIO 220 Molecular Biology (3)
 CHE 110 General Chemistry I (5)
 CHE 112 General Chemistry II (5)
 CHE 230 Quantitative Analysis (4)
 HEA 201 Healthcare Systems and Perspectives (3)
 MAT 131 Elementary Statistics and Probability (3)

B. Upper Division Requirements (42 units)

BIO 324 Microbiology with Clinical Applications (3)
 BIO 325 Microbiology with Clinical Applications Laboratory (1)
 CHE 316 Survey of Organic Chemistry (3)
 CHE 317 Survey of Organic Chemistry Laboratory (1)
 CLS 301 Intro Clin Lab Proced Lec (2)
 CLS 304 Introduction to Urinalysis and Body Fluids (3)
 CLS 306 Clin Immun & Immunohem (4)
 CLS 307 Clinical Hematology (4)
 CLS 308 Pathophys for Hlth Professions (3)
 CLS 401 Overview: Virology/Mycology (2)
 BIO 425 Medical Bacteriology (2)
 BIO 435 Medical Bacteriology Laboratory (2)
 BIO 458 Human Parasitology (3)
 BIO 459 Human Parasitology Laboratory (1)
 CHE 450 Biochemistry I (4)
 CHE 451 Biochemistry I Lab (1)
 CHE 456 Clinical Chemistry (3)

CLS 301 Intro Clin Lab Proced Lec (2), CLS 304 Introduction to Urinalysis and Body Fluids (3), CLS 306 Clin Immun & Immunohem (4), CLS 307 Clinical Hematology (4), CLS 308 Pathophys for Hlth Professions (3), CLS 401 Overview: Virology/Mycology (2), BIO 425 Medical Bacteriology (2)/BIO 435 Medical Bacteriology Laboratory (2), BIO 458 Human Parasitology (3) and CHE 456 Clinical Chemistry (3): These are pre-clinical courses from which grade point averages are calculated to determine clinical placement eligibility. They must have been taken within the last five years in the United States. Exceptions may be granted by the Program Coordinator.

Phlebotomy experience (CLS 302 Clinical Practice Lab (1)) is required by many of the affiliated labs for clinical internships in medical technology. Each medical technology student is required to consult with an advisor regarding this elective.

California state licensure for medical technology requires that three (3) units in physics, including light and electricity, be completed prior to issuing the clinical trainee license. Each medical technology student is required to consult with an advisor regarding this state regulation.

Post-Baccalaureate Certificate Program in Clinical Science - Medical Technology (29 units)

All pre-clinical requirements must be completed prior to starting the clinical internship. See BS degree Curriculum. The Post Baccalaureate Certificate in Clinical Science - Medical Technology is awarded upon successful completion of Clinical Year Laboratories and Lectures as a California Licensed Clinical Laboratory Technologist Trainee in an affiliated clinical facility. Awardees are eligible for the California issued licensure for the generalist Clinical Laboratory Scientist and to sit for the National Certifications Examination(s).

Requirements

Required Courses

CLS 430 Clin Micro Lab (3-4)
 CLS 431 Clin Chemistry Lab (3-4)
 CLS 432 Clin Hem/Urinalysis Lab (4)
 CLS 433 Clin Immunohem/Sero Lab (3)
 CLS 434 Clin Special Proc Lab (1)
 CLS 440 Correl Clin Micro (2)
 CLS 441 Correl Clin Chem (2)
 CLS 442 Correl Clin Hem-Urinalysis (2)
 CLS 443 Correl Clin Immunohem-Sero (2)
 CLS 491 Management Skills in Clinical Sciences (3)
 CLS 492 Research Methods in Clinical Science (3)

Post-Baccalaureate Certificate Program in Clinical Science - Cytotechnology (30 units)

All pre-clinical requirements must be completed prior to starting the clinical internship. See BS degree Curriculum. The Post Baccalaureate Certificate in Clinical Science – Cytotechnology is awarded upon successful completion of Clinical Year Laboratories and Lectures as a Cytotechnologist Trainee in an affiliated clinical facility. Awardees are eligible to sit for the national certification of the ASCP - Board of Certification and California issued state licensure.

Requirements

Required Courses

CLS 450 Micro: Fem Genit Tract (4)
 CLS 451 Micro: Resp & Gi Tract (2)
 CLS 452 Micro: Gu Tract/Body Cav Fluid (2)
 CLS 453 Micro: Fine Needle Aspir (2)
 CLS 454 Micro: Systems Overview (4)
 CLS 455 Cytologic Preparation (2)
 CLS 460 General Cytology (3)
 CLS 461 Cyto Res & Gi Tract (2)
 CLS 462 Cyto Gu Body C Fluids (2)
 CLS 463 Fine Needle Aspirat Cytol (1)
 CLS 491 Management Skills in Clinical Sciences (3)
 CLS 492 Research Methods in Clinical Science (3)