

CLINICAL SCIENCE, BACHELOR OF SCIENCE

Requirements

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 (43 units)

See the "General Education (<https://catalog.csudh.edu/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 (3 Units)

See the "Graduation Writing Assessment Requirement (<https://catalog.csudh.edu/general-information/baccalaureate-degrees-undergraduate-studies/gwar-certifying-courses/>)" section in the University Catalog.

Statutory Requirements: United States History, Constitution and American Ideals (6 Units)

See the "University Graduation Requirements (<https://catalog.csudh.edu/general-information/baccalaureate-degrees-undergraduate-studies/university-graduation-requirements/>)" section 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)

Code	Title	Hours
Lower Division Requirements		
BIO 120	Principles of Biology I	3
BIO 121	Principles of Biology Laboratory I	1
BIO 122	Principles of Biology II	3
BIO 123	Principles of Biology Laboratory II	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 ¹	4
HEA 201	Healthcare Systems and Perspectives	3
MAT 131	Elementary Statistics and Probability	3
Upper Division Requirements		
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 ¹	2
CLS 304	Introduction to Urinalysis and Body Fluids ¹	3
CLS 306	Clin Immun & Immunohem ¹	4
CLS 307	Clinical Hematology ¹	4
CLS 308	Pathophys for Hlth Professions ¹	3
BIO 320	Cell Biology ¹	3
BIO 340	Genetics ¹	3
BIO 422	Histology ¹	3
BIO 424	Histology Laboratory ¹	1
Total Hours		72

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)

Code	Title	Hours
Lower Division Requirements		
BIO 120	Principles of Biology I	3
BIO 121	Principles of Biology Laboratory I	1
BIO 122	Principles of Biology II	3
BIO 123	Principles of Biology Laboratory II	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 ¹	4
HEA 201	Healthcare Systems and Perspectives	3
MAT 131	Elementary Statistics and Probability	3
Upper Division Requirements		
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 ¹	2
CLS 304	Introduction to Urinalysis and Body Fluids ¹	3
CLS 306	Clin Immun & Immunohem ¹	4
CLS 307	Clinical Hematology ¹	4
CLS 308	Pathophys for Hlth Professions ¹	3
CLS 401	Overview: Virology/Mycology ¹	2
BIO 425	Medical Bacteriology ¹	2
BIO 435	Medical Bacteriology Laboratory ¹	2
BIO 458	Human Parasitology ¹	3
BIO 459	Human Parasitology Laboratory	1
CHE 450	Biochemistry I	4
CHE 451	Biochemistry I Lab	1
CHE 456	Clinical Chemistry ¹	3
Total Hours		76

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Phlebotomy experience (CLS 302 Clinical Practice Lab) 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.

Program Learning Outcomes

- Demonstrate the ability to recall, apply and synthesize knowledge of scientific principles, clinical concepts, mechanisms leading to disease, and methodologies in each area of the laboratory.
- Demonstrate the ability to correlate laboratory findings with the disease presentation.
- Demonstrate the ability to perform clinical diagnostic testing and evaluate outcomes in order to solve problems related to pre-analytical, analytical, and post-analytical components of services in each area of the laboratory.
- Demonstrate the ability to use knowledge of research design/practice to evaluate published studies, to create an abstract and proposal, and to address laboratory-related advances and innovations.
- Demonstrate the ability to apply principles of management to address laboratory operations, communication, ethics, safety, regulatory and compliance, and professional development.
- Demonstrate professionalism in personal conduct by showing the ability to communicate effectively, respect patient rights, culture, privacy, and participate as a member of the healthcare team and comply with laboratory standards of practice.
- Graduates of the program, upon completion of their clinical training and passage of the appropriate certification examination(s), are considered to be clinical/medical laboratory scientists and professionals armed with the technical skills and knowledge theory necessary to meet current and future standards of quality laboratory and healthcare services practice.

Cytotechnology Option Roadmaps

4-Year Degree Roadmap

Freshman		
Fall		Hours
MAT 131	Elementary Statistics and Probability (GE Area 2) ^{can be substituted by MAT 132 or MAT 134}	3
BIO 120	Principles of Biology I (GE 5B)	3
BIO 121	Principles of Biology Laboratory I (GE 5C)	1
CHE 110	General Chemistry I (Meets GE 5A) ^{Prerequisite CHE 108 (5) or CHE 110 Placement Test}	5
GE Area 1C: Oral Communication		3
Hours		15
Spring		
GE Area 1B: Critical Thinking		3
GE Area 1A: English Composition		3
CHE 112	General Chemistry II	5
BIO 122	Principles of Biology II	3

BIO 123	Principles of Biology Laboratory II	1
Hours		15
Sophomore		
Fall		
CHE 230	Quantitative Analysis ¹	4
HEA 201	Healthcare Systems and Perspectives	3
GE Area 4A Perspectives on Individual, Groups, and Society		3
GE Area 3A: Arts		3
Free Electives to reach 120 units		2
Hours		15
Spring		
POL 101	American Institutions	3
BIO 250	Elem Hum Anat & Physiol	3
BIO 124	Principles of Biology III	3
BIO 125	Principles of Biology Lab III	1
CLS 301	Intro Clin Lab Proced Lec ¹	2
GE Area 3B: Humanities		3
Hours		15
Junior		
Fall		
GE Area 4B: Global and Historical Perspectives		3
GE Area 6: Ethnic Studies		3
CHE 316	Survey of Organic Chemistry	3
CHE 317	Survey of Organic Chemistry Laboratory	1
BIO 220	Molecular Biology	3
BIO 221	Molecular Biology Laboratory	1
Hours		14
Spring		
CLS 304	Introduction to Urinalysis and Body Fluids ¹	3
CLS 307	Clinical Hematology (Meets GVAR requirements) ¹	4
HIS 101	History Of United States ^{Statutory Requirement}	3
GE Area 3UD: Integrative studies in the Arts and Humanities		3
Free Electives to reach 120 units		3
Hours		16
Senior		
Fall		
BIO 326	General Microbiology	3
BIO 327	General Microbiology Laboratory	1
BIO 320	Cell Biology ¹	3
CLS 306	Clin Immun & Immunohem ¹	4
GE Area 4UD: Integrative Studies in the Social & Behavioral Sciences		3
Hours		14
Spring		
CLS 308	Pathophys for Hlth Professions ¹	3
BIO 422	Histology ¹	3
BIO 424	Histology Laboratory ¹	1
BIO 340	Genetics (GE 5UD) ¹	3
Free Electives to reach 120 units		6
Hours		16
Total Hours		120

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2-Year Roadmap (transfer students)

First Year		
Fall		Hours
BIO 220	Molecular Biology	3
BIO 221	Molecular Biology Laboratory	1

BIO 250	Elem Hum Anat & Physiol	3
CHE 230	Quantitative Analysis ¹	4
GE Area 3UD: Integrative Studies in the Arts & Humanities		3
Hours		14
Spring		
CLS 301	Intro Clin Lab Proced Lec ¹	2
CLS 304	Introduction to Urinalysis and Body Fluids ¹	3
CHE 316	Survey of Organic Chemistry	3
CHE 317	Survey of Organic Chemistry Laboratory	1
BIO 340	Genetics (GE 5UD)	3
GE Area 4UD: Integrative Studies in the Social & Behavioral Sciences		3
Hours		15
Second Year		
Fall		
CLS 306	Clin Immun & Immunochem ¹	4
BIO 422	Histology ¹	3
BIO 424	Histology Laboratory ¹	1
BIO 326	General Microbiology	3
BIO 327	General Microbiology Laboratory	1
Elective to meet 60 units		3
Hours		15
Spring		
CLS 307	Clinical Hematology (Meets GEAR requirements) ¹	4
CLS 308	Pathophys for Hlth Professions ¹	3
BIO 320	Cell Biology ¹	3
Electives to reach 60 units		6
Hours		16
Total Hours		60

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Medical Technology Roadmaps

4-Year Degree Roadmap

4-Year Degree Roadmap

First Year		
Fall		Hours
BIO 120	Principles of Biology I (GE 5B)	3
BIO 121	Principles of Biology Laboratory I (GE 5C)	1
CHE 110	General Chemistry I (GE 5A)	4
MAT 131	Elementary Statistics and Probability (GE Area 2) ^{Can be substituted by MAT 132 or MAT 134}	3
GE 1C: Oral Communication		3
Hours		14
Spring		
CHE 112	General Chemistry II	4
BIO 122	Principles of Biology II	3
BIO 123	Principles of Biology Laboratory II	1
GE Area 1A: English Composition		3
GE Area 1B: Critical Thinking		3
Hours		14
Second Year		
Fall		
HIS 101	History Of United States (Statutory Requirement)	3
HEA 201	Healthcare Systems and Perspectives	3
CHE 230	Quantitative Analysis ¹	4
GE Area 3A: Arts		3

GE Area 4A: Perspectives on Individuals & Society		3
Hours		16
Spring		
POL 101	American Institutions ^{Statutory Requirements}	3
BIO 250	Elem Hum Anat & Physiol	3
BIO 251	Elem Hum Anatomy Phys Lab (Elective) ^{Elective}	1
GE Area 3B: Humanities		3
GE Area 4B: Global & Historical Perspectives		3
GE Area 6: Ethnic Studies		3
Hours		16
Third Year		
Fall		
CLS 301	Intro Clin Lab Proced Lec ¹	2
CLS 304	Introduction to Urinalysis and Body Fluids ¹	3
BIO 220	Molecular Biology	3
BIO 221	Molecular Biology Laboratory (Elective) ^{Elective}	1
CHE 316	Survey of Organic Chemistry	3
CHE 317	Survey of Organic Chemistry Laboratory	1
GE Area 4UD: Integrative Studies in the Social & Behavioral Sciences		3
Hours		16
Spring		
CLS 306	Clin Immun & Immunochem ¹	4
CHE 451	Biochemistry I Lab	1
CHE 450	Biochemistry I	4
BIO 340	Genetics (GE 5UD)	3
Elective to meet 120 units		3
Hours		15
Fourth Year		
Fall		
CLS 307	Clinical Hematology (Meets GEAR requirements) ¹	4
CLS 308	Pathophys for Hlth Professions ¹	3
BIO 324	Microbiology with Clinical Applications	3
BIO 325	Microbiology with Clinical Applications Laboratory	1
BIO 458	Human Parasitology ¹	3
BIO 459	Human Parasitology Laboratory ¹	1
Hours		15
Spring		
BIO 425	Medical Bacteriology ¹	2
BIO 435	Medical Bacteriology Laboratory ¹	2
CHE 456	Clinical Chemistry ¹	3
CLS 401	Overview: Virology/Mycology ¹	2
GE Area 3UD: Integrative Studies in the Humanities		3
Hours		12
Total Hours		118

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2-Year Roadmap (transfer students)

First Year

Fall		Hours
CHE 316	Survey of Organic Chemistry	3
CHE 317	Survey of Organic Chemistry Laboratory	1
CLS 301	Intro Clin Lab Proced Lec ¹	2
CHE 230	Quantitative Analysis ¹	4
BIO 220	Molecular Biology	3
BIO 221	Molecular Biology Laboratory (Elective)	1
GE Area 3UD: Integrative Studies in the Arts & Humanities		3
Hours		17

Spring

CLS 304	Introduction to Urinalysis and Body Fluids ¹	3
CLS 306	Clin Immun & Immunohem ¹	4
CLS 308	Pathophys for Hlth Professions ¹	3
BIO 340	Genetics (GE 5UD)	3
GE Area 4UD: Integrative Studies in the Social & Behavioral Sciences		3
Hours		16

Second Year

Fall		Hours
CLS 307	Clinical Hematology (Meets GEAR requirements) ¹	4
BIO 324	Microbiology with Clinical Applications	3
BIO 325	Microbiology with Clinical Applications Laboratory	1
BIO 459	Human Parasitology Laboratory	1
BIO 458	Human Parasitology	3
Elective to meet 120 units		1
Hours		13

Spring

BIO 425	Medical Bacteriology ¹	2
BIO 435	Medical Bacteriology Laboratory ¹	2
CHE 456	Clinical Chemistry ¹	3
CLS 401	Overview: Virology/Mycology ¹	2
CHE 450	Biochemistry I	4
CHE 451	Biochemistry I Lab	1
Hours		14
Total Hours		60

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