

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 (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)

Code	Title	Hours
Lower Division Requirements		
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 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 & Immunochem 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 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 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 & Immunochem 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

1. Demonstrate the ability to recall, apply and synthesize knowledge of scientific principles, clinical concepts, pathophysiology, and methodologies in each area of the laboratory.
2. Demonstrate the ability to correlate laboratory findings with the pathophysiology displayed.
3. 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.
4. 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.
5. Demonstrate the ability to apply principles of management to address laboratory operations, communication, ethics, safety, regulatory and compliance, and professional development
6. Demonstrate professionalism in personal conduct by showing the ability to communicate effectively, respect patient rights, culture and privacy, participate as a member of the health care team, and compliance with laboratory standards of practice
7. Graduates of the clinical internship program are expected to take and pass the appropriate state and national certification credentialing examinations, to gain employment as certified professionals, to sustain membership in professional organizations, and to participate in continuing learning throughout their careers.

Cytotechnology Option Roadmaps

4-Year Degree Roadmap

Course	Title	Hours
First Year		
Fall		
GE Area A1 Oral Communication		3
BIO 120	Principles of Biology I	3
BIO 121	Principles of Biology Lab I	1
CHE 110	General Chemistry I	5
MAT 131	Elementary Statistics and Probability	3
Hours		15
Spring		
GE Area A2 Written Communication		3
HEA 201	Healthcare Systems and Perspectives (GE Area E)	3
CHE 112	General Chemistry II	5
BIO 122	Principles of Biology II	3
BIO 123	Principles of Biology II Lab	1
Hours		15
Second Year		
Fall		
GE Area A3 Logic/Critical Thinking		3
POL 101	American Institutions	3
BIO 124	Principles of Biology III	3

BIO 125	Principles of Biology Lab III	1
CHE 230	Quantitative Analysis ¹	4
Hours		14
Spring		
GE Area F Ethnic Studies		3
GE Area C or D		3
GE Area C or D		3
BIO 250	Elem Hum Anat & Physiol	3
HIS 101	History Of United States	3
Hours		15
Third Year		
Fall		
CHE 316	Survey of Organic Chemistry	3
CHE 317	Survey of Organic Chemistry Laboratory	1
GE Area C or D		3
GE Area C or D		3
GE Area C or D		3
CLS 301	Intro Clin Lab Proced Lec ¹	2
Hours		15
Spring		
BIO 220	Molecular Biology	3
BIO 221	Molecular Biology Laboratory	1
BIO 324	Microbiology with Clinical Applications	3
BIO 325	Microbiology with Clinical Applications Laboratory	1
CLS 304	Introduction to Urinalysis and Body Fluids ¹	3
CLS 306	Clin Immun & Immunochem ¹	4
Hours		15
Fourth Year		
Fall		
CLS 307	Clinical Hematology ¹	4
CLS 308	Pathophys for Hlth Professions ¹	3
GE Area C3 Integrative Studies in the Humanities		3
BIO 320	Cell Biology ¹	3
Elective to meet 120 units		2
Hours		15
Spring		
BIO 422	Histology ¹	3
BIO 424	Histology Laboratory ¹	1
BIO 340	Genetics (satisfies GE Area B5) ¹	3
GE Area D3 Integrative Studies in the Social Sciences		3
Elective to meet 120 units		3
ENG 350	Advanced Composition (GWAR satisfying course)	3
Hours		16
Total Hours		120

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2-Year Roadmap (transfer students)

Course	Title	Hours
First Year		
Fall		
BIO 220	Molecular Biology	3
BIO 221	Molecular Biology Laboratory	1
BIO 250	Elem Hum Anat & Physiol	3
CHE 230	Quantitative Analysis ¹	4
BIO 324	Microbiology with Clinical Applications	3
BIO 325	Microbiology with Clinical Applications Laboratory	1
Hours		15

Spring		
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
CLS 306	Clin Immun & Immunohem ¹	4
ENG 350	Advanced Composition (GWAR satisfying course)	3
CLS 301	Intro Clin Lab Proc Lec ¹	2
Hours		16
Second Year		
Fall		
CLS 307	Clinical Hematology ¹	4
Elective to meet 120 units		3
GE Area D3 Integrative Studies in the Social Sciences		3
CLS 308	Pathophys for Hlth Professions ¹	3
BIO 320	Cell Biology ¹	3
Hours		16
Spring		
BIO 422	Histology ¹	3
BIO 424	Histology Laboratory ¹	1
BIO 340	Genetics (satisfies GE Area B5) ¹	3
GE Area C3 Integrative Studies in the Humanities		3
Elective to meet 120 units		3
Hours		13
Total Hours		60

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Medical Technology Roadmaps

4-Year Degree Roadmap

Course	Title	Hours
First Year		
Fall		
GE Area A1 Oral Communication		3
BIO 120	Principles of Biology I	3
BIO 121	Principles of Biology Lab I	1
CHE 110	General Chemistry I	5
MAT 131	Elementary Statistics and Probability (GE Area B4)	3
Hours		15
Spring		
GE Area A2 Written Communication		3
CHE 112	General Chemistry II	5
GE Area A3 Logic/Critical Thinking		3
BIO 122	Principles of Biology II	3
BIO 123	Principles of Biology II Lab	1
Hours		15
Second Year		
Fall		
CHE 230	Quantitative Analysis ¹	4
BIO 250	Elem Hum Anat & Physiol	3
GE Area F Ethnic Studies		3
POL 101	American Institutions	3
GE Area C or D		3
Hours		16
Spring		
HEA 201	Healthcare Systems and Perspectives (GE Area E Lifelong Learning and Self-Development)	3
GE Area C or D		3

GE Area C or D		3
CHE 316	Survey of Organic Chemistry	3
CHE 317	Survey of Organic Chemistry Laboratory	1
HIS 101	History Of United States	3
Hours		16

Third Year

Fall		
BIO 220	Molecular Biology	3
BIO 324	Microbiology with Clinical Applications	3
BIO 325	Microbiology with Clinical Applications Laboratory	1
GE Area C or D		3
GE Area C or D		3
CLS 301	Intro Clin Lab Proc Lec	2
Hours		15

Spring

CLS 304	Introduction to Urinalysis and Body Fluids	3
CLS 306	Clin Immun & Immunohem ¹	4
CLS 308	Pathophys for Hlth Professions ¹	3
GE Area B5 Integrative Studies in Natural Sciences		3
GE Area C3 Integrative Studies in the Humanities		3
Hours		16

Fourth Year

Fall		
CLS 307	Clinical Hematology ¹	4
CHE 450	Biochemistry I ¹	4
CHE 451	Biochemistry I Lab ¹	1
BIO 458	Human Parasitology ¹	3
BIO 459	Human Parasitology Laboratory ¹	1
ENG 350	Advanced Composition (GWAR satisfying course)	3
Hours		16
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 D3 Integrative Studies in the Social Sciences		3
Hours		12
Total Hours		121

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2-Year Roadmap (transfer students)

Course	Title	Hours
First Year		
Fall		
CHE 316	Survey of Organic Chemistry	3
CHE 317	Survey of Organic Chemistry Laboratory	1
CLS 301	Intro Clin Lab Proc Lec ¹	2

BIO 324	Microbiology with Clinical Applications	3
BIO 325	Microbiology with Clinical Applications Laboratory	1
CHE 230	Quantitative Analysis ¹	4
Hours		14
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
GE Area C3 Integrative Studies in the Humanities		3
ENG 350	Advanced Composition (GWAR satisfying course)	3
Hours		16
Second Year		
Fall		
CLS 307	Clinical Hematology ¹	4
CHE 450	Biochemistry I ¹	4
CHE 451	Biochemistry I Lab ¹	1
GE Area B5 Integrative Studies in Natural Sciences		3
Elective to meet 120 units		2
Hours		14
Spring		
BIO 425	Medical Bacteriology ¹	2
BIO 435	Medical Bacteriology Laboratory ¹	2
CHE 456	Clinical Chemistry ¹	3
BIO 458	Human Parasitology ¹	3
BIO 459	Human Parasitology Laboratory ¹	1
CLS 401	Overview: Virology/Mycology ¹	2
GE Area D3 Integrative Studies in the Social Sciences		3
Hours		16
Total Hours		60

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