Clinical Laboratory Science

Affiliated Institutions and Program Directors (subject to change)

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St. Luke's Medical Center, Cedar Rapids, Iowa--Nadine Sojka, MS, MT (ASCP)
University of North Dakota Clinical Laboratory Science Program--Ruth Paur, MS, MT (ASCP)

Clinical laboratory science solves problems associated with diagnostic medicine. Through laboratory work, research, and supervisory activities, clinical laboratory scientists contribute to the accurate diagnosis of disease.

The Clinical Laboratory Science program begins with three years of on-campus study in science, math, and Liberal Education. It concludes with a fourth year of highly specialized training at a hospital school of clinical laboratory science accredited by the National Accrediting Agency for Clinical Laboratory Sciences. Permission to apply for the competitive fourth year positions usually requires a grade point average of nearly 3.00. Clinical areas of study include hematology, chemistry, immunology, microbiology, immunohematology, and microscopy. Upon completion of the clinical year, students are eligible to take the National Registry Examination of the American Society of Clinical Pathologists and the National Certifying Examination of Medical Technologists.

Graduates of the program are in high demand and are prepared for technologist and supervisory positions in hospital, clinical, and research laboratories. The Clinical Laboratory Science degree is also appropriate preparation for graduate study in related careers such as biology, chemistry, and medicine.

Note: Students must make a formal application to be considered for the fourth-year clinical training. Students should discuss this procedure with the advisor early.

Programs

- Clinical Laboratory Science, B.S. ((3 + 1 Option)) *major*
- Clinical Laboratory Science, B.S. ((4 + 1 Option)) *major*

Career Directions

Laboratory Supervisor
Laboratory Technologist
Medicine
Research
Also: Graduate Study

Preparation

Recommended High School Courses

Biology

Chemistry

Physics

Mathematics

Computers

Clinical Laboratory Science, B.S. *major* (3 + 1 Option)

The Clinical Laboratory Science student must consult with the Clinical Laboratory Science advisor at the start of the academic program and regularly throughout the course of study. The student must complete the Bemidji State University Liberal Education requirements before the year of clinical study.

To prepare the student for the clinical year of training, two options are available: 1) a 3+1 option, where a student earns a Clinical Laboratory Science, B.S., degree, with the fourth year spent at an affiliated clinical program, and 2) a 4+1 option, where a student earns a Biology, B.S., degree, including specific courses in biology and chemistry, and completes the fifth year at an affiliated clinical program. Both options are described below.

Required Credits: 84
Required GPA: 2.25

I REQUIRED COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- BIOL 2110 Human Anatomy and Physiology (5 credits)
- BIOL 3300 Introduction to Hematology (4 credits)
- BIOL 3380 Molecular Genetics: Theory and Practice (4 credits)
- BIOL 3580 Immunology (4 credits)
- BIOL 3710 Microbiology (4 credits)
- BIOL 4210 Parasitology (4 credits)
- CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 2212 Principles of Chemistry II (4 credits)
- CHEM 3311 Organic Chemistry I (3 credits)
- CHEM 3371 Organic Chemistry Laboratory I (1 credit)
- CHEM 4411 Biochemistry I (3 credits)
- CHEM 4471 Biochemistry Laboratory I (1 credit)

SELECT 1 OF THE FOLLOWING COURSES:

- MATH 1170 College Algebra (4 credits)
- MATH 1470 Precalculus (5 credits)

II REQUIRED CLINICAL STUDIES

Clinical year courses, taken during the senior year beginning with summer term, are taken through entrance into the clinical year program at the University of North Dakota or at affiliated hospitals.

SUGGESTED SEMESTER SCHEDULE FOR CLINICAL LABORATORY SCIENCE MAJOR, B.S.

The following is a list of Clinical Laboratory Science courses arranged by year. This suggested schedule is intended to help students plan their courses without course conflicts. Courses that are asterisked(*) are recommended but not required. Courses that are double asterisked(**) are required but offered only in alternate years.

Note: With proper student planning and in consultation with the Clinical Laboratory Science coordinator, a student may complete his or her academic degree in 128 semester credits. It is possible, in some circumstances, that courses in a student's Liberal Education program may be used in his or her academic major. In addition, Clinical Laboratory Science students should register for ECON 2000 Markets and Resource Allocation in Liberal Education Goal Area 5.

Freshman

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- BIOL 2110 Human Anatomy and Physiology (5 credits)
- CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 2212 Principles of Chemistry II (4 credits)
- ENGL 1151 Composition (3 credits)
- ENGL 2152 Argument and Exposition (3 credits)
- MATH 1170 College Algebra (4 credits)
- or MATH 1470 Precalculus (5 credits)

Sophomore

- *BIOL 2360 Genetics (4 credits)
- **BIOL 3300 Introduction to Hematology (4 credits)
- BIOL 3380 Molecular Genetics: Theory and Practice (4 credits)
- BIOL 3710 Microbiology (4 credits)
- BIOL 3755 Medical Microbiology (3 credits)
- CHEM 3311 Organic Chemistry I (3 credits)
- *CHEM 3312 Organic Chemistry II (3 credits)
- CHEM 3371 Organic Chemistry Laboratory I (1 credit)
- *CHEM 3372 Organic Chemistry Laboratory II (1 credit)

Junior

- **BIOL 3300 Introduction to Hematology (4 credits)
- BIOL 3580 Immunology (4 credits)
- BIOL 4210 Parasitology (4 credits)
- CHEM 4411 Biochemistry I (3 credits)
- CHEM 4471 Biochemistry Laboratory I (1 credit)
- STAT 2610 Applied Statistics (4 credits)
- or PSY 3401 Basic Statistics for Research (4 credits)

Senior

- Clinical year courses

Clinical Laboratory Science, B.S. *major* (4 + 1 Option)

Note: After completing the clinical year courses, students will receive a double major: Biology, B.S., and Clinical Laboratory Science, B.S.

In this option, the student completes a Biology, B.S., major at Bemidji State University, and then applies for admission to the clinical year program through the University of North Dakota or other affiliated institution (a 2.80 GPA overall and in science courses is one requirement for entrance into the clinical year program).

This option may be of interest to students considering a pre-professional program such as pre-medicine, pre-veterinary medicine, or other pre-professional area. Students who fail to gain admission to the professional school of their choice will have the option of pursuing a health-related career in Clinical Laboratory Science.

Required Credits: 108
Required GPA: 2.25

REQUIRED CLINICAL STUDIES 4 + 1 OPTION

(a 2.80 GPA overall and in science courses is one requirement for entrance into the clinical year program). This option may be of interest to students considering a pre-professional program such as pre-medicine, pre-veterinary medicine, or other pre-professional area. Students who fail to gain admission to the professional school of their choice will have the option of pursuing a health-related career in Clinical Laboratory Science. NOTE: After completing the clinical year courses, students will receive a double major: Biology, B.S. and Clinical Laboratory Science, B.S. In this option, the student completes a Biology, B.S., major at Bemidji State University, and then applies for admission to the clinical year program through the University of North Dakota or other affiliated institution

I REQUIRED BIOLOGY COURSES

I. REQUIRED BIOLOGY COURSES:

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- BIOL 2110 Human Anatomy and Physiology (5 credits)
- BIOL 2360 Genetics (4 credits)
- BIOL 2610 General Ecology (3 credits)
- BIOL 3300 Introduction to Hematology (4 credits)
- BIOL 3380 Molecular Genetics: Theory and Practice (4 credits)
- BIOL 3580 Immunology (4 credits)
- BIOL 3710 Microbiology (4 credits)
- BIOL 4210 Parasitology (4 credits)

II CAPSTONE EXPERIENCE

This requirement may be completed in one of the following ways: A OR B

A.
COMPLETE A TWO-SEMESTER, 4 CREDIT RESEARCH COURSE (2 CREDITS PER SEMESTER)--ADVANCED LABORATORY PROJECTS IN
BIOLOGY (BIOL 4894 AND BIOL 4895) OR ADVANCED FIELD PROJECTS IN BIOLOGY (BIOL 4896 AND BIOL 4897)

B.
COMPLETE SOME OTHER CAPSTONE EXPERIENCE APPROVED BY
YOUR BIOLOGY ACADEMIC ADVISOR AND THE DEPARTMENT

III REQUIRED COURSES IN RELATED FIELDS

COMPLETE THE FOLLOWING COURSES:

- CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 2212 Principles of Chemistry II (4 credits)
- CHEM 3311 Organic Chemistry I (3 credits)
- CHEM 3312 Organic Chemistry II (3 credits)
- CHEM 3371 Organic Chemistry Laboratory I (1 credit)
- CHEM 3372 Organic Chemistry Laboratory II (1 credit)
- CHEM 4411 Biochemistry I (3 credits)
- CHEM 4471 Biochemistry Laboratory I (1 credit)

- PHYS 1101 General Physics I (4 credits)
  or PHYS 2101 Physics I (5 credits)
- PHYS 1102 General Physics II (4 credits)
  or PHYS 2102 Physics II (5 credits)

- STAT 2610 Applied Statistics (4 credits)
  or PSY 3401 Basic Statistics for Research (4 credits)

IV REQUIRED CLINICAL STUDIES

Clinical year courses, taken after the senior year beginning with summer term, are taken through entrance into the clinical year program at the University of North Dakota or at affiliated hospitals. NOTE: A clinical year position is not guaranteed. Students must apply for a clinical year position in October of the junior year. Please see advisor regarding the clinical year of study.

Courses

All-University Courses

The course numbers listed below, not always included in the semester class schedule, may be registered for by consent of the advisor, instructor, or department chair, or may be assigned by the department when warranted. Individual registration requires previous arrangement by the student and the completion of any required form or planning outline as well as any prerequisites.

1910, 2910, 3910, 4910 DIRECTED INDEPENDENT STUDY
1920, 2920, 3920, 4920 DIRECTED GROUP STUDY
1930, 2930, 3930, 4930 EXPERIMENTAL COURSE
1940, 2940, 3940, 4940 IN-SERVICE COURSE
1950, 2950, 3950, 4950 WORKSHOP, INSTITUTE, TOUR
1960, 2960, 3960, 4960 SPECIAL PURPOSE INSTRUCTION
1970, 2970, 3970, 4970 INTERNSHIP
1980, 2980, 3980, 4980 RESEARCH
1990, 2990, 3990, 4990 THESIS