

CLINICAL LABORATORY SCIENCES

CLINICAL LABORATORY TECHNICIAN OR MEDICAL LABORATORY TECHNICIAN

TECHNICAL OR TRANSFER

LIMITED ENROLLMENT

CONTACT PERSON: Angela Uhlich • Jack Science Center 220 224-5669 or 323-5482 • Angela.Uhlich@bsc.nodak.edu

The mission of the Clinical Laboratory Technician/Medical Laboratory Technician (CLT/MLT) Program is to provide a high quality learning-centered education in clinical laboratory theory and practice that maximizes student learning and makes students partners in their education.

The CLT/MLT, under the supervision of a physician or clinical laboratory scientist, performs many general laboratory tests which aid physicians in the diagnosis and treatment of disease. CLTs/MLTs are in demand throughout the nation in clinical, research and public health laboratories.

The goals of the Bismarck State College CLT/MLT program are to train competent CLTs/MLTs with the knowledge and skills necessary to demonstrate entry level proficiency in all areas of clinical laboratory science, to provide a two-year associate degree program for students in North Dakota and surrounding states, and to operate a program in which a maximum number of credits will fulfill requirements for four-year Clinical Laboratory Science programs in the state. The curriculum outlined below is prescribed to allow a student to meet these employment and transferability goals.

Clinical laboratory science is a demanding field of study and career. Success depends on self-discipline, self-motivation, self-reliance, integrity and the ability to work independently to solve problems and produce accurate laboratory results under stressful conditions.

Students receive both theoretical and experiential study, including a 7-month rotation through one of the program's clinical affiliate laboratories at Medcenter One Health Systems or St. Alexius Medical Center. Minimum grade requirements for those enrolled in the program are a 2.00 grade point average in all science and math courses and a 2.00 grade point average overall. Those who complete the requirements earn an associate in science degree and are eligible to write a national board examination to become certified as a CLT or MLT.

A strong science background (completion of high school units in chemistry, biology and algebra, or equivalent) is recommended for success in this program. The CLT/MLT program is highly selective and has a limited enrollment. Selection depends upon academic preparation as well as early date of application. The deadline for applications is May 1.

An interview and tour of Medcenter One Health Systems laboratory are required prior to acceptance into the program. The purposes of the tour and interview are to assist students in making the right career choice, and to design a semester-by-semester curriculum plan for each student, which will afford him/her the greatest opportunity for success.

BSC's CLT/MLT program is accredited by the National Accrediting Agency for Clinical Laboratory Science, 8410 W. Bryn Mawr Ave., Suite 670, Chicago, IL 60631. Phone: 773-714-8880.

CURRICULUM FOR ASSOCIATE IN SCIENCE:

FRESHMAN

CREDITS

Phlebotomy (CLS 103)	3
Anatomy and Physiology I&II (BIOL 220-221).....	6
AND	
Anatomy and Physiology I&II Lab (BIOL 220L-221L)	2
OR	
Human Structure and Function (CLS 100)	4
Chemistry (CHEM 115 or 121)	4
Chemistry Lab (CHEM 115L or 121L).....	1
Intro. to Organic and Biochemistry (CHEM 116)	4
Intro. to Organic and Biochemistry Lab (CHEM 116L).....	1
Urinalysis (CLS 113)	1
Clinical Parasitology (CLS 115)	1
*College Algebra (MATH 103)	4
Intro. to Medical Laboratory Science (CLS 101)	1
College Composition I (ENGL 110)	3
Introductory Microbiology (MICR 202).....	3
Introductory Microbiology Lab (MICR 202L).....	1
Immunology (CLS 201).....	4
Hematology (CLS 225).....	3
Total credits.....	38-42

SUMMER SESSION

Clinical Chemistry I (CLS 235).....	3
Clinical Microbiology I (CLS 245).....	3
Clinical Internship I (CLS 205).....	1
Clinical Internship II (CLS 215).....	2
Total credits.....	9

SOPHOMORE

Intro. to Professional Writing (ENGL 125).....	3
Fundamentals of Public Speaking (COMM 110).....	3
Intro. to Psychology (PSYC 111).....	3
Enrichment.....	2
Art and Humanities Electives.....	6
Social Science Elective.....	3
Clinical Chemistry II (CLS 236).....	1
Immunohematology (CLS 240).....	3
Clinical Microbiology II (CLS 246).....	1
Clinical Internship III (CLS 255).....	12
Total credits.....	37

*Higher math may be selected

PHLEBOTOMY TECHNICIAN

TECHNICAL LIMITED ENROLLMENT

CONTACT PERSON: Angela Uhlich • Jack Science Center 220 224-5669 or 323-5482 • Angela.Uhlich@bsc.nodak.edu

The mission of the Bismarck State College Phlebotomy Technician (PBT) program is to provide a high quality learning-centered education in phlebotomy theory and practice that maximizes student learning and makes students partners in their education. Phlebotomy is the skill of drawing blood for diagnostic purposes. BSC's PBT program will provide students with the most comprehensive training possible to keep up with the demands of a rapidly changing health care environment.

Students who successfully complete the two-semester program will earn a program certificate and be qualified to take a national certification exam.

The demand for certified phlebotomists is increasing. Clinical laboratories in many states now require phlebotomists to possess a certificate of completion from a nationally-approved and recognized program. Reasons include the steadily increasing numbers of diagnostic tests available to physicians, the growth in technology, and recent changes in the scope of phlebotomy practice itself. Blood-drawing was the domain of clinical laboratory scientists and clinical laboratory technicians 20 years ago. Phlebotomy is now a profession in its own right. This practice allows clinical lab scientists and technicians to work more exclusively with the diagnostic procedures of laboratory medicine.

The tasks of phlebotomists today go beyond drawing blood, however. They are also required to interpret physician's orders, use computers to enter patient demographics and send reports, process specimens and perform point-of-care test procedures in some facilities. BSC has offered a phlebotomy lecture/student lab course for many years. This program consists of one semester of courses at BSC, plus a four-week clinical rotation at one of the laboratories of the Q&R Clinic/Medcenter One Health Systems in Bismarck, Mandan, or Dickinson, or at Mid-Dakota Clinic and St. Alexius Medical Center in Bismarck.

The phlebotomy technician program has a limited enrollment of five students per semester. Selection depends upon early date of application as well as academic preparation. This is a demanding program. Successful students are those who are highly disciplined, self-motivated, self-reliant and capable of working independently.

Application deadline is May 1 for the fall semester and Oct. 1 for the spring semester. An interview is required prior to acceptance into the program.

BSC's Phlebotomy Technician program is approved by the National Accrediting Agency for Clinical Laboratory Science, 8410 W. Bryn Mawr Ave., Suite 670, Chicago, IL 60631. Phone: 773-714-8880.

SEMESTER I

CREDITS

Introduction to Computers (CSCI 101).....	3
College Composition I (ENGL 110).....	3
Human Structure and Function (CLS 100).....	4
Medical Terminology (BOTE 171).....	3
Phlebotomy (CLS 103).....	3
Organizational Behavior (BADM 281) (Elective).....	3
Total credits.....	19

SEMESTER II

Phlebotomy Internship (CLS 104).....	8
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CLINICAL LABORATORY SCIENTIST OR MEDICAL TECHNOLOGIST TRANSFER

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Besides being qualified to perform general laboratory tests, clinical laboratory scientists are also qualified to supervise a clinical laboratory, specialize in specific areas or go into clinical education.

To become a registered clinical laboratory scientist, a student must complete three years of academic studies and one year of professional training at an accredited school of clinical laboratory sciences.

Bismarck State College offers the first two years of academic training necessary for a bachelor of science in clinical laboratory science from most colleges and universities. Pre-professional courses offered in the first two years of study are designed to give the clinical laboratory science student the necessary scientific background to transfer into their junior year. Students should contact the school they plan to transfer to for the specific prerequisites of that college.

Students majoring in clinical laboratory science at Bismarck State College should apply to an accredited clinical laboratory science program the second semester of their sophomore year. Those who complete the requirements earn an Associate in Science degree.

SUGGESTED CURRICULUM FOR ASSOCIATE IN SCIENCE:

FRESHMAN

CREDITS

College Composition I-II, Intro. to Professional Writing (ENGL 110 and 120 or 125)	6
General Biology I&II (BIOL 150-151).....	6
General Biology I&II Lab (BIOL 150L-151L).....	2
General Chemistry I&II (CHEM 121-122).....	8
General Chemistry I&II Lab (CHEM 121L-122L)	2
*Algebra (MATH 103).....	4
Enrichment	2
Social Science Electives (SOC 110, PSYC 111 or ECON 201) .	6
Immunology (CLS 201).....	4
Total credits.....	40

SOPHOMORE

CREDITS

Anatomy and Physiology I&II (BIOL 220-221).....	6
Anatomy and Physiology I&II Lab (BIOL 220L-221L)	2
Organic Chemistry I&II (CHEM 241-242)	8
Organic Chemistry I&II Lab (CHEM 241L-242L)	2
Introductory Microbiology (MICR 202).....	3
Introductory Microbiology Lab (MICR 202L).....	1
Elements of Biochemistry (BIOC 260).....	3
Elements of Biochemistry Lab (BIOC 260L).....	1
Fundamentals of Public Speaking (COMM 110)	3
Ethics (PHIL 210)	3
Art and Humanities Electives	3
Total credits.....	35

*Higher math may be selected.

CLINICAL LABORATORY SCIENCES (CLS)

CLS 100 Human Structure and Function

F&S

4 credits

Includes lecture and laboratory. Designed for students enrolled in the Clinical Laboratory Technician and Phlebotomy Technician programs. Does not fulfill the requirements for nursing, surgical technician, massage therapy. Not GERTA approved. Fundamental concepts of the structure and function of the cells, tissues, organs and organ systems of the human body. Special emphasis is placed on those systems most closely related to diagnostic procedures performed in the clinical laboratory, including the following: skeletal, muscular, nervous, cardiovascular, lymphatic, immune, endocrine, digestive, respiratory and renal. Open to all students.

CLS 101 Introduction to Medical Laboratory Science

Fall

1 credit

An introduction to the medical laboratory and the profession of clinical laboratory science. Professional ethics, medical terminology, laboratory safety, the use and care of basic laboratory equipment. Open to all students.

CLS 103 Phlebotomy

F&S EO

3 credits

Phlebotomy is the "art of drawing blood." The course consists of a knowledge component to include: anatomy of hand, arm, foot and blood vessels; blood composition, specimen types, and coagulation factors. The motor skills component will include instruction in manual phlebotomy techniques, and drawing and handling specimens. The attitude component discusses the public relations aspect of the job and job applications. Open to all students.

CLS 104 Phlebotomy Internship

F&S, SM

8 credits

The internship provides a supervised rotation of no less than 160 hours in the phlebotomy section of the affiliated clinical laboratory. Prerequisites:

acceptance into the Phlebotomy Technician program, CLS 103, ENGL 110, CSCI 101, CLS 100, BOTE 171.

CLS 113	Urinalysis	Fall	1 credit
Review of renal anatomy and physiology; urinalysis theory and techniques, with emphasis on microscopic analysis of urine sediment. Includes lab. Prerequisites: Acceptance into CLT program. Corequisite: CLS 101.			
CLS 115	Clinical Parasitology	Fall	1 credit
Study of parasites and their relationship to the human host. Includes lab. Prerequisite: Acceptance into CLS program. CLS 101.			
CLS 201	Immunology	Spring EO	4 credits
The foundations of diagnostic serology, immunohematology, histocompatibility and hematology as well as new technology such as monoclonal antibodies and molecular biology are covered in order for students to become better prepared for a career in laboratory medicine. Prerequisites: General Biology 150-151 or equivalent, CHEM 115,116 or 121,122 strongly recommended. Open to all students.			
CLS 205	Clinical Internship I	SM	1 credit
Supervised rotations in the phlebotomy and clinical microscopy departments of the clinical affiliate laboratory. Prerequisites: CLS 101, 103, 113, 115, 201-225. Corequisites: CLS 235, 245.			
CLS 215	Clinical Internship II	SM	2 credits
Supervised experience in the hematology, chemistry, microbiology and blood banking departments of the affiliated clinical laboratory. Prerequisites: CLS 205.			
CLS 225	Hematology	Spring	3 credits
Identification of normal and abnormal blood cells in various hematological disorders. Theory and applications of hematology procedures. Morphologic examination of blood and marrow and routine manual hematologic procedures. Prerequisite: CLS 101.			
CLS 235	Clinical Chemistry I	SM	3 credits
Principles of instrumentation and the theory and application of the biochemical tests performed in the clinical laboratory. The student will receive instruction in the basic techniques required for performing routine manual determinations. Prerequisite: CLS 101, 113, CHEM 115,116, 115L, 116L. BIOL 220, 221, 220L, 221L or CLS 100. Corequisite: CLS 205.			
CLS 236	Clinical Chemistry II	Fall	1 credit
Continuation of the lectures given during the summer session. Prerequisite: CLS 235.			
CLS 240	Immunohematology	Fall	3 credits
Lecture and laboratory. Fundamental principles of immunology are presented and applied to serology and blood banking. Donor selection, blood collection and processing, blood components and compatibility testing. Preparation and administration of blood and genetics of blood inheritance. Theory of blood coagulation and procedures. Prerequisites: CLS 101, 201, 225.			
CLS 245	Clinical Microbiology I	SM	3 credits
The morphology, culture characteristics and identification of bacteria pathogenic to man and their role in infectious disease are discussed, as well as antibiotics susceptibility testing and rapid identification systems. Prerequisite: MICR 202, CLS 101, 115, 225. Corequisite: CLS 205.			
CLS 246	Clinical Microbiology II	Fall	1 credit
Continuation of the lectures given during the summer session and Mycology. Prerequisites: CLS 245.			
CLS 255	Clinical Internship III	BD	12 credits
Supervised experience in the hematology, chemistry, microbiology, and blood banking departments of the affiliated clinical laboratory. Prerequisites: All CLS courses.			
CLS 294	Independent Study		1-3 credits
Independent or directed study of special topics in clinical laboratory. Department chairperson approval is required.			
CLS 195-295	Service Learning		1-3 credits
Maximum of six semester hours. Service learning may be accomplished by one of three methods: Joining a club that has a public service component, doing volunteer work at a non-profit organization, or taking a course that links public service with its curriculum.			
CLS 197-297	Cooperative Education/Internshi	F&S SM	1-3 credit hours each
Repeatable up to a maximum of six semester hours. Work hours are arranged by employer, adviser and student. Progress is checked by oral and written reports from the employer. Periodic student-adviser conferences are required to discuss progress or problems. Students are required to submit an accounting of their experiences to their instructor. All co-op experiences are based on a satisfactory/unsatisfactory basis. Department chair approval is required.			
CLS 299	Special Topics in Clinical Laboratory Science	BD	1-3 credits
Repeatable up to six semester hours. An examination of special topics in medical laboratory technology.			