Clinical/Medical Laboratory Technology CTAG Alignment

This document contains information about the Career-Technical Articulation Number (CTAN) for the Clinical/Medical Laboratory Technology Career-Technical Assurance Guide (CTAG). The CTAN is:

1. **Introduction to Medical (Clinical) Laboratory Science:** CTAN alignment with the Tech Prep Laboratory Applications subject area in the Health Science Career Field Technical Content Standards of the Ohio Department of Education. This CTAN is already an approved OAN in the Clinical/Medical Laboratory Technology TAG. The number and title is: OHL008 – Introduction to Medical (Clinical) Laboratory Science.

General Course Description: Students will apply practical application of a wide range of clinical duties. Topics covered will include hematology, urinalysis, hematopoiesis processes, body chemistry, microbiology, and blood typing. Students will perform laboratory exercises illustrating principles of the cell and human physiology. Emphasis is given to safe handling, collection procedures, and preparation of specimens. Additionally, students will correlate and document clinical findings and maintain quality management in a clinical laboratory.

Advising Notes: Students must pass the associated course and the CETE End of Course Assessment to be eligible for college credit.

Semester Credit Hours: 2-3

Alignment:

Outcomes marked with an asterisk are essential and must be taught.

Learning Outcomes **The student will be able to:**	**Competencies in ODE's REVISED Career Field Technical Content Standards Dated October 2013.**
1. Discuss the different careers available in the profession of medical laboratory science*	1.1.2 Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience.
2. Explain the differences between the terms licensure, certification, registration and accreditation. *	1.1.2 Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience.

3. Describe the different governing groups and agencies involved in the profession of medical laboratory science.*	1.1.4 Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships.
4. Identify the organizations associated with the following initials and describe what they are: * • ASCLS* • ASCP* • MLS/MT* • MLT* • NAACLS* • TJC* • CAP* • CLIA* • CLSI*	1.1.4 Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships.
5. Identify the major routine tests perform in the following sections of the clinical lab. * • Blood bank* • Chemistry* • Hematology* • Immunology* • Microbiology* • Urinalysis*	5.9.13 Identify major routine tests performed in clinical lab sections (e.g., blood bank, chemistry, hematology, serology, microbiology, urinalysis).
6. Define the term “standard precautions”. Identify the two primary blood borne pathogens they are meant to prevent.*	3.1.1. Use standard precaution guidelines, recommended by the governing bodies for reducing the risk of transmission of pathogens. 4.3.1. Describe the chain of infection 4.3.2. Describe mechanisms for the spread of infection 4.3.3 Describe methods of controlling or eliminating microorganisms and the importance of practices that hinder the spread of infection

	4.3.4 Identify and use appropriate level of personal protective equipment (PPE) when encountering body fluids, potential of splashing, or respiratory droplets. 4.3.6 Identify and follow standard precaution guidelines. 4.3.7. Identify, follow, and document isolation precautions. 5.9.3 Differentiate between aseptic and sterile procedure when collecting specimens and maintain bio- hazardous materials procedures (e.g., urine, feces, sputum, and blood).

7. Create a clinical laboratory safety checklist that identifies key elements in the four categories below: * • Biohazards* • Fire hazards* • Electrical hazards* • Chemical hazards*	1.3.2 Follow protocols and practices necessary to maintain a clean, safe, and healthy work environment. 1.3.5 Access and implement safety compliance measures (e.g. quality assurance information, safety data sheets [SDSs],product safety data sheets [PSDSs], U.S. Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization. 3.1.1. Use standard precaution guidelines, recommended by the governing bodies for reducing the risk of transmission of pathogens. 3.1.4 Decrease the risk of injury to individuals or others by using authorized strategies. 3.1.6 Identify risks associated with chemical, electrical, and aquatic elements in the work environment. 3.1.8 Clean, store, or dispose of supplies, specimens and laboratory glassware following protocol and standard precautions. 3.1.10 Implement disaster preparedness response for emergency situations. 3.1.11 Identify risk factors of exposure to hazardous materials and demonstrate safety precautions. 3.1.13 Follow Occupational Health and Safety Administration protocol for exposure and disposal of contaminated hazardous waste. 3.1.17 Identify and respond to emergency call lights and alarms. 5.1.1. Use standard operating procedures for the safe use of

	instruments, equipment and gas cylinders. 5.1.2 Locate and use safety data sheets to prepare and interpret labels for chemicals, supplies, and to identify hazards associated with handling and storing chemical materials. 5.1.3. Neutralize acids, bases, or caustic solutions for handling and disposal.

	5.1.9 Implement a chemical inventory system that includes all pertinent information regarding stability, hazards and sensitivity per standard operating procedure (SOP). 5.1.10 Maintain an inventory system for manufactured products per standard operating procedure (SOP). 5.9.3 Differentiate between aseptic and sterile procedure when collecting specimens and maintain bio- hazardous materials procedures (e.g., urine, feces, sputum, and blood).
8. Describe the proper procedure for performing a venipuncture. *	3.1.9 Determine bleeding risk factors and implement precautions. 3.1.12 Differentiate and apply principles of aseptic and sterile techniques. 5.9.4 Discuss the methods of blood collection, specimen processing and labeling procedures and the potential problems that may occur. 5.9.5 Identify patient/client and inform them of the medical procedure to be performed. 5.9.8 Differentiate between specimen collection, storage and handling techniques (e.g., temperature, light, time, humidity). 5.1.8 Verify expiration dates and lot numbers. 5.9.9 Determine order of draw and appropriate anticoagulants for ordered tests and correlate tube stopper colors with tube additives and their actions. 5.9.10 Identify complications of venipuncture (e.g. patient fainting, short draw, inadequate inversion, hemolysis, lack of blood flow, hematoma, petechiae, nerve injury, mastectomy issues). 5.9.12 Determine the general criteria for suitability of a specimen for analysis and reasons for specimen

	rejection and recollection.
9. Perform a successful venipuncture. *	3.1.9 Determine bleeding risk factors and implement precautions. 3.1.12 Differentiate and apply principles of aseptic and sterile techniques. 5.5.1 Follow standard operating procedure (SOP) to aseptically collect and prepare dry and wet samples for analysis. 5.9.1 Maintain the integrity of a clinical sample, including patient/client identification and chain of custody and explain how to adhere to chain-of-custody guidelines when required (e.g., forensic studies, drug screen). 5.9.4 Discuss the methods of blood collection, specimen processing and labeling procedures and the potential problems that may occur. 5.9.5 Identify patient/client and inform them of the medical procedure to be performed. 5.9.8 Differentiate between specimen collection, storage and

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	specimen for analysis and reasons for specimen rejection and recollection.
10. List common anticoagulants used in collecting blood for laboratory testing. *	5.9.9 Determine order of draw and appropriate anticoagulants for ordered tests and correlate tube stopper colors with tube additives and their actions. 3.1.15. Account for all instruments, supplies and equipment. 3.1.8 Clean, store, or dispose of supplies, specimens and laboratory glassware following protocol and standard precautions.
11. Cite the appropriate order of draw when additive tubes are used. *	5.9.9 Determine order of draw and appropriate anticoagulants for ordered tests and correlate tube stopper colors with tube additives and their actions
12. Describe the proper procedure for obtaining quality specimens for the lab (venous, arterial and capillary).*	5.1.8 Verify expiration dates and lot numbers. 5.9.7 Identify resources needed for special procedures and demonstrate knowledge of special phlebotomy collection procedures (e.g., phenylketonuria [PKU], galactosemia, blood donations, blood cultures). 5.9.14 Instruct patients/clients in the collection procedures for random, routine, non-blood specimen collection (e.g., clean-catch, mid-stream urine, stool specimens, semen, or sputum for testing.) 5.9.12 Determine the general criteria for suitability of a specimen for analysis and reasons for specimen rejection and recollection.
13. Describe the proper procedures for processing whole blood specimens when serum or plasma is, needed including general storage requirements. *	5.9.8 Differentiate between specimen collection, storage and handling techniques (e.g., temperature, light and time). 5.9.16 Assist with preparations for non-CLIA waived procedures.

14. Identify the major components of a Code of Medical Ethics and apply to selected situations in Clinical Laboratory Science. *	1.1.6 Explain the importance of work ethic, accountability, and responsibility and demonstrate associated behaviors in fulfilling personal, community, and workplace roles. 1.3.1. Analyze how regulatory compliance affects business operations and organizational performance. 1.3.3 Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice). 1.4.3 Verify compliance with security rules, regulations, and codes (e.g., property, privacy, access, accuracy issues, client and patient record confidentiality) pertaining to technology specific to industry pathway. 3.1.2 Maintain individuals' rights, respect individual's choices and describe informed consent.

	3.1.3 Describe confidentiality guidelines in the Health Insurance Portability and Accountability Act (HIPAA). 2.2.1 Provide privacy and demonstrate sensitivity for diverse populations. 6.2.7 Describe the possible consequences of inappropriate use of health information.
15. Demonstrate the ability to use the following basic clinical laboratory equipment and instrumentation: * a. *Spectrophotometer b. *Balance c. *Pipettes d. *Microscope e. *Centrifuge	5.1.6 Adjust, calibrate, maintain and perform systems diagnostics on laboratory equipment per standard operating procedure (SOP) and equipment specifications. 5.1.7 Maintain equipment logs and determine when to perform, implement, or schedule preventive maintenance and/or systems updates. 5.1.8 Verify expiration dates and lot numbers. 5.2.15 Describe, use, and calibrate precision weighing and measuring techniques (e.g., analytical balance, micropipette) that are based on the metric system. 5.2.9 Perform spectroscopy of biological materials explaining the principles behind the procedures, the purpose of a blank and determine the concentration of biomolecular samples. 5.5.5 Explain the principles of microscopy and process a specimen for light microscopy. 5.9.15 Perform Clinical Laboratory Improvement Act (CLIA) waived tests (e.g., dipstick or tablet reagent urinalysis, blood glucose by glucose monitoring devices, ovulation tests, urine pregnancy tests).

16. Discuss the importance of quality assurance in a clinical laboratory setting. *	1.3.5 Access and implement safety compliance measures (e.g., quality assurance information, safety data sheets [SDSs], product safety data sheets [PSDSs], U.S. Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization. 5.5.12 Comply with industry-based and required regulatory quality-assurance practices (e.g., quality control [QC], Good Laboratory Practice [GLP], and Good Manufacturing Practice [GMP]) for documentation 5.8.6 Define the concepts of confidence limit and significant figures. 5.8.8 Compute measures of central tendency and dispersion to interpret results and draw conclusions. 5.8.10 Create, interpret and use tabular and graphical displays and describe the data. 5.9.2 Describe control substance procedures, protocols, documentation and labeling techniques.
17. Calculate metric conversions, simple serial dilutions, basic Beer's Law, and total magnification, as well as construct and interpret standard curve.	5.2.18 Calculate conversions of metric and standard units 5.5.2 Prepare and dispense stock reagents, buffers, media, and serial dilutions by calculating concentrations, adjusting factors such as pH and selecting purification techniques and containers. 5.2.10 Calculate the volume, temperature, and pressure of gases using the ideal gas law, Charles Law, Boyles Law, and Beer's Law. 5.5.5 Explain the principles of microscopy and process a specimen for light microscopy. 5.2.9 Perform spectroscopy of biological materials

	explaining the principles behind the procedures, the purpose of a blank and determine the concentration of biomolecular samples. 5.8.10 Create, interpret and use tabular and graphical displays and describe the data.