

Florida Department of Education
Curriculum Framework

2017 – 2018

Program Title: Medical Laboratory Technology
Career Cluster: Health Science

AS	
CIP Number	1351100405
Program Type	College Credit
Standard Length	76 credit hours
CTSO	HOSA: Future Health Professionals
SOC Codes (all applicable)	29-2011 Medical and Clinical Laboratory Technologists
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Health Science career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of Health Science career cluster.

The purpose of this program is to prepare students for employment as medical/clinical laboratory technologist SOC Code 29-2011 (medical clinical laboratory technologist) or medical laboratory technologists (associate degree) or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes but is not limited to specific techniques and instruments, identification of factors directly affecting procedures and results, confirmation of results and monitoring quality control programs within pre-determined parameters, and correction of errors using pre-set standards. A clinical component is a necessary element of this program.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of 76 credit hours.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Demonstrate knowledge of the healthcare delivery system and health occupations.
- 02.0 Demonstrate the ability to communicate and use interpersonal skills effectively.
- 03.0 Demonstrate legal and ethical responsibilities.
- 04.0 Demonstrate an understanding of and apply wellness and disease concepts.
- 05.0 Recognize and practice safety and security procedures.
- 06.0 Recognize and respond to emergency situations.
- 07.0 Recognize and practice infection control procedures.
- 08.0 Demonstrate an understanding of information technology applications in healthcare.
- 09.0 Demonstrate employability skills.
- 10.0 Demonstrate knowledge of blood borne diseases, including HIV/AIDS.
- 11.0 Apply basic math and science skills.
- 12.0 Demonstrate accepted professional, communication and interpersonal skills.
- 13.0 Discuss phlebotomy in relation to the health care setting.
- 14.0 Identify the anatomic structure and function of body systems in relation to services performed by phlebotomist.
- 15.0 Recognize and identify collection reagents supplies, equipment and interfering chemical substances.
- 16.0 Demonstrate skills and knowledge necessary to perform phlebotomy.
- 17.0 Practice infection control following standard precautions.
- 18.0 Practice accepted procedures of transporting, accessioning and processing specimens.
- 19.0 Practice quality assurance and safety.
- 20.0 Demonstrate knowledge and use of basic laboratory equipment and techniques.
- 21.0 Demonstrate basic knowledge of and perform clinical laboratory Point of Care (POC) testing (Waived).
- 22.0 Demonstrate basic knowledge of and perform Point of Care (POC) Testing using CLIA approved Waived instrumentation.
- 23.0 Discuss the general responsibilities and functions encountered by a medical technician.
- 24.0 Apply quality assurance principles and safety protocols.
- 25.0 Demonstrate knowledge of the operation of computer systems.
- 26.0 Demonstrate an understanding of the basic principles of molecular diagnostics.
- 27.0 Demonstrate knowledge of urinalysis and body fluids principles and procedures.
- 28.0 Demonstrate knowledge of hematological principles and procedures.
- 29.0 Demonstrate knowledge of hemostasis and related diagnostic principles and procedures.
- 30.0 Demonstrate knowledge of immunology principles and procedures.
- 31.0 Demonstrate knowledge of clinical chemistry principles and procedures.
- 32.0 Demonstrate knowledge of immunohematology principles and procedures.
- 33.0 Demonstrate knowledge of microbiological principles and procedures.
- 34.0 Demonstrate knowledge of advanced hematological principles and procedures.
- 35.0 Demonstrate knowledge of advanced hemostasis testing.
- 36.0 Demonstrate knowledge of advanced microbiological principles and procedures.
- 37.0 Demonstrate knowledge of advanced clinical chemistry principles and procedures.

- 38.0 Demonstrate knowledge of advanced immunological procedures.
 - 39.0 Demonstrate knowledge of advanced immunohematology principles and procedures.
 - 40.0 Demonstrate and understanding of advanced principles of molecular diagnostics.
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Florida Department of Education
Student Performance Standards

2017 – 2018

Program Title: Medical Laboratory Technology
CIP Number: 1351100405
Program Length: 76 credit hours
SOC Code(s): 29-2011

Standards 1-11 are referred to as the **Health Science Core** and are required standards in this program. Secondary and Postsecondary students completing the health science core will not have to repeat the core in any other health science program in which it is a part. When the recommended sequence is followed, the structure allows students to complete at specified points for employment or remain for advanced training or cross-training.

To ensure consistency whenever these courses are offered, the health science core standards (1-11) have been placed in a separate document. You can access the course standards and benchmarks by visiting this link:
http://www.fldoe.org/core/fileparse.php/5652/urlt/health_sci_core_psav_cc_1718.tif

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

Phlebotomy: (12-19)

12.0	Demonstrate accepted professional, communication, and interpersonal skills. – The student will be able to:
12.01	Demonstrate the appropriate professional behavior of a phlebotomist.
12.02	Explain to the patient the procedure to be used in specimen collection.
12.03	Explain in detail the importance of identifying patients correctly when drawing blood.
12.04	Describe the scope of practice (job skills and duties) for a phlebotomist.
12.05	List and describe professional organizations that provide accreditation, certification, and licensure to phlebotomists and phlebotomy programs.
12.06	Explain the importance of continuing education in relation to certification to maintain competency and skills.
13.0	Discuss phlebotomy in relation to the health care setting. – The student will be able to:
13.01	List, classify and discuss various departments and services within the health care setting in which the phlebotomist must interact with to obtain laboratory specimens from patients.

13.02	Identify the major departments/sections with the clinical laboratory, the major types of procedures run in each department/section, and their specimen requirements.
13.03	Describe roles of the major classifications of clinical laboratory personnel (i.e., pathologist, chief/administrative technologist, CLS, MLS, MLT, MT, phlebotomist, lab assistant, etc.).
14.0	Identify the anatomic structure and function of body systems in relation to services performed by phlebotomist. – The student will be able to:
14.01	Describe and define major body systems with emphasis on the circulatory system.
14.02	List and describe the main superficial veins used in performing venipuncture.
14.03	Locate the most appropriate sites(s) for capillary and venipuncture.
14.04	Describe the function of the following blood components: erythrocytes, thrombocytes, leukocytes and plasma.
14.05	Compare and contrast between serum and plasma as it relates to blood collection.
14.06	Discuss hemostasis as it relates to blood collection.
15.0	Recognize and identify collection reagents supplies, equipment and interfering chemical substances. – The student will be able to:
15.01	Identify and discuss proper use of appropriate types of equipment needed to collect various clinical laboratory blood specimens by venipuncture.
15.02	Explain the special precautions and types of equipment needed to collect blood from the pediatric patient.
15.03	Identify and discuss proper use of supplies used in collecting micro-specimens.
15.04	Identify and discuss the proper use of the various types of anticoagulants, preservatives and gels used in blood collection and the vacuum tube color-codes for these additives.
15.05	Describe the types of patient's specimens that are analyzed in the clinical laboratory and the phlebotomist's role in collecting and/or transporting these specimens to the laboratory.
15.06	Describe substances potentially encountered during phlebotomy which can interfere in analysis of blood constituents.
15.07	Define and utilize correct medical terminology and metric measurement needed for specimen collection.
16.0	Demonstrate skills and knowledge necessary to perform phlebotomy. – The student will be able to:
16.01	Follow approved procedure for completing a laboratory requisition form.
16.02	Recognize a properly completed requisition and apply established protocol for patient and specimen identification for transport to a reference lab.
16.03	Demonstrate knowledge of established protocol for patient and specimen identification in the Physician Office Laboratory (POL).
16.04	Discuss appropriate methods for facilitating and preparing the patient for capillary and venipuncture collection.

16.05	List appropriate antiseptic agents useful in preparing sites for capillary and venipuncture.
16.06	Perform venipuncture by evacuated tube, butterfly and syringe systems, demonstrating appropriate use of supplies, proper handling of equipment and specimens, and appropriate patient care.
16.07	Describe the correct order of draw.
16.08	Describe the use of barcoding systems used for specimen collection.
16.09	Convey an understanding of capillary puncture using appropriate supplies and techniques for both adults and pediatric patients.
16.10	Describe the most common complications associated with capillary and venipuncture, their causes, prevention and treatment.
16.11	Recognize and respond to possible adverse patient reactions such as allergies, convulsions, syncope and light headedness.
16.12	Perform appropriate procedures for disposing of used or contaminated capillary and venipuncture supplies.
16.13	Perform appropriate techniques for making a peripheral blood smear for hematologic evaluation.
16.14	Demonstrate the proper procedure for collecting blood cultures.
16.15	Discuss the effects of hemolysis and methods of prevention.
16.16	Demonstrate a working understanding of how age and weight of patients impacts the maximum amount of blood that can be safely drawn.
17.0	Practice infection control following standard precautions. – The student will be able to:
17.01	Define the term "nosocomial/ hospital acquired infection."
17.02	Describe and practice procedures for infection prevention including hand washing skills.
17.03	Discuss and perform transmission based precautions.
17.04	Identify potential routes of infection and their complications.
18.0	Practice accepted procedures of transporting, accessioning and processing specimens. – The student will be able to:
18.01	Follow the approved procedure for preparation and processing (e.g. - centrifugation, separation, aliquoting, labeling, and storage) of serum, plasma, urine, sputum, stool, and wound culture specimens.
18.02	Demonstrate knowledge of accessioning procedures.
18.03	Describe the significance of time constraints for specimen collection, transporting and delivery.
18.04	Describe routine procedures for transporting and processing specimens including DOT packaging requirements.
19.0	Practice quality assurance and safety. – The student will be able to:

19.01	Distinguish and perform procedures which ensure reliability of test results when collecting blood specimens.
19.02	Demonstrate knowledge of and practice appropriate patient safety.
19.03	Practice safety in accordance with OSHA (State & Federal guidelines) for chemical, biological, and PPE established procedures including proper disposal of sharps.
19.04	Follow documentation procedures for work related accidents.
19.05	Implement appropriate Joint Commission patient safety goals and other accrediting/regulatory agency guidelines.

Medical Laboratory Technician: (20-33)

20.0	Demonstrate knowledge and use of basic laboratory equipment and techniques. -The student will be able to
20.01	Identify the parts of the microscope and explain the function of each.
20.02	Demonstrate the proper technique for operation of the microscope.
20.03	Demonstrate use of standard laboratory equipment including glassware, pipettes and centrifuge.
20.04	Perform basic laboratory math calculations.
20.05	Apply principles of quality assurance to correct problems encountered in monitoring daily quality control.
20.06	Evaluate laboratory findings and take necessary action to confirm or clarify results according to standard operation and procedure.
20.07	Demonstrate knowledge of operation and principles of laboratory instruments.
21.0	Demonstrate the basic knowledge of and perform clinical laboratory Point of Care (POC) testing (Waived)- The student will be able to
21.01	Demonstrate the ability to interpret instructions of point of care testing including , but not limited to the following:
121.01	Test principle
221.01	Storage & Stability
321.01	Internal vs. External Quality Control
421.01	Specimen collection & preparation
521.01	Directions for use
621.01	Interpretation of results
721.01	Interfering substances

	21.02 Demonstrate and discuss knowledge of lot numbers use and importance in regard to both kits and reagents.
	21.03 Demonstrate knowledge of the frequency in which quality control procedures should be performed.
	21.04 Explain the CLIA 88 classification of laboratory testing into waived, moderate, and highly complex including the personnel qualified to perform each.
22.0	Demonstrate basic knowledge of and perform Point of Care(POC) Testing using CLIA approved Waived instrumentation- The student will be able to
	22.01 Demonstrate and perform POC testing specific to microbiology, hematology, urinalysis, and clinical chemistry.
	22.02 Demonstrate competence in instrument maintenance.
	22.03 Demonstrate knowledge of quality control and calibrations involved within the POC instruments.
	22.04 Identify normal limits and associate abnormal results with disease or disorders.
	22.05 Discuss the significance of reporting critical values as it applies to Point of Care testing.
23.0	Discuss the general responsibilities and functions encountered by a medical technician–The students will be able to:
	23.01 Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions.
	23.02 Organize and communicate the results obtained by observation and experimentation.
	23.03 Demonstrate ability to evaluate and draw conclusions.
	23.04 Demonstrate ability to report observations in written or oral form.
	23.05 Discuss the licensure and certification requirements of the major classifications of clinical laboratory personnel.
24.0	Apply quality assurance principles and safety protocols–The student will be able to:
	24.01 Recognize specimen suitability and determine need for rejection/recollection using factors described in clinical protocol.
	24.02 Describe special procedures for transporting and processing specimens.
	24.03 Describe clinical laboratory role in providing quality assurance in laboratory testing, reporting, and use and maintenance of equipment.
	24.04 Demonstrate required calibration procedures.
	24.05 Demonstrate and record quality control procedures required for the tests performed and recognize unacceptable results.
	24.06 Report identified problems encountered in daily quality control according to standard operating procedures.
	24.07 Comply with current OSHA regulations regarding laboratory hazards.

25.0 Demonstrate knowledge of the operation of computer systems--The student will be able to:

25.01 Discuss the role of computer systems in laboratory data management.

25.02 Demonstrate knowledge of common computer terminology.

25.03 Demonstrate entry level computer operations for specimen accessioning, data reporting, and quality control recording.

25.04 Demonstrate entry level operational skills in the use of computer-interfaced analytical instrumentation.

26.0 Demonstrate an understanding of the basic principles of molecular diagnostics. -The student will be able to

26.01 Discuss the principles and major steps of the polymerase chain reaction (PCR).

26.02 Label the organelles and important parts of a eukaryotic animal cell.

26.03 Describe the function of the organelles and important parts of a eukaryotic animal cell.

26.04 Discuss the structure, function, and components of DNA and RNA.

26.05 Define the key terms of molecular diagnostics.

26.06 Understand the principles of molecular diagnostic testing.

26.07 Compare the advantages and disadvantages of molecular techniques over traditional diagnostic tests for infectious diseases.

26.08 List molecular tests associated with the identification of microorganisms.

26.09 Identify the types of samples appropriate for molecular diagnostics.

26.10 Discuss the ethical impact of genetic technologies on the delivery of health care.

26.11 Outline requirements for reducing contamination in a molecular lab.

26.12 Discuss nucleic acid probes and their role in clinical laboratory diagnostics.

27.0 Demonstrate knowledge of urinalysis and body fluids principles and procedures. -The student will be able to:

27.01 Identify the components of the urinary system and explain their functions.

27.02 Discuss diseases affecting the urinary system.

27.03 Describe collection, transport and storage procedures for random and timed urine specimens.

27.04 Discuss physical properties related to normal and abnormal components of the urine including related odors, color.

27.05	Discuss specific gravity techniques; calibration and use of the refractometer.
27.06	Perform dipstick or tablet (nonautomated) urinalysis techniques for chemical exam of the urine and interpret results
27.07	Demonstrate the proper use of urine strip readers.
27.08	Describe renal function tests.
27.09	Describe principles of and perform routine physical and chemical analyses on urine.
27.10	Prepare urine sediments and perform identification and quantitation of microscopic formed elements.
27.11	Correlate abnormal physical, chemical and microscopic urine results with associated pathological conditions.
27.12	Define and discuss the differences between transudates and exudates.
27.13	Discuss miscellaneous body fluids to include cerebral spinal, seminal and joint fluids.
27.14	Perform physical, chemical and microscopic evaluations of common body fluids.
28.0	Demonstrate knowledge of hematological principles and procedures—The student will be able to:
28.01	Discuss the organs, cells and cellular interaction of the lymphoid, myeloid and reticuloendothelial systems.
28.02	Demonstrate an understanding of basic concepts of hematopoietic regulation, proliferation and cellular differentiation.
28.03	Identify the components of blood.
28.04	Discuss the function of formed elements of blood.
28.05	Demonstrate an understanding of the synthesis of normal and abnormal molecular structure of hemoglobin, common hemoglobinopathies and associated tests.
28.06	Describe normal hemoglobin-oxygen function using the Oxygen Dissociation Curve (ODC).
28.07	Discuss assessment and impact of preanalytical, analytical and post-analytical factors on hematology testing.
28.08	Discuss techniques of hematology related to calculation of red blood cell indices.
28.09	Discuss selected cytochemical staining and flowcytometry procedures.
28.10	Perform standard operational procedures to evaluate erythrocytes and their physical properties using patient blood and quality control samples.
28.11	State the review process of histogram/scatterplot/scattergram analysis.
28.12	Describe the categories used in a morphological classification of anemias.

28.13	Correlate automated hemogram parameter for red cell indices with peripheral exam of blood smear.
28.14	List the maturation sequence and identify distinguishing morphology for stages of developing white blood cells or leukocytes using stained smears, photographs, electronic images or other visual means of representation.
28.15	Discuss normal and abnormal hematology findings, reference ranges and associated diseases.
28.16	Demonstrate an understanding of, normal and abnormal white cell morphology, related disease states and associated tests.
28.17	Discuss the principles of and perform routine hematology procedures applying quality control procedures as necessary.
28.18	Perform commonly used methods to evaluate leukocytes, correlate and verify automated cell counts with established criteria.
28.19	Identify the criteria used to classify nonmalignant leukocytic disorders, e.g. shift to the left, toxic granulation, Döhle bodies, etc.
28.20	Perform techniques of manual blood smear evaluation including white blood cell differential, red cell and platelet morphology.
28.21	Correlate peripheral blood evaluation with automated cell analysis.
28.22	Perform platelet counts on patient and control specimens using manual and automated techniques and correlate counts with peripheral smear.
29.0	Demonstrate knowledge of hemostasis and related diagnostic principles and procedures–The student will be able to:
29.01	Discuss and define the interactive systems necessary to maintain hemostasis.
29.02	Discuss common coagulopathies and associated treatments and therapies.
29.03	Discuss assessment and impact of preanalytical factors on hemostasis testing
29.04	Describe the principles of and perform routine testing used in the evaluation of the vascular, platelet, coagulation and fibrinolytic systems.
29.05	Discuss additional hemostasis tests performed to differentiate the cause of abnormal routine tests.
30.0	Demonstrate knowledge of immunology principles and procedures–The student will be able to:
30.01	Discuss the functions of the cells of the immune system, cytokines and regulatory molecules.
30.02	Discuss physical and chemical properties of immunogens (antigens), immunoglobulins (antibodies) and complement
30.03	Describe their roles in both <i>in vivo</i> and <i>in vitro</i> reactions.
30.04	Compare and contrast the principles of basic agglutination, flocculation and precipitation procedures in immunology/serology.
30.05	Perform basic procedures in immunology/serology.
30.06	Discuss principles of, immunoelectrophoresis, immunofixation and enzyme immunoassay.

	30.07	Discuss the clinical significance of the commonly performed immunology/ tests.
	30.08	Discuss selected specialty serological tests such as immuno assays.
31.0		Demonstrate knowledge of clinical chemistry principles and procedures–The student will be able to:
	31.01	Identify the chemistry analytes used to evaluate various body systems.
	31.02	Discuss the renal system and related chemistry tests.
	31.03	Discuss principles of and perform common renal function tests.
	31.04	Discuss carbohydrate, protein and lipid metabolism.
	31.05	Discuss principles of and perform commonly ordered tests related to carbohydrate, protein and lipid metabolism.
	31.06	Discuss the liver and its functions as related to chemistry tests.
	31.07	Discuss principles of and perform commonly ordered liver function tests.
	31.08	Discuss enzyme classification, origin, activity and function.
	31.09	Discuss principles of and perform commonly ordered enzyme procedures.
	31.10	Discuss electrolyte balance as related to health and disease.
	31.11	Discuss principles of and perform electrolyte analyses.
	31.12	Discuss principles of and perform commonly ordered tests to evaluate cardiac function.
	31.13	Discuss the physiology of the endocrine system and the principal tests used to evaluate endocrine function.
	31.14	Discuss the role of the laboratory in therapeutic drug monitoring and toxicology.
	31.15	Discuss and perform general electrophoresis techniques.
	31.16	Discuss the clinical significance of commonly ordered chemistry tests.
	31.17	Demonstrate knowledge of principles of instrumentation as related to the clinical chemistry laboratory.
	31.18	Discuss techniques of clinical chemistry related to standardization of procedure and use of standards, blanks and controls.
	31.19	Discuss techniques of clinical chemistry related to visual colorimetry; calibration and use of the spectrophotometer.
	31.20	Discuss basic techniques of clinical chemistry related to normal and abnormal physiology.

32.0	Demonstrate knowledge of immunohematology principles and procedures—The student will be able to:
32.01	Discuss donor interview, criteria for selection, phlebotomy preparation, and donor blood processing.
32.02	Discuss blood component collection and, preparation, storage and use.
32.03	Describe the roles of FDA, AABB, and state agencies and how to contact each.
32.04	Compare advantages and disadvantages for autologous, versus homologous (allogenic) blood collection and transfusion.
32.05	Discuss basic genetics of the blood group antigens
32.06	Discuss the ABO and Rh blood group systems and differentiate by using appropriate testing procedures.
32.07	Describe required tests on recipient blood samples and recognize discrepancies of ABO typing results.
32.08	Discuss and differentiate other blood group systems such as Duffy, Kell, Kidd, S,s, Lu and the common usually cold-reacting antibodies such as Le, P, I, M and N.
32.09	Perform antigen and antibody testing to determine Rh phenotypes.
32.10	Apply properties of blood group antigens to perform and interpret antibody screening.
32.11	Perform identification tests to detect clinically significant antibodies.
32.12	Discuss the safety and determine compatibility of blood components for transfusion.
32.13	Discuss and perform routine compatibility testing including the immediate spin crossmatch and the electronic crossmatch.
32.14	Discuss and perform red cell antigen typing on recipient donor specimens.
32.15	Identify symptoms of and required laboratory protocol for handling suspected transfusion reactions.
32.16	Discuss immune hemolytic disorders and perform the direct antiglobulin test.
32.17	Discuss appropriate absorption and elution techniques.
32.18	Verify appropriate quality control (QC) on reagents.
32.19	Describe the immune process which causes hemolytic disease of the fetus and newborn.
33.0	Demonstrate knowledge of microbiological principles and procedures—The student will be able to:
33.01	Discuss microbial taxonomy and nomenclature.
33.02	Discuss bacterial metabolism, reproduction, cell structures and their functions.

33.03	Discuss classification, composition and preparation of culture media.
33.04	Discuss the human pathogenesis of bacteria.
33.05	Discuss and perform techniques of microbiology related to sterilization techniques.
33.06	Perform culturing techniques for urine, stool, wound, throat, body fluids, blood and exudates.
33.07	Perform techniques of microbiology related to inoculation and transfer of cultures.
33.08	Discuss the principles of Gram and AFB stains.
33.09	Accurately perform, read and report gram stains.
33.10	Perform techniques necessary for isolation and identification of aerobic and anaerobic bacterial organisms.
33.11	Identify commonly encountered aerobic bacteria through morphological, physical and biochemical properties.
33.12	Perform and interpret antibiotic susceptibility tests.
33.13	Discuss collection and handling of specimens for fungal, mycobacterial and viral culture.
33.14	Prepare and examine specimens, and identify ova and parasites when present.
<p>Medical Laboratory Technology (Associate Degree) - The following intended outcomes (34-40), in addition to the outcomes for the program of Medical Laboratory Technology (Certificate), complete the competencies for the Medical Laboratory Technology (Associate Degree) program.</p>	
34.0	Demonstrate knowledge of advanced hematological principles and procedures—The student will be able to:
34.01	Correlate histogram/scatterplot/scattergram review to differential results.
34.02	Describe the categories used in etiological classification of anemias.
34.03	Perform procedures, apply appropriate quality control procedures, recognize and follow up, within pre-established reporting guidelines, laboratory procedures used in the identification, classification and differentiation of neoplastic disorders.
34.04	Perform selected cytochemical staining procedures.
34.05	Discuss the basic principles and applications of flow cytometry.
34.06	Discuss the principle of hemoglobin electrophoresis with pattern interpretation.
35.0	Demonstrate knowledge of advanced hemostasis testing—The student will be able to:

35.01	Discuss the principle of substitution testing for factor deficiencies.
35.02	Correlate the laboratory test results for fibrinolysis with conditions affecting the fibrinolytic system.
35.03	Perform additional hemostasis tests performed to differentiate the cause of abnormal routine tests.
35.04	Correlate laboratory results with possible inherited and/or acquired coagulation abnormalities.
36.0	Demonstrate knowledge of advanced microbiological principles and procedures--The student will be able to:
36.01	Discuss procedures for and clinical significance of anaerobe identification.
36.02	Classify fungi and state their clinical significance.
36.03	Perform general techniques used in identifying fungi.
36.04	Identify selected fungi.
36.05	Discuss and perform automated microbiological procedures.
36.06	Identify life cycles, modes of transmission, prevention and pathophysiology of clinically significant parasites.
36.07	Discuss microbial and immunological techniques to identify selected clinically significant viruses.
36.08	Discuss classification and related disease states of clinically significant viruses.
36.09	Identify commonly used antibiotics, their usage and mechanisms of activity.
37.0	Demonstrate knowledge of advanced clinical chemistry principles and procedures--The student will be able to:
37.01	Perform, calculate, analyze and recognize normal/abnormal electrophoresis procedures.
37.02	Perform and calculate results of immunoassay procedures.
37.03	Perform, calculate, and recognize associated disease states for selected isoenzyme assays.
37.04	Perform, calculate, and recognize associated disease states for blood lipid profiles.
37.05	Perform and calculate selected procedures related to endocrine function.
37.06	Perform selected assays for therapeutic and toxic substances.
37.07	Discuss the principles and procedures of blood gas analysis, including arterial specimen collection and clinical significance.
38.0	Demonstrate knowledge of advanced immunological procedures--The student will be able to:

38.01	Perform selected specialty serological tests such as immunofluorescence assays.
38.02	Discuss, perform and interpret antinuclear antibody patterns and their relationship to disease states.
38.03	Discuss MHC and HLA proteins and the application to transplant technology and rejection.
39.0	Demonstrate knowledge of advanced immunohematology principles and procedures--The student will be able to:
39.01	Resolve questions regarding donor suitability.
39.02	Analyze the various parameters of required testing of donor blood according to AABB Standards.
39.03	Describe the preparation and use of washed red cells, leukocyte-reduced red cells and platelet concentrations from donor units.
39.04	Describe the preparation and use of cryoprecipitate and fresh frozen plasma.
39.05	Describe the principle and use of the antiglobulin test, both direct and indirect methods, including the purpose for using IgG sensitized cells.
39.06	Perform methods of adsorption and elution techniques.
39.07	Perform procedures for identification of multiple antibodies in recipient specimen including enzyme enhancement, dosage, temperature and complement binding.
39.08	Determine appropriate dosage of Rh Immune Globulin based on test results.
39.09	Interpret the preliminary investigation results to determine whether a transfusion reaction has occurred.
40.0	Demonstrate and understanding of advanced principles of molecular diagnostics--The student will be able to:
40.01	Describe the steps used to prepare genomic DNA from blood and buccal cells.
40.02	Describe the process of Fluorescent In Situ Hybridization (FISH).
40.03	Compare and contrast real time PCR and conventional PCR.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Clinical learning experiences in a clinical laboratory and related areas are an integral part of this program. Clinical learning experiences should reflect the full breadth of responsibilities expected of a Medical Laboratory Technician and should include appropriate experiences in each of the areas of the laboratory described herein. The specified length for each of the courses listed is inclusive of clinical experience for each of the respective laboratory sections.

Special Notes

The following ATD programs have been approved by the Florida State Board of Education for statewide articulation credit into this degree program.

Medical Clinical Laboratory Technician –ATD (0351100404/0351100401) - 40 credits

The following industry certifications have been approved by the Florida State Board of Education for statewide articulation credit into this degree program.

Registered Phlebotomy Technician (RPT) (AMEDT005)- 3 credits

This program meets the Department of Health HIV/AIDS Domestic Violence and Prevention of Medical Errors education requirements. Upon completion of this program, the instructor will provide a certificate to the student verifying that these requirements have been met.

If students in this program are seeking a licensure, certificate or registration through the Department of Health, please refer to 456.0635 F.S. for more information on disqualification for a license, certificate, or registration through the Department of Health.

Outcomes 01-11 are referred to as the Health Careers Core and do not have to be completed if the student has previously completed the Core in another health science program. The Core should be taken first or concurrently with the first course in the program. Following the successful completion of the core, the student is eligible to take the National Health Care Foundation Skill Standards Assessment with instructor approval and the completion of a portfolio

Career and Technical Student Organization (CTSO)

HOSA: Future Health Professionals is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

Additional Resources

For additional information regarding articulation agreements, Bright Futures Scholarships, Fine Arts/Practical Arts Credit and Equivalent Mathematics and Equally Rigorous Science Courses please refer to:
<http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml>