



Clemson University  
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### Education & Training Plan

## **Clinical Medical Assistant w/ Pediatrics Certification Program with Externship**

Student Full Name: \_\_\_\_\_

Start Date: \_\_\_\_\_ End Date: \_\_\_\_\_

**Program includes National Certification & an Externship Opportunity**  
**Mentor Supported**

### **Clemson University Program with Externship**

|                       |            |
|-----------------------|------------|
| Course Code:          | CLEM-MAPED |
| Program Duration:     | 6 Months   |
| Course Contact Hours: | 780        |
| Student Tuition:      | \$3,950.00 |

### **The Clinical Medical Assisting Profession**

The Clinical Medical Assisting program is designed to prepare students to function as professionals in multiple healthcare settings. Medical assistants with a clinical background perform various clinical tasks including assisting with the administration of medications and with minor procedures, performing an EKG electrocardiogram, obtaining laboratory specimens for testing, educating patients, and other related tasks. Job opportunities are prevalent with physician's offices, clinics, chiropractor's offices, hospitals and outpatient facilities.

### **The Clinical Medical Assisting Program**

This program prepares students to assist physicians by performing functions related to the clinical aspects of a medical office. Instruction includes preparing patients for examination and treatment, routine laboratory procedures, pharmacology, taking and documenting vital signs, technical aspects of phlebotomy, the 12-lead EKG and the cardiac life cycle.

The purpose of the Clinical Medical Assisting program is to prepare students to assist physicians by performing functions related to the clinical aspects of a medical office.

This course covers the following key areas and topics:

- Clinical responsibilities of the medical office - assisting the physician with patient related care
- Preparing patients for examination and treatment, routine procedures and diagnostic testing
- HIPAA, patient confidentiality, legal aspects of healthcare and regulatory patient care issues
- Recording and taking of vital signs, blood pressure, and other patient care items related to the physician office visit
- Review and administration of medications, allergies & other pharmacology related items
- Laboratory procedures, phlebotomy and the proper techniques required to collect specimens for laboratory analysis
- Cardiology and the proper placement of leads when taking a 12 lead EKG

## Education and National Certifications

- Students should have or be pursuing a high school diploma or GED.
- National Certification exam that is available to students who successfully complete this program:
  - **National Healthcareer Association (NHA) Certified Clinical Medical Assistant (CCMA) Exam**

In addition to facilitating entry-level clinical medical assisting related positions, this course is ideal for students interested in pursuing a future formal Certified Medical Assistant (CMA), Nursing (LPN) or a Nursing (RN) program.

## Clinical Medical Assisting Detailed Course Information

This program covers the following key areas and topics:

- Responsibilities of the clinical medical assistant and introduction to healthcare facilities
- Medical terminology, anatomy and physiology, circulation of the heart and blood vessels
- Care & safety of patients, medical & legal aspects of care, confidentiality and HIPAA
- Effective verbal and non-verbal communication, interpersonal skills and human behavior
- Aseptic techniques, infection prevention, universal precautions, proper use and disposal of biohazards and sharps
- Documenting patient medical histories, updating patient medical files, vital signs and documentation
- Applying sterile dressings, preparing patients for x-rays, performing various injections, administering oral medications, instructing patients on the proper usage of medications
- Phlebotomy, venipunctures and capillary sampling, collecting specimens and point of care testing
- Performing 12 lead EKGs and EKG strip analysis (P,Q,R,S,T wave form)
- Role of the EKG technician
- Function of the EKG department in a variety of settings (hospital, clinic, office, mobile service)
- Medical terminology related to electrocardiography
- Care and safety of patients including medical and legal aspects of patient care
- Anatomy and physiology of the cardiovascular system
- Electrophysiology, the conduction system of the heart, and the cardiac cycle
- Circulation of blood through the heart and vessels
- Lead placement for 12-lead electrocardiography
- Basic EKG interpretation of normal rhythms and arrhythmias
- EKG troubleshooting including recognizing artifacts
- Waves and measurements
- EKG strip analysis (P,Q,R,S,T wave-form interpretation)
- Identification of rhythms using the 12-lead EKG
- Pacemakers

- Holter monitoring and the echocardiogram
- The history of Phlebotomy and the roles and responsibilities of a Phlebotomy Technician
- Laboratory operations (e.g. safety, quality control, quality assurance, laboratory law, ethics and regulatory issues)
- Anatomy and physiology of the circulatory system and anatomy of the hand, leg & foot – including arteries and veins
- Universal precautions – safety protocols, infection control and medical asepsis
- Specimen collection, processing, handling, documentation and transportation
- Venipunctures and skin puncture practice, syringe practice, heel puncture, protocol, syringe draws, etc.

## National Certification

Students who complete the Clemson University Clinical Medical Assistant w/ Pediatrics program will be prepared to sit for the National Healthcareer Association (NHA) Certified Clinical Medical Assistant (CCMA) national certification exam(s). In order to work as a Clinical Medical Assistant w/ Pediatrics, many states nationwide are requiring that learners achieve national certification prior to working in that state. Students who complete this program are encouraged to complete the practical/clinical externship option with their program. This comprehensive program is designed to prepare students to sit for National Healthcareer Association (NHA) Certified Clinical Medical Assistant (CCMA) exam(s). Students who complete this program can and do sit for the National Healthcareer Association (NHA) Certified Clinical Medical Assistant (CCMA) national certification exam(s) and are qualified, eligible and prepared to do so.

## Externship / Hands on Training / Practicum

Although not a requirement, once students complete the program, they have the ability to participate in an externship and/or hands on practicum so as to practice the skills necessary to perform the job requirements of a professional in this field. Students will be assisted with completing a resume and/or other requirements necessary to work in this field. All students who complete this program are eligible to participate in an externship and will be placed with a participating organization near their location. The institution works with national organizations and has the ability to place students in externship opportunities nationwide.

**Clemson University contact:** If students have any questions regarding this program including national certification and externships, **they should call Salley Ouellette of Clemson University at | (864) 656-2200 or via email at [palmer4@clemson.edu](mailto:palmer4@clemson.edu)**

**Note :** No refunds can be issued after the start date published in your Financial Award document.



## About Clemson University!

Clemson Online, a unit reporting directly to the Provost, works closely with leadership teams across the University to develop, market, and deliver top-quality courses and programs in blended and online formats. The office provides vision, leadership, coordination, and expertise in support of faculty design, delivery, and evaluation of technology-enhanced, blended, and fully online courses and instructional materials. Dynamic, transformative, and unique eLearning opportunities characterize Clemson's approach to online teaching and learning.

**Our Mission:** Clemson Online provides strategic leadership for online education, emphasizing innovative teaching and superior learning outcomes to maximize student success in 21st-century academic and professional contexts.

**Our Vision:** Clemson Online will define the public web-grant university through measurable achievements in online education, research, and service. The office is committed to pursuing strategic opportunities, providing supportive resources, promoting superior educational quality, and ensuring faculty involvement and responsibility in shaping Clemson's online future.



## Clemson University and Pearson Education

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## **Clinical Medical Assistant Modules**

### **THE MEDICAL ASSISTING PROFESSION**

- Define the medical assistant's role in the healthcare profession
- Explain the AMA's Principles of Medical Ethics

### **INTERPERSONAL COMMUNICATION**

- Provide examples of verbal, nonverbal, and symbolic communication
- Discuss listening strategies
- Explain potential barriers to communication with patient
- Explain cultural and age factors as they relate to communication
- Explain the grief process

### **PATIENT-CENTERED CARE**

- Define the medical assistant's role in patient-centered care
- Discuss wellness and the holistic approach to healthcare
- Explain the mind-body connection
- Describe the different types of pain, pain assessment, and pain management
- Discuss the methods of assisting patients with special needs
- Define the medical assistant's role as it relates to extended life, terminal care, and hospice
- Describe the considerations and laws associated with extended life care

### **SAFETY AND THE PATIENT ENCOUNTER**

- Define the medical assistant's role as it relates to safety in the medical office
- Discuss proper body mechanics for the medical office employee
- Describe procedures intended to provide a safe environment Discuss emergency plans for a medical facility
- Explain Standard Precautions and OSHA's Bloodborne Pathogen Standards
- Define the medical assistant's role in the clinical visit
- Define triage
- Explain the types of consent needed from patients Identify the parts of the medical record
- Explain how to chart for a medical record
- Discuss the role of EMS in emergency care

### **MEDICAL AND SURGICAL ASEPSIS**

- Explain Standard Precautions and OSHA's Bloodborne Pathogen Standards
- Describe the medical assistant's role in infection control within the medical office
- Explain the cycle of infection and the body's natural defenses against infection
- Explain the practices related to aseptic technique for a health professional

### **PHARMACOLOGY AND MEDICATION ADMINISTRATION**

- Describe the role of the medical assistant in medication administration

- Explain the procedures for administering medication in various forms
- Describe pharmacological terms related to drug effects, functions, classifications, and nomenclature
- Perform basic dosage calculations
- State the safety guidelines for administering medications
- Explain the forms, routes, and procedures for medication administration

## **VITAL SIGNS**

- Take vital signs
- Explain how to prepare a patient for a physical examination
- Describe the assessment methods used in an examination

## **MINOR SURGERY**

- Explain how to prepare skin for a surgical procedure
- Set up a sterile tray
- List the responsibilities of the medical assistant in assisting in a minor surgical procedure
- Explain how to assist with suturing
- Explain how to remove sutures or staples
- Explain how to change a sterile dressing

## **MEDICAL IMAGING**

- Define the medical assistant's role in medical imaging
- Describe the types of diagnostic imaging used in medical facilities
- Describe the equipment used for selected diagnostic imaging procedures
- Explain the safety guidelines to protect patients and staff in selected diagnostic imaging procedures
- Explain patient preparation and instructions for selected diagnostic imaging procedures
- Explain patient positioning for selected diagnostic imaging procedures

## **PULMONARY SYSTEM AND TESTING**

- Explain the role and responsibilities of the medical assistant in pulmonary testing
- Describe basic anatomy and physiology of the pulmonary system
- Discuss common pulmonary diseases
- Explain tests and procedures related to pulmonary assessment and diagnosis

## **EENT**

- Define the medical assistant's role in the EENT office
- Describe the anatomy and physiology of the eye and ear
- Describe selected diseases and disorders of the eye and ear
- Explain diagnostic procedures and assessments related to the eyes and ears
- Describe the anatomy and physiology of the nose, nasal passages, and throat
- Describe selected diseases and disorders of the upper respiratory system
- Discuss diagnosis and treatment procedures of the upper respiratory system

## **IMMUNOLOGY AND ALLERGIES**

- Define the medical assistant's role in the immunology office

- Discuss the anatomy and physiology of the immune system
- Describe immunodeficiency diseases and disorders
- Describe common diagnostic procedures for allergies

## **DERMATOLOGY**

- Define the medical assistant's role in the dermatology setting
- Discuss the anatomy and physiology of the integumentary system
- Describe common types of dermatitis and skin disorders

## **ENDOCRINOLOGY**

- Define the medical assistant's role in the endocrinology office
- Identify the structures of the endocrine system
- Discuss the physiology of the endocrine system
- Discuss the diseases and disorders of the endocrine system

## **EMERGENCY CARE**

- Define the medical assistant's role in emergency care
- Discuss the role of EMS in emergency care
- List the equipment and supplies maintained for emergencies in a medical office
- Explain how to manage selected emergencies in the medical office

## **GASTROENTEROLOGY AND NUTRITION**

- Describe the basic anatomy and physiology of the gastrointestinal system
- Explain selected diseases and disorders of the gastrointestinal system
- Identify the six nutrients of the body and their functions
- Explain the use of food guidance tools
- Discuss nutritional related disorders
- Explain the MA's role in the diagnostic procedures related to the gastrointestinal system

## **ORTHOPEDICS AND PHYSICAL THERAPY**

- Explain the steps of common procedures performed in the orthopedic office
- Describe common diseases and disorders of the musculoskeletal system
- Describe the anatomy and physiology of the musculoskeletal system
- Define the role of the medical assistant in the orthopedic office

## **PEDIATRICS**

- Define the medical assistant's role in a pediatric specialty office
- Discuss the age-related physical and developmental factors for children
- Explain how to assist in procedures performed in the pediatric specialty office
- Describe common childhood diseases and disorders

## **OBSTETRICS AND GYNECOLOGY**

- Define the role of the medical assistant in the obstetric/gynecology office

- Discuss the anatomy and physiology of the female reproductive system
- Explain the basics of menstrual cycle and menopause
- Describe common disorders and conditions related to the female reproductive system
- Discuss the processes of pregnancy and childbirth
- Obtain a complete obstetrical medical history
- Explain common complications of pregnancy
- Discuss the benefits and challenges of breastfeeding
- Explain how to assist in common procedures in the obstetric/gynecology office

## **NEUROLOGY**

- Define the medical assistant's role in the neurology/neurosurgery practice
- Describe the anatomy and physiology of the nervous system
- Describe common diseases and disorders of the nervous system
- Explain how to assist in common diagnostic and therapeutic procedures in the neurology/neurosurgery practice

## **MENTAL HEALTH**

- Define the medical assistant's role in the mental health field
- Describe the cognitive functions of the brain
- Define mental wellness
- Describe common mental health disorders
- Explain how mental disorders are assessed, diagnosed, and treated

## **ONCOLOGY**

- Identify the medical assistant's role in the oncology office
- Describe the different types of malignant neoplasms
- Describe routine cancer screening tests
- Explain tumor markers and how they are used in cancer diagnosis
- Discuss the staging and grading of malignancies
- Discuss the various remedies used in cancer treatment
- Explain hospice care for terminally ill patients
- Describe a cancer prevention lifestyle

## **GERIATRICS**

- Define the medical assistant's role in the geriatric office
- Describe the physical changes that take place during aging
- Explain the psychological aspects of aging
- Describe the social components of the aging process
- Discuss the nutritional needs and challenges associated with aging
- Describe the various cultural views of the elderly in society

## **ALTERNATIVE MEDICINE**

- List the five National Center for Complementary and Alternative Medicine (NCCAM) classifications of complementary and alternative medicine
- Describe selected types of alternative medicine



## **EKG Modules**

### **CORONARY ANATOMY AND PHYSIOLOGY**

- Describe the gross anatomy of the heart including the muscle and cellular structure, atria, ventricles, and valves
- Trace the flow of blood through the heart and the cardiovascular system
- Distinguish between the phases of the cardiac cycle including the events that occur during each phase
- Identify the effects diastole and systole have on the EKG tracing
- Describe the interaction between the nervous system and the heart

### **ELECTROPHYSIOLOGY**

- Describe the gross anatomy of the heart including the muscle and cellular structure, atria, ventricles, and valves
- Describe the interaction between the nervous system and the heart
- Distinguish between the terms polarized, depolarized and repolarized as they relate to contraction and relaxation
- Identify the phases of an action potential
- Explain the P wave, QRS complex, T wave, and U wave as found in an EKG tracing
- Distinguish between the absolute and relative refractory periods including the implications of each period
- Properly label all waves and complexes on a rhythm strip
- Explain the delineations found on EKG paper
- Identify the waves in a variety of QRS complexes

### **LEAD MORPHOLOGY AND PLACEMENT**

- Distinguish between an electrocardiograph and an electrocardiogram
- Identify the proper placement of bipolar leads and augmented leads
- Explain the effect augmentation has on an EKG
- Explain Einthoven's law and Einthoven's triangle
- Identify the leads composing the hexaxial diagram
- Identify the proper location of the precordial leads
- Explain the electrocardiographic truths
- Describe the normal QRS complex deflections in each of the 12 leads on an EKG

### **TECHNICAL ASPECTS OF THE EKG**

- Describe the control features of an EKG machine
- Differentiate between macroshock and microshock
- Describe the different kinds of artifacts found on a rhythm strip
- Correctly troubleshoot artifacts found on a rhythm strip
- Identify rhythms that can be mimicked by artifact
- Differentiate between artifacts and arrhythmia

### **CALCULATING HEART RATE**

- Determine a patient's heart rate
- Calculate the heart rate on a variety of rhythm strips using a variety of methods
- Differentiate between the three types of rhythm regularity
- Employ the five steps to interpret a variety of rhythms
- Correctly identify a variety of rhythms
- Determine what kind of heart rate to calculate for different kinds of rhythm regularity

## **HOW TO INTERPRET A RHYTHM STRIP**

- Determine a patient's heart rate
- Calculate the heart rate on a variety of rhythm strips using a variety of methods
- Differentiate between the three types of rhythm regularity
- Employ the five steps to interpret a variety of rhythms
- Correctly identify a variety of rhythms
- Determine what kind of heart rate to calculate for different kinds of rhythm regularity

## **RHYTHMS ORIGINATING IN THE SINUS NODE**

- State the criteria for each of the sinus rhythms
- Correctly interpret a variety of sinus rhythms on single and double-lead strips
- Identify the adverse effects for each of the sinus arrhythmias
- Describe the possible treatment for the sinus arrhythmias
- Correctly identify a variety of rhythms

## **RHYTHMS ORIGINATING IN THE ATRIA**

- State the criteria for each of the atrial arrhythmias
- Correctly identify a variety of rhythms

## **RHYTHMS ORIGINATING IN THE AV JUNCTION**

- Differentiate between high, low, and midjunctional conduction locations
- State the criteria for each of the junctional arrhythmias
- Correctly interpret a variety of junctional arrhythmias
- Identify the adverse effects of each type of junctional rhythm
- Describe the possible treatment for each type of junctional arrhythmia
- Correctly identify a variety of rhythms

## **RHYTHMS ORIGINATING IN THE VENTRICLES**

- Describe the conduction that occurs in ventricular rhythms
- State the criteria for each of the ventricular arrhythmias
- Correctly interpret a variety of ventricular arrhythmias
- Identify the adverse effects of each type of ventricular rhythm
- Describe the possible treatment for each type of ventricular arrhythmia
- Correctly identify a variety of rhythms

## **AV BLOCKS**

- Identify the three degrees of AV block

- State the criteria for each type of AV block
- Correctly identify each type of AV block
- Identify the adverse effects of each type of AV block
- Describe the possible treatment for each type of AV block
- Correctly identify a variety of rhythms

## **RHYTHM PRACTICE STRIPS**

- Calculate the heart rate on a variety of rhythm strips using a variety of methods
- Differentiate between the three types of rhythm regularity
- Employ the five steps to interpret a variety of rhythms
- Correctly interpret a variety of sinus rhythms on single and double-lead strips
- Correctly interpret a variety of atrial arrhythmias
- Differentiate between high, low, and midjunctional conduction locations
- Correctly interpret a variety of junctional arrhythmias
- Correctly interpret a variety of ventricular arrhythmias
- Correctly identify each type of AV block
- Correctly identify a variety of rhythms
- Determine what kind of heart rate to calculate for different kinds of rhythm regularity

## **ARTIFICIAL PACEMAKERS**

- Describe the primary function of a pacemaker
- Identify the indications for a pacemaker
- Define selected terms associated with pacemakers
- Describe the types of temporary pacemakers
- Identify what each letter of a pacemaker code means
- Identify pacemaker rhythms as being either VVI or DDD
- Identify the different kinds of pacemaker malfunctions

## **DIAGNOSTIC ELECTROCARDIOGRAPHY**

- State the goal of stress testing
- Describe the indications and contraindications (relative and absolute) for stress testing
- Describe how to calculate target heart rate
- Describe how an exercise stress test and pharmacological stress test are conducted
- Describe the three most commonly used protocols for treadmill exercise testing
- Explain the conditions in which a stress test may be terminated
- Identify the normal signs and symptoms during the stress test as well as EKG changes that may indicate a positive or negative stress test
- Explain the relationship between specificity and sensitivity as it relates to a stress test
- Identify the indications and contraindications for Holter monitoring
- Identify the artifacts associated with Holter monitoring
- Indicate the conditions in which Holter results may be determined positive or negative

## **HOW TO INTERPRET A 12-LEAD EKG**

- Identify the six steps necessary to interpret a 12-lead EKG
- Determine if a right or left bundle branch block exists
- Identify right and left ventricular hypertrophy

- Determine if any miscellaneous effects are present

## **MYOCARDIAL INFARCTION**

- Describe the classic symptoms of a myocardial infarction
- Describe the difference between Q wave myocardial infarction (MI) and non-Q wave MI
- Describe what EKG changes are associated with ischemia, injury, and infarction
- Describe the different kinds of ST segment abnormalities and explain what each implies
- Describe the different T wave abnormalities and explain what each implies
- Describe how a significant Q wave differs from a normal Q wave
- Describe normal R wave progression
- Identify the transition zone in a variety of EKGs

## **CARDIAC MEDICATIONS AND ELECTRICAL THERAPY**

- Describe the effect of each class of antiarrhythmic medication on the action potential
- Give examples of each class of antiarrhythmic medications
- Describe emergency medications including the mode of action of each
- Describe the two types of electrical therapy

## **Phlebotomy Modules**

### **PHLEBOTOMY PRACTICE AND QUALITY MANAGEMENT**

- Define phlebotomy and identify healthcare professionals who perform phlebotomy procedures
- Identify the importance of phlebotomy procedures to the overall care of the patient
- List professional competencies for phlebotomists and key elements of a performance assessment
- List members of a healthcare team who interact with phlebotomists
- Describe the roles of clinical laboratory personnel and common laboratory departments/sections
- Describe healthcare settings in which phlebotomy services are routinely performed
- Explain components of professionalism and desired character traits for phlebotomists
- Describe coping skills that are used to handle stress in the workplace
- Define the difference between quality improvement and quality control
- Describe the basic tools used by a phlebotomist to participate in quality improvement activities
- Evaluate the effectiveness of the latest phlebotomy safety supplies and equipment in blood collection
- Describe preanalytical complications related to phlebotomy procedures and how they impact patient safety
- Explain how you should prevent and/or handle complications in blood collection
- List at least five factors about a patient's physical disposition that can affect blood collection
- List examples of substances that can interfere in a clinical analysis of blood constituents and describe methods used to prevent these interferences
- Describe how allergies, a mastectomy, edema, and thrombosis can affect blood collection
- List preanalytical complications that can arise with test requests and identification
- Describe complications associated with tourniquet pressure and fist pumping
- Describe how the preanalytical factors of syncope, petechiae, neurological complications, hemoconcentration, hemolysis, and intravenous therapy affect blood collection, and methods used to prevent these interferences

## **COMMUNICATION STRATEGIES FOR PHLEBOTOMISTS**

- Apply methods for effective verbal and nonverbal communication, active listening, and written communication that take into account cultural competence and sensitivity in the workplace
- Describe the basic components of the medical record
- Provide examples of maintaining confidentiality and privacy related to patient information
- Identify potential clerical or technical errors that may occur during labeling or documentation of phlebotomy procedures
- Describe ways that healthcare workers may use computer systems to accomplish job functions

## **PROFESSIONAL ETHICS, LEGAL, AND REGULATORY ISSUES FOR PHLEBOTOMISTS**

- Define basic ethical and legal terms and explain how they differ
- Describe types of consent used in healthcare settings, including informed consent and implied consent
- Describe how you can avoid litigation as it relates to blood collection
- Define standards of care from a legal and a healthcare provider's perspective
- Identify key elements of the Health Insurance Portability and Accountability Act (HIPAA)
- List key factors common to health professional liability insurance policies
- List common issues in lawsuits against healthcare providers and prevention tips to avoid lawsuits in phlebotomy

## **INFECTION CONTROL FOR PHLEBOTOMISTS**

- Explain the infection control policies and procedures that must be followed in specimen collection and transportation
- Identify the basic programs for infection control and isolation procedures
- Explain the proper techniques for handwashing, gowning, gloving, masking, double-bagging, and entering and exiting the various isolation areas
- Identify steps to avoid transmission of blood-borne pathogens
- Identify ways to reduce risks for infection and accidental needle sticks
- Describe measures that can break each link in the chain of infection
- Identify the steps to take in case of blood-borne pathogen exposure
- Discuss safety awareness and basic skills essential for all healthcare workers
- Explain the safety policies and procedures that must be followed in specimen collection and transportation
- Describe the safe use of equipment in healthcare facilities

## **SAFETY AND FIRST AID FOR PHLEBOTOMISTS**

- Discuss safety awareness and basic skills essential for all healthcare workers
- Explain the measures that should be taken for fire, electric, radiation, mechanical, and chemical safety in a healthcare facility
- Describe the safe use of equipment in healthcare facilities
- List precautions that can reduce the risk of injury to patients

## **MEDICAL TERMINOLOGY AND ORGANIZATION OF THE HUMAN BODY**

- Define medical terminology by using word elements such as roots, prefixes, and suffixes
- Define the differences among the terms anatomy, physiology, and pathology
- Describe the directional terms, anatomic surface regions, and cavities of the body

- Describe the role of homeostasis in normal body functioning
- Describe the structure of the human cell including the role of each organelle

## **ANATOMY AND PHYSIOLOGY OF ORGAN SYSTEMS**

- Describe the role of homeostasis in normal body functioning
- Describe the purpose, function, and structural components of the major body systems
- Identify examples of pathologic conditions associated with each organ system
- List common diagnostic tests associated with each organ system

## **THE CARDIOVASCULAR AND LYMPHATIC SYSTEMS**

- Describe the role of homeostasis in normal body functioning
- Identify examples of pathologic conditions associated with each organ system
- List common diagnostic tests associated with each organ system
- Define the functions of the cardiovascular and lymphatic systems, including the structures and functions of the heart
- Identify and describe the structures and functions of the heart
- List pathologic conditions and common laboratory tests associated with the cardiovascular and lymphatic systems
- Trace the flow of blood through the cardiovascular system
- Describe the properties of arterial blood, venous blood, and capillary blood
- Compare the cellular and noncellular components of blood
- Describe the differences and similarities between whole blood, serum, and plasma
- Explain the structures and functions of different types of blood vessels
- Identify the veins most commonly used for phlebotomy procedures
- Define homeostasis, including its role in the basic process of coagulation and fibrinolysis

## **BLOOD COLLECTION EQUIPMENT**

- Describe the following features for anticoagulants and additives used in blood collection: the various types available, their mechanisms of action on collected blood, examples of tests performed on these tubes of anticoagulants and additives, and the vacuum-collection tube color codes
- Describe the equipment used in specimen collection

## **PREANALYTICAL COMPLICATIONS CAUSING MEDICAL ERRORS IN BLOOD COLLECTION**

- Describe preanalytical complications related to phlebotomy procedures and how they impact patient safety
- Explain how you should prevent and/or handle complications in blood collection
- List at least five factors about a patient's physical disposition that can affect blood collection
- List examples of substances that can interfere in a clinical analysis of blood constituents and describe methods used to prevent these interferences
- Describe how allergies, a mastectomy, edema, and thrombosis can affect blood collection
- List preanalytical complications that can arise with test requests and identification
- Describe complications associated with tourniquet pressure and fist pumping
- Describe how the preanalytical factors of syncope, petechiae, neurological complications, hemoconcentration, hemolysis, and intravenous therapy affect blood collection, and methods used to prevent these interferences

## **VENIPUNCTURE PROCEDURES**

- Describe the steps a healthcare worker should take in preparing himself or herself for a venipuncture procedure
- List supplies and equipment used in a typical venipuncture procedure
- Describe detailed steps in the patient identification process and what to do if information is missing
- Describe methods for hand hygiene
- Identify the most appropriate sites for venipuncture and situations when these sites might not be acceptable
- Identify alternative sites for the venipuncture procedure
- Describe the process and time limits for applying a tourniquet to a patient's arm
- Describe the decontamination process and the agents used to decontaminate skin for routine blood tests and blood cultures
- Describe the steps of a venipuncture procedure by using the evacuated tube method, syringe method, and butterfly method according to the CLSI Approved Standard
- Describe the "order of draw" for collection tubes
- Describe how to react when the patient has fainted or experiences nausea, vomiting, or convulsions
- Explain why it is necessary to control the depth of the incision
- Describe at least three sources of pre-examination error that can occur during: blood specimen handling, blood specimen transportation, and specimen processing or storage
- Name three methods commonly used to transport specimens
- Describe the function of a chain of custody, and the Custody and Control Form

## **CAPILLARY BLOOD SPECIMENS**

- Describe the decontamination process and the agents used to decontaminate skin for routine blood tests and blood cultures
- Describe the "order of draw" for collection tubes
- Describe the reasons for acquiring capillary blood specimens
- Explain why capillary blood from a skin puncture is different from blood taken by venipuncture and the effect on laboratory tests
- List the laboratory tests for which capillary specimens may be collected
- Explain why it is necessary to control the depth of the incision
- Describe the procedure for performing a skin puncture
- Describe the procedure for making blood smears
- Name three methods commonly used to transport specimens
- Describe the function of a chain of custody, and the Custody and Control Form

## **SPECIMEN HANDLING, TRANSPORTATION, AND PROCESSING**

- Name three methods commonly used to transport specimens
- Describe the function of a chain of custody, and the Custody and Control Form

## **PEDIATRIC AND GERIATRIC PROCEDURES**

- Describe fears or concerns that children in different developmental stages might have toward the blood-collection process
- Suggest appropriate behaviors for dealing with parents during a venipuncture or skin puncture
- Identify puncture sites for a heel stick on an infant and describe the procedure
- Describe the venipuncture sites for infants and young children

- Discuss the types of equipment and supplies that must be used during microcollection and venipuncture of infants and children
- Describe the procedure for specimen collection for neonatal screening
- Define five physical and/or emotional changes associated with the aging process
- Describe how a healthcare worker should react to physical and emotional changes associated with the elderly
- Explain the special precautions and types of equipment needed to collect capillary blood gases

## **POINT-OF-CARE COLLECTIONS**

- List terms that are synonymous with point-of-care testing
- Identify four analytes whose levels can be determined through point-of-care testing
- Describe the most widely used application of point-of-care testing
- Define quality assurance and its requirements in point-of-care testing
- Explain the special precautions and types of equipment needed to collect arterial blood gases

## **ARTERIAL, INTRAVENOUS (IV), AND SPECIAL COLLECTION PROCEDURES**

- List the steps and equipment in blood culture collections
- Discuss the requirements for the glucose and lactose tolerance tests
- Explain the special precautions and types of equipment needed to collect arterial blood gases
- Differentiate cannulas from fistulas
- List the special requirements for collecting blood through intravenous (IV) catheters
- Differentiate therapeutic phlebotomy from autologous transfusion
- Describe the special precautions needed to collect blood in therapeutic drug monitoring (TDM) procedures
- Explain special considerations for blood donor collection procedures

## **URINALYSIS, BODY FLUIDS, AND OTHER SPECIMENS**

- Identify body fluid specimens, other than blood, that are analyzed in the clinical laboratory, and identify the correct procedures for collecting and/or transporting these specimens to the laboratory
- Describe the correct methodology for labeling urine specimens
- Identify specimens collected for microbiological, throat, sputum, and nasopharyngeal cultures and the protocol that must be followed when transporting these specimens
- List the types of patient specimens needed for gastric and sweat chloride analysis
- List types of urine specimen collections and differentiate the uses of the urine specimens obtained from these collections
- Describe how to detect adulteration of urine specimens

## **DRUG USE, FORENSIC TOXICOLOGY, WORKPLACE TESTING, SPORTS MEDICINE, AND RELATED AREAS**

- Define toxicology and forensic toxicology
- Give five examples of specimens that can be used for forensic analysis
- Describe the function of a chain of custody, and the Custody and Control Form
- List examples of how blood alcohol contents is measured
- Describe at least three factors that affect testing for alcohol content



**Note: This program can be completed in 6 months. However, students will have online access to this program for a 24-month period.**

For Informational  
Use Only

## MICROSOFT OFFICE

- Module Use an integrated software package, specifically the applications included in the Microsoft Office suite
- Demonstrate marketable skills for enhanced employment opportunities
- Describe proper computer techniques for designing and producing various types of documents
- Demonstrate the common commands & techniques used in Windows desktop
- List the meaning of basic PC acronyms like MHz, MB, KB, HD and RAM
- Use WordPad and MSWord to create various types of documents
- Create headings and titles with Word Art
- Create and format spreadsheets, including the use of mathematical formulas
- Demonstrate a working knowledge of computer database functions, including putting, processing, querying and outputting data
- Define computer terminology in definition matching quizzes
- Use the Windows Paint program to alter graphics
- Use a presentation application to create a presentation with both text and graphics
- Copy data from one MS Office application to another application in the suite
- Use e-mail and the Internet to send Word and Excel file attachments
- Demonstrate how to use the Windows Taskbar and Windows Tooltips
- Explain how copyright laws pertain to data and graphics posted on the Internet
- Take the college computer competency test after course completion
- Follow oral and written directions and complete assignments when working under time limitations

**Note: Although the Microsoft Office Module is not required to successfully complete this program, students interested in pursuing free Microsoft MOS certification may want to consider completing this Microsoft Office Module at no additional cost.**

## **System Requirements:**

### **Windows Users:**

- Windows 8, 7, XP or Vista
- 56K modem or higher
- Soundcard & Speakers
- Firefox, Chrome or Microsoft Internet Explorer

### **Mac OS User:**

- Mac OS X or higher (in classic mode)
- 56K modem or higher
- Soundcard & Speakers
- Apple Safari

### **iPad Users:**

- Due to Flash limitations, eLearning programs are NOT compatible with iPads

### **Screen Resolution:**

- We recommend setting your screen resolution to 1024 x 768 pixels.

### **Browser Requirements:**

- System will support the two latest releases of each browser. When using older versions of a browser, users risk running into problems with the course software.
- Windows Users: Mozilla Firefox, Google Chrome, Microsoft Internet Explorer
- Mac OS Users: Safari, Google Chrome, Mozilla Firefox

### **Suggested Plug-ins:**

- Flash Player
- Real Player
- Adobe Reader
- Java