Course Syllabus

PLAB 1223 – Phlebotomy

Catalog Description: Skill development in the performance of a variety of blood collection methods using proper techniques and standard precautions. Includes vacuum collection devices, syringes, capillary skin puncture, butterfly needles and blood culture, and specimen collection on adults, children, and infants. Emphasis on infection prevention, patient identification, specimen labeling, quality assurance, specimen handling, processing, accessioning, professionalism, ethics, and medical terminology.

Prerequisites: Enrollment in this course requires enrollment in the MLT or MA program OR department head approval and successful completion of the admissions process.

Semester Credit Hours: 2
Lecture Hours per Week: 2
Lab Hours per Week: 1
Contact Hours per Semester: 48

State Approval Code: 51.1009

Instructional Goals and Purposes: The purpose of this course is to teach and develop the skill of blood collection.

Class section meeting time: This is an online lecture course with face to face labs that once per week during the semester.

Alternate Operations During Campus Closure: In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Panola College to move to altered operations. During this time, Panola College may opt to continue delivery of instruction through methods that include but are not limited to: online learning management system (CANVAS), online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor Panola College’s website (www.panola.edu) for instructions about continuing courses remotely, CANVAS for each class for course-specific communication, and Panola College email for important general information.

Learning Outcomes:
1. Demonstrate infection control and safety practices.
2. Describe quality assurance as it relates to specimen collection.
3. Explain the role of specimen collection in the overall patient care system
4. Identify collection equipment, various types of additives used, special precautions necessary, and substances that can interfere in clinical analysis of blood constituents.
5. Demonstrate venipuncture and capillary puncture techniques on adults, children, and infants.
6. Explain requisitioning, transport and processing.

Specific Course Objectives (includes SCANS):
After studying all materials and resources presented in the course, the student will be able to:

1. Chapter 1- (1a-v, 1b-ii, 2c-iii)
a. State the traditional and expanding duties of the phlebotomist.
b. Describe the professional characteristics that are important for a phlebotomist.
c. State and describe the three components of communication.
d. List the barriers to communication and methods to overcome them.
e. State the competencies expected of a certified phlebotomist.

2. Chapter 2 (1a-i, 1a-v, 1b-v, 2c-i, 2c-ii, 2c-iii)
   a. Describe the qualifications and functions of the personnel employed in a clinical laboratory.
   b. Discuss the basic functions of the hematology, chemistry, blood bank (immunohematology), serology (immunology), microbiology, and urinalysis sections.
   c. Describe the appropriate collection and handling of samples analyzed in the individual clinical laboratory sections.
   d. Identify the most common tests performed in the individual clinical laboratory sections and state their functions.

3. Chapter 3 (1a-i, 1a-v, 1b-v, 2c-i, 2c-ii, 2c-iii)
   a. Discuss the roles of the Clinical Laboratory Improvement Amendments (CLIA), Clinical and Laboratory Standards Institute (CLSI), the Joint Commission (TJC), and the College of American Pathologist (CAP) in the regulation of health care.
   b. Explain the role of the phlebotomist in complying with the Patient's Bill of Rights
   c. State the primary role of the phlebotomist in complying with Health Insurance Portability and Accountability Act (HIPAA).
   d. Define assault, battery, and defamation. Describe how a phlebotomist could be involved in a malpractice suit.
   e. State examples of how informed consent is obtained. Describe how a phlebotomist should respond to a patient who refuses a venipuncture.
   f. Describe the methods required for obtaining consent for collection of a sample for HIV testing.

4. Chapter 4 (1a-i, 1a-v, 1b-v, 2c-i, 2c-ii, 2c-iii)
   b. Describe the correct procedure for performing routine hand hygiene. List and state the purpose of the personal protective equipment used by phlebotomist.
   c. Describe the symptoms of latex allergy.
   d. Describe the procedures for donning and removing personal protective equipment (PPE).
   e. List and describe Standard Precautions and transmission-based precautions.
   f. Name a common blood and body fluid disinfectant.
   g. List in order the actions to be taken if an exposure to bloodborne pathogens occurs.

5. Chapter 5 (1a-v, 1a-i, 1b-ii, 1c-ii, 2c-iii)
   a. Define and state the purpose of prefixes, word roots, suffixes, and combining forms.
   b. Correctly form medical terms using prefixes, word roots, suffixes, and combining forms
   c. State the meaning of the commonly used prefixes, suffixes, and word roots.
   d. Associate common word roots with the corresponding body system.
   e. State the different plural forms of medical terms.
   f. Define the meanings for common medical abbreviations.

6. Chapter 6 (1a-i, 1a-v, 1b-v, 2c-i, 2c-ii, 2c-iii)
   a. Explain the levels of organization of the human body.
   b. Use directional terms to describe the position and location of body structures.
   c. List the body cavities and name the main organs contained in each cavity.
   d. State the four quadrants of the abdominopelvic cavity.
   e. List all the body systems and identify their functions and major components.

7. Chapter 7 (1a-v, 1b-ii, 2c-ii)
   a. Briefly describe the functions of the blood vessels, heart, and blood.
   b. Differentiate between arteries, veins, and capillaries by structure and function.
   c. Locate the femoral, radial, brachial, and ulnar arteries; Locate the basilic, cephalic, median cubital, radial, and saphenous veins.
   d. Identify the components of blood and state the major function of red blood cells, white blood cells, and platelets.
   e. Describe the major disorders associated with the circulatory system.
   f. State the clinical correlations of laboratory tests associated with the circulatory system.
8. **Chapter 8 (1a-v, 1b-ii, 2c-iii)**
   a. List the items that may be carried on a phlebotomist's tray.
   b. Differentiate among the various needle sizes as to gauge, length, and purpose.
   c. Discuss methods to dispose of contaminated needles safely.
   d. Differentiate among an evacuated tube system, a syringe, and a winged blood collection set, and state the advantages and disadvantages of each.
   e. Identify the types of evacuated tubes by color code, and state the anticoagulants and additives present, any special characteristics, and the purpose of each.
   f. State the mechanism of action, advantages, and disadvantages of the anticoagulants, EDTA, sodium citrate, potassium oxalate, and heparin.
   g. List the correct order of draw when collecting multiple tubes of blood.
   h. Discuss the use of tourniquets, gauze, bandages, gloves, and slides when performing venipuncture.
   i. Correctly select and assemble venipuncture equipment when presented with a clinical situation.

9. **Chapter 9 (1a-v, 1b-ii, 1c-ii 2c-iii)**
   a. List the required information on a requisition form.
   b. Discuss the appropriate procedure to follow when greeting and reassuring a patient.
   c. Describe correct patient identification procedures for inpatients and outpatients, as well as illustrate patient preparation and positioning.
   d. Correctly assemble venipuncture equipment and supplies.
   e. Name and locate the three most frequently used veins for venipuncture.
   f. Correctly apply a tourniquet and state why the tourniquet can be applied for only 1 minute.
   g. Describe vein palpation and discuss the venipuncture site cleansing procedure.
   h. State the steps in a venipuncture procedure, and correctly perform a routine venipuncture using an evacuated tube system.
   i. Demonstrate safe disposal of contaminated needles and supplies.
   j. List the information required on a sample tube label.
   k. Explain the importance of delivering samples to the laboratory in a timely manner.

10. **Chapter 10 (1a i-v, 1b-ii-v, 2c-i 2c-ii, 2c-iii)**
    a. Discuss the procedures to follow when patients are asleep, not in the rooms, or being visited by a physician, member of the clergy, or friend.
    b. Describe the identification procedure for patients that are too young, are cognitively impaired, or do not speak the language.
    c. Identify patient complications and describe methods to handle each situation.
    d. Discuss the procedure to follow when a patient develops syncope during the venipuncture.
    e. Describe methods used to locate veins that are not prominent.
    f. Describe conditions when it is not advisable to draw from veins in the legs or feet.
    g. State reasons why blood should not be drawn from a hematoma, burned area, scarred area, or an arm adjacent to a mastectomy.
    h. State the procedure to follow when drawing blood from a patient with a fistula.
    i. List 15 venipuncture errors that may produce hemolysis and the test affected.
    j. List 9 causes of hematomas.
    k. List 9 reasons for rejecting a sample.

11. **Chapter 11 (1a-i, 1a-v, 1b-v, 2c-i, 2c-ii, 2c-iii)**
    a. Define a fasting sample, and name three tests affected by not fasting.
    b. List four reasons for requesting timed samples.
    c. Discuss diurnal variation of blood constituents and list substances that would be affected.
    d. Differentiate between a trough and a peak level in therapeutic drug monitoring and state the importance of collecting the sample at the prescribed time.
    e. Discuss the timing sequences for the collection of blood cultures, the reasons for selecting a particular timing sequence, the number of samples collected and the aseptic techniques required when collecting blood cultures.
    f. Describe the procedure for collecting samples for cold agglutinins and cryoglobulins.
    g. List test that must be chilled immediately after collection and tests that are affected by exposure to light.
    h. Define chain of custody.
12. Chapter 12 (1a-v, 1bii-v, 1c-ii 2c-iii)
a. List six reasons for performing dermal punctures on children and adults.
b. Describe the various types of equipment needed for dermal sample collection.
c. Discuss the purpose and methodology for warming the puncture site.
d. Identify the acceptable and unacceptable sites for performing heel and finger punctures and the conditions when each is performed.
e. State the complications produced by the presence of alcohol at the puncture site.
f. State the correct positioning of the lancet for dermal puncture.
g. Name the major cause of microsample contamination.
h. State the order of collection for dermal puncture samples.
i. Correctly perform dermal punctures on the heel and the finger.
j. Discuss the necessary precautions for collecting high-quality samples for newborn bilirubin test.

13. Chapter 13 (1a-v, 1bii-v, 1c-ii 2c-iii)
a. Differentiate between quality control and quality assessment.
b. Discuss forms of documentation used in the phlebotomy department.
c. Discuss the role of variables in the development of a quality management program.
d. Differentiate among preexamination, examination, and postexamination variables related to the phlebotomist scope of practice.
e. For each step of the phlebotomy collection procedure state a quality control procedure failure that can affect the collection of a quality specimen.
f. Describe a quality management system.
g. State and describe the twelve quality essentials used in a quality management system.
h. Describe the purpose of quality indicators.
i. List the six areas of the Lean system and describe how Lean can benefit the phlebotomy department.

14. Chapter 14 (1a-v, 1b-iii, 1c-l, 2a-I, 2c-iv)
a. Describe the recommended requirements for personnel performing arterial punctures.
b. Define arterial blood gases and describe their diagnostic function.
c. List the equipment and materials needed to perform arterial punctures and discuss preparation of materials.
d. State four factors that are considered when selecting a site for arterial puncture and name the preferred site.
e. Describe the steps in the performance of an arterial puncture.

15. Chapter 15 (1a-v, 1b-iii, 1c-i, 2a-l, 2c-iv)
a. Define point-of-care testing (POCT) and state various locations where POCT is performed.
b. Discuss the advantages and disadvantages of POCT.
c. State the regulations required for POCT and the qualifications required for health-care personnel to perform testing.
d. Explain the POCT quality control procedures for Clinical Laboratory Improvement Amendments (CLIA) compliance.
e. Describe the test and instrumentation commonly used in POCT.

16. Chapter 16 (1a-v, 1b-iii, 1c-v, 2a-i, 2c-iv)
a. Provide patients with instructions and containers for the collection of random, first morning, midstream clean-catch, and 24-hour urine samples.
b. Provide patients with instructions and containers for the collection of random and timed fecal samples.
c. Provide patients with instructions and containers for the collection of semen samples.
d. Describe how to correctly collect a throat swab and a nasopharyngeal sample.
e. Discuss the major components and concerns for the blood donor selection process.
f. Compare and contrast the blood donor collection process and the routine venipuncture.
g. Describe the safety precautions associated with sample processing.
h. State four rules for safe operation of a centrifuge.

17. Lab #1 (1b-i-iii, 1bvi-v)
a. State the traditional and expanding duties of the phlebotomist.
b. Describe the professional characteristics that are important for a phlebotomist.
c. Discuss the importance of communication and interpersonal skills for the phlebotomist within
the laboratory, with patients, and with personnel in other departments of the hospital.
d. State and describe the three components of communication.
e. List the barriers to communication and methods to overcome them.
f. Describe the qualifications and functions of the personnel employed in a clinical laboratory.
g. Discuss the basic functions of the hematology, chemistry, blood bank (immunohematology),
sérology (immunology), microbiology, and urinalysis sections.
h. Describe the appropriate collection and handling of samples analyzed in the individual clinical
laboratory sections.
i. Identify the most common tests performed in the individual clinical laboratory sections and state
their functions.

18. Lab #2 (1b-vi, 2b-vi)
a. Discuss the roles of the Clinical Laboratory Improvement Amendments (CLIA), Clinical and
Laboratory Standards Institute (CLSI), the Joint Commission (TJC), and the College of
American Pathologist (CAP) in the regulation of health care.
b. Explain the role of the phlebotomist in complying with the Patient's Bill of Rights
c. State the primary role of the phlebotomist in complying with Health Insurance Portability and
Accountability Act (HIPAA).
d. Define assault, battery, and defamation. Describe how a phlebotomist could be involved in a
malpractice suit.
e. State examples of how informed consent is obtained. Describe how a phlebotomist should
respond to a patient who refuses a venipuncture.
f. Describe the methods required for obtaining consent for collection of a sample for HIV testing.

19. Lab #3 (1b-v, 1a-i, 1c-ii)
b. Describe the correct procedure for performing routine hand hygiene. List and state the purpose
of the personal protective equipment used by phlebotomist.
c. Describe the symptoms of latex allergy.
d. Describe the procedures for donning and removing personal protective equipment (PPE)
e. List and describe Standard Precautions and transmission-based precautions.
f. Name a common blood and body fluid disinfectant.
g. List in order the actions to be taken if an exposure to bloodborne pathogens occurs.

20. Lab #4 (1b-v, 1a-i, 1c-ii)
a. Define and state the purpose of prefixes, word roots, suffixes, and combining forms.
b. Correctly form medical terms using prefixes, word roots, suffixes, and combining forms.
c. State the meaning of the commonly used prefixes, suffixes, and word roots.
d. Associate common word roots with the corresponding body system.
e. State the different plural forms of medical terms.
f. Define the meanings for common medical abbreviations.

21. Lab #5 (1b-v, 1a-i, 1c-ii)
a. Explain the levels of organization of the human body.
b. Use directional terms to describe the position and location of body structures.
c. List the body cavities and name the main organs contained in each cavity.
d. State the four quadrants of the abdominopelvic cavity.
e. List all the body systems and identify their functions and major components.

22. Lab #6 (1b-v, 1a-i, 1c-ii)
a. Briefly describe the functions of the blood vessels, heart, and blood.
b. Differentiate between arteries, veins, and capillaries by structure and function.
c. Locate the femoral, radial, brachial, and ulnar arteries; Locate the basilic, cephalic, median
cubital, radial, and saphenous veins.
d. Identify the components of blood and state the major function of red blood cells, white blood
cells, and platelets.
e. Describe the major disorders associated with the circulatory system.
f. State the clinical correlations of laboratory tests associated with the circulatory system.

23. Lab #7 (1b-v, 1a-i, 1c-ii)
a. List the items that may be carried on a phlebotomist's tray.
b. Differentiate among the various needle sizes as to gauge, length, and purpose.
c. Discuss methods to dispose of contaminated needles safely.
d. Differentiate among an evacuated tube system, a syringe, and a winged blood collection set, and state the advantages and disadvantages of each.
e. Identify the types of evacuated tubes by color code, and state the anticoagulants and additives present, any special characteristics, and the purpose of each.
f. State the mechanism of action, advantages, and disadvantages of the anticoagulants, EDTA, sodium citrate, potassium oxalate, and heparin.
g. List the correct order of draw when collecting multiple tubes of blood.
h. Discuss the use of tourniquets, gauze, bandages, gloves, and slides when performing venipuncture.
i. Correctly select and assemble venipuncture equipment when presented with a clinical situation.
j. Practice venipuncture and dermal skills.

24. Lab #8 (1b-v, 1a-i, 1c-ii)
   a. List the required information on a requisition form.
   b. Discuss the appropriate procedure to follow when greeting and reassuring a patient.
   c. Describe correct patient identification procedures for inpatients and outpatients, as well as illustrate patient preparation and positioning.
   d. Correctly assemble venipuncture equipment and supplies.
   e. Name and locate the three most frequently used veins for venipuncture.
   f. Correctly apply a tourniquet and state why the tourniquet can be applied for only 1 minute.
   g. Describe vein palpation and discuss the venipuncture site cleansing procedure.
   h. State the steps in a venipuncture procedure, and correctly perform a routine venipuncture using an evacuated tube system.
   i. Demonstrate safe disposal of contaminated needles and supplies.
   j. List the information required on a sample tube label.
   k. Explain the importance of delivering samples to the laboratory in a timely manner.
   l. Practice venipuncture and dermal skills.

25. Lab #9 (1b-v, 1a-i, 1c-ii)
   a. Discuss the procedures to follow when patients are asleep, not in the rooms, or being visited by a physician, member of the clergy, or friend.
   b. Describe the identification procedure for patients that are too young, are cognitively impaired, or do not speak the language.
   c. Identify patient complications and describe methods to handle each situation.
   d. Discuss the procedure to follow when a patient develops syncope during the venipuncture.
   e. Describe methods used to locate veins that are not prominent.
   f. Describe conditions when it is not advisable to draw from veins in the legs or feet.
   g. State reasons why blood should not be drawn from a hematoma, burned area, scarred area, or an arm adjacent to a mastectomy.
   h. State the procedure to follow when drawing blood from a patient with a fistula.
   i. List 15 venipuncture errors that may produce hemolysis and the test affected.
   j. List 9 causes of hematomas.
   k. List 9 reasons for rejecting a sample.
   l. Practice venipuncture and dermal skills.

26. Lab #10 (1b-v, 1a-i, 1c-ii)
   a. Define a fasting sample, and name three tests affected by not fasting.
   b. List four reasons for requesting timed samples.
   c. Discuss diurnal variation of blood constituents and list substances that would be affected.
   d. Differentiate between a trough and a peak level in therapeutic drug monitoring and state the importance of collecting the sample at the prescribed time.
   e. Discuss the timing sequences for the collection of blood cultures, the reasons for selecting a particular timing sequence, the number of samples collected and the aseptic techniques required when collecting blood cultures.
   f. Describe the procedure for collecting samples for cold agglutinins and cryoglobulins.
   g. List test that must be chilled immediately after collection and tests that are affected by exposure to light.
h. Define chain of custody.
i. Practice venipuncture and dermal skills.

27. **Lab # 11 (1b-v, 1a-i, 1c-ii)**
   a. List six reasons for performing dermal punctures on children and adults.
   b. Describe the various types of equipment needed for dermal sample collection.
   c. Discuss the purpose and methodology for warming the puncture site.
   d. Identify the acceptable and unacceptable sites for performing heel and finger punctures and the conditions when each is performed.
   e. State the complications produced by the presence of alcohol at the puncture site.
   f. State the correct positioning of the lancet for dermal puncture.
   g. Name the major cause of microsample contamination.
   h. State the order of collection for dermal puncture samples.
   i. Correctly perform dermal punctures on the heel and the finger.
   j. Discuss the necessary precautions for collecting high-quality samples for newborn bilirubin test.
   k. Practice venipuncture and dermal skills.

28. **Lab #12 (1b-v, 1a-i, 1c-ii)**
   a. Differentiate between quality control and quality assessment.
   b. Discuss forms of documentation used in the phlebotomy department.
   c. Discuss the role of variables in the development of a quality management program.
   d. Differentiate among pre-examination, examination, and post-examination variables related to the phlebotomist scope of practice.
   e. For each step of the phlebotomy collection procedure state a quality control procedure failure that can affect the collection of a quality specimen.
   f. Describe a quality management system.
   g. State and describe the twelve quality essentials used in a quality management system.
   h. Describe the purpose of quality indicators.
   i. List the six areas of the Lean system and describe how Lean can benefit the phlebotomy department.
   j. Practice venipuncture and dermal skills.

29. **Lab #13 (1b-v, 1a-i, 1c-ii)**
   a. Describe the recommended requirements for personnel performing arterial punctures.
   b. Define arterial blood gases and describe their diagnostic function.
   c. List the equipment and materials needed to perform arterial punctures and discuss preparation of materials.
   d. State four factors that are considered when selecting a site for arterial puncture and name the preferred site.
   e. Describe the steps in the performance of an arterial puncture.
   f. Practice venipuncture and dermal skills.

30. **Lab #14 (1b-v, 1a-i, 1c-ii)**
   a. Define point-of-care testing (POCT) and state various locations where POCT is performed.
   b. Discuss the advantages and disadvantages of POCT.
   c. State the regulations required for POCT and the qualifications required for health-care personnel to perform testing.
   d. Explain the POCT quality control procedures for Clinical Laboratory Improvement Amendments (CLIA) compliance.
   e. Describe the test and instrumentation commonly used in POCT.
   f. Practice venipuncture and dermal skills.

31. **Lab #15 (1b-v, 1a-i, 1c-ii)**
   a. Provide patients with instructions and containers for the collection of random, first morning, midstream clean-catch, and 24-hour urine samples.
   b. Provide patients with instructions and containers for the collection of random and timed fecal samples.
   c. Provide patients with instructions and containers for the collection of semen samples.
   d. Describe how to correctly collect a throat swab and a nasopharyngeal sample.
   e. Discuss the major components and concerns for the blood donor selection process.
   f. Compare and contrast the blood donor collection process and the routine venipuncture.
g. Describe the safety precautions associated with sample processing.

h. State four rules for safe operation of a centrifuge.

i. Practice venipuncture and dermal skills.

Course Content:
A general description of lecture/discussion topics included in this course are listed in the Learning Objectives / Specific Course Objectives sections of this syllabus.

Students in all sections of this course will be required to do the following:

1. Proctored Exams
2. Comprehensive Final Exam
3. Laboratory Assignments/Quizzes
4. Quizzes/Assignments + Case Studies

Methods of Instruction/Course Format/Delivery:

The lecture portion of this course is offered in an online format. However, there will be required laboratories as scheduled in the course listing for the semester. Students will be fully responsible with keeping track of all assignments due dates, lab dates and time, as well as being aware of the testing center times for the four mandatory proctored exams.

Students are expected to demonstrate basic competency in reading, writing, oral communication, math, and computer skills. Proficiency will be measured by quizzes, assignments, laboratory assignments and quizzes, three regular examinations and a comprehensive final exam.

Major Assignments / Assessments:
The following items will be assigned and assessed during the semester and used to calculate the student’s final grade.

Assignments
1. Quizzes (Chapters 1-16)
2. Case Studies (Chapters 1-4, 8-13, 15-16)

Assessment(s):
1. Laboratory Assignments/Quizzes (Pre, During)
2. Proctored Exam#1 (Chapters 1-5)
3. Proctored Exam #2 (Chapters 6-10)
4. Proctored Exam #3 (Chapters 11-16)
5. Comprehensive Final Exam (Chapters 1-16)

Course Grade:
The grading scale for this course is as follows:

Major Exams (Covering Lecture and Laboratory Information) 40%
Quizzes + Attendance 25%
Assignments 20%
Comprehensive Final Exam 15%

Total: 100%

Texts, Materials, and Supplies:
• Strasigner, Susan King, and Di Lorenzo, Marjorie Schaub. The Phlebotomy Textbook. 3rd Edition. ISBN 9780803620575

Required Readings:
• Strasigner, Susan King, and Di Lorenzo, Marjorie Schaub. The Phlebotomy Textbook. 3rd Edition. ISBN 9780803620575

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Other:
• For current texts and materials, use the following link to access bookstore listings: http://www.panolacollegestore.com
• For testing services, use the following link: http://www.panola.edu/elearning/testing.html
• If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Administration Building or go to http://www.panola.edu/student-success/disability-support-services/ for more information.
• Withdrawing from a course is the student’s responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.
SCANS CRITERIA

1) **Foundation skills are defined in three areas: basic skills, thinking skills, and personal qualities.**

   a) **Basic Skills**: A worker must read, write, perform arithmetic and mathematical operations, listen, and speak effectively. These skills include:
      i) **Reading**: locate, understand, and interpret written information in prose and in documents such as manuals, graphs, and schedules.
      ii) **Writing**: communicate thoughts, ideas, information, and messages in writing, and create documents such as letters, directions, manuals, reports, graphs, and flow charts.
      iii) **Arithmetic and Mathematical Operations**: perform basic computations and approach practical problems by choosing appropriately from a variety of mathematical techniques.
      iv) **Listening**: receive, attend to, interpret, and respond to verbal messages and other cues.
      v) **Speaking**: Organize ideas and communicate orally.

   b) **Thinking Skills**: A worker must think creatively, make decisions, solve problems, visualize, know how to learn, and reason effectively. These skills include:
      i) **Creative Thinking**: generate new ideas.
      ii) **Decision Making**: specify goals and constraints, generate alternatives, consider risks, and evaluate and choose the best alternative.
      iii) **Problem Solving**: recognize problems and devise and implement plan of action.
      iv) **Visualize ("Seeing Things in the Mind's Eye")**: organize and process symbols, pictures, graphs, objects, and other information.
      v) **Knowing How to Learn**: use efficient learning techniques to acquire and apply new knowledge and skills.
      vi) **Reasoning**: discover a rule or principle underlying the relationship between two or more objects and apply it when solving a problem.

   c) **Personal Qualities**: A worker must display responsibility, self-esteem, sociability, self-management, integrity, and honesty.
      i) **Responsibility**: exert a high level of effort and persevere toward goal attainment.
      ii) **Self-Esteem**: believe in one's own self-worth and maintain a positive view of oneself.
      iii) **Sociability**: demonstrate understanding, friendliness, adaptability, empathy, and politeness in group settings.
      iv) **Self-Management**: assess oneself accurately, set personal goals, monitor progress, and exhibit self-control.
      v) **Integrity and Honesty**: choose ethical courses of action.

2) **Workplace competencies are defined in five areas: resources, interpersonal skills, information, systems, and technology.**

   a) **Resources**: A worker must identify, organize, plan, and allocate resources effectively.
i) Time: select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

ii) Money: Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

iii) Material and Facilities: Acquire, store, allocate, and use materials or space efficiently. Examples: construct a decision time line chart; use computer software to plan a project; prepare a budget; conduct a cost/benefits analysis; design an RFP process; write a job description; develop a staffing plan.

b) **Interpersonal Skills:** A worker must work with others effectively.
   i) Participate as a Member of a Team: contribute to group effort.
   ii) Teach Others New Skills.
   iii) Serve Clients/Customers: work to satisfy customer's expectations.
   iv) Exercise Leadership: communicate ideas to justify position, persuade and convince others, responsibly challenge existing procedures and policies.
   v) Negotiate: work toward agreements involving exchange of resources, resolve divergent interests.
   vi) Work with Diversity: work well with men and women from diverse backgrounds. Examples: collaborate with a group member to solve a problem; work through a group conflict situation, train a colleague; deal with a dissatisfied customer in person; select and use appropriate leadership styles; use effective delegation techniques; conduct an individual or team negotiation; demonstrate an understanding of how people from different cultural backgrounds might behave in various situations.


c) **Information:** A worker must be able to acquire and use information.
   i) Acquire and Evaluate Information.
   ii) Organize and Maintain Information.
   iii) Interpret and Communicate Information.
   iv) Use Computers to Process Information.
   Examples: research and collect data from various sources; develop a form to collect data; develop an inventory record-keeping system; produce a report using graphics; make an oral presentation using various media; use on-line computer data bases to research a report; use a computer spreadsheet to develop a budget.

d) **Systems:** A worker must understand complex interrelationships.
   i) Understand Systems: know how social, organizational, and technological systems work and operate effectively with them.
   ii) Monitor and Correct Performance: distinguish trends, predict impacts on system operations, diagnose deviations in systems' performance and correct malfunctions.
   iii) Improve or Design Systems: suggest modifications to existing systems and develop new or alternative systems to improve performance.
   Examples: draw and interpret an organizational chart; develop a monitoring process; choose a situation needing improvement, break it down, examine it, propose an improvement, and implement it.

e) **Technology:** A worker must be able to work with a variety of technologies.
   i) Select Technology: choose procedures, tools or equipment including computers and related technologies.
   ii) Apply Technologies to Task: understand overall intent and proper procedures for setup and operation of equipment.
   iii) Maintain and Troubleshoot Equipment: Prevent, identify, or solve problems with equipment, including computers and other technologies.
   Examples: read equipment descriptions and technical specifications to select equipment to meet needs; set up and assemble appropriate equipment from instructions; read and follow directions for troubleshooting and repairing equipment.