MLAB - 111 - Introduction to Clinical Laboratory Science

2025-2026 Course Proposal Form

Course Information

Please select which best fits this course proposal:*

- [ ] Course New/Reactivation Proposal
- [x] Course Revision Proposal
- [ ] Course Retirement Proposal
- [ ] Course Outcomes Revision Proposal

Department* Medical Laboratory Technology

IF proposing a new course type or prefix, please select "NEW Course Type or NEW Prefix" from the dropdown and input the requested data in the new text field that follows.

Course Type:* Allied Health Sciences

NEW Course Type:

NEW Prefix:

Prefix:* MLAB

Course Number:* 111

Course Title:* Introduction to Clinical Laboratory Science

Credit(s):* 2

Course Description:* Introduction of the student to the profession of laboratory medicine. This includes: organizational structure of hospitals and laboratories; medical ethics; related medical terminology; quality assurance; laboratory safety; calculations and knowledge of the basic routine laboratory tests.

Lecture Hours:* 2

Laboratory Hours:* 0

Clinical Hours:* 0

Clinical Hours:* 0

Internship Hours:* 0

Prerequisite(s): None

Corequisite(s): None

Pre / Corequisite(s): None

Required Materials* Check with the College Bookstore for required materials.

Course Learning Outcomes:* 1. Explain the profession of medical laboratory technician (medical technology) as it relates to issues of accreditation, certification, licensure, and other legislature and regulatory topics. 2. Identify various levels of personnel in a clinical laboratory, including the education, qualifications, and professional duties of each. 3. Identify safety protocols and precautions necessary for safe practice in a clinical laboratory. 4. Describe quality assurance and quality control protocols used to ensure the accuracy and precision of clinical laboratory data. 5. Demonstrate knowledge of the various departments in a clinical laboratory, including the most commonly performed laboratory tests in each department. 6. Demonstrate an ethical and professional attitude in all aspects of their course performance, adhering to all program policies and procedures as delineated in the Program Student Handbook.

Student Learning Outcomes:*

LECTURE 1: INTRODUCTION TO THE PROFESSION

1. Define the term medical technology or medical laboratory technician and describe the general role of the laboratory in assessing body functions. [1]

2. Describe the two major reasons that physicians order laboratory tests. [1]

3. **Describe the overall functions of a clinical laboratory, stating four aspects of assuring quality test results. [2]**

4. **State two factors that are important in the developing and monitoring of a quality assurance program in a laboratory. [4]**

5. **Describe the general health care system in the United States, and where laboratory tests are performed. [5]**

6. **Identify the Professional Service Departments in a full-service hospital. [5]**

7. **Explain the organization structure of a full-service clinical laboratory. [5]**

8. **Define and differentiate between the two areas of pathology under the supervision of a pathologist. [2]**

9. **Identify the laboratory personnel qualifications and responsibilities for each laboratory personnel: [2]**

10. **Identify <u>two</u> general differences between the four classes of laboratory personnel. [2]**

11. **Summarize the CLIA88 complexity model and identify the personnel standards/requirements for each of the test complexity categories. [2]**

12. **Define the abbreviations HIPAA and PHI, and list the information included as PHI. [1]**

13. **Define "informed consent", and list eight exceptions to the requirement for informed consent allowed by HIPAA. [1]**

14. **List and discuss five considerations that HIPAA affects in the laboratory workplace. [1]**

15. **Summarize the impact of HIPAA on the daily activities of personnel in the clinical laboratory. [1]**

16. Give examples of cases where the regulations of HIPAA would direct the actions of laboratory workers and describe the correct procedures for handling these situations. [1]

17. Define the terms registration, certification, licensure and accreditation. [1]

18. Identify the agencies involved with registration, certification, licensure and accreditation and describe their function as they apply to hospitals, Medical laboratory technician/Medical Laboratory programs, students, and graduates [1]

19. Identify those agencies that currently offer certifying examinations for laboratory personnel. [1]

20. Identify those agencies that accredit educational programs in medical laboratory technicians. [1]

21. Identify those agencies that accredit hospitals and clinical laboratories. [1]

22. Describe five qualities or aptitudes, which are desirable to find in clinical laboratory personnel. [2]

23. Illustrate the career mobility in the field of medical laboratory technician/medical laboratory technology. [2]

24. Identify the specific departments, which are part of a full-service clinical laboratory. [5]

25. Describe the following appropriate relationships, which should be maintained with the following: [1]

a. Pathologists

b. Physicians

c. Supervisors

d. Other Laboratory Personnel

e. Other Hospital Personnel

f. Patients

26. Define what is meant by a Code of Ethics. [6]

27. Describe seven major points that should serve as a Code of Ethics to guide the professional conduct of Clinical Laboratory personnel and students. [6]

28. Describe six major points that should serve as a Code of Ethics to guide the personal conduct of Clinical Laboratory personnel and students. [6]

LECTURE 2: LABORATORY SAFETY

1. Describe the contents necessary in a clinical laboratory's SAFETY MANUAL. [3]

2. Explain the EMERGENCY PRECAUTIONS a clinical laboratory must take to ensure employee safety. [3]

3. State what the following abbreviations stand for and explain the role of these agencies in setting and enforcing safety standards: [3]

a. OSHA

b. CLSI

c. CDC

d. CAP

4. Define the term "biohazard". [3]

5. Identify nine methods of acquiring an accidental biological infection in a clinical laboratory environment. [3]

6. Identify the biohazard symbol (label) and explain the

method and significance of labeling containers properly. [3]

7. Describe the contents and guidelines of an Infectious Control Program for a clinical laboratory. [3]

8. Define the term "universal precautions" or “Standard Precautions”. [3]

9. List eight (8) guidelines that are part of “universal precautions” or “Standard Precautions”. [3]

10. Define the terms PPE and “engineering controls” in reference to infection control in the laboratory. [3]

11. Identify those body fluids which pose the greatest risk of disease transmission for those persons whose activities involve contact with them. [3]

12. List the most important specimen-borne infections which are of major concern in a health care setting. [3]

13. Explain the major routes of transmission for the most important specimen-borne infections identified above in objective #12. [3]

14. Explain the first aid procedures for skin puncture and mucous membrane exposure to infectious body fluids. [3]

15. Identify and describe the methods, materials, equipment and procedures which are used to limit the risk of exposure to specimen-borne infections or biohazards in general. [3]

16. Explain the types or classifications of chemical hazards found in a clinical laboratory and give examples of each. [3]

17. Describe the information contained on Material Safety Data Sheets (MSDS) and how MSDSs are used in a clinical laboratory. [3]

18. Describe the proper storage techniques for clinical

laboratory chemicals and the precautions one must take when transporting and using hazardous chemicals. [3]

19. Explain the identification system used for Hazard Warning Labels developed by the National Fire Protection Association. [3]

20. Identify other hazards encountered in the clinical laboratory environment. [3]

21. Explain the proper method of pipetting body or chemical fluids in a clinical laboratory. [3]

22. Describe the proper method of cleaning and disinfecting (decontaminating) clinical laboratory work surfaces. [3]

23. Identify the solution most common ascribed to disinfect work surface areas in a clinical laboratory. [3]

24. Explain the function and purpose of an autoclave. [3]

25. Identify the usual time, pressure and temperature settings of an autoclave to sterilize biological material or equipment. [3]

26. Identify the method and materials used to ensure an autoclave is working properly (quality assurance). [3]

27. Define the term “infectious waste”, as described by OSHA. [3]

28. Explain the OSHA standards for proper laboratory waste disposal. [3]

29. Describe the OSHA approved containers used for disposal of sharps and body fluid specimens. [3]

30. Identify the two methods used for final decontamination of laboratory waste. [3]

31. Identify the basic first aid procedures for the following

common emergencies: [3]

a. Alkali or acid burns on the skin or in the mouth.

b. Alkali or acid burns in the eye.

c. Heat burns.

d. Minor cuts.

e. Serious cuts.

32. List and explain thirteen (13) major general rules for safety in the clinical laboratory. [3]

LECTURE 3: QUALITY ASSURANCE PROGRAMS AND QUALITY CONTROL

1. Define what is meant by Quality Assurance and give two synonyms for this term. [4]

2. List and describe the four key elements of a quality assurance program. [4]

3. List and define three different types of variables that quality assurance programs should control. [4]

4. Describe the material used for quality control procedures and compare its makeup to that of patient samples being tested. [4]

5. Explain why quality control material should be handled with the same precautions used for actual patient samples. [4]

6. Describe how QC material is used in an analytical method. [4]

7. Explain why quality control material is used in analytical methods. [4]

8. Describe the process of evaluating the results of QC material to determine if the results are acceptable. [4]

9. Describe how the know QC range is calculated for a given QC material. [4]

10. Calculate the lowest and highest acceptable values of a QC range when it is expressed in a "$\pm$ 2 SD" format. [4]

11. Identify the ONE (only) category of error that QC material can detect. [4]

12. Define and differentiate "accuracy" and "precision" of an analytical method. [4]

13. Define "systematic" and "random" error, and relate each term to either accuracy or precision. [4]

14. Suggest possible sources of systematic variation in an analytical method. [4]

15. Suggest possible sources of random variation in an analytical method. [4]

16. Define the terms outlier, trend, and shift and describe how each of these can be recognized when evaluating QC data. [4]

17. List and explain four types of error that QC material CANNOT predict or control. [4]

18. Describe five methods other than QC results that are used to ensure precise and accurate patient data. [4]

LECTURE 4: URINALYSIS

1. Define the term "urinalysis." [5]

2. Describe the tasks performed in the department of urinalysis. [5]

3. Describe the meaning of the following abbreviations associated with urinalysis: [5]

a. UA

j. HPF (hpf)

s. ~

b.	PKU	k.	LPF (lpf)
t.	<		
c.	pH	l .	g/dL
u.	WBC		
d.	QNS	m.	mg/dL
v.	RBC		
e.	ASAP	n.	trace
w.	SSA		
f.	UTI	o.	1+
x.	OR		
g.	TUR	p.	2+
y.	ER		
h.	GTT	q.	3+
i.	hCG	r.	4+

4. Define and give examples of intrinsic and extrinsic abnormalities that can be identified by performing urinalysis. [5]

5. Describe the type of urine specimen (time of day) appropriate for a routine urinalysis and two reasons why this is important. [5]

6. Identify the type of container used to collect specimens for routine urinalysis. [5]

7. Identify the urine specimen time limit for analysis. [5]

8. Identify the storage requirement for a specimen for routine urinalysis if the urine cannot be processed within

routine urinalysis if the urine cannot be processed within one hour. [5]

9. Describe the difference between a random urine specimen, freshly voided urine specimen and a clean "Mid-Stream" catch urine specimen. [5]

10. Explain the physical and chemical changes that occur in a urine specimen if the urine is not examined within 1 hour of collection. [5]

11. Identify the best urine preservative. [5]

12. Describe two reasons for allowing urine to come to room temperature before analysis. [5]

13. Identify the physical characteristics of a urine specimen and describe their clinical significance. [5]

14. Describe the proper procedure for using the urine chemistry strips. [5]

15. Identify the chemical tests performed by the use of reagent strips on a routine urine specimen and describe their clinical significance. [5]

16. Identify the specific confirmation tests and tablet tests that are used on a routine urine specimen and describe the circumstances in which they are used. [5]

17. Describe the performance of a urine microscopic examination. [5]

18. Describe the normal constituents found in a microscopic examination of a urine sediment. [5]

19. Identify the abnormal findings in a microscopic urine sediment and describe their significance. [5]

20. Compare the urine chemistry strip results and the microscopic examination results to ensure accuracy and

precision of reported test data. [5]

21. Describe the clinical significance of the fecal occult blood test. [5]

22. Explain the procedure and method for measuring fecal occult blood. [5]

LECTURE 5: SEROLOGY

1. Define the terms antigen, antibody, and serology. [5]

2. Identify the type of specimens used in serology. [5]

3. Describe the tasks performed in the department of serology. [5]

4. Describe the meaning of the following abbreviations associated with serology: [5]

a. VDRL
k. anti-HBc
u. STS

b. RPR
l. anti-HBe
v. HTLV-I

c. FTA-ABS
m. anti-HBs
w. SLE

d. MHA-TP
n. hCG
x. ASO

e. RA
o. EBV
y. ANA

f. CRP
p. CEA
z. AIDS

f. AIDS

g. HIV-I

q. CSF

aa. HAV

h. HBsAg

r. HLA

bb. IgE

i. IgG

s. IgM

cc. Mono

j. Ag

t. Ab

5. Define the term "titer".[5]

6. Describe the reasons for performing a titer on a patient's serum. [5]

7. Explain the meaning of a “acute” and “convalescent” titers, and describe how these are used to determine when a titer is diagnostic. [5]

8. Define and describe the principle of agglutination test procedures [5]

9. Describe the following agglutination test methods and describe their clinical significance: [5]

a. RA

b. RPR

c. CRP

d. Mono

e. Cold Agglutinin

10. Define the term "ELISA."[5]

11. Identify the tests methods which utilize the ELISA technique. [5]

12. Describe the ELISA test method used for detecting b-hCG. [5]

LECTURE 6: MICROBIOLOGY

1. Define the term “microbiology.” [5]

2. Identify the common types of specimens used in microbiology. [5]

3. Differentiate between sterile and antiseptic techniques and explain the differences between disinfectants and antiseptics. [5]

4. Describe the tasks performed in the department of microbiology. [5]

5. Describe the meaning of the following abbreviations associated with microbiology: [5]

a. MIC	i. GC	q. KOH
b. O & P	j. STD	r. CO_2
c. Staph	k. BAP	s. E. coli
d. Strep	l. MAC	t. modified TM

e. URI

m. THIO

u. PVA

f. UTI

n. GPC

v. SABs

g. TB

o. GNB

w. AFB

h. GI

p. GNC

x. GPB6.

6. Describe the specimen collection process of the following: [5]

a. urine culture

b. throat culture

c. sputum culture

d. stool culture

e. urogenital culture

f. csf culture

g. blood culture

h. wound culture

7. Describe the proper handling and storage of the specimens for culture identified above. [5]

8. Define the term "primary plating", and draw a diagram of inoculation procedure of the specimens identified above. [5]

9. Differentiate between laboratory media which is considered "selective" media versus "differential" media. [5]

10. Describe the Gram Staining process, listing the four components of the procedure, and explain the purpose of the Gram Stain. [5]

11. Differentiate between Gram POSITIVE microorganisms and Gram-NEGATIVE microorganisms. [5]

12. Describe the difference between microorganisms that are classified microscopically as “cocci” and “bacilli.” [5]

13. Describe the difference between aerobic & anaerobic microorganisms. [5]

14. Define the term "nosocomial infection."[5]

15. Identify the most common microorganisms associated with causing nosocomial infections. [5]

16. Identify the primary pathogenic microorganisms associated with the following specimens: [5]

a. urine culture

b. throat culture

c. sputum culture

d. stool culture

e. wound culture

f. urogenital culture

g. blood culture

h. csf culture

17. Identify the methods used to identify pathogenic microorganisms. [5]

18. Describe meaning of "antibiotic susceptibility" testing. [5]

19. Differentiate between "sensitive" and "resistant" antibiotic susceptibility patterns in the Kirby-Bauer method. [5]

20. Identify and describe the two laboratory techniques used to perform antibiotic susceptibility testing. [5]

21. Describe the handling and processing techniques used for specimens for acid fast bacilli (AFB). [5]

22. Identify the most pathogenic AFB microorganism. [5]

23. Define the term “mycology”. [5]

24. Describe the four major classifications of fungi. [5]

25. Explain the collection techniques used for obtaining specimens for fungi. [5]

26. Define the term "parasitology."[5]

27. Differentiate between protozoa and metazoan. [5]

28. Describe the major classifications of the protozoa and metazoa. [5]

29. Explain the collection techniques used for obtaining specimens for parasites. [5]

30. Define the term "virus."[5]

31. Identify the most common pathogenic viruses. [5]

32. Identify the type of specimens collected for viral disease detection. [5]

LECTURE 7: HEMATOLOGY

1. Define the term "hematology."[5]

2. Identify the type of specimens used in hematology. [5]

3. Describe the tasks performed in the department of hematology. [5]

4. Describe the meaning of the following abbreviations associated with hematology: [5]

a. RBC
i. Sed Rate
q. Mono

b. WBC
j. diff
r. Lymph

c. Hgb
k. CBC
s. Band

d. Hct
l. ESR
t. Seg

e. MCV
m. IDA
u. EDTA

f. MCH
n. RA

f. MCH n. PA
v. Retic

g. MCHC o. PMN
w. Baso

h. RDW p. Eos

5. Differentiate between red blood cells, white blood cells and platelets and describe their function and clinical significance. [5]

6. Differentiate between white blood cells that are classified as granulocytes and agranulocytes. [5]

7. Identify those tests that are included in a complete blood count (CBC) and describe their clinical significance. [5]

8. Describe the clinical significance of the RBC indices. [5]

9. Describe the "differential count" and explain its clinical significance. [5]

10. Describe the process of making a blood film (smear). [5]

11. Explain the variations in the blood film making process used to make a blood film thinner or thicker. [5]

12. Identify the normal white blood cell types found in normal peripheral blood circulation and state their normal relative percentages. [5]

13. Explain the meaning of a "shift to the left."[5]

14. Define the term “hematocrit.” [5]

15. Describe the clinical significance of the hematocrit. [5]

16. Explain the method used to measure a patient's hematocrit using the microhematocrit method. [5]

17. Define the term "anemia."[5]

18. Describe how anemias are classified and give one example of each. [5]

19. Define the term "leukemia."[5]

20. Describe how the leukemias are classified and give four categories of leukemias. [5]

21. Describe the clinical significance of the ESR. [5]

22. Explain the method used to measure a patient's ESR. [5]

23. Describe the clinical significance of the Retic Count. [5]

24. Explain the method used to measure a patient's Retic Count. [5]

LECTURE 8: COAGULATION

1. Define the term "coagulation."[5]

2. Identify the type of specimens used in coagulation. [5]

3. Describe the tasks performed in the department of coagulation. [5]

4. Describe the meaning of the following abbreviations associated with coagulation: [5]

a. PT

d. FDP

b. APTT

e. D-Dimer

c. FSP

f. DIC

5. Briefly explain those components involved in blood coagulation after blood vessel injury. [5]

6. Review the biological function of platelets and list the three phases of their activity. [5]

7. Identify those laboratory tests which measure specific platelet function. [5]

8. Define the terms "thrombocytopenia" and "thrombocytosis" and identify two causes of each. [5]

9. Briefly explain the plasma coagulation cascade scheme. [5]

10. Differentiate between the extrinsic, intrinsic and common pathways of coagulation. [5]

11. Identify the coagulation pathways associated with the PT & APTT tests. [5]

12. Explain the clinical significance of performing PT and APTT testing, including the medications each test is used to monitor. [5]

13. Explain the clinical significance of the following coagulation tests: [5]

a. Fibrinogen

b. FSP / FDP / D-Dimer

c. Factor Assays

14. Define the term “fibrinolysis.” [5]

15. Identify those laboratory tests, which measure fibrinolysis. [5]

16. Explain the clinical significance of DIC. [5]

LECTURE 9: IMMUNOHEMATOLOGY

1. Define the term "immunohematology.” [5]

2. Identify the type of specimens used in immunohematology. [5]

3. Describe the tasks performed in the department of immunohematology. [5]

4. Identify the four major ABO blood groups and state the antigens and antibodies that each blood group possesses. [5]

5. Define the term “Rh.” [5]

6. Describe the meaning of the following abbreviations associated with immunohematology: [5]

a. ABO
b. Rh
c. X-match
d. HBV
e. AIDS
f. HIV
g. RPR
h. Type and Cross
i. AABB
j. D & C
k. TUR
l. Ab
m. Ag
n. HCV
o. HLA
p. DAT
q. IAT
r. Cryo
s. FFP
t. HDN
u. PC

7. Describe the process of collecting a unit of blood from a volunteer. [5]

8. Identify and describe the clinical significance of nine laboratory tests which are performed on donor blood before it can be used. [5]

9. Identify the different blood components that can made from a unit that has been drawn from a donor. [5]

10. Identify the most common transfused blood component. [5]

11. Explain the meaning of the term “-pheresis.” [5]

12. Identify and describe the clinical significance of three laboratory tests which are performed on a patient who will receive blood. [5]

13. Explain the clinical significance of a STAT X-match. [5]

14. Describe the meaning and purpose of prenatal screening. [5]

15. Describe the symptoms and cause of an immediate acute type of hemolytic transfusion reaction. [5]

16. Name two common non-hemolytic transfusion reactions and describe the symptoms and cause of each. [5]

17. Define the term “Autologous Donation.” [5]

18. Describe the purpose of Autologous Donation and general requirements for Autologous Donation. [5]

LECTURE 10: CHEMISTRY

1. Define the term "chemistry."[5]
2. Identify the type of specimens used in chemistry. [5]
3. Describe the tasks performed in the department of chemistry. [5]

4. Describe the meaning of the following abbreviations associated with chemistry: [5]

a. Na	r. TDM	ii. NH_3
b. K	s. AMI	jj. pH
c. Cl	t. GTT	kk. T_4
d. HCO_3	u. Ca	11. T_3
e. tCO_2	v. PO_4	mm. TSH
f. CK	w. BUN	nn. TIBC
g. LD	x. UA	oo. PSA
h. AST (SGOT)	y. Fe	pp. AFP
i. ALT (SGPT)	z. Cu	qq. FSH

j. GGT	aa. A/G	rr. LH
k. ALP	bb. CEA	ss. hCG (ß-hCG)
l. ACP	cc. FBS	
m. HDL	dd. Li	
n. LDL	ee. NaCl	
o. VLDL	ff. M	
p. VVLDL	gg. N	
q. TP	hh. Mg	

5. Identify those tests that comprise the "electrolytes."[5]

6. Identify four tests that would be part of a “cardiac profile.” [5]

7. Identify two tests that would be associated with a "renal profile."[5]

8. Identify four tests that would be associated with a "lipid profile."[5]

9. Identify four tests that would be associated with a "liver

9. Identify four tests that would be associated with a "liver profile."[5]

10. Identify four tests that would be associated with a "thyroid profile." [5]

11. Differentiate between "therapeutic" drugs and "drugs of abuse."[5]

12. Differentiate between "peak" and "trough" therapeutic drug levels. [5]

13. Define the terms "hemolysis" and "lipemia." [5]

14. Identify those chemistry laboratory tests which are influenced by hemolysis and lipemia, including the test the is most affected by hemolysis. [5]

LECTURE 11: VENIPUNCTURE

1. Describe why blood drawing is important. [5]

2. Identify four ways, in which you can inspire confidence

2. Identify four ways, in which you can inspire confidence in the hospital patients that you draw. [5]

3. Describe ways in which to gain confidence in your own ability. [5]

4. Explain the reason for blood to be classified as a tissue. [5]

5. Identify the specific type of tissue associated with blood. [5]

6. Describe, in detail, the function of the specific cell types and amount of blood in an adult. [5]

7. Name the three general classifications of formed elements (cells) in blood and describe their function. [5]

8. Define the medical root words associated with the formed elements in blood. [5]

9. Describe the composition of blood. [5]

10. Name the types of white blood cells normally found in peripheral blood. [5

11. Define the medical root words associated with leukocytes found in peripheral blood. [5]

12. List the normal reference values (numbers) for all the formed elements in blood. [5]

13. Identify the chemical composition of blood plasma. [5]

14. Differentiate between the three forms in which blood is generally tested in the laboratory, and identify those forms, which contain fibrinogen. [5]

15. Describe the color, effect, mode of action, precautions, and use of the commonly used anticoagulants in the B-D Hemogram closure system. [5]

16. Arrange the types of blood collection tubes in their proper blood drawing order. [5]

17. Name the blood collection tubes most commonly used in the different laboratory departments. [5]

18. Describe the various venous sites from which blood may be drawn and those sites to avoid. [5]

19. Explain the safety precautions a phlebotomist must take in performing blood-drawing procedures. [5]

20. Describe in detail the chronological order of the collection of blood from a patient. [5]

a. organization

b. patient identification

c. preparation of equipment

d. preparation of patient

e. venipuncture technique

f. inverting anticoagulated samples

g. disposal of contaminated needle

h. labeling of specimens

i. clean up

j. care of patient after venipuncture

k. remove gloves/wash hands

l. departure from room

f. departure from room

21. Explain what is meant by a "timed" specimen. [5]

22. Describe the glucose tolerance test (GTT). [5]

23. Identify the blood collection tube used for drawing GTT samples and explain why this tube is used. [5]

24. Identify several complications found in blood drawing and propose solutions to solve these difficulties. [5]

25. Identify which physiological factors can have an effect on laboratory specimens and which tests they affect. [5]

26. Discuss ways in which hemolysis occurs and how hemolysis can be prevented. [5]

27. Identify the most common cause of hemolysis. [5]

28. Identify those tests, which are most influenced by hemolysis and describe how they are altered. [5]

29. Discuss the role and responsibility of laboratory personnel in the acceptance and rejection of laboratory specimens. [5]

30. Propose four reasons for collecting micro skin puncture blood samples. [5]

31. Identify the most common sites for obtaining micro skin puncture samples from patients. [5]

32.Identify the tests which are part of Ohio's Newborn Screening Program. [5]

33. Identify anticoagulant used when drawing arterial blood gas samples. [5]

34. Describe the arterial blood gas drawing procedure. [5]

35. Identify several collection errors associated with arterial blood gas and describe how these collection errors influence blood gas results. [5]

36. Describe how blood gas samples should be transported to the laboratory and how improper transport influences blood gas results. [5]

LECTURE 12 LAB CALCULATIONS

1. **Define the primary units of measure used in the metric system for volume, length, and weight.**

2. **List the prefixes used in the metric system to express values more than or less than the primary unit, and indicate their abbreviation and values.**

3. **Convert easily between units of measure within the metric system.**

4. **Relate the metric system to the English system of measure commonly used in the United States, stating the equivalent value of each commonly used metric unit in English units, and vice versa.**

5. **Perform mathematical conversions of metric units to English units and vice versa.**

6. **Describe the origin and usage of the International System of Units (SI System), and state the standard unit of measure for common clinical laboratory measurements using the SI System.**

7. **Define the term “dilution”, and give examples of how this procedure might be used in a clinical laboratory.**

8. **Recognize various expressions of a dilution as different descriptions of the same mixture.**

9. **Determine the final dilution of a mixture, given the amount of substance being diluted and the amount of diluent used.**

10. **Calculate the amount of a substance needed to prepare a given volume of a particular dilution.**

11. **Calculate the amount of diluent needed to dilute a given amount of substance to a particular dilution.**

12. **Determine the substance concentration of a diluted sample when given the concentration measurement and dilution information.**
13. **Define the terms solution, solvent, and solute.**

14. **Differentiate between miscible and immiscible mixtures.**

15. **Differentiate between saturated and unsaturated solutions.**

16. **Use the proportion format to perform solution calculations in which the concentration of the solution remains the same.**

17. **Perform calculations in which a solution of a certain concentration is prepared from another solution of a different concentration.**

18. **Define the term “percent”, and describe how this term applies to weight-per-weight, weight-per-volume, and volume-per-volume solutions.**

19. **Calculate the percent concentration of solutions, given the amount of solute and solvent used to prepare the solution.**

20. **Calculate the amount of solute needed to prepare a particular volume of a solution of a given percent concentration.**

21. **Calculate the amount of solvent needed to prepare a solution of a given percent concentration, given the amount of solute used.**

22. **Correctly calculate and prepare an assigned amount of a given reagent of a specific percentage concentration in the college laboratory.**

General Education Outcomes:

Please select up to 2 from the list of the general education outcomes taught in this course.

Select up to 2 of the following:*

- [x] Communicate effectively in oral and written formats
- [ ] Employ or utilize information access and literacy skills
- [x] Demonstrate problem-solving and critical thinking skills
- [ ] Employ mathematical and science literacy skills
- [ ] Acquire a cultural, artistic and global perspective
- [ ] Demonstrate professional and human relations skills

Types of Formative Assessment:

Please select at least 3 formative assessment tools that are most appropriate to the course description and outcomes, regardless of modality. Formative assessment tools are learning activities or assessments that monitor and provide ongoing feedback on student learning. Formative assessments allow students to identify their strengths and weaknesses and for instructors to address student questions and misunderstandings

Select at least 3 of the following:*

- [x] Practice Quizzes
- [ ] Paper Drafts
- [x] Class Discussions/Q&A
- [ ] Low-stakes Group Work
- [ ] Homework Assignment
- [ ] Surveys/Polls
- [ ] Laboratory/Instrument Practice
- [x] Written Reflections
- [ ] Self-appraisal using study guides, quiz software, interactive textbook
- [ ] Other

Types of Summative Assessment:

Please select at least 2 summative assessment tools that are most appropriate to the course description and outcomes, regardless of modality. Summative assessment tools are learning activities or assessments that evaluate student learning at the end of an instructional period, like a module, unit, or course. Summative assessments are formally graded and allow instructors to determine whether and to what extent students have met the course learning outcomes.

Select at least 2 of the following:*

- [x] Instructor-Created Exams/High-Stakes Quizzes
- [ ] Standardized Tests
- [x] Laboratory Reports
- [ ] Final Projects
- [ ] Final Essays/Research Papers
- [ ] Final Presentations
- [ ] Final Reports
- [ ] Internships/ Clinical Site Evaluations
- [ ] Other

Minimum Acceptable Standards* Overall 77% - C

Please answer the following questions related to your curriculum proposal:

Why are you recommending these changes? (courses outdated, recommendation of advisory committee, results of assessment activities and data, better attainment of program/course outcomes)

Justification:* This course will be a part of the “Light the Fire” initiative to gain students in high school and the general student population.

Last Semester Needed:

Impact Report Statement

List all program(s) or course(s) affected by these changes. If no program(s) or course(s) are affected, please state "NA" below. Run an Impact Report by clicking in the top left corner and answer below according to the results.

Impact Report:

What impact will these changes have on other courses or programs? (List impacted programs and comments or input you have gathered from other faculty, program directors, or Division Chairs)

Other Courses or Programs: This would be an aid to increasing enrollment into the MLT program and its corequisites.

What impact will these changes have on institutional resources? (Budget, faculty, equipment, labs, instructional

design, etc.) Have you already discussed this impact with appropriate personnel (financial aid, administration, division chair, other faculty)?

Institutional Resources: None.

What impact will these changes have on current students? How will you ensure that current students are not penalized by these changes?

Current Students: No impact on current students

What impact will these changes have on transferability, national/regional association standards, etc.?

Transferability, National / Regional Association Standards, Etc.: None

What impact will these changes have on the institution's mission and student's achievement of general education outcomes/requirements?

Mission; General Education Outcomes / Requirements: None

Administrative Use Only

Please do not alter the information within this section.

Course OID:

Information or Voting Item:

- [ ] Information Item (If the proposal does not impact other courses, select this option)
- [ ] Voting Item

Implementation Semester and Year* Fall 2025