A. COURSE INFORMATION

Course number/section: CLSC_3200_001/BIMS_3200_001
Class meeting time: MW 1:00-1:50 PM
Class location: CI 122
Course Website: https://bb9.tamucc.edu/

B. INSTRUCTOR INFORMATION

Instructor: Dr. Felix Omoruyi
Office location: Center for the Sciences 130B
Office hours: M – 12:00 - 1:00 PM; T – 12:00 – 2:00 PM; R – 2:00 – 4:00 PM
Telephone: 825-2473
E-mail: felix.omoruyi@tamucc.edu
Appointments: N/A

C. COURSE DESCRIPTION

This course consist of studies of general laboratory techniques and procedures, laboratory safety and regulations, professional ethics, phlebotomy technique, microscopy and chemical examination of urine and body fluids.

D. PREREQUISITES AND COREQUISITES

BIOL 1407, CHEM 1312 or CHEM 1412
Corequisites
STME 0092

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES


Supplies
You will need a scientific calculator.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information
can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

**Infection Control/Safety/First Aid**
The student should be able to:
1. Explain the measures that should be taken by fire, metrical, radiation, and chemical safety in a health care facility.
2. Identify protective measures to avoid transmission of blood borne pathogens.
3. Identify the basic program for safety, infection, control, and isolation procedures.
4. Explain the proper techniques for hand washing, gowning, gloving, masking, and interring and exiting the various isolation areas.

**Phlebotomy Techniques**
The student should be able to:
1. Describe differences between venipuncture and skin puncture equipment and supplies.
2. Identify the types of safety equipment needed to collect blood by venipuncture.
3. Identify the most appropriate sites for venipuncture.
4. Describe the procedure for making a blood smear.
5. Explain reasons for acquiring capillary blood specimens.

**Complications, Variables & Ethics**
The student should be able to:
1. List 5 factors about patients’ physical disposition that can affect blood collection and how it affects the blood sample.
2. Identify how the Pre-analytical factors of syncope, hemoconcentration, IV therapy, seizure, and hemolysis affect blood collections.
3. Describe Pre-analytical complications related to blood collection techniques.
4. List examples of substances that can interfere in clinical testing of blood analyses and describe methods used to prevent these interfusions.
5. Identify Pre-analytical complications that can arise with test request and identifications.
6. Describe which blood constituents are photosensitive or thermolabile.
7. List reasons for specimen rejection.
8. List examples of policies and procedures important to phlebotomy.

**Introduction to Urinalysis**
The student should be able to:
1. List major chemical constituents of urine.
2. Describe a method for determining whether a questionable fluid is urine.
3. Define common terms encountered in urinalysis.
4. Discuss several methods for preserving urine specimens including their advantages and disadvantages.
5. Recognize normal and abnormal daily urine volumes.
6. Describe the type of specimen needed to obtain optimal results when a specific urinalysis procedure is requested.
7. List changes that may occur in a urine specimen that remains at RT for more than 2 hrs.
Quality Assurance in Urinalysis
The student should be able to:
1. Discuss procedures and documentation for quality control.
2. Describe the difference between quality assurance and quality control.
3. Describe post-analytical, analytical and pre-analytical elements of urinalysis and describe effects of each on urine specimens.
4. Define accuracy and precision
5. Describe procedures and documentation for instrumentation the urinalysis laboratory.
7. Evaluate the differences between external Quality Control and internal Quality Control.
8. Describe CQI and TQM.

Renal Function
The student should be able to:
1. Discuss physiologic mechanisms of glomerulus filtration tubular resorption, tubular secretion, and renal blood flow.
2. Identify lab procedures used to evaluate these 4 renal functions.
3. Differentiate between indigenous and exogenous procedures.
4. Describe the advantages and disadvantages in using, urea, inulin creatinine, B2 microglobulin and radionucleotides for the measurement of glomerular filtration.
5. Calculate creatinine clearance and determine if results are normal
6. Define osmolarity and discuss its relationship to urine concentration
7. Describe basic principles of clinical osmometers.
8. Calculate a PAH clearance and relate this to renal blood flow.
9. Describe the relationship of urinary ammonia and titratable acidity to the production of acidic urine.

Urine Microscopy
The student should be able to:
1. Differentiate among phase contrast, interference-contrast, and polarized microscopy.
2. Discuss methods used for the standardization of microscopic exams.
3. Correlate physical and chemical urinalysis results with microscopic observations.
4. Discuss the significance of RBC’s, WBC’s and cast urinalyses sediment.
5. Name and describe normal crystals found in acidic urine and alkaline urine.
6. State the significance of cystine, leucine, tyrosine, cholesterol, sulfonamide, x-ray dye, acyclovir and ampicillin crystals.
7. Explain how casts can be formed and include major proteins found in casts.
8. Name and describe 3 types of epithelial cells found in urinary sediment.
9. List normal values for RBCs, WBCs and hyaline casts.
10. Differentiate between RBCs, yeast and oil droplets.
Physical Properties of Urine
The student should be able to:
1. Discuss the relationship of urochrome to normal urine color.
2. Discuss the significance of cloudy urine and clear red urine.
3. Name 2 pathologic causes of black or brown urine.
4. List common terminology used to report normal and abnormal urine color.
5. Discuss the significance of pyridium in a specimen.
7. Define specific gravity and explain why this measurement can be significant in routine urinalysis.
8. Name 2 non-pathogenic causes of abnormally high specific gravity readings.

Chemical Properties of Urine
The student should be able to:
1. Describe proper technique for performing chemical test on urine by reagent strip and give possible errors if technique isn’t followed.
2. Use several causes of premature derivation of reagent strips and how to avoid them.
3. Name 2 reasons for measuring urines PH and discuss their clinical applications.
4. Discuss the principle of PH testing by reagent strip.
5. Describe 3 renal causes of proteinuria and 2 non-renal reasons for proteinuria.
6. Name a confirmatory test for urine protein and name sources of error associated with the procedure.
7. State the renal threshold urine for glucose.
8. Describe the principle of the glucose oxidase method of reagent strip testing for glucose and name possible causes of interference with this method.
9. Describe the copper reaction method for detection of urinary reducing substance and list causes of interference.
10. Name 3 reasons for the appearance of ketonuria.
11. List the 3 “ketone bodies” appearing in urine and describe their measurements by the sodium nitroprusside reaction and causes of interference.
12. Differentiate between hematuria and hemoglobinuria and explain the clinical significance.
13. Describe the chemical principle of the reagent strip method for blood testing.
14. Describe the degradation of hemoglobin.
15. Describe the relationship of urinary bilirubin and urobilinogen to the diagnosis of bile duct obstruction, liver disease, and hemolytic disorders.
16. Discuss the principle of oxidation test and diazotization test for urinary bilirubin.
17. Explain the advantage of performing an Ictotest for detection of urine bilirubin.
18. Describe the Watson-Schwartz test used to differentiate between urobilinogen, porphobilinogen, and Ehrlich-reactive compounds.
19. Discuss the principle of the nitrite reagent strips test for bacturia.
20. List survival causes of false negative result in the reagent strip test for nitrite.
21. Compare reagent strip testing for urine specific gravity with refractometer and urinometer testing.
22. Describe the principle of the reagent strip test for leukocytes.
23. Discuss the advantages and disadvantages of the reagent strip test for leukocytes.
Forensic Drug Testing
The student should be able to:
1. Define the term toxicology.
2. List the major toxicants.
3. Define the pathologic mechanisms of the major toxicants.
4. Discuss the laboratory methods used to evaluate toxicity.
5. Explain the difference between quantitative and qualitative tests in toxicology.
6. Explain why it may not be important to measure free drug concentrations and metabolites.
7. Describe the NIDA-5 drugs and the process by which they are measured.
8. List commonly used antidotes.
9. Explain key differences between a clinical laboratory and a forensic laboratory.

Metabolic Disorders
The student should be able to:
1. Explain the abnormal accumulation of metabolites in the urine in terms of over flow and renal disorders.
2. Name the metabolic defect in phenylketonuria and describe the clinical manifestations it produces.
3. Describe the test used in the detection of PICU.
4. Describe screening test for urinary tyrosine and its metabolites how its presence can be determined.
5. Name the abnormal urinary substance in alkaptonuria and state how its presence can be determined.
6. State the clinical significance of branched chain amino acid disorders.
7. Define porphyria and how it correlates to heme production pathway.
8. Define mucopolysaccharidosis and how these diseases are detected.
9. Explain key differences between a clinical laboratory and a forensic laboratory.

Body Fluids
The student should be able to:
1. Define serous fluid, synovial fluid, and CSF.
2. Differentiate between transudate and exudates.
3. Describe routine tests and normal results for synovial, serous, and CSF.
4. Describe changes in synovial, serous, and CSF in pathological conditions.

G. INSTRUCTIONAL METHODS AND ACTIVITIES
Disposable lab coats, gloves, and goggles will be provided for you and are required for all labs. You will not be permitted to work in the lab without these items. You will also need a scientific calculator and a black Sharpie marker.
H. MAJOR COURSE REQUIREMENTS AND GRADING

The final course grade will be based on two exams, problem portfolio, and a final exam according to the following percentages:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>PERCENT OF FINAL GRADE</th>
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<tbody>
<tr>
<td>Examination average (2 exams)</td>
<td>50%</td>
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<tr>
<td>Problem portfolio</td>
<td>20%</td>
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<tr>
<td>Final examination (comprehensive)</td>
<td>30%</td>
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Grades
You are expected to read the material that corresponds to the objectives as they are covered. Mastering course objectives will require that you have read the material. All questions are keyed to the specific course and lab objectives. Use these objectives to study.

There is no provision for making up late work and/or missed exams or quizzes. A grade of zero will be entered for any late or missed exam, lab, quiz or practical due to an unexcused absence. The only **excused** absences are personal illness, immediate family medical emergency or immediate family funeral.

The following scale will be used to report grades:

- A  90 - 100
- B  80 - 89
- C  70 - 79
- D  60 - 69
- F  below 60

I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>Month</th>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Aug.</td>
<td>27</td>
<td>Introduction and Safety</td>
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<tr>
<td></td>
<td>29</td>
<td>Infection Control/First Aid/Lab Resources</td>
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<tr>
<td>Sep.</td>
<td>03</td>
<td>Labor Day</td>
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<td>05</td>
<td>Vascular System</td>
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<td>10</td>
<td>Anticoagulants and Homeostasis</td>
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<td>17</td>
<td>Phlebotomy Techniques</td>
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<td>Complications &amp; Variables</td>
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<td>Ethics, Legal and Regulations</td>
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<tr>
<td>Oct.</td>
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<tr>
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<td>Renal Function</td>
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<td>08</td>
<td>Introduction to Urinalysis</td>
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<td>Physical Properties of Urine</td>
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<td>Microscopic Examination of Urine</td>
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<td>Nov.</td>
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<td>EXAM 2</td>
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<td>07</td>
<td>Quality Assurance in Urinalysis</td>
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<td>Forensic Drug Testing</td>
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<td>21</td>
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<td>28</td>
<td>Body Fluids</td>
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<td>Dec.</td>
<td>Body Fluids</td>
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<td>03</td>
<td>Review</td>
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<td>05</td>
<td>Review</td>
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<td>12</td>
<td>FINAL 11:00 - 1:30 PM</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness
Students are expected to attend all lectures. If you know in advance that you will miss an exam due to official University business, you must provide the Professor with official documentation of the absence at least fourteen days prior to missing. It is the student’s responsibility to obtain official documentation in timely fashion. Once the documentation has been verified, the Professor will decide how to handle the absence. In the overwhelming majority of cases, assignments and exams will be turned in or completed prior to the planned, official absence. Exams given outside regularly scheduled times may vary in format and content at the discretion of the faculty member. Absolutely nothing may be turned in late by anyone for any reason.

Late Work and Make-up Exams
There is no provision for making up late work and missed exams.

Extra Credit
There is no provision for extra credit

Cell Phone Use
No use of cell phone in class

Laptop Use
Only for assessing lecture notes posted on blackboard

Food in Class
No eating in class

Missed Exam
Unexcused absence during exams will result in a zero for that exam. It is the student’s responsibility to contact me in cases of extreme emergency. The only excused absences are personal illness, immediate family medical emergency, or attending funeral of immediate family.
K. COLLEGE AND UNIVERSITY POLICIES

- **Academic Integrity (University)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a
• **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

• **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

• **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.
L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.