



**CLINICAL LABORATORY TECHNOLOGY
CLBT 1070 CLINICAL CHEMISTRY
COURSE SYLLABUS
SPRING SEMESTER 2020**

COURSE INFORMATION

Credit Hours/Minutes: 4/6000
Class Location: Room 739 Gillis Building
Class Meets: Monday, Tuesday, Wednesday, 12:30pm-3:15pm
Course Reference Number (CRN): 40202

INSTRUCTOR CONTACT INFORMATION

Instructor Name: Cynthia Williams, MS, MT (AMT) (HHS)
Email Address: Cynthia Williams (cwilliams@southeasterntech.edu)
Vidalia/Office Location: Vidalia Campus/Office Location: 716 Gillis Building
Office Hours: 7:30-8 am; 3:30-5 pm
Phone: 912-538-3183
Fax Number: 912-538-3106

SOUTHEASTERN TECHNICAL COLLEGE'S (STC) CATALOG AND HANDBOOK

Students are responsible for all policies and procedures and all other information included in Southeastern Technical College's [Catalog and Handbook](http://www.southeasterntech.edu/student-affairs/catalog-handbook.php) (<http://www.southeasterntech.edu/student-affairs/catalog-handbook.php>).

REQUIRED TEXT

Clinical Chemistry, Principles, Procedures, Correlations, 6th Edition, Bishop, Michael L. et al. Lippincott Williams & Wilkins Publishers

REQUIRED SUPPLIES & SOFTWARE

Ink pens, pencil, highlighter, permanent marker, paper and any other supplies deemed necessary by instructor. Calculator is provided. Students should not share login credentials with others and should change passwords periodically to maintain security.

COURSE DESCRIPTION

Develops concepts and techniques of clinical chemistry applicable to medical laboratory technology. Topics include: carbohydrates, electrolytes and acid-base balance, nitrogenous compounds, related lab math, enzymes and endocrinology, liver functions, lipids, toxicology and therapeutic drug monitoring, safety and quality control, correlation of disease states, process improvement (team approach), and critical thinking skills.

MAJOR COURSE COMPETENCIES

1. Carbohydrates,
2. Electrolytes and acid-base balance,
3. Nitrogenous compounds,

4. Related lab math
5. Enzymes and endocrinology,
6. Liver functions,
7. Lipids,
8. Toxicology and therapeutic drug monitoring,
9. Safety and quality control,
10. Correlation of disease states,
11. Process improvement (team approach),
12. Critical thinking skills

PREREQUISITE(S)

BIOL 2114, BIOL 2114L, Chem 1151, Chem 1151L CLBT 1010

COURSE OUTLINE

Carbohydrates

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|---|-----------------|-------------------|
| 1 | Describe carbohydrate metabolism. | Cognitive | Comprehension |
| 2 | Discuss test principles and procedures. | Cognitive | Comprehension |
| 3 | Perform selected tests. | Psychomotor | Guided Response |

Electrolytes and Acid-Base Balance

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|---|-----------------|-------------------|
| 1 | Describe and discuss electrolyte functions and procedures. | Cognitive | Comprehension |
| 2 | Explain acid-base balance. | Cognitive | Comprehension |
| 3 | Perform selected tests. | Psychomotor | Guided Response |
| 4 | Discuss carbon dioxide (CO ₂) content in the blood. | Cognitive | Comprehension |
| 5 | Discuss carbon dioxide (CO ₂) procedures. | Cognitive | Comprehension |
| 6 | Discuss the carbonate-bicarbonate buffer system. | Cognitive | Comprehension |
| 7 | Discuss blood gases. | Cognitive | Comprehension |
| 8 | Interpret arterial blood gasses (ABG) results. | Cognitive | Comprehension |
| 9 | Discuss selected mineral (e.g., iron, calcium, phosphorus, and magnesium) physiology. | Cognitive | Comprehension |
| 10 | Discuss mineral test principles and procedures. | Cognitive | Comprehension |

Nitrogenous Compounds

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|--|-----------------|-------------------|
| 1 | Discuss nitrogenous compound physiology including blood urea nitrogen (BUN), uric acid, proteins, and creatinine/creatine. | Cognitive | Comprehension |
| 2 | Discuss concept of clearance tests. | Cognitive | Comprehension |
| 3 | Discuss nitrogenous compound selected testing principles and procedures. | Cognitive | Comprehension |

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|--|-----------------|-------------------|
| 4 | Interpret electrophoretic patterns. | Cognitive | Comprehension |
| 5 | Perform selected tests. | Psychomotor | Guided Response |
| 6 | Discuss the critical factors relating to therapeutic drug monitoring (TDM) such as patient blood levels, dosage administered, and specimen collection times. | Cognitive | Comprehension |

Related Lab Math

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|---|-----------------|-------------------|
| 1 | Perform related quality control (QC) math calculations--mean, median, mode, standard deviation, coefficient of variation. | Cognitive | Synthesis |
| 2 | Perform related math calculations using Beer's law. | Cognitive | Synthesis |
| 3 | Perform related math calculations for clearances, dilutions, metric system and preparation of solutions using $V_1C_1 = V_2C_2$. | Cognitive | Synthesis |
| 4 | Perform related math calculations for calculation of globulin, (A/G ratio), Ion gap, Blood gases (Henderson Hasselbach), Low density Lipoprotein(LDL)-Cholesterol, LDL: High density lipoprotein (HDL) ratio, Indirect bilirubin, %Creatine kinase (CK)-MB of total CK. | Cognitive | Synthesis |

Enzymes and Endocrinology

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|---|-----------------|-------------------|
| 1 | Discuss the physiology of selected enzymes. | Cognitive | Comprehension |
| 2 | Relate selected enzymes to tissue locations. | Cognitive | Application |
| 3 | Discuss isoenzymes and the clinical implications. | Cognitive | Comprehension |
| 4 | Discuss selected test principles and procedures. | Cognitive | Comprehension |
| 5 | Interpret electrophoretic patterns. | Cognitive | Comprehension |
| 6 | Perform selected tests. | Psychomotor | Guided Response |
| 7 | Discuss the physiology of selected hormones. | Cognitive | Comprehension |
| 8 | Discuss thyroid functions and testing. | Cognitive | Comprehension |
| 9 | Discuss other hormone functions and testing. | Cognitive | Comprehension |

Liver Functions

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|---|-----------------|-------------------|
| 1 | Discuss the physiology of the liver. | Cognitive | Comprehension |
| 2 | Describe bilirubin metabolism. | Cognitive | Comprehension |
| 3 | Discuss selected liver function test principles/procedures. | Cognitive | Comprehension |
| 4 | Perform selected tests such as bilirubin and ammonia. | Psychomotor | Guided Response |

Lipids

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|--|-----------------|-------------------|
| 1 | Describe the physiology of selected lipids and lipoproteins. | Cognitive | Comprehension |
| 2 | Discuss cholesterol, triglyceride, fatty acid, and lipoprotein test principles and procedures. | Cognitive | Comprehension |
| 3 | Interpret electrophoretic patterns. | Cognitive | Comprehension |
| 4 | Perform selected tests. | Psychomotor | Guided Response |

Toxicology and Therapeutic Drug Monitoring

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|--|-----------------|-------------------|
| 1 | Discuss the application of therapeutic drug testing. | Cognitive | Comprehension |
| 2 | Discuss critical factors relating to TDM such as patient blood levels, dosage administered, and specimen collection times. | Cognitive | Comprehension |
| 3 | Discuss legalities of testing for drugs of abuse (including alcohol). | Cognitive | Comprehension |
| 4 | Discuss selected tests for toxic substances. | Cognitive | Comprehension |

Safety and Quality Control

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|---|-----------------|-------------------|
| 1 | Implement established safety guidelines when considering biological, chemical, electrical, mechanical, fire, and radiation hazards. | Cognitive | Application |
| 2 | Calibrate and operate selected instrumentation. | Cognitive | Application |
| 3 | Discuss blood gas instrumentation. | Cognitive | Comprehension |
| 4 | Perform selected tests. | Psychomotor | Guided Response |
| 5 | Establish standard curve for selected procedure. | Cognitive | Application |
| 6 | Set up standard deviation chart for selected lab procedure. | Cognitive | Application |
| 7 | Calculate and prepare common laboratory solutions. | Psychomotor | Complex Response |
| 8 | Evaluate test procedure using quality control guidelines. | Cognitive | Evaluation |
| 9 | Identify and discuss normal/ abnormal/critical values. | Cognitive | Knowledge |
| 10 | Correlate abnormal/normal findings with disease states. | Cognitive | Analysis |

Correlation of Disease States

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|---|-----------------|-------------------|
| 1 | Evaluate laboratory data and correlate with disease states. | Cognitive | Evaluation |

Process Improvement (Team Approach)

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|--|-----------------|-------------------|
| 1 | Discuss current and potential issues in the chemistry lab. | Cognitive | Comprehension |

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|---|-----------------|-------------------|
| 2 | Describe methods used to improve performance in the clinical chemistry laboratory using numerical data. | Cognitive | Comprehension |

Critical Thinking Skills

| ORDER | DESCRIPTION | LEARNING DOMAIN | LEVEL OF LEARNING |
|-------|--|-----------------|-------------------|
| 1 | Evaluate situations determining correct steps to take to troubleshoot the instrument to report reliable results. | Cognitive | Evaluation |
| 2 | Evaluate laboratory data to determine which tests are needed and whether the results are reliable. | Cognitive | Evaluation |
| 3 | Determine whether results are "critical values". | Cognitive | Application |

GENERAL EDUCATION CORE COMPETENCIES

Southeastern Technical College has identified the following general education core competencies that graduates will attain:

1. The ability to utilize standard written English.
2. The ability to solve practical mathematical problems.
3. The ability to read, analyze, and interpret information.

STUDENT REQUIREMENTS

Students are expected to complete all tests, assignments, and Laboratory Reports by the due dates. A ten point penalty will be assessed for each day an assignment or Laboratory Report is late. Students are required to pass all laboratory skills in three attempts. A student may not progress until skills are mastered. Students are responsible for policies, procedures, and requirements (drug screen, background check, immunizations, Fit test, CPR...) included in the STC Catalog/Clinical Laboratory Technology (CLT) handbook. Students are required to read the chapter prior to class. Tests will be timed. Points will be deducted for spelling due to Medical Liability in the work place. Laboratory results are legal documents.

ATTENDANCE GUIDELINES

Class attendance is a very important aspect of a student's success. Being absent from class prevents students from receiving the full benefit of a course and interrupts the learning process. Southeastern Technical College considers both tardiness and leaving early as types of absenteeism. Responsibility for class attendance rests with the student. Regular and punctual attendance at all scheduled classes is required for student success. Students will be expected to complete all work required by the instructor as described in the individual course syllabus.

Instructors have the right to give unannounced quizzes/assignments. Students who miss an unannounced quiz or assignment will receive a grade of 0. Students who stop attending class, but do not formally withdraw, may receive a grade of "F" (Failing 0-59) and face financial aid repercussions in upcoming semesters.

Instructors are responsible for determining whether missed work may be made up and the content and dates for makeup work is at the discretion of the instructor.

Attendance is counted from the first scheduled class meeting of each semester. To receive credit for a course a student must attend at least 90% of the scheduled instructional time. All work missed due to tardiness or absences must be made up at the convenience of the instructor. Any student attending less than the required scheduled instructional time (90%) may be dropped from the course as stated below in the Withdrawal Procedure.

Tardy means arriving after the scheduled time for instruction to begin. Early departure means leaving before the end of the scheduled time. Three (3) tardies or early departures equal one (1) absence for the course. For this class, which meets 3 days a week for 15 weeks, the maximum number of days a student may miss is 5 days during the semester.

STUDENTS WITH DISABILITIES

Students with disabilities who believe that they may need accommodations in this class based on the impact of a disability are encouraged to contact the appropriate campus coordinator to request services.

Swainsboro Campus: Macy Gay mgay@southeasterntech.edu, 478-289-2274, Building 1, Room 1208

Vidalia Campus: Helen Thomas hthomas@southeasterntech.edu, 912-538-3126, Building A, Room 108

Specific Absences

Provisions for Instructional Time missed because of documented absences due to jury duty, military duty, court duty, or required job training will be made at the discretion of the instructor.

PREGNANCY

Southeastern Technical College does not discriminate on the basis of pregnancy. However, we can offer accommodations to students who are pregnant that need special consideration to successfully complete the course. If you think you will need accommodations due to pregnancy, please make arrangements with the appropriate campus coordinator.

Swainsboro Campus: Macy Gay mgay@southeasterntech.edu, 478-289-2274, Building 1, Room 1208

Vidalia Campus: Helen Thomas hthomas@southeasterntech.edu, 912-538-3126, Building A, Room 108

It is strongly encouraged that requests for consideration be made **PRIOR** to delivery and early enough in the pregnancy to ensure that all the required documentation is secured before the absence occurs. Requests made after delivery **MAY NOT** be accommodated. The coordinator will contact your instructor to discuss accommodations when all required documentation has been received. The instructor will then discuss a plan with you to make up missed assignments.

WITHDRAWAL PROCEDURE

Students wishing to officially withdraw from a course(s) or all courses after the drop/add period and prior to the 65% point of the term in which student is enrolled (date will be posted on the school calendar) must speak with a Career Counselor in Student Affairs and complete a Student Withdrawal Form. A grade of "W" (Withdrawn) is assigned for the course(s) when the student completes the withdrawal form.

Important – Student-initiated withdrawals are not allowed after the 65% point. After the 65% point of the term in which student is enrolled, the student has earned the right to a letter grade and will receive a grade for the course. Please note: Abandoning a course(s) instead of following official withdrawal procedures may result in a grade of "F" (Failing 0-59) being assigned.

Informing your instructor that you will not return to his/her course, does not satisfy the approved withdrawal procedure outlined above.

There is no refund for partial reduction of hours. Withdrawals may affect students' eligibility for financial aid for the current semester and in the future, so a student must also speak with a representative of the Financial Aid Office to determine any financial penalties that may be assessed due to the withdrawal. A grade of "W" will count in attempted hour calculations for the purpose of Financial Aid.

MAKEUP GUIDELINES (TESTS, QUIZZES, HOMEWORK, PROJECTS, ETC.)

Exams or labs missed for any reason will be made up at the discretion of the instructor. A maximum of one exam can be made up. If more than one exam is missed the student will only be allowed to make up the first exam missed and a grade of "0" will be awarded for any other missed exams including the final. If you are 30 minutes late for class, you are considered absent and missed the test. Remember, the first test can be made up and the second will be a zero, to include the final.

Extenuating circumstances are determined at the instructor's discretion. Unless otherwise scheduled with the instructor, it is expected that the test will be taken the next day, scheduled outside of regular class time. Failure to follow this procedure will result in a grade of zero.

ACADEMIC DISHONESTY POLICY

The Southeastern Technical College Academic Dishonesty Policy states that all forms of academic dishonesty, including but not limited to cheating on tests, plagiarism, collusion, and falsification of information, will call for discipline. The policy can also be found in the Southeastern Technical College Catalog and Handbook.

PROCEDURE FOR ACADEMIC MISCONDUCT

The procedure for dealing with academic misconduct and dishonesty is as follows:

1. First Offense

Student will be assigned a grade of "0" for the test or assignment. Instructor keeps a record in course/program files and notes as first offense. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus. The Registrar will input the incident into Banner for tracking purposes.

2. Second Offense

Student is given a grade of "WF" (Withdrawn Failing) for the course in which offense occurs. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus indicating a "WF" has been issued as a result of second offense. The Registrar will input the incident into Banner for tracking purposes.

3. Third Offense

Student is given a grade of "WF" for the course in which the offense occurs. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus indicating a "WF" has been issued as a result of third offense. The Vice President for Student Affairs, or designee, will notify the student of suspension from college for a specified period of time. The Registrar will input the incident into Banner for tracking purposes.

STATEMENT OF NON-DISCRIMINATION

The Technical College System of Georgia and its constituent Technical Colleges do not discriminate on the basis of race, color, creed, national or ethnic origin, sex, religion, disability, age, political affiliation or belief, genetic information, disabled veteran, veteran of the Vietnam Era, spouse of military member or citizenship status (except in those special circumstances permitted or mandated by law). This school is in compliance with Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, or national origin; with the provisions of Title IX of the Educational Amendments of 1972, which prohibits discrimination on the basis of gender; with the provisions of Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination on the basis of handicap; and with the American with Disabilities Act (ADA).

The following individuals have been designated to handle inquiries regarding the nondiscrimination policies:

| | |
|---|--|
| American With Disabilities Act (ADA)/Section 504 - Equity- Title IX (Students) – Office of Civil Rights (OCR) Compliance Officer | Title VI - Title IX (Employees) – Equal Employment Opportunity Commission (EEOC) Officer |
| Helen Thomas, Special Needs Specialist Vidalia Campus 3001 East 1 st Street, Vidalia Office 108 Phone: 912-538-3126 Email: Helen Thomas hthomas@southeasterntech.edu | Lanie Jonas, Director of Human Resources Vidalia Campus 3001 East 1st Street, Vidalia Office 138B Phone: 912-538-3230 Email: Lanie Jonas ljonas@southeasterntech.edu |

ACCESSIBILITY STATEMENT

Southeastern Technical College is committed to making course content accessible to individuals to comply with the requirements of Section 508 of the Rehabilitation Act of Americans with Disabilities Act (ADA). If you find a problem that prevents access, please contact the course instructor.

GRIEVANCE PROCEDURES

Grievance procedures can be found in the Catalog and Handbook located on Southeastern Technical College’s website.

ACCESS TO TECHNOLOGY

Students can now access Blackboard, Remote Lab Access, Student Email, Library Databases (Galileo), and BannerWeb via the mySTC portal or by clicking the Current Students link on the [Southeastern Technical College \(STC\) Website \(www.southeasterntech.edu\)](http://www.southeasterntech.edu).

TECHNICAL COLLEGE SYSTEM OF GEORGIA (TCSG) GUARANTEE/WARRANTY STATEMENT

The Technical College System of Georgia guarantees employers that graduates of State Technical Colleges shall possess skills and knowledge as prescribed by State Curriculum Standards. Should any graduate employee within two years of graduation be deemed lacking in said skills, that student shall be retrained in any State Technical College at no charge for instructional costs to either the student or the employer.

GRADING POLICY

Chapter test average of 70 or higher is required to sit for the comprehensive final (grades of 69.9 will not be rounded up). You MUST pass all skills in this course to pass this course. Test and labs will be timed. Points will be deducted for spelling due to Medical Liability in the work place. Laboratory results are legal documents. NO GRADES WILL BE DROPPED!!! You must receive a “C” or higher in all CLBT, core, and clinical courses to progress in the CLT program.

| Assessment/Assignment | Percentage |
|------------------------------|-------------------|
| Chapter tests | 60% |
| Instrument presentation | 5% |
| Lab Reports | 5% |
| Comprehensive Final | 30% |

GRADING SCALE

| Letter Grade | Range |
|---------------------|--------------|
| A | 90-100 |
| B | 80-89 |
| C | 70-79 |
| D | 60-69 |
| F | 0-59 |

CLBT 1070 CLINICAL CHEMISTRY SPRING SEMESTER 2020 LESSON PLAN

Lesson plan is subject to change at the discretion of the instructor.

| WEEK | CHAPTER | CONTENT | ASSIGNMENTS & TESTS DUE | COMP AREA |
|--|---------|---|---|------------------------------------|
| 1 & 2 January 7-8; 13-15 | 1,2,3 | Syllabi review 1: Basic Principles and Practices 2: Phlebotomy and Specimen Considerations 3: Lab Safety and Regulations | Read assigned chapter Lab Safety handout sheet Assign Instrumentation Presentation Immunizations, Drug screen, and background check required this semester. Serial dilution lab Pipetting lab Dilutions lab | Course 4,9,11,12 Core A-C |
| 3 January 21-22 (Holiday is Monday Jan.20) | 4,5 | 4: Quality Control (QC) and Statistics 5: Analytical Techniques Instrumentation/Trouble-shoot equipment | Read assigned chapter QC Lab/Trouble shoot QC Linearity Lab | Course 4,9,11,12 Core A-C |
| 4 January 27-29 | 10 | 10: Amino Acids and Proteins | Read assigned chapter TEST 1-5 Khan academy videos : 3 videos | Course 3,9,11,12 Core A,C |
| 5 February 3-5 | 11 | 11: Non protein Nitrogen Compounds | Read assigned chapter | Course 3,9,10,11,12 Core A-C |
| 6 February 10-12 | 12 | 12: Enzymes | Read assigned chapter | Course 4,5,10,12 Core A-C |
| 7 February 17-19 | 13 | 13: Carbohydrates | Read assigned chapter Test :Chapters 10,11,12 | Course 1,10,11,12 Core A-C |
| 8 February 24-26 | 14 | 14: Lipids and Lipoproteins | Read assigned chapter | Course 7,9,10 Core A-C |
| 9 March 2-4 | 15 | 15: Electrolytes | Read assigned chapter | Course 2,4,9,10 Core A-C |
| 10 March 9-11 | 16 | 16: Blood Gases, pH and Buffer Systems | Test Chapters 13,14,15 Practice: acid/ base handout | Course 2,9,10 Core A-C |
| 11 March 16-18 | 24 | 24: Liver Function | Read assigned chapter | Course 6,10 Core A-C |
| 12 March 23-25 | 25 | 25: Cardiac Function | Read assigned chapter Students draw chemistry lab | Course 4,5,10 |

| WEEK | CHAPTER | CONTENT | ASSIGNMENTS & TESTS DUE | COMP AREA |
|--|----------|---|---|-----------------------------------|
| | | | Piccolo lab | Core A-C |
| 13 March 30- April 1 (April 6-9 Holiday!!) | 17,29,30 | 17: Trace Elements 29:Therapeutic Drug Monitoring 30: Toxicology | Read assigned chapter Test 16,24,25 Hormones Hand out | Course 4,8,10,12 Core A-C |
| 14 April 13-15 | 22,31 | 22: Thyroid 31: Tumor markers Vitamins | Read assigned chapter Vitamin Hand out Calculations skills Correlate lab values to disease states | Course 4,5,9,10,12 Core A-C |
| 15 April 20-22 | Review | Review | TEST 17,22,29,30,31,& Vitamins Review Polanski cards, study stack, Clinical Lab review, Handouts and Purpose of the test | Course 1-12 Core A-C |
| 16 April 27-29 | Review | Finals | Comprehensive Final | Course 1-12 Core A-C |

MAJOR COURSE COMPETENCIES:

1. Carbohydrates,
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3. Nitrogenous compounds,
4. Related lab math
5. Enzymes and endocrinology,
6. Liver functions,
7. Lipids,
8. Toxicology and therapeutic drug monitoring,
9. Safety and quality control,
10. Correlation of disease states,
11. Process improvement (team approach),
12. Critical thinking skills

GENERAL CORE EDUCATIONAL COMPETENCIES:

- A. The ability to utilize standard written English.
- B. The ability to solve practical mathematical problems.
- C. The ability to read, analyze, and interpret information