

RARITAN VALLEY COMMUNITY COLLEGE ACADEMIC COURSE OUTLINE

MLTC 230 Hematology

I. Basic Course Information

- A. Course Number and Title: MLTC 230 Hematology
- B. New or Modified Course: Modified
- C. Date of Proposal: Semester: Fall Year: 2024
- D. Effective Term: Fall 2025
- E. Sponsoring Department: Science & Engineering
- F. Semester Credit Hours: 4 credit
- G. Weekly Contact Hours: 6 Lecture: 3
 Laboratory: 3
 Out of class student work per week: 7.5
- H. Prerequisites: MLTC 100 with a grade of C or higher and BIOL 125 with a grade of C or higher; or permission of the instructor
- I. Laboratory Fees: No

II. Catalog Description

Prerequisites: MLTC 100 with a grade of C or higher and BIOL 125 with a grade of C or higher; or permission of the instructor. This course is a comprehensive examination of hematology and blood coagulation, including blood cell maturation, physiology, and morphology, and hemostasis theory and procedures. The lab develops skills used in the performance of hematology and coagulation analysis. Emphasis is on the mechanics of test procedures, interpretation of hematology test results, and correlation with disease.

III. Statement of Course Need

- A. Hematology analysis is a necessary skill needed for competent MLTs. This course is required for the Medical Laboratory Technology program.
- B. There is a lab component in this course so that the theory can be practiced.

- C. This course generally transfers as a Free Elective, but dependent on the transfer institution it may transfer as a Program Elective to schools that offer a B.S. degree in Clinical Laboratory Science.

IV. Place of Course in College Curriculum

- A. Free Elective
- B. This course meets a program requirement for the Associate of Applied Science degree program in Medical Laboratory Technology
- C. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, www.njtransfer.org; b) for all other colleges and universities, go to the individual websites.

V. Outline of Course Content

- I. PHYSIOLOGY (to include blood, body fluids, and bone marrow)
 - A. Production
 - B. Destruction
 - C. Function
- II. DISEASE STATES
 - A. Erythrocytes
 - 1. Anemia
 - a. Microcytic
 - 1) Iron deficiency
 - 2) Thalassemia
 - 3) Sideroblastic
 - 4) Chronic inflammation
 - b. Normocytic
 - 1) Hereditary hemolytic
 - 2) Acquired hemolytic
 - 3) Hypoproliferative
 - 4) Acute hemorrhage
 - c. Macrocytic
 - 1) Megaloblastic
 - 2) Non-megaloblastic
 - d. Hemoglobinopathies
 - 2. Erythrocytosis
 - a. Relative
 - b. Absolute
 - B. Leukocytes (WHO classification)
 - 1. Benign leukocyte disorders
 - a. Myeloid

- b. Lymphoid
 - 2. Myeloid neoplasia
 - a. Acute leukemia
 - b. Myelodysplastic syndromes
 - c. Myeloproliferative neoplasms
 - 3. Lymphoid neoplasia
 - a. Acute leukemia
 - b. Chronic leukemia/lymphoma
 - c. Plasma cell dyscrasias
 - 4. Hereditary anomalies
- C. Platelets
 - 1. Quantitative abnormalities
 - a. Thrombocytopenia
 - 1) Increased destruction (e.g., ITP, TTP, HIT)
 - 2) Decreased production
 - 3) Pseudothrombocytopenia
 - b. Thrombocytosis
 - 2. Qualitative defects
 - a. von Willebrand disease
 - b. Bernard-Soulier syndrome
 - c. Glanzmann thrombasthenia

III. HEMATOLOGY LABORATORY TESTING

- A. Cell Counts (to include blood and body fluids)
 - 1. Manual
 - 2. Automated
 - 3. Reticulocytes
 - 4. Spurious results
- B. Differentials and Morphology Evaluation (to include blood and body fluids)
- C. Hemoglobin
 - 1. Quantitative
 - 2. Qualitative
 - a. Electrophoresis
 - b. Sickle solubility
- D. Hematocrit
- E. Indices
- F. Hemolytic Indicators (e.g., haptoglobin, LD)
- G. Special Stains
 - 1. Esterase
 - 2. Myeloperoxidase
 - 3. Prussian blue
 - 4. Kleihauer Betke
- H. Other Studies
 - 1. ESR
 - 2. G6PD
 - 3. Heinz body
- I. Flow Cytometry Immunophenotyping

1. Leukemia
 2. Lymphoma
 3. Lymphocyte subsets
 4. PNH
 - J. Molecular and Cytogenetic Testing
 1. Recurring cytogenetic abnormalities (WHO classification)
 2. *BCR-ABL*
 3. *JAK2*
- IV. HEMOSTASIS
- A. Physiology
 1. Coagulation pathways
 2. Fibrinolytic pathway
 3. Vascular system
 - B. Disease States
 1. Coagulation factor deficiencies
 - a. Acquired
 - b. Hereditary
 2. Fibrinolytic system
 3. Hypercoagulable states
 4. DIC
 - C. Laboratory Determinations
 1. PT/INR
 2. APTT
 3. Fibrinogen
 4. D-dimer
 5. Thrombin time
 6. Mixing studies
 7. Platelet function (e.g., PFA)
 8. Hypercoagulability assessment
 - a. Assays (e.g., protein S, protein C)
 - b. Molecular (e.g., factor V Leiden, prothrombin 20210)
 9. Anti-Xa

VI. A. Course Learning Outcomes:

At the completion of the course, students will be able to:

1. Describe the cell components and their primary functions of the hematopoietic system (GE 1).
2. Use appropriate mathematical applications to interpret data (GE-2*).
3. Perform proper laboratory techniques required in hematology (GE 3).
4. Explain the clinical significance of hematology and coagulation analysis and results (GE 1*)

(*Embedded critical thinking)

5. Describe the process of hematopoiesis for the various blood cell lines.
6. Describe pre- and post-examination procedures in the hematology lab.
7. Describe cellular morphology changes associated with disease.
8. Explain the principles of and demonstrate the proper use of hematology and coagulation analyzers.
9. Discuss common situations that may interfere with patient test results.
10. Describe the process of hemostasis.
11. Explain how coagulation is assessed in the hematology lab.
12. Describe quality assessment practices for hematology and coagulation.
13. Develop professionalism, communication skills, and interpersonal relationships by working cooperatively with instructors, preceptors and fellow students

C. Assessment Instruments

1. Exams
2. Assignments
3. Quizzes
4. laboratory products
5. laboratory reports
6. research papers
7. demonstrations
8. essays
9. journals
10. portfolios

VII. Grade Determinants

- A. Exams
- B. Assignments
- C. Quizzes
- D. laboratory reports
- E. research papers

The primary formats, modes, and methods for teaching and learning that may be used in the course:

- A. lecture/discussion
- B. small-group work
- C. computer-assisted instruction
- D. guest speakers
- E. laboratory
- F. student oral presentations
- G. simulation/role playing

- H. student collaboration
- I. independent study

VIII. Texts and Materials

A. Textbooks

Samples of specific texts that may be featured:

- Clinical Hematology Theory & Procedures, Mary Loiose Turgeon, 5th edition
- Hems Notes: A Pocket Atlas of Cell Morphology, Denise M. Harmening and Kathleen Finnegan

(Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

IX. Resources

- A. Laboratory
- B. Computers with internet access.
- C. RVCC library databases.

X. Honors Options

An Honors Option is not available for this course.