



Clinical Laboratory Science Refresher Courses Overview

Welcome to the CLS Refresher Courses developed by the University of Nebraska Clinical Laboratory Sciences Program in partnership with the Nebraska Public Health Laboratory. These online education courses/modules are designed to educate laboratory professionals using a self-study format. An individual may choose to complete an entire course, e.g. Clinical Chemistry or only a few units, e.g. Carbohydrates, Lipids, etc.

The goal of these courses/units is to present a detailed overview of the topics relevant to the field of clinical laboratory science and management.

Course Structure

Each **course** is divided into several **units**. Some courses are further divided into modules. Each unit/module addresses a specific content area and uses a similar approach:

Objectives will provide the specific performances or actions the learner will be able to do after completing the instructional or learning activities within that module.

Assignments include the instructional content and evaluation tools:

- 1) **Learning activities** provided may take a variety of formats:
 - a. Videostream(s) of topic presentations by speakers. (Handouts to accompany these will be available)
 - b. Informational handouts to read with all pertinent information covered.
 - c. Video clips of various laboratory procedures or techniques.
 - d. Internet sites with appropriate learning material.
 - e. Self-study handouts that encourage the learner to pull significant information from additional resources, e.g. textbooks, internet, etc. This format provides information with blanks or questions for the learner to fill in. A self-study key will be available to check your responses.
 - f. Exercises to apply the information to specific situations
- 2) **Self-assessments** are offered to reinforce the information presented in the learning activities. Questions on the self-assessment are directly linked to the learning objectives.
- 3) **Self-assessment keys** are available to help the learner determine if successful learning was accomplished.
- 4) **Unit quizzes** are available for learners desiring continuing education documentation. A score of 70% must be attained to receive CEUs for that module. The number of CEUs for each module is determined by the average amount of time to complete the learning activities. Quiz questions are directly linked to the learning objectives.
- 5) An **evaluation** is available to provide feedback on the modules you complete. Participants requesting CEUs will be required to complete a module evaluation.



Computer Requirements:

All participants must have access to a computer, printer and firewall-free Internet connection.

Recommended Computer Specifications:

Processor: 2.0 GHz Pentium/ Celeron/ AMD or higher

Memory: 512Mb RAM or higher

Storage: 40Gb Hard Drive or higher

Operating System: Windows XP (Home or Professional edition)

CD/DVD Drive: 48x CD-ROM Drive 12x DVD-ROM Drive OR CD-R/RW (48x24x48) for mass storage

Web Browser: Internet Explorer 6.0 (or higher)

Internet Access: High Speed Cable Internet and active email account

Software: Microsoft Office XP (includes Word, Excel, Power Point)

Free Software

Additional software is required for some components in these courses. These are available for free from the manufacturer's website. We recommend that you install them on any computer you may use for these courses. There are links provided within each course to obtain this software.

Examples include:

Adobe: Acrobat Reader

Real Systems: Real Player

Apple: QuickTime Player

Macromedia: Flash Player

Blackboard Navigation

When you log into Blackboard, click on the name of the CLS Refresher Course for which you are enrolled on the far right side of the screen, under 'My Courses'. When the course opens up, links on the left side of the screen will allow you to review the 'Course information' and 'Units' to access specific modules. Modules may be listed under each unit.

NOTE: When watching videostream sessions, comments may be made about a specific page number in the handout. These mentioned page numbers may not exactly match the handout version you are using.

Textbook Resources

Accessibility to educational resources such as textbooks is highly recommended. There are many good resources available. A list of textbooks recommended by UNMC faculty is provided. New texts are continually being released, so this list is by no means exclusive.

General Laboratory (coverage of all areas)

McPherson, R.A. & Pincus, M.R., Henry's Clinical Diagnosis and Management by Laboratory Methods, 21st Ed., Elsevier Saunders, 2007



Blood Banking/Immunohematology:

Modern Blood Banking and Transfusion Practices, Harmening, Denise, 5th Ed., F.A. Davis, 2005
Textbook of Blood Banking and Transfusion Medicine, Rudmann, Sally, 2nd Ed., Elsevier Saunders, 2005
AABB Technical Manual, 17th Edition, 2011
AABB Standards for Blood Banks and Transfusion Services, 27th Edition, 2011

Chemistry:

Bishop, M.L., Fody, E.P., & Schoeff, L., Clinical Chemistry: Principles, Procedures, Correlations, 6th Ed., Lippincott Williams & Wilkens, 2010
Burtis, C.A. & Ashwood, E.R., Tietz Fundamentals of Clinical Chemistry, 6th Ed., W.B. Saunders, 2008
Burtis, C.A., Ashwood, E.R., & Bruns, D.E., Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, 4th Ed., Elsevier Saunders, 2005.
Anderson, S.C. & Cockayne, S., Clinical Chemistry Concepts and Applications, revised edition, Waveland Press, Inc., 2007

Hematology

McKenzie, S.B., Clinical Laboratory Hematology, 2nd Ed., Pearson/Prentice Hall, 2010
Carr, J.H. & Rodak, B.F., Clinical Hematology Atlas, 3rd Ed., W.B. Saunders Co., 2008
Rodak, B.F., Hematology: Clinical Principles and Applications, 4th Ed., Saunders Elsevier, 2012
Anderson, S.C. & Poulsen, K.B., Atlas of Hematology, Lippincott Williams & Wilkins, 2003
Turgeon, M.L., Clinical Hematology Theory and Procedures, 5th Ed., Lippincott Williams & Wilkins, 2011

Immunology

Stevens, C.D., Clinical Immunology and Serology: A Laboratory Perspective, 3rd Ed., F.A.Davis, 2010
Kindt, Thomas, Goldsby, Richard, Osborne, Barbara, Kuby Immunology, 6th Ed, W.H. Freeman and Company, 2007

Microbiology

Mahon, C.R., Lehman, D.C. & Manuselis, G., Textbook of Diagnostic Microbiology, 4th Ed., Saunders Elsevier, 2010
Forbes, B.A., Sahm, D. F., & Weissfeld, A.S., Bailey and Scott's Diagnostic Microbiology, 12th Ed., Elsevier Mosby, 2007
Winn, W.C., et.al., Koneman's Color Atlas & Textbook of Diagnostic Microbiology, 6th Ed., Lippincott Williams & Wilkins, 2006

Urine and Body Fluids

Brunzel, N.A., Fundamentals of Urine and Body Fluid Analysis, 2nd Ed., W.B. Saunders, 2004
Strasinger, S. K. & Di Lorenzo, M.S., Urinalysis and Body Fluids, 5th Ed., F.A. Davis, 2008

Management/Laboratory Operations

(Many textbooks listed above have chapters/sections dealing with these topics)

Harmening, D.M., Laboratory Management: Principles and Processes, 2nd Ed., D.H. Publishing & Consulting, Inc. 2007
Hudson, J., Principles of Clinical Laboratory Management, Pearson Prentice Hall, 2003