



**University of Nebraska Medical Center
School of Allied Health Professions
Clinical Laboratory Science Program
Nebraska Methodist Hospital Medical Technology Program**

Course Title: Clinical Immunology and Molecular Diagnostics
Course Number: CLS 420
Credit Hours: 1 semester hour
Prerequisites: Enrollment in the Clinical Laboratory Science Program
Semesters offered: Semester I

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Faculty Contact Codes: NMH: All Nebraska Methodist Hospital students
UNMC: All students except for NMH and DAO
Specific clinical/program sites:
NMH: Nebraska Methodist Hospital
NMC: Nebraska Medical Center
UMC: University of Missouri – Columbia (all clinical sites)
UI: University of Iowa (all clinical sites)
KS: Washburn University – Topeka, Kansas (all clinical sites)
UCCS: University of Colorado – Colorado Springs
Affiliate: Creighton, Grand Island, Hastings, Kearney, Norfolk, North Platte, Scottsbluff
DAO: Degree Advancement Option

Class Days, Times, Location: Established for each student at multiple clinical locations.

Course Description: This course includes the theory, practical application, and evaluation of immunological components, principles and methodologies used in the assessment of immunologically related disorders, including hypersensitivity reactions, autoimmune, immunoproliferative and immunodeficient disorders. The theory and application of molecular diagnostic tools, such as polymerase chain reaction (PCR), nucleic acid probes, and microarrays are also addressed.

Instruction: Instructional methods will include lectures, independent reading and writing assignments, case studies, self-assessments, archived presentation sessions, and synchronous and/or asynchronous online delivery of learning programs.

Course Goals:

Upon successful completion of Clinical Immunology and Molecular Diagnostics, the Clinical Laboratory Science student will:

1. Differentiate innate, adaptive, active and passive immunity.
2. Describe the cells, systems, and actions in the immune response.
3. Incorporate applications of immune principles in the study of normal and abnormal physiologic conditions.
4. Evaluate laboratory testing relating to immune system components.
5. Correlate laboratory findings related to immune system components.
6. Discuss the application of molecular diagnostic methodologies and tools in the clinical laboratory.
7. Utilize the writing process as an approach to help develop and clarify critical thinking.

Required Textbook:

1. Stevens CD. (2010). *Clinical Immunology and Serology: A Laboratory Perspective* (3rd ed.). Philadelphia, PA: F.A. Davis.
ISBN: 978-0-8036-1814-5

Major References:

1. Mahon CR, Lehman DC, Manuselis G. (2011). *Textbook of Diagnostic Microbiology* (4th ed.). St. Louis, MO: Saunders Elsevier.
2. MTS Lab Training Library, University of Washington, Immunology Section, available at <http://www.labtraining.org>.

Grading System:

Student laboratory unit	(10%)
Autoimmunity quiz	(5%)
Lecture writing assignments	(10%)
Lecture series examination	(25%)
Molecular diagnostics unit	(20%)
Research paper	(30%)

Grading Scale:

A+	= 97.00-100.00	B-	= 80.00-82.99
A	= 93.00-96.99	C+	= 77.00-79.99
A-	= 90.00-92.99	C	= 73.00-76.99
B+	= 87.00-89.99	C-	= 70.00-72.99
B	= 83.00-86.99	Failing	= Below 70

Grade**Requirements:**

Satisfactory completion of the course requires each of the following:

1. A $\geq 70\%$ on the student laboratory written examination. If the score is $< 70\%$, additional work will be required.*
2. All lecture writing assignments must be satisfactorily completed prior to taking the Clinical Immunology/Molecular Diagnostics lecture exam.
3. A $\geq 70\%$ on the Clinical Immunology and Molecular Diagnostics lecture series written examination.
 - a. $< 70\%$ on this exam will require successful completion ($\geq 85\%$) of remedial work.

- b. All remedial work must be completed to the satisfaction of the course faculty. Repeated submissions of unsatisfactory remedial work will lead to a discussion with UNMC faculty and may trigger an Unprofessional Behaviors Documentation.
 - c. Successful completion of remedial work will not alter the original earned exam score.
 - d. Upon successful completion of the remedial work an additional exam will be required which must be passed with a $\geq 70\%$.*
4. A $\geq 70\%$ on the Immunology/Molecular Diagnostics Research Paper assignments, including both the:
 - a. Calculated score combining all revision phases
 - b. Final submission paper
 If the score on either is $< 70\%$, additional work will be required.*
 5. A $\geq 70\%$ on the Molecular Diagnostics module, including both the:
 - a. Written examination
 - b. Molecular test methodology paper
 If the score on either is $< 70\%$, additional work will be required.*
 6. Assignments not turned in by the due date/time (central time zone) and/or not submitted in the correct format following CLS Writing Guidelines will result in a 20% grade deduction per day beyond the due date/time. **The deadline date and time stated in the assignment instructions will be monitored by Blackboard and strictly adhered to.** Until a paper is submitted totally completed in the correct format; it is not considered submitted. Assignments not received by one week past the due date will receive a 0%. All assignments must be submitted to receive a final course grade. Required minimum scores are determined by an assignment's earned score prior to any late penalty.
 7. Late papers must be submitted with a quality of work to earn a minimum of half the original possible score or 70% of the original possible score for the exercises listed in #1, #3, #4 and #5 above to receive a final course grade. (Student's grade will remain as previously discussed in point #6).
 8. Documentation of unprofessional behavior will trigger the completion of a Professional Behaviors Evaluation and a counseling session with program administration. If a student does not improve their professional behavioral skills after counseling, the student may be placed on non-academic probation.
 9. For students who are not showing satisfactory progress in the course, additional assignments may be made at the discretion of the course faculty and administration.

*Successful completion of additional work will earn an altered score or average of 70%. If the additional work is not successfully completed, the student may be put on academic probation and be required to demonstrate acceptable progress to remain in the program.

Course Topics:

Topics	Associated Learning Objective Categories
Clinical Immunology	<p>Student Laboratory: Mechanisms of Immunology Immunologic Methods</p> <p>Lecture Series: Autoimmunity Immune Deficiencies Immunochemistry Profiles</p>
Molecular Diagnostics	Molecular Diagnostic Testing

Schedule:

(All lectures will be archived and should be available online within 24 hours of the end time of the session.)

Date/Time/Location	Unit/Activity
Prior to beginning clinical rotations	<p>Student Laboratory: Mechanisms of Immunology Immunologic Methods</p>
As assigned per clinical rotation	<p>Molecular Diagnostics: Fundamental Concepts of Molecular Diagnostic Testing section Testing Methodologies section Introduction to Clinical Applications section Molecular Test Methodology paper</p>
8/18 – 8/29	<p>Introduction to CLS 420 View the Introduction to CLS 420 presentation on Blackboard Introduction to CLS 420 quiz due online 8/29 by 8:00 a.m. central time (CT)</p>
9/6 – 9/13	<p>Lecture Series: Read Chapter 14 pp. 225-232 (through Rheumatoid Arthritis) in: Stevens CD. (2010). <i>Clinical Immunology and Serology: A Laboratory Perspective</i> (3rd ed.). Philadelphia, PA: F.A. Davis. View the assigned material at the University of Washington - MTS Site: Section – Immunology on Blackboard. Autoimmunity quiz due online 9/13 by 8:00 a.m. CT</p>
9/12	<p>Research Paper: Research paper prospectus due online 9/12 by 8:00 a.m. CT</p>
9/13 1300 – 1350 SEC 2018	<p>Lecture Series: Immune Deficiencies lecture – D. Perry</p>
9/13 1400 – 1450 SEC 2018	<p>Autoimmunity lecture – A. Reinhardt</p>

Date/Time/Location	Unit/Activity
9/19	Lecture Series: Autoimmunity lecture paper due online 9/19 by 8:00 a.m. CT
9/19 – 9/23	Research Paper: Students conference with their faculty contact to discuss their prospectus
9/26	Research Paper: Revised prospectus due online 9/26 by 8:00 a.m. CT Lecture Series: Immune deficiencies lecture paper due online 9/26 by 8:00 a.m. CT
9/27 1300-1450 SEC 2018	Lecture Series: Immunochemistry lecture – R. Otten
10/3	Lecture Series: Immunology lecture exam (time scheduled varies at site) (DAO students schedule exam with proctor during the week of 10/3 – 10/9)
10/17	Research Paper: Introductory paragraph, outline and annotated bibliography due online 10/17 by 8:00 a.m. CT
11/7	Research Paper: First submission of the research paper due online 11/7 by 8:00 a.m. CT
12/5	Research Paper: Final submission of the research paper due online 12/5 by 8:00 a.m. CT
12/13	CLS 420 course evaluation due online

***Reminder – Student’s last name must be included on ALL file names for assignments submitted on Black board!!**

ADA Accommodations:

It is the policy of the University of Nebraska Medical Center to provide flexible and individualized accommodation to students with documented disabilities. To receive reasonable accommodations, students must complete a Request for Services application and provide documentation to the Services for Students with Disabilities office. Information is available at the Counseling and Student Development Center website at www.unmc.edu/stucouns/ You may contact Ronda Stevens, MSW, Coordinator of Services for Students with Disabilities at 402-559-5553 or rstevens@unmc.edu. The office is located in Bennett Hall, 6001 within the Counseling and Student Development Center. Meetings are by appointment. Adequate time for processing, up to four weeks, is recommended.

Statement of Academic Integrity:

The University of Nebraska Medical Center has established a policy on academic integrity and professional conduct. This policy may be found in the UNMC Student Handbook. All students are expected to adhere scrupulously to this policy. Cheating, academic misconduct, fabrication, and plagiarism are viewed as serious matters and will lead to disciplinary action as described in the UNMC Student Handbook under Procedural rules Relating to Student Discipline. Additional materials related to Responsible Conduct in Research can be found in the UNMC Student Handbook. Selected sections from the UNMC Student Handbook follow:

CHEATING: A general definition of cheating is the use or attempted use of unauthorized materials or information for an academic exercise. Examples of cheating include but are not limited to:

1. using unauthorized materials such as books, notes, calculators or other aids during an examination or other academic exercises;
2. receiving unauthorized assistance from another person during an exam or exercise such as copying answers, receiving answer signals, conversation or having another person take an examination for you;
3. providing assistance to another person during an exam or exercise, such as allowing your answers to be copied, signaling answers or taking an exam for someone else;
4. obtaining answers and/or other information without authorization from someone who has previously taken an examination;
5. including all or a portion of previous work for another assignment without authorization;
6. appropriating another person's ideas, processes, result, or words without giving appropriate credit, i.e. an appropriate attribution or citation (plagiarism). For example, a student who quotes verbatim the results of a previous student's work in a required term paper, but fails to credit the individual through citation. The work is recent and thus cannot be considered common knowledge.

ACADEMIC MISCONDUCT: Academic misconduct is defined as the falsification of official documents and/or obtaining records, examinations or documents without authorization. Several examples of academic misconduct are:

1. the unauthorized acquisition of all or part of an unadministered test;
2. selling or otherwise distributing all or part of an unadministered test;
3. changing an answer or grade on an examination without authorization;
4. falsification of information on an official university document such as a grade report, transcript, an instructor's grade book or evaluation file or being an accessory to an act of such falsification;
5. forging the signature of an authorizing official on documents such as letters of permission, petitions, drop/add, transcripts, and/or other official documents;
6. unauthorized entry into a building, office, file or computer data base to view, alter or acquire documents.

Research misconduct has been defined by the Federal DHHS Office of Research Integrity (ORI) and UNMC subscribes to this definition: **"Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results." Research misconduct does not include honest error or differences of opinion. It is important that every student understand the meaning of fabrication, falsification, and plagiarism.**

Fabrication is making up data or results and recording or reporting them. Some examples are:

1. indicating a laboratory experiment had been repeated numerous times or
2. done in a controlled environment when it had not, thus leading to an invented or uncorroborated conclusion.

Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research or academic performance is not accurately represented in the research or academic records.

Some examples are:

1. altering an original source document, misquoting or misrepresenting a source to support a point of view or hypothesis;
2. Using computer software to change research images so they show something different than the original data.

Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit, i.e. an appropriate attribution or citation. An example is:

1. In the methods section of a thesis, a graduate student describes a procedure used in research for the thesis. The procedure was developed by a fellow graduate student in the laboratory of their major professor; however, neither the student who developed this procedure nor the major professor was given credit in the thesis. This implies that the author had himself developed the procedure.
2. In the background section of a thesis, a graduate student quotes verbatim the results of a previous investigator's work but fails to credit the individual through citation. The work is recent and thus cannot be considered common knowledge.