**COURSE OUTLINE**

**Fall 2014**

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| Course Number Course Title | IST 434/ CHM 482/ CHM 582  Molecular Diagnostics |
| Semester/Year  Credit hours | Fall 2014  3 |
| Days/Time | Mondays, Wednesdays and Fridays 10 am – 10:50 am |
| Location | BBSC 125 |
| Instructor | Menashi Cohenford, BSc., MT, Ph.D |
| Office | BBSC Room 241 H |
| Phone | 304-696-2697 |
| E-Mail | Cohenford@marshall.edu |
| \*Office/Hours | M-F 11am-12pm M 2-3 pm and W 2-3pm |
| University Policies | By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy be going to [www.marshall.edu/academic-affairs](http://www.marshall.edu/academic-affairs) and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to <http://www.marshall.edu/academic-affairs/?page_id=802> Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment. |

**\***Or by appointments.

**Course Description:** This course is designed to provide an overview of the general principles and methods used to diagnose bacterial, viral and human diseases by molecular techniques.

**Prerequisites**: BSC 121 or 250 or CHM 212 or IST 340 or consent of instructor

**Required Text and Other Materials**

* Molecular Diagnostics: Fundamentals, Methods and Clinical Applications. Publisher FA Davis and Company. Author Buckingham, Lela. 2nd Edition ISBN 9780803626775
* Supplemental materials are contained within the Blackboard Learn environment (<http://www.marshall.edu/muonline/>).

**Grading Policy and Grading System:**

Your grade will be calculated as follows:

**Undergraduate Students Graduate Students**

Exam 1: 40% 40%

Exam II: 40% 40%

Quizzes: 20% 15%

Project - 5%

Total 100% 100%

Your final grade in the class will be measured as follows:

A: 90-100

B: 80-89

C: 70-79

D: 60-70

F: Below 60

**Exams:** The exams will be focused on the materials presented in class. All lectures will be in powerpoint format. Each exam will be based on multiple choice questions and descriptive essays. These essays may at times be thought provoking and require you to apply learned concepts in simulated situations. *There will be no final exam for the course.*

**Make-up Exams and Penalty***:* Make-up exams will be granted only in cases recognized by the University through an excused absence; the policy on excused absences can be found on pp. 79–81 of the 2010–2011 undergraduate catalog: <http://www.marshall.edu/catalog/undergraduate/ug_10-11_published.pdf>. Students without a valid excuse will receive an F (zero) for the exam.

**Project:** Each graduate student will be assigned a research topic for presentation in class. The date for each presentation will be announced in advance to allow for adequate preparation. In addition, each student must submit a written report about his/her presentation. Failure to submit the written report will result in a grade of an **F** for the course.

**Quizzes:** Following each main topic there will be a 15-20 minute quiz. The quiz dates will be announced to allow for adequate preparation. The quiz may vary in format and may include both multiple choice and short answer questions.

**Attendance Policy:** Student attendance and participation will be required. Punctual attendance to lectures will be considered in the final grade. For example, if a student with a 68 average has a full attendance record and has actively participated, that student may receive a grade of C for the course.

**Other Policies:** The use of cell phones is prohibited in class. Any student using a cell phone will be asked to leave the lecture hall.

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| **Course Student Learning Outcomes** | **How Practiced in this Course** | **How Assessed in this Course** |
| Students will gain an understanding of:   * Biochemistry and Organization of the Human Genome * DNA Replication and Repair * Gene Structure and Expression * Mutations and factors contributing to mutations. | In-class lectures, discussions, chapter review problems, video clippings and reading materials provided by instructor. | Announced quizzes, and Exam I  Exam I covers powerpoint presentations made in class and reading materials provided by instructor. In addition, it includes chapters 1, 2, 3 and 8 in the textbook. |
| Students will learn the principles of:   * Different nucleic acid amplification technologies such as PCR, LCR, TMA, NASBA and the DNA Strand Displacement method.      * Signal amplification methods relying on hybrid capture and Cleavase technologies. * Technologies based on FRET Probes, hybrid capture assays and Cleavase. * Southern blots, Northern blots, and various nucleic acid sequencing methods. | In-class lectures, discussions, videos, student research projects and reading materials provided by instructor. | Announced quizzes, and Exam II  Exam II covers powerpoint presentations made in class and reading materials provided by instructor. In addition, it includes chapters 4-7 and 9-11 in the textbook. |

**†Course Schedule**

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| August 25-Aug 29th | Overview of Course |
| Week 1 | *Introduction to Molecular Diagnostics* |
| Sept 1st -September 5th    Week 2 | **Chapter 1 DNA and Reading Materials Provided by Instructor**  Powerpoint Presentation:  Biochemistry and Organization of the Human Genome: Part I A and B  Review Link: [http://www.youtube.com/watch?v=jLyi2K-29xU&feature=related](https://outlookweb.marshall.edu/owa/redir.aspx?C=deefa3f13424492a90123689ef52613d&URL=http%3a%2f%2fwww.youtube.com%2fwatch%3fv%3djLyi2K-29xU%26feature%3drelated) |
| September 1st | **Labor Day Holiday** |
| September 8th-12th  Week 3 | **Chapter 1 DNA and Reading Materials Provided by Instructor**  Powerpoint Presentations:  Biochemistry and Organization of the Human Genome:Part II  DNA Replication and Repair Part I |
| September 15th-19th    Week 4 | **Chapter 2 & 3- RNA and Proteins**  **Plus Reading Materials Provided by Instructor**  Powerpoint Presentations:  DNA Repair and Replication Part II  Gene Structure and Expression Part I & II |
| September 22nd -26th  Week 5 | **Chapter 8- Chromosomal Structure and Chromosomal Mutations**  Powerpoint Presentation:  Mutations Part I & Part II |
| Sept 29th –October 3rd  Week 6 | **Chapters 4-7, 9-11**  Powerpoint Presentation:  Mutations Part III  **Molecular Technologies: Part 1**  **Exam #1:** Materials from Powerpoint Presentations  **Chapters 1, 2,3 and 8**  **Plus Reading Materials Provided by Instructor** |
| October 6th-10th  Week 7 | **Chapters 4-7, 9-11**  Powerpoint Presentation:  **Molecular Technologies**: **Part 1** (cont), Part II and Part III |
| October 13th – 17th    Week 8 | **Chapters 4-7, 9-11**  Powerpoint Presentation:  **Molecular Technologies**: Part III (cont), Part IV and Part V |
| October 20st –24th    Week 9 | **Chapters 4-7, 9-11**  Powerpoint Presentation:  Molecular Technologies: Part V ( (Cont)  and Part VI |
| October 27th – Oct 31st  Week 10 | **Chapters 4-7, 9-11**  Powerpoint Presentation:  Molecular Technologies Part VI |
| Nov 3rd -Nov 7th    Week 11 | Molecular Technologies - Part VI (Cont)  **Chapters 4-7, 9-11**  Powerpoint Presentation:  Statistical Parameters of An Assay |
| Nov 10th -Nov 14th  Week 12 | **Chapters 4-7, 9-11**  Powerpoint Presentation:  Statistical Parameters of An Assay |
| Nov 17th-Nov 21st    **Nov 21st**  Week 13 | PowerPoint Presentation: Cancer and Aging  PowerPoint Presentation: Common Immunological Techniques  **EXAM II:** Includes all powerpoints & materials provided by instructor after exam I |
| Nov 24th –Nov 28th    Nov 28th  Week 14 | **Thanksgiving/Fall Break-Classes Dismissed** |
| December 1st -5th  **Dec 2nd**  **Dec 3rd**  **Dec 5th**  Week 15 | **DEAD WEEK**  **DVD Film** Judah Folkman **Project Presentations by Graduate Students**  **Last Day of Class** |

**‡** The above course schedule is presented as a guide only and may be changed at any time by the instructor.