



ACADEMIC EXCELLENCE, REDEFINED
American University of Ras Al Khaimah
BIOL 271: General Genetics Laboratory, Fall 2017

I. Course Title : General Genetics Laboratory
Course Number : BIOL 271
Course Credit Hours : 1

II. Pre-requisites or co-requisites : Co-requisite, BIOL 270 General Genetics

III. Class Time and Location : 08:00 - 09:40 (Sunday)

IV. Instructor Information:

Name : Mr. John Marton
Room No : 119, Building B
Office Hours : 08:00 PM - 4:00 PM, Sunday to Thursday
Email : jmarton@aurak.ae
Office Phone : 07-2210500 Ext: 1246

V. Course Description: Basic Genetics laboratory techniques to accompany BIOL 320.

VI. Course Goals and Objectives:

- To help students develop some hands-on skills and learn some basic genetic techniques.
- To promote critical thinking, problem solving, and writing through applying modern laboratory skills in Genetics.

VII. Student Learning Outcomes:

At the end of this course students will be able to:

CSLO 1: Apply probability and statistics-based methodologies to analyze data and solve Genetics problems

CSLO 2: Perform basic Molecular Genetics techniques and interpret and analyze results obtained through usage of these techniques

CSLO 3: List and explain various genetic properties with associated principles through lab experiments and written lab analyses.

VIII. Course Materials and Basic Resources:

- Handouts will also be provided for laboratory exercises.
- Text book: *Genetics Laboratory Investigations, 13th edition*, Mertens, T. and Hammersmith, R., 2007, Benjamin Cummings, ISBN-13: 9780131742529
- Web resources: National Human Genome Research Institute – Education materials about Genetics and Genomics: <http://www.genome.gov/Education/>

- Cold Spring Harbor Laboratory – DNA Learning Center: <http://www.dnalc.org>

IX. Weekly Topics

| Week | Topic | CSLO |
|-----------------|---|-------|
| Week 1: | General Introduction about Safety in Laboratory | |
| Week 2: | Mitosis-Cell Division analysis | 2-3 |
| Week 3: | A study of sex chromatin in human cells | 2-3 |
| Week 4: | Quiz I | 2-3 |
| Week 5: | Probability -Genetic crosses, Binomial expansion and Factorial(In-class activity & discussions) | 2-3 |
| Week 6: | Probability -Chi-Square test(In-class activity & discussions) | 2-3 |
| Week 7: | Mendelian Genetics of Corn – Part 1 | 2-3 |
| Week 8: | Mendelian Genetics of Corn – Part 2 | 2-3 |
| Week 9: | Midterm Exam | 2-3 |
| Week 10: | Bacterial transformation(along with video clip) | 2-3 |
| Week 11: | Preparation of plasmid DNA using Qiagen miniprep kit | 1-2 |
| Week 12: | Phenol: Chloroform extraction of genomic DNA | 1-2 |
| Week 13: | Quiz II | 1-2-3 |
| Week 14: | Restriction enzyme digestion of plasmid DNA | 1-2 |
| Week 15: | Agarose gel electrophoresis of restriction digested Plasmid & purified DNA | 1-2 |
| Week 16: | Final Examination(07/01/2018) | 1-2-3 |

Please note that the above is a tentative schedule and is subject to change.

X. Evaluation of Learning

| Assessment Tool | Weightage |
|----------------------|-------------|
| Lab reports | 10% |
| Assignments | 5% |
| In Class Assignments | 5% |
| 2 Quizzes | 20% (2x10%) |
| Midterm Examination | 20% |
| Final Examination | 40% |

XI. Grading System and Scale

University course work is measured in terms of quantity and quality. A credit normally represents one hour per week of lecture or recitation or not fewer than two hours per week of independent or laboratory work throughout a semester. The number of credits is a measure of quantity. The grade is a measure of quality. The university system for undergraduate grading is as follows

| Grade | Percentage Scores | Grade Points |
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| A- | 87-89 | 3.7 |
| B+ | 84-86 | 3.3 |
| B | 80-83 | 3.0 |
| B- | 77-79 | 2.7 |
| C+ | 74-76 | 2.3 |
| C | 70-73 | 2.0 |

| | | |
|----|-------|-----|
| C- | 67-69 | 1.7 |
| D+ | 64-66 | 1.3 |
| D | 60-63 | 1.0 |
| F | 0-59 | 0 |

Additional Grade Notations

Please refer to Pg. 40 of the University Catalog Book 2012 – 2013.

XII. Teaching and Learning Methodologies

One of the primary methods of instruction for this course is lectures and demonstrations that train students in the methodology used for problem-solving as well as performing standard laboratory techniques in Genetics. Laboratory exercises involving problem-solving will take the form of in-class and homework assignments and are geared to provide students with fundamental mathematical skills required to analyze and interpret data from genetic experiments. Lectures for other laboratory exercises will provide the background for the necessary techniques and manipulations followed by hands-on experience by students. Emphasis will be laid on conducting experimental procedures within the context of the safe operating procedures. Lectures will be supported by hand outs that provide the necessary experimental background and details of procedures as well as by web-based resources such as videos. In addition to students working individually, pair/group work will also be encouraged during performance of laboratory exercises to foster building of teamwork, leadership and organizational skills by students. In class assignments are meant to foster group work and discussion in solving genetics-based problems and out-of-class assignments provide the opportunity for students to engage in literature searches to build on material learned in class. Laboratory reports communicate the experimental laboratory exercises in writing and require students to exercise data interpretation, analysis and written presentation skills. Students will be provided a general rubric for writing of lab reports and will be informed of any additional requirements for specific laboratory reports. Assignments, quizzes and discussion sessions are intended to reinforce learning. Assignments will consist of data analysis and/or review questions based on the laboratory exercise. Methods that foster active participation as well as individual and cooperative learning will be employed and these include question and answer sessions and group analysis and discussion of experimental data. The application of the methodologies and techniques used in the laboratory to Genetics research will also be emphasized. Quizzes and examinations will assess student knowledge, understanding and application of mathematical and laboratory-based methodologies used in Genetics.

I. Class Attendance System

Because students benefit from the lectures and activities prepared by their instructors and discussions with their fellow students, class attendance is required. Students are expected to attend all the classes or other scheduled sessions for the courses in which they are registered, including make-up classes. Please refer to Pgs. 23 and 24 of the University Catalog Book 2011 – 2012 for University Policy on Attendance.

According to current University Regulations for attendance,

“Student with 2 absences: receives 5% warning

Student with 3 absences: receives 10% warning

Student with 5 absences: receives 15% and fails the course”

II. Additional information

A. The American University of Ras Al Khaimah *Student Handbook*:

Be sure that you read the latest edition of The American University of Ras Al Khaimah *Student Handbook*. You will be held responsible for all that is contained therein. The following points repeat or

supplement, but in no way are intended to contradict, the policies in your handbook. In case of conflict, the last word is the *Student Handbook*.

B. Make-up for missed exams or quizzes:

Ordinarily, a student will receive a score of '0' for any missed exam or quiz. However, at the instructor's discretion, this rule may be relaxed, and a make-up exam may be given, or an alternative method of evaluating the student's knowledge of the course materials devised, only in the case of extreme emergencies (e.g., death in the family, severe illness) that are beyond the control of the student or when a student provides a written 'excuse' from a responsible party for missing the exam the next time he/she arrives on campus.

C. Late assignment/homework policy:

Assignments and homework should be handed in on the due date at the beginning of the class session. No late homework will be accepted for any reason.

D. Academic Misconduct:

Students should consult Pg. 21 – Pg. 23 and Pg. 39 – Pg. 40 of the American University of Ras Al Khaimah Catalog Book 2011 – 2012 for the University policies on Academic Integrity, Plagiarism and Misconduct.

The Honor Code and Honor System

The Honor Code is an integral part of university life. Students are responsible, therefore, for understanding the code's provisions. Cheating and attempted cheating, plagiarism, lying, and stealing of academic work and related materials constitute Honor Code violations. In the spirit of the code, a student's word is a declaration of good faith acceptable as truth in all academic matters. To maintain an academic community according to these standards, students and faculty must report all alleged violations to the Honor Committee.

AURAK expects its students to uphold high standards of academic integrity and conduct. In particular, students are required to:

- Attend classes regularly and punctually.
- Be actively involved in class discussions and other course related classroom activities.
- Complete assignments on time.
- Meet the requirements for course and program completion.
- Abide by high standards of academic integrity, ethics, and honesty.
- Refrain from cheating on homework and examinations, plagiarizing other people's work by submitting it as their own, or any other forms of academic dishonesty.
- Adhere to the published test or examination rules and regulations.
- Make every effort to maintain good academic standing.

Given the internet and easy access to information and knowledge sources, the University is committed to students' learning in an ethical manner. For all academic assignments, project work, and presentations, students need to ensure that due acknowledgement is given to the source of any information which they incorporate in their work. The following are some examples of academic misconduct:

- Cheating/using unfair means in examinations
- Significant paraphrasing in written academic work that is unacknowledged
- Unacknowledged use of information or ideas unless such ideas are commonplace
- Citing sources which student has not read or referred to
- Breaching the word limit of assignments and mentioning wrong word count
- Plagiarism

Plagiarism. Plagiarism is a serious academic offense. Plagiarism is the use of someone else's ideas, words, projects, artwork, phrasing, sentence structure or other work without properly acknowledging the ownership (source) of the property (item). Plagiarism is dishonest because it misrepresents the work of someone else as one's own. It is intellectual theft as it robs others of credit for their work. Plagiarism takes many forms including:

- Using someone else's words without putting those words in quotation marks and providing full information about their source, sufficient information so that another person could easily locate the words that are being quoted, whether it is in an article, a book, or on the web.
- Using unique, original ideas, phrases, sentences, paragraphs, or other materials, etc. from a single source or a variety of sources such as a text, journal, web page, electronic source, design, artwork, etc. in one's work without citing all sources. For a student found plagiarizing, the punishment will be a failing grade in the assignment without the right to redo the assignment up to a failing grade in the course.

Examples of Cheating. Acts of cheating include, but are not limited to, the following:

1. Copying from another student's paper during an exam, or allowing or encouraging another student to copy from your paper during an exam.
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Any violations of the University's academic rules, regulations or directives are reported to the DVCAA and may result in one of the following disciplinary measures.

- Verbal or written warning
- Repeating the term
- Dismissal

Please refer to the relevant section in the *Handbook* and ensure a clear understanding of the provisions of the University honor code and honor system in order to avoid infringement of the policy and attendant penalization.

E. Mobile Phones: All mobile phones, pagers and/or other communication devices should be turned off before entering the classroom. If your mobile device sounds off during class, you will be asked to leave the room, thereby incurring one-half absence. If your mobile device sounds off during an exam or quiz, you will not be allowed to make-up the exam or quiz.

F. Diversity and the Use of English. English is the common language of the AURAK campus, the use of which includes everyone. It is the only language to be used in the classroom. AURAK brings together students and faculty from diverse cultural and linguistic backgrounds, which is one of the strengths of the university. This diversity provides an opportunity to share our different experiences and

enlarge our understanding of the world. Classroom discussions and other activities are to be conducted with courtesy and civility and respect for one another and for our differences.



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Sec 2 -08:00 - 09:40 (Tuesday)

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| Week 6: | Probability -Genetic crosses, Binomial expansion and Factorial | |
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| Week 9: | Midterm Exam | |
| Week 10: | Bacterial transformation | |
| Week 11: | Plasmid isolation | |
| Week 12: | Quiz II | |
| Week 13: | Restriction digestion | |
| Week 14: | Agarose gel electrophoresis-I | |
| Week 15: | Agarose gel electrophoresis-II | |
| Week 16: | Final Examination | |

Please note that the above is a tentative schedule and is subject to change.

X. Evaluation of Learning

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