Molecular Genetics 233

Unit outline

Semester 1 2012

Unit Details

<table>
<thead>
<tr>
<th>Unit Details</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Index Number</td>
<td>311420</td>
</tr>
<tr>
<td>Credit Points</td>
<td>25</td>
</tr>
<tr>
<td>Unit Coordinator</td>
<td>Dr Kylie Munyard</td>
</tr>
</tbody>
</table>
| Address                             | Building 308: Room 202  
School of Biomedical Sciences      
Curtin University of Technology    
GPO Box U1987                      
PERTH WA 6845                     |
| Email                               | K.Munyard@curtin.edu.au |
| Phone                               | (08) 9266 7519          |
| Fax                                 | (08) 9266 2342          |

Assessment Overview

To pass this unit you must attempt all the assessment tasks, and must earn 50% or greater for your overall mark. Failure to pass any single component may result in failing the unit. Attendance at practical sessions is compulsory.

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Applies to …</th>
<th>Worth</th>
<th>Due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test x 3</td>
<td>Lectures</td>
<td>65%</td>
<td>See Assessment Details p.4</td>
</tr>
<tr>
<td>Practical test (written)</td>
<td>Practicals</td>
<td>30%</td>
<td>Thurs/ Friday 24th/ 25th May</td>
</tr>
<tr>
<td>Concept Survey</td>
<td>Lectures &amp; Practicals</td>
<td>5%</td>
<td>Week 2 &amp; Week 14</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Please read this outline carefully before commencing your study in this unit.
Introduction

Molecular genetics crosses the boundaries of the more traditional life sciences such as genetics, biochemistry, microbiology, and cell biology. The main objective of Molecular Genetics 233 is to provide basic information about DNA and genes: their structure and function, what they do in cells, and how this influences the function of the organism as a whole. We also explore how changes in DNA and genes can lead to genetic diseases and cancer. This unit provides the background knowledge necessary for entry into the third year Molecular Genetics, Medical Biotechnology and Biotechnology units. In these units the principles and applications of molecular biology techniques are explored in more detail.

Learning Outcomes

Upon completion of this unit you should be able to:

- Describe the structure and organisation of genetic material in cells.
- Compare and contrast the organisation and function of genetic information in prokaryotic and eukaryotic cells.
- Describe various mechanisms of regulating the expression of genetic information.
- Explain how the genetic information is decoded and translated into the amino acid sequence of proteins.
- Evaluate how molecular biology is helping to unravel the basis of cancer, genetic and infectious diseases.
- Complete (with supervision) simple laboratory experiments that demonstrate the basic principles of molecular genetics.

Staff

Ph: 9266 7519, Fax: 9266 2342, Email: K.Munyard@curtin.edu.au

Rob Steuart: Lab 310
Ph: 9266 4772, Fax: 9266 2342, Email: R.Steuart@curtin.edu.au
**Course Materials**

*FLECS-Blackboard:* Most lecture notes, the unit outline, sample test questions, useful links, animations and the practical manual will be available on the Molecular Genetics 233 FLECS-Blackboard site. There will also be an electronic bulletin board available where any announcements relating to the unit will be posted. Please keep an eye on this site to make sure you don’t miss any important information. You should also feel free to use the bulletin board to talk to each other about matters relating to this unit.

You can access the MG233 FLECS-Blackboard site via the url: “http://lms.curtin.edu.au”. Log in using your OASIS username and password.

If you are having problems logging onto FLECS-Blackboard, or are unfamiliar with its operation please contact Eleanor Morgan for help. She can be found in Room 308.205, Tel 9266 7516, Fax 9266 2342, or Email: e.morgan@curtin.edu.au.

*iLectures:* All lectures will be recorded using the ilecture system. A link to the lectures will be posted on FLECS-Blackboard as each one is ready.

**Recommended text**

The recommended text for this unit is:

*Genetics: A conceptual approach (4th Edition)*

by Benjamin A. Pierce (W.H. Freeman & Company).

This book is available in the Bookshop.

You will need to have access to a text book to assist in your learning. If you do not wish to purchase the recommended text, then most post-2000 molecular biology/genetics text books should be suitable.

**Other Resources**

**Online Text Books**

Online textbooks can be found at the following URL. The NCBI website ([http://www.ncbi.nlm.nih.gov/](http://www.ncbi.nlm.nih.gov/)) has a wealth of information that will be useful to you as a student and as a scientist. To search for online books at NCBI go here:


**World Wide Web Resources**

There are also abundant “free” resources on the World Wide Web. Key word searches on selected topics of interest can lead you to a wealth of knowledge. Some useful URLs are given below. Please be careful when using web-based references. Just because someone has published their ideas and/or thoughts on the web doesn’t mean they are correct! Only use peer-reviewed sites or information from very reputable sources. Anything that is not peer-reviewed will not be acceptable as a reference for assignments (unless specifically stated) so it pays to get into good habits now.

Biology “backgrounders” (basic information on cancer/aids/genomes etc)


Genetic Science Learning Centre

[http://gslc.genetics.utah.edu/](http://gslc.genetics.utah.edu/)

National Centre for Biotechnology Information (USA)

Assessment Details

Upon completion of this unit you will be given a “Grade-Mark”. A mark of 50% or greater is required to pass this unit. All components must be attempted. Failure to pass a component may result in failing the unit.

Theory Tests (65%)
Your mastery of the theory component of this unit will be assessed in three tests, spaced as evenly as possible throughout the semester. The tests will be conducted in the Assessment Centre (Tests 1 & 2) or during formal University Exam weeks (Test 3). Information is available on the Assessment Centre website http://cits.curtin.edu.au/students/assessment.cfm and on the unit FLECS- Blackboard site. You will have a window of one week during which you can sit tests 1 & 2. You will be allowed two attempts at the first test and your highest mark will be recorded. Your first attempt can be taken any time in the given time-frame, but your second attempt can only be taken between 2nd and 4th April (inclusive). There is no “second chance” for the second and third tests. The third test will be held during the formal exam weeks at a date and time to be advised. The tests are composed of a variety of question-types (e.g. multiple-choice, fill in the blank, match the phrases, and true/ false). For each lecture/ topic there is a set of questions. Each student will be randomly assigned to a subset of those questions when they log on to the Assessment Centre computers to sit their test. More information about the tests, including sample questions, will be made available during lectures and on the FLECS-Blackboard unit area. All three tests are “closed-book”, that is, you will not be allowed to use any notes or books during the tests.

Test 1 (20%): Weeks 5/6, Wednesday 28th March to Wednesday 4th April 2012
Assessing the material taught in weeks 1 to 4 (inclusive).
Held in the Assessment Centre, completed on a computer.

Test 2 (20%): Weeks 11/12, Wednesday 9th May to Tuesday 15th May 2012
Assessing the material taught in weeks 5 to 10 (inclusive).
Held in Assessment Centre, completed on a computer.

Test 3 (25%): Exam Weeks, between 4th and 15th June 2012.
Assessing the material taught in weeks 11 to 13 (inclusive).
Completed as a normal paper exam.

Practical Test (30%): Week 13, Thursday/Friday 24th/ 25th May 2012
This is a 1.5 hour test. The Practical Test will be held during the normal lab time in week 13. It will be made up of questions similar (or in some cases identical) to those in your Laboratory Manual. You will be tested on your comprehension of the concepts introduced in the laboratory rather than your ability to physically do the work. It will be an open-book test, that is, you can take in any notes etc. that you wish to have handy. It is a very good idea for you to pay attention to the weekly prac questions…they are excellent pre-made notes for the prac exam.
Concept Survey (5%): Weeks 2 and 14
A concept survey is a set of questions relating to fundamental concepts in the field of Molecular Genetics. Your participation in the Concept Survey may help you in at least three ways: (1) an insight into your own knowledge and understanding of scientific and molecular concepts, (2) a way to identify areas that could benefit from some more study, and (3) knowledge gained by the survey may be used to develop teaching and learning activities that may further help you to learn. Your participation is voluntary. If you chose to not participate the 5% allocated to this survey (for your participation) will be transferred to another component of your assessment.

More information about the Concept Survey will be provided during the Lecture in Week 1 and on FLECS-Blackboard.

Significance of the Unit
In accordance with Curtin policy, students are advised that this unit is a significant unit, in which two fail grades may lead to termination of your course of study.

Supplementary Examination
Supplementary examinations are awarded only at the discretion of the Board of Examiners, and are not automatically awarded. No written application for supplementary examination will be considered. The Board of Examiners will carefully review individual cases before reaching a decision. The aim of a supplementary examination is to allow the student to correct minor problems/deficiencies in the initial assessment and not to gain extra study time or correct major problems.

Supplementary examinations, if awarded, will be indicated on Oasis, and exam dates will be advertised later this semester. You will not receive written notification if you are awarded a supplementary exam, so if you think you may need one, pay attention to the notices, and check Oasis regularly. It is your responsibility to check. A student who does not sit for a scheduled supplementary examination has no claim to a further examination.

Academic Integrity
The Academic Integrity website provides information and resources for students on the topic of academic integrity (e.g. cheating, plagiarism, collusion, falsification of data). It has downloadable booklets and links to policies and procedures related to student (and staff) responsibilities and rights. http://academicintegrity.curtin.edu.au

Plagiarism
Plagiarism is a very serious offence, and in severe cases can result in expulsion from the University. It is your responsibility to inform yourself of the University’s plagiarism policy. A comprehensive booklet is available as a pdf from the Academic Integrity website. Useful examples and explanations of plagiarism are given in the booklet. Ignorance of the plagiarism policy will not be considered to be a useful defense, in the
event of a charge of plagiarism. If you are in any doubt as to what constitutes plagiarism, or how to avoid plagiarizing, please ask the unit coordinator for help.
# Molecular Genetics 233

**Lecture & Practical Timetable/ Outline 2012**

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture 1 Fri 8-9am 402.220</th>
<th>Lecture 2 Fri 9-10am 402.220</th>
<th>Practicals Thurs or Friday 10-1pm or Thurs 2-5pm 310.103A*</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 Feb 1</td>
<td>DNA the Molecule of Life (AP)</td>
<td>DNA Replication (AP)</td>
<td>DNA Extraction from WBC</td>
</tr>
<tr>
<td>5 Mar 2</td>
<td>Transcription (AP)</td>
<td>Translation (AP)</td>
<td>DNA Quantity &amp; Quality</td>
</tr>
<tr>
<td>12 Mar 3</td>
<td>Gene Regulation 1</td>
<td>Gene Regulation 2</td>
<td>Plasmid DNA extraction</td>
</tr>
<tr>
<td>19 Mar 4</td>
<td>Scientific Writing: summarising (KG)</td>
<td>DNA Repair &amp; Mutagenesis (DG)</td>
<td>PCR</td>
</tr>
<tr>
<td>26 Mar 5</td>
<td>Genetic Variation</td>
<td>Genome Organisation</td>
<td>RNA Extraction from Tomato Leaves</td>
</tr>
<tr>
<td>2 Apr 6</td>
<td><strong>EASTER FRIDAY – NO LECTURES</strong></td>
<td><strong>NO LAB</strong></td>
<td></td>
</tr>
<tr>
<td>9 Apr 7</td>
<td><strong>NON-TEACHING</strong></td>
<td><strong>NO LAB</strong></td>
<td></td>
</tr>
<tr>
<td>16 Apr 8</td>
<td>Mendelian Genetics</td>
<td>Non-Coding RNAs</td>
<td>Bacteriophages: Host restriction &amp; modification</td>
</tr>
<tr>
<td>23 Apr 9</td>
<td>Cancer Genetics 1</td>
<td>Cancer Genetics 2</td>
<td>Enzymes</td>
</tr>
<tr>
<td>30 Apr 10</td>
<td>Epigenetics</td>
<td>Antibodies &amp; Supergene Families (DN)</td>
<td>The Lac Operon</td>
</tr>
<tr>
<td>7 May 11</td>
<td>Enzymes</td>
<td>PCR</td>
<td>Cloning &amp; Transformation</td>
</tr>
<tr>
<td>14 May 12</td>
<td>Cloning</td>
<td>Sequencing</td>
<td>Colony PCR</td>
</tr>
<tr>
<td>21 May 13</td>
<td>Markers</td>
<td>Topics by Request</td>
<td><strong>PRAC TEST</strong></td>
</tr>
<tr>
<td>28 May 14</td>
<td><strong>Study Week</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/15 Jun 15-16</td>
<td><strong>Final Exams</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Check your Lab time, you only need to attend one lab session a week.*

**Key to Guest Lecturers**

- AP: Adrian Paxman
- DG: David Groth
- KG: Keith Gregg
- DN: Delia Nelson