



Course Outline

BABS3121

Molecular Biology of Nucleic Acids

School of Biotechnology and Molecular Science

Faculty of Science

Term 1, 2019

1. Staff

Position	Name	Email	Consultation times and locations	Contact Details
Course Convenor	A/Prof. Noel Whitaker	n.whitaker@unsw.edu.au	In the teaching lab sessions OR By Appointment	9385 2041 Room 3109, E26
Lecturer(s)	Prof.M.Crossley	m.crossley@unsw.edu.au	By Appointment	
	A/Prof. V. Murray	v.murray@unsw.edu.au	By Appointment	
	Dr. M. Janitz	m.janitz@unsw.edu.au	By Appointment	
	Dr. R. Edwards	richard.edwards@unsw.edu.au	By Appointment	
	Dr. A. Todd			

2. Course information

Units of credit: 6

Pre-requisite(s): BIOC2201. BIOC2101 or BABS2204 or BABS2261 or BABS2202 or MICR2011

Teaching times and locations:

Lecture Times	Weeks 1 – 9 Monday 5pm – 6pm, AND Tuesday 9am – 10am, AND Wednesday 12pm - 1 pm	Law Theatre G02 Old Main Building 230 Central Lecture Block 1
Practical Class	Weeks 2 – 9 Thursdays 9am – 1pm OR Thursdays 2pm - 6 pm Week 11 <u>only</u> Tuesday 9 am – 1pm OR Tuesday 2pm – 6pm	Wallace Wurth 122 Wallace Wurth 122

See: <http://timetable.unsw.edu.au/2019/BABS3121.html>

The syllabus comprises a detailed analysis of gene structure and function which includes: structure and properties of polynucleotides such as DNA and RNA; structure of chromatin; mechanisms and regulation of gene replication, transcription and translation, DNA repair and the molecular biology of cancer induction; recombinant DNA technology; nucleic acid sequencing, recombinant DNA technology, application of genomics and proteomics, microarray analyses; protein production using recombinant DNA systems. Practical work provides extensive experience with contemporary molecular techniques; literature surveys and web-based research are also used to enhance the theoretical and practical aspects of the syllabus.

2.2 Course aims

The overall aim of the course is to provide a solid foundation in molecular techniques as well as an introduction to informatics-based methods from which students can pursue future work in industry or academia (including Honours projects). This course complements and supports other BABS courses. Weekly practical sessions provide exposure to procedures used in the routine manipulation and analysis of DNA and associated products (including RNA and proteins).

Aims:

- Create an environment for student engagement and motivation
- Student application of their learning to real-life problems
- Provide a solid foundation for further nucleic acid work
- Promote UNSW graduate attributes including team work

2.3 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Perform experimental analysis of gene expression at the mRNA and protein level.
This includes planning of laboratory work, recording observations and data, analysis and interpretation of results and the proper and safe use of laboratory equipment.
2. Apply theory and practical methods to the understanding of molecular biology and regulation of expression of genes as well as designing approaches for analysis of gene expression.
3. Critically evaluate scientific literature relevant to molecular biology
4. Identify the features of quality writing and apply to their own scientific report and essay style writing

2.4 Relationship between course and program learning outcomes and assessments

Course Learning Outcome (CLO)	LO Statement	Program Learning Outcome (PLO) See: https://www.handbook.unsw.edu.au/undergraduate/programs/2019/3970	Related Tasks & Assessment
1	Perform experimental analysis of gene expression at the mRNA and protein level	1. Ethical, social and professional understanding 2. Teamwork, collaborative and management skills. 5. Research, enquiry and analytical thinking abilities	Assessment 3: Laboratory report and Poster presentations. Laboratory Log Books - planning of laboratory work, recording observations and data, analysis and interpretation of results and the proper and safe use of laboratory equipment
2	Apply theory and practical methods to the understanding of molecular biology and regulation of expression of genes as well as designing approaches for analysis of gene expression	2. Teamwork, collaborative and management skills . 5. Research, enquiry and analytical thinking abilities ... 6. Capability and motivation for intellectual development	Assessment 1: Pre-census Assessment 2: Mid-term Assessment 3: Laboratory report and Poster presentation Assessment 4: Final Exam
3	Critically evaluate scientific literature relevant to molecular biology	3. Information literacy including the ability to make appropriate and effective use of information 6. Capability and motivation for intellectual development	Assessment 4: Final Exam
4	Identify the features of quality writing and apply to their own scientific report and essay style writing	4. Effective and appropriate communication in both professional and social context 6. Capability and motivation for intellectual development	Assessment 1: Pre-census Assessment 2: Mid-term Assessment 3: Laboratory report and Poster presentation Assessment 4: Final Exam

3. Strategies and approaches to learning

3.1 Learning and teaching activities

Throughout the course, students are encouraged to develop problem-solving skills and to critically evaluate concepts, ideas and research results by participating in all face-to-face activities such as lectures and practical classes. Also, online learning materials will be made available to further assist students' learning.

Lectures serve to emphasize certain principles covered in the text, provide an overview and connect the individual components of the course. They may also cover current ideas and research. The lectures provide a guide to the material need to cover for the course. Most lectures will closely follow the textbook or there will be resource material identified.

However, students are encouraged to extend their knowledge by reading from a variety of sources. Lecture notes and recordings are also available online.

Laboratory based experimentation is an essential part of modern science. The practicals in this course are designed for students to learn and enhance their lab techniques and are designed to complement the lecture series.

3.2 Expectations of students

Students are expected to attend all lectures and practical classes. Attendance records will be kept in practical classes, attendance at less than 80% of classes may result in the grade of UF. Students are expected to maintain an accurate record of their laboratory work in a Laboratory Notebook. This is generally in an electronic or online form. Laboratory demonstrators will check and provide feedback on the students records in the Laboratory Notebook.

Students are expected to consult the course Moodle site on at least a weekly basis. protocols governing email, social networks and discussion forums.

Social networks (i.e. Facebook, Twitter etc) will not be used to share class materials and a way to contact academics including demonstrators/tutors involved in this course. If students have course-related questions, they are encouraged to use discussion forums on the course's Moodle website. These are monitored regularly. If more help is needed, students may send enquiries or requests for appointments from their UNSW email. When sending an email to the course coordinator, a student must state their name, student number and the course in which they are enrolled.

4. Course schedule and structure

Week (Start)	Lecture 1 Law Theatre G02 Monday 5 - 6pm	Lecture 2 OMB 230 Tuesday 9 - 10am	Lecture 3 CLB 1 Wednesday 12 - 1pm	Practical (4hrs) WW 122 Weeks 2-9 Thursdays 9am OR 2pm Week 11, Tuesday 9am OR 2pm
1 (18/2)	Course Intro (NW)	Basic Techniques (MJ)	Basic Techniques (MJ)	
2 (25/2)	Basic Techniques (MJ)	Viral Vectors/Critiquing Research articles/good writing (NW)	Viral Vectors/Critiquing Research articles/good writing (NW)	GFP plasmid seq and expression analysis (day 1)
3 (4/3)	Pre-census quiz (online – Moodle)	Transcription/Control of gene expression (MC)	Transcription/Control of gene expression (MC)	GFP plasmid seq and expression analysis (day 2)
4 (11/3)	Transcription/Control of gene expression (MC)	Transcription/Control of gene expression (MC)	Mid-term exam	GFP plasmid seq and expression analysis (day 3)
5 (18/3)	The Transcriptome (RE)	The Transcriptome (RE)	The Transcriptome (RE)	Synthesis of CRISPR/CAS9 guides (day 1)
6 (25/3)	The Transcriptome (RE)	RNA Biology (ncRNA) (MJ)	Microarray background/intro to computer prac (NW)	Synthesis of CRISPR/CAS9 guides (day 2)
7 (1/4)	Primer design (NW)	Catalytic Nucleic Acids (AT))	Replication, Repair & Cancer (NW)	Microarray (day 1)
8 (8/4)	Replication, Repair & Cancer (NW)	Replication, Repair & Cancer (NW)	Replication, Repair & Cancer (NW)	Microarray (day 2)
9 (15/4)	DNA structure/damage (VM)	DNA structure/damage (VM)	Future applications (MJ)/Wrap up and exam (NW)	Microarray (day 3)
10 (22/4)	(Easter Monday)			(ANZAC Day)

11 (29/4)

Microarray (day 4)/poster presentation
Tuesday 9am OR 2pm!

Note: This course consists of 7 hours of class contact hours per week. You are expected to take an additional 7 hours of non-class contact hours to complete assessments, readings and exam preparation. Practicals in bold type (**GFP plasmid** and the **Microarray** practicals) are assessable.

4.1 LECTURE SUMMARIES

1. BACKGROUND MOLECULAR BIOLOGY (3 lectures – MJ).

References:

Course text book

BIOC2201 lectures

BABS3121 lab manual notes (Appendices) in One Note

- i) Theoretical Background to Laboratory Techniques used in Practical Work
DNA cloning, PCR and its variations, Vectors ii)
Primary, secondary and tertiary structure of DNA.
The interaction of proteins with DNA, Basis for the sequence specific recognition of DNA by proteins, Hybridisation
- iii) Chromatin structure
The structure of the nucleosome. The effect of chromatin structure on the control of gene expression
- iv) The organisation of genes in humans.
Repetitive sequences. Important elements in chromosomes.

2. VIRAL VECTORS / CRITIQUING RESEARCH ARTICLES / GOOD WRITING (2 lectures – NW).

Inverted lecture in which groups discuss recent examples of gene therapy and the viral vectors used. The groups will then report out to the whole class (with peer review)

Week 3: PRE-CENSUS QUIZ

3. TRANSCRIPTION AND THE CONTROL OF GENE EXPRESSION (4 Lectures - MC).

References:

Alberts *et al.*, *Molecular Biology of the Cell*, 5th ed. Portions of Chapters: 4, 5 & 7

- i) How genes are turned on and off at the transcriptional level
 - a. How DNA-binding proteins control RNA polymerase binding
 - b. How DNA-binding proteins were discovered
 - c. How they find their target genes
 - d. How they turn them on or off
 - e. How is this regulation maintain this for long periods
- ii) Regulatory proteins
 - a. How were DNA-binding proteins and their genes identified?
 - b. What can be done with these genes?
 - c. How have things changed in the post-genomic era?
- iii) Mechanism of action of regulatory proteins
 - a. What we have learned about DNA-binding from studying transcription factors
 - b. What have we discovered about activation and repression and repression domains
 - c. What functional domains actually do and how this leads to epigenetics
- iv) Transcription factors in development
 - a. Loss of function experiments
 - b. Gain of function experiments
 - c. Analysis using genomic techniques

Week 3: PRE-CENSUS QUIZ

4. THE TRANSCRIPTOME (4 lectures – RE)

References:

Alberts *et al.*, *Molecular Biology of the Cell*, 5th ed. Portions of Chapter: 7

- i) Transcriptomics
 - a. What is transcriptomics?
 - b. Differential expression
 - c. DNA microarrays
 - d. Single cell arrays
 - e. Sequence-based transcriptomics
 - f. Gene Expression qPCR
 - g. RNASeq

- ii) Differential gene expression
 - a. Clustering samples by gene expression
 - b. Identifying differentially expressed genes
 - c. Normalising gene expression

5. RNA BIOLOGY (1 lecture – MJ)

- i) Translation
 - a. Ribosomal RNA (rRNA) and snoRNAs
 - b. Transfer RNA (tRNA)
- ii) mRNA processing and splicing
 - a. Heterogenous nuclear RNAs (hnRNAs)
 - b. Intron splicing
- iii) Post-translational gene silencing
 - a. Catalytic ncRNAs (Ribozymes)
 - b. RNA interference (RNAi)
- iv) RNA directed transcriptional gene silencing
- v) LncRNA, snoRNAs and piRNA

6. MICROARRAY BACKGROUND/INTRO TO THE COMPUTER PRACTICAL AND PRIMER DESIGN FOR THE PRACTICAL (2 lecture – NW)

7. CATALYTIC NUCLEIC ACIDS (1 lecture. AT)

- i) RNA enzymes
 - a. Natural & Artificial Ribozymes
- ii) DNA enzymes
 - a. DNAzymes/Deoxyribozymes
 - b. PlexZymes/MNAzymes
 - c. Applications in Therapy? and Diagnostics

8. REPLICATION, REPAIR AND CANCER (4 Lectures - NW). References:

Watson *et al.*, *Molecular Biology of the Gene*, 5th ed., Chapters 8 and 9.

Alberts *et al.*, *Molecular Biology of the Cell*, 5th ed., Chapter 5, pages 263-316; Chapter 20, pages 1205-18 and 1230-40.

- i) DNA replication mechanisms, including initiation and completion of replication. The proteins and enzymes involved in replication;. Comparison of prokaryotic and eukaryotic DNA replication systems. The replicon model of replication initiation; initiation of replication and its control in the cell cycle, replication of telomeres.
- ii) DNA repair. Replication errors and their repair; DNA damage and its repair; excision repair; recombinational repair; repair deficiencies.

iii) Cancer

The role that DNA damage, carcinogens, somatic mutations, epigenetic changes and genetic instability play in the induction and progression of cancer. The techniques employed to identify cancer-causing genes, including cancer genomics.

9. DNA STRUCTURE/DAMAGE (2 lectures – VM)

- i) DNA structure and properties of DNA ii) Anti-tumour drugs that affect cell division iii) Methods to assess drug-DNA damage
- iv) DNA sequencing techniques to analyse drug-DNA damage
- v) Next-generation DNA sequencing techniques to analyse drug-DNA damage

10. FUTURE DIRECTIONS IN NUCLEIC ACIDS AND MOLECULAR TECHNIQUES / COURSE DEBRIEF AND THE FINAL EXAM (1 lecture – Mmj/NW)

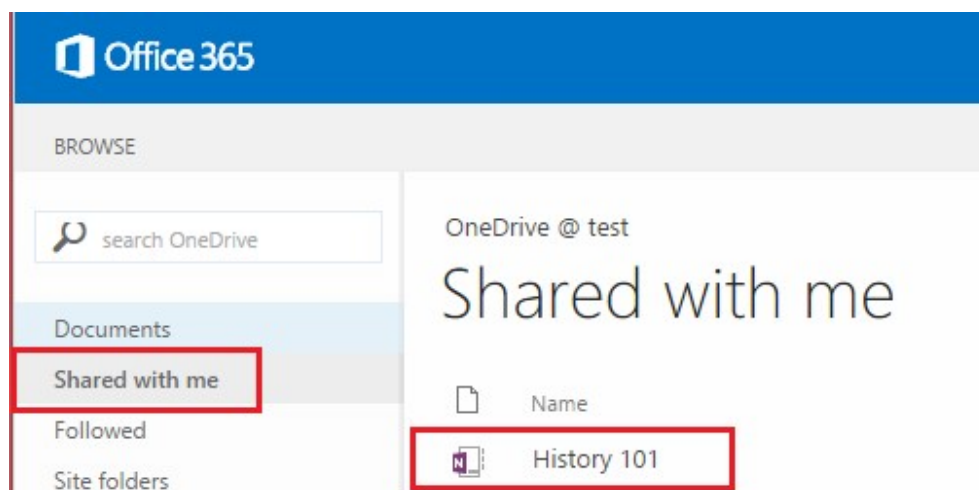
Frontiers and molecular biology – research projects
Other courses relevant to molecular biology

4.1 PRACTICALS

Details of the practicals are outlined in the Electronic Note book for practical work which is supported in *OneNote*.

For this course, we require students to record their results, observations in and Electronic Note Book. Using an electronic/online lab notebook allows you to record your results, upload results/images etc without having to bring paper notebooks into the lab and take out of the lab at the end of the session. One critical feature is that any edits are tracked (with date/time/identity) and OneNote does this. OneNote is part of Office365 (all UNSW staff and students have access) and, therefore, uses/integrates the MS Office suite (Word, Excel, PowerPoint). We assume that students have installed and are familiar with using the MS Office365.

When you are given access to the Notebook “BABS3121 (Molecular Biology of Nucleic Acids)” you will receive an email on your UNSW email. Students can find all new class notebooks on their OneDrive for Business inside the **Shared with me** folder.



Students can find all of their class notebooks (including this one for BABS3121) by going to the **Class notebooks** entry in the **Quick Launch** navigation pane for SharePoint on the left side of the screen.



Home

Notebook

Documents

Class Notebooks

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admin@demotenant4.n

5. Assessment

5.1 Assessment tasks

Assessment task and methods	Weight (%)	Submission methods	Mark and feedback style	Due date
Assessment 1: Time limit, 1 hour Pre-census on-line quiz (Moodle) Released Monday, 4/3 at 5pm Closed Tuesday, 5/3 at 9am Marks released Tuesday, 5/3 at 5pm	5	On line	Uploaded to Moodle	Week 3
Assessment 2: Practical work GFP Plasmid Scientific Report Open 18/3 9am Closed 29/3 11:59pm Marks released 19/3	20	On line submission (Moodle)	Demonstrators, marks and written feedback via Moodle	Week 5
Microarray Poster Presentation Week 11 Practical sessions (Tuesday 30/4 not Thursday!) Verbal feedback from peer and academic markers during presentations. Marks released 14/4	15	Poster presentation	Teachers, demonstrators and peer marks uploaded to Moodle. Verbal feedback during poster session	Week 11
Assessment 3: Mid-Term exam 45 minutes Marks released 27/3	30	Wed 13/3, 12pm, CLB1	Teachers. Marks uploaded via Moodle.	Week 4

Assessment 4: Final written exam	30	End of course	Exam period
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Assessment 1: Online Pre-census quiz (Moodle)

Series of MCQ questions covering the content of the Basic Techniques lectures (MJ) and the Viral Vectors/Critiquing Research Articles/good writing (NW) lectures.

Assessment 2: Practical work

The **GFP plasmid sequence and expression analysis** experiment requires a written assessment to be submitted. Written reports should follow the usual format of Introduction, Methods, Results and Discussion. In most cases 'Methods' can be covered simply by saying 'as described in the practical notes', and then listing any significant variations. Marks will mainly be awarded for clear presentation of results, with the inclusion of sample calculations where appropriate. The discussion should include an interpretation of the results, and your assessment of whether the results are reliable. If the experiment failed to yield the expected result the possible reasons for this should be discussed along with assumptions that have been made in interpreting the results etc. In general, the reports that score the highest marks will be those that are clear, complete and concise. (You shouldn't take the time to write too many pages and we don't have the time to read them!).

The laboratory practical **Microarray** results will be presented as a poster during the prac session in week 11 (but on **Tuesday, not Thursday!**). See details in One Note

In addition to the written reports, all students should equip themselves with a laptop or borrow one of the SurfacePros to access OneNote in which to record details of experiments *as they are carried out* and to record results *as they are obtained*. This Electronic Notebook should also be used to record information provided by the demonstrators in talks introducing experiments or as experiments progress, to write answers to questions asked in the practical notes and to keep a record of experiments run as demonstrations.

Occupational Health and Safety – Online quiz

OH&S issues are covered later in separate sections however, all students doing a BABS course are required to complete (and score 100% in) the BABS Health and Safety Quiz which is embedded in the Practicals Section of Moodle course for each of the BABS courses. This only needs to be completed once per year for all BABS courses. You will need to bring a copy of the final screen (showing the score) to get into the lab for each course for the first time each session.

Further information

UNSW grading system: <https://student.unsw.edu.au/grades>

UNSW assessment policy: <https://student.unsw.edu.au/assessment>

5.2 Assessment criteria and standards

Assessment 1: Pre-census on-line quiz

MCQs will be marked correct or incorrect.

Assessment 2: Practical work GFP

Plasmid report marking guide.

GFP Plasmid report (worth 20% of final course mark)
Introduction (15%)
Background and aims of the experiment (half a page)
Materials and Methods (10%)

Materials and Methods can be covered by writing 'as described in the lab manual', and then listing any significant variations.
Use a diagram to show the experimental procedure (don't copy from the lab manual).

Results (35%)

Day 1

Correctly label and annotated gel photo from day 1.
From the pGLO-GFP plasmid and the pGLO-BFP plasmid DNA sequences on Moodle, what are the expected sizes of the pGLO-GFP and pGLO-BFP.

Present the DNA sequencing results but not the whole sequence! Include (at minimum) 10 nucleotides on either side of the mutated base for the pGLO-GFP and pGLO-BFP plasmids on both strands (forward and reverse primers) – a total of 4 sequences

What did you see on each of the agar plates (with the *E. coli* transformed with the plasmids)?

The DNA sequences of the BFP pGLO plasmid and the GFP pGLO plasmid are in the Content Library (of OneNote). Locate the site that was mutated by site-directed mutagenesis and show this region (sequence and chromatogram).

Days 2 - 3 Protein

Gels:

Correctly label and annotated protein gel photos from days 2 and 3 showing any fluorescence under UV illumination and the Coomassie staining under white light. What was the estimated molecular weight of the GFP protein (heat-treated and non-heat treated)?

What was the effect of adding arabinose?

What effect did heating have on the GFP protein (apparent size, function)?

What was the fold increase in the amount of GFP protein (comparing uninduced (and/or non-transfected), semi-induced and induced)? (you might do this by eye but better is to try ImageJ to quantify the densitometry of the band in the image)?

Was there GFP protein without arabinose induction?

Was the GFP protein in the absence of the pGLO plasmid?

RT-qPCR:

How much RNA was isolated from each clone (i.e cultures of *E. coli* transfected with pGLO-GFP)? How much cDNA

Show the working ($\Delta\Delta Ct$) for estimating fold induction of GFP mRNA expression (comparing uninduced (and/or non-transfected), semi-induced and induced) Questions for consideration:

Was there GFP mRNA without arabinose induction?

Was the GFP mRNA in the absence of the pGLO plasmid?

What is the purpose of performing qRT-PCR on samples that have not been reverse transcribed?

Why do we also have the water (no-template) controls?

Discussion (35%)

Day 1

Why was ampicillin and arabinose added to the transfection plates?

Did the DNA sequencing identify the NA sequence change(s) between the GFP and the BFP? How did this affect the amino acids?

In which region of the GFP/BFP was this change and how does this explain the change in function of the protein (i.e. the colour of fluorescence)?

Days 2 - 3

Did the heat treatment affect the apparent molecular weight of the GFP protein?
Does the induction of mRNA expression correlate with the amount of GFP protein? Was there GFP expression in the absence of arabinose induction? What does this say about the inducible promoter?

References (5%)

Cite literature and tools used in the report.

Microarray Poster presentations marking guide.

Poster Section (worth 15% of final course mark)

Introduction (/3)

Is the background to the practical clear?

What approach is being taken?

Are the aims stated?

Methods (/1)

Can you understand the experimental approach?

Can you understand how you would do RT-PCR from the methods given?

Results (/5)

Are the results clearly presented?

Are all the necessary results included?

Are any changes in the procedure/problems with the procedure identified?

Are the figures labelled?

Did the experiment work? Can you tell from the presentation?

Conclusions (/5)

Are the conclusions clearly stated?

Are they logical and in agreement with the results?

Discussion of the changes in gene expression for the MB-175 cells?

For the SK-BR-III cells?

Are the limitations of the experiment mentioned?

Presentation (/2)

Is the poster well-presented?

Is it clearly laid out and easy to follow?

Understanding (/4)
Can the presenter give clear answers on technique?
Do they understand why each step was included?
Do they understand the microarray procedure?
Can they explain the changes in gene expression observed?
Total/20

Assessments 2, 3 and 4: Expectation of writing quality Written assessments and presentations will be assessed according to Biggs’s SOLO taxonomy. Biggs’s SOLO approach to learning has 5 types of response to the assessment and these will be applied to the scientific report and the written exams.

The figure below gives an idea of what is required to achieve different types of grade:

<i>SOLO Type of Response</i>	<i>Mark region</i>	<i>Grade Type</i>
I Prestructural	<40	F
II Unistructural	40-50	F – P
III Multistructural IV Relational	51-64	P
V Extended Abstract	65-80	C – D
	81-100	D – HD

An answer that relies upon information provided during the lectures and simply ‘regurgitates’ this information will at most be awarded a mark of 40-50, i.e. a ‘**unistructural**’ response. The student has failed to demonstrate adequately a firm understanding of the principles and their application as required in the examination question. An incorrect answer, where it appears the student is unclear of the principles is more likely to be considered as a ‘**prestructural**’ answer and will result in a mark of less than 40.

A correct answer using information provided during the lecture corresponds to a ‘**multistructural**’ response. The answer suggests an understanding of the principles and limited information to support the answer. In contrast, a correct answer using lecture information, but supported by strategic references would demonstrate a firm understanding of the principles and the use of information to explain the concepts and applications. This is considered as a ‘**relational**’ response. The best answer possible will not only demonstrate a firm understanding of the principles and their applications, but also the implications in the wider context of the field, as they relates to the question, i.e. ‘**extended abstract**’.

The best way to demonstrate and ‘extended abstract’ answer is to include relevant information you have read from scientific journals/sources.

5.3 Submission of assessment tasks

If assessment tasks are not completed, then they will receive a mark of zero.

In the case that they are submitted late, without acceptable special consideration application, then they will be accepted but panelised up to 10% per day they are late.

Electronic submissions will be through TurnItIn. In the case of electronic submission, no paper versions will need to be submitted.

5.4. Feedback on assessment

Assessment 1: Online Pre-census quiz (Moodle)

Correct responses and explanations will be given via Moodle on Tuesday, 5/3 at 5pm

Assessment 2: Practical work

GFP Plasmid report: demonstrators will mark and provide written feedback on the reports. The marks will be checked by the coordinators (NW) and the marked reports returned electronically via Moodle on 19/3

Microarray poster presentations: peer and academic marker feedback during the poster presentation. Marks will be collated and reported on 14/4.

Assessment 3: Mid-term exam

Marks will be reported back to students via Moodle on 27/3

Assessment 4: Final exam

No feedback, the course marks will be reported back to students by The University after the end of term exam period.

6. Academic integrity, referencing and plagiarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.

Further information about referencing styles can be located at

<https://student.unsw.edu.au/referencing>

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage.¹ At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and **plagiarism** can be located at:

- The *Current Students* site <https://student.unsw.edu.au/plagiarism>, and
- The *ELISE* training site <http://subjectguides.library.unsw.edu.au/elise/presenting> The *Conduct and Integrity Unit* provides further resources to assist you to understand your conduct obligations as a student: <https://student.unsw.edu.au/conduct>.

7. Readings and resources

Text Books

Alberts *et al.*, *Molecular Biology of the Cell*, 6th ed. (Garland, 2014) – Molecular Cell focus

OR

Watson *et al.*, *Molecular Biology of the Gene*, 7th ed. (Benjamin Cummings, 2013) – Molecular genetics focus

Viral Vectors in Gene Therapy readings

Overview

¹ International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013.

1. Emerging Platform Bioprocesses for Viral Vectors and Gene Therapies (<http://www.bioprocessintl.com/2016/emerging-platform-bioprocesses-for-viral-vectors-andgene-therapies/>)

2. Gene therapies development: slow progress and promising prospect (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5328344/>)

Viral Vector Gene Therapy Case studies

1. Degenerative eye disease (choroideremia) gene therapy
 - See report in New Scientist (<http://www.newscientist.com/article/dn24879gene-therapy-restores-sight-in-people-with-eye-disease.html#.UzpP1v6KC70>)
 - Original Lancet journal (http://ac.els-cdn.com/S0140673613621170/1-s2.0S0140673613621170-main.pdf?_tid=9f297b72-b95f-11e3-bc84-00000aacb35e&acdnat=1396330789_ca9b8684a042befb8f8c6fd045322546)
2. Monkey colour vision (dichromatic → trichromatic, male polymorphism)
 - See report in Nature News (<http://www.nature.com/news/2009/090916/full/news.2009.921.html>)
 - Original Nature Article (*Katherine Mancuso, et al. Nature, Vol. 461, No. 7261, September 16, 2009.*) - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2782927/pdf/nihms-138870.pdf>

Resources

The Learning Centre - <http://www.lc.unsw.edu.au>

Essay and Assignment Writing - <https://student.unsw.edu.au/essay-and-assignmentwriting>

Exam Preparation Tips - <https://student.unsw.edu.au/exam-preparation>

8. Administrative and support matters

School Contact:

A/Prof Noel Whitaker

Director of Teaching and Deputy Head of School

Email: n.whitaker@unsw.edu.au

Tel: +61 2 9385 2041

Dr Anne Galea

Deputy Director of Teaching

Email: a.galea@unsw.edu.au

Tel: +61 2 9385 8156

Dr John Wilson

Science Academic Disability Adviser and School "At risk student" support

j.e.wilson@unsw.edu.au Tel: +61 2 9385

Faculty Contact:

Dr Gavin Edwards

Associate Dean (Academic Programs) Email:

g.edwards@unsw.edu.au

Tel: +61 2 9385 4652

Biosciences Student Office:

Ms Julna Zhao

Student Advisor (BABS)

Enquires via: **unsw.to/webforms**.

Tel: +61 (2) 9385 8915

8.1 Special consideration and supplementary exams

Students who believe that their performance, either during the session or in the end of session exams, may have been affected by illness or other circumstances may apply for special consideration. Applications can be made for compulsory class absences such as (laboratories and tutorials), in-session assessments tasks, and final examinations.

You must submit the application prior to the start of the relevant exam, or before a piece of assessment is due, except where illness or misadventure prevent you from doing so. If you become unwell on the day of the exam or fall sick during an exam, you must provide evidence dated within 24 hours of the exam, with your application.

UNSW has a fit to sit/submit rule which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so.

You must obtain and attach Third Party documentation before submitting the application. Failure to do so may result in the application being rejected.

Further information on special consideration can also be found at <https://student.unsw.edu.au/specialconsideration>.

HOW TO APPLY FOR SPECIAL CONSIDERATION

The application must be made through Online Services in [myUNSW](#) (My Student Profile tab > My Student Services > Online Services > Special Consideration).

Students will be contacted via *their official university email* as to the outcome of their application.

SUPPLEMENTARY EXAMINATIONS:

The University does not give deferred examinations. However, further assessment exams may be given to those students who were absent from the final exams through illness or misadventure. Special Consideration applications for final examinations and in-session tests will only be considered after the final examination period when lists of students sitting supplementary exams/tests for each course are determined at School Assessment Review Group Meetings. Students will be notified via the online special consideration system as to the outcome of their application. **It is the responsibility of all students to regularly consult their official student email accounts and myUNSW in order to ascertain whether or not they have been granted further assessment.**

For Term 1 2019, Supplementary Exams will be scheduled between

Monday 27 May – Friday 31 May, 2019

Further assessment exams will be offered in this period ONLY and failure to sit for the appropriate exam may result in an overall failure for the course. Further assessment will NOT be offered on any alternative dates.

- *Website where student related information, policies and guidelines are available*

9. Additional support for students

- The Current Students Gateway: <https://student.unsw.edu.au/>
- Academic Skills and Support: <https://student.unsw.edu.au/academic-skills>
- Student Wellbeing, Health and Safety: <https://student.unsw.edu.au/wellbeing>
- Disability Support Services: <https://student.unsw.edu.au/disability-services>
- UNSW IT Service Centre: <https://www.it.unsw.edu.au/students/index.html>