

# Administration of a Large Undergraduate Course

## Level-1 Biology University of Glasgow

Andrea Brown

Anne Tierney

Jo Smith

Ian Reid

Joyce Pugh

Douglas Neil

Mike Blatt

L1 Biology Teaching Manager

Deputy Co-ordinator 1X

Deputy Co-ordinator 1Y

Systems Analyst

Technician

Year Co-ordinator and co-ordinator 1Y

Co-ordinator 1X

Biology Teaching Centre

Floor 9, Boyd Orr Bldg

University of Glasgow

Glasgow

G12 8QQ



# **Level-1 Biology: 1X Molecular (semester 1) 1Y Organismal (semester 2)**

**Biology (40 credits) + Chemistry or Science Fundamentals (40 credits) + ?**

- Lectures
- Laboratory sessions
- Tutorials
  - (i) prepare answers to questions in advance
  - (ii) discuss how to approach assignment (e.g., HEM Report)
- Small group discussion exercises (labs)
- Student-directed small group activities and individual problems

## Statistics

- 650-750 students
- 88 lectures delivered by 23 lecturers
- 11 workshops delivered by 6 lecturers (including ELA)
- 14 lab sessions per week supervised by 6 University Teachers with 30 GTAs (3 GTAs/lab; 42 lab slots)

### **Additional staff (organised through Heads Of Divisions):**

- 31 additional lab staff (48 lab slots)
- 42 tutors (84 tutorial slots)
- 17 staff for discussion exercise (28 lab slots)
- 68 markers

## **Make large classes seem smaller!**

- “Lack of interaction with faculty members (in and out of class)
- Lack of structure in lectures
- Lack of or poor discussion sections
- Inadequate contact with teaching assistants
- Inadequacy of classroom facilities and environment
- Lack of frequent testing or graded assignments”

(From: Carbonne and Greenberg (1998) In M.Kaplan (ed), To Improve the Academy Vol 17, cited in Cooper and Robinson, New Directions for Teaching and Learning (2000), no 81, page 5.)

## Online Resources Available to L1 Biology Students

- L1 Biology webpage
- Moodle (University of Glasgow's VLE)
- Coursecompass (VLE)
  - (i) multiple choice question bank (immediate feedback)
  - (ii) e-textbook
  - (iii) activities and simulations

Supported by Pearsons and customised to fit course

- Web-based Genetics exercises

## Lectures

- 3 lectures per day (9.00am, 2.00pm and 5.00pm)
- “Team-taught”
- Entry with coloured ticket
- Lecture attendance checked at random times throughout the year
- Non-attenders e-mailed but not penalised
- Good correlation between attendance level and final grades

# Laboratories

- 7 “wet” labs per module)
- lab leaders’ meeting
- demonstrators’ meeting
- GTA feedback
  - (a) staff responsible for designing lab
  - (b) lab leaders
  - (c) GTA demonstrators
- GTAs demonstrate to same group of students each week
- student attendance compulsory (CR if attendance less than 75%)

10:15

Lab Attendance Map

01/02/2007

A7	0606833 Daly Philip	B8 C8	<i>nan</i>	0602804 Hawkins Katrina	D8 E8		0605592 MacKinnon Donna	F8 G8	0602896 McCabe Scott		H4
A6	0602824 Cunningham Megan	B7 C7	0607637 Faulkner Andrew	0607445 Halliburton Elaine	D7 E7	<i>nan</i>	0605368 MacKenzie Hannah	F7 G7	0603158 McAteer Maria		H3
A5	0603080 Cunningham Madeleine	B6 C6		0603996 Gribben Nicolette	D6 E6	0603209 Jennings Anna	0603270 MacKenzie Carrie	F6 G6	0602802 May Tracy		H2
A4	0606694 Barrett Tessa	B5 C5	0603108 Earley Megan	0602852 Gouraguine Adam	D5 E5	0603197 Jardine Jacqueline	0602842 Symington Jill	F5 G5			H1
A3	0603125 Allan Stuart	B4 C4	0600215 Clarke Jasper	0606837 Gillespie Neil	D4 E4			F4 G4	0600218 Mallalieu Sophia		
A2	0603030 Allan Laura	B3 C3	<i>nan</i>		D3 E3	0606559 Howie Ruth	0605386 Lochrie Lauren	F3 G3			
A1	0605448 Aitchison Roxanne	B2 C2	0607702 Devine Warren	0606107 Gardner Debbie	D2 E2	0301059 Ho Poyao	0603244 Loch Jonathan	F2 G2	0605033 MacMillan Elizabeth		
		B1 C1		0606938 Furlong Tom	D1 E1		0600285 Larnie Kerri	F1 G1	0603150 MacLellan Kirsten		

From Other Lab Groups



# Assessment

## Module 1X

Home assignment	5%
Essays	20%
Genetics Problems	10%
*Plant Science Assignment	10%
Skulls Profile	5%
End-of-course-examination	50%

## Module 1Y

Lifestyle Project:	
Group tasks	12%
Individual Problem (peer marking component)	8%
HEM Report	15%
2 short assignments:	
GIT	7.5%
Circulation	7.5%
End-of-course-examination	50%

Matric No:



Name:

Lab:

Seat No:

Title:

Course:

Mark

Plagiarism Statement:  
I have read and understood the section on "Copying of Course Work: Plagiarism" in the Level-1 Course Information Document. By signing below, I certify that the work handed in is entirely my own except where indicated.  
Course work will not be accepted if this declaration has not been signed.

Signed  ..... Date : 12/04/2007 09:45

IBLS



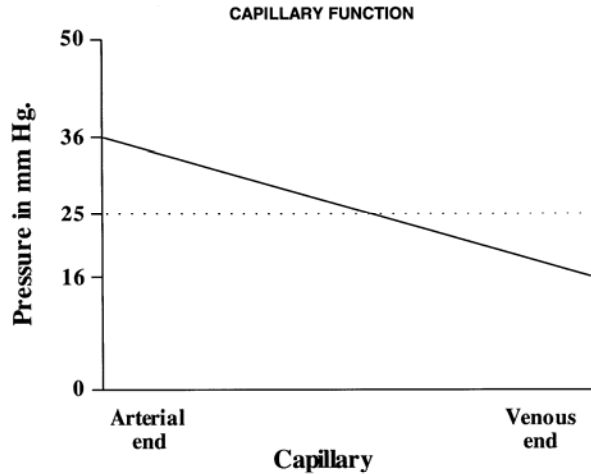
### L1 Biology Circulation Assignment Week 21

You should hand in this assignment during your laboratory session in week 21 (week beginning 12th March, 2007)

Matriculation Number

Room 9 2 4 Seat No A 3 Lab No 1 1

**Circulation Assignment:** (worth 7.5% of the total marks for this module)  
You should work through this assignment at home. The final version that you will submit will be completed in the laboratory in week 21 under examination conditions. Marks will normally only be credited to you if you complete this assignment at your normal laboratory session. Your assignment will be marked and returned to you. A model answer will then be posted in the Biology Teaching Centre.



The graph shows pressure (in mm Hg) along the length of a capillary from its arterial end to its venous end. The **solid line** shows the normal change in hydrostatic pressure along the length of the capillary, while the **dotted line** shows the normal osmotic pressure of the blood plasma.

- (i) Draw a line on the diagram to indicate the region of the capillary where there will be a net loss of fluid from the blood plasma. Label it 1.
- (ii) (a) Draw in a line to indicate how protein malnutrition (leading to a lower level of albumin in the blood) would affect the osmotic pressure of the blood plasma. Label it 2a.
- (b) Draw in a line to indicate the region of the capillary where net fluid intake would occur in such a person. Label it 2b

Official use  
Only

0 - 1

0 - 1

0 - 1

1383503496

CONTINUED OVERLEAF

- (iii) If the arteries are 'hardened' (due to loss of elasticity resulting from ageing and/or atherosclerosis) resulting in blood reaching the capillaries at a higher hydrostatic pressure, what effect would this have on the overall loss of fluid from the capillaries?

Official use  
Only

0 - 1

- (iv) If the vein receiving blood from a particular capillary was compressed (or was partially blocked by a tumour) resulting in a raising of the hydrostatic pressure at the venous end of the capillary, how would this effect the overall uptake of fluid by the capillary?

0 - 1

- (v) If more fluid escapes from the blood plasma in the capillaries than re-enters (i.e. a net loss occurs), where does this fluid go?

0 - 1

- (vi) Name two substances which you would reasonably expect to be at a lower concentration in the plasma at the venous end of a capillary compared to its arterial end.

Answer 1

Answer 2

0 - 2

- (vii) Any of the conditions listed in (ii), (iii) and (iv) could result in oedema (swellings produced by fluid collecting in the tissues). Explain why this is so.

0 - 2

9910503490

SEQUENCING QUESTION: DOWN'S SYNDROME (5 Marks)

Matriculation Number

Surname

The twelve statements below have been arranged in random order. Select those statements that are relevant and appropriate to Down's Syndrome (Trisomy 21) and place them in an order that leads logically from the initial genetic error to the characteristics of the affected individual. (There may be more than one correct answer. Marks are given for partly correct answers.)

Letters that identify each Statement

- A - leads to physical abnormalities and mental retardation in the offspring
- B - most frequently in germ cells of older fathers
- C - two chromosome 21s in one gamete
- D - most frequently in germ cells of older mothers
- E - three chromosome 21s in one gamete
- F - non-disjunction
- G - only one chromosome 21 in an affected zygote
- H - genetic defect occurs most frequently in somatic cells of older offspring
- I - three chromosome 21s in an affected zygote
- J - chromosome 21
- K - extra 21 chromosome is replicated at S phase in germ cell of parent
- L - two chromosome 21s in cells of affected zygote

FOR ROUGH WORKING only:

**Excluded Items** From the list above, identify the statements that are incorrect or inappropriate to the question. Enter the identifying letter for each of these statements here:

EXCLUDED ITEMS

**Included Items** From the list above, identify the statements that are appropriate to the question. Write the identifying letter for each such statement here:

INCLUDED ITEMS (complete and proceed to the next instruction)

**Order of Included Items** Arrange the included items (from the box immediately above) in an order that leads logically from the **initial genetic error** to the **characteristics of the affected individual**. Write them in the box below, in the logical order.

ORDER OF INCLUDED ITEMS (rough working : this box is not marked)

FINAL ANSWER

Record your answer by entering the letters for each included statement, in the correct order, in the boxes below (ONE CAPITAL LETTER PER BOX)

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Section B Question 3 (10 marks)**

BH 199

Please PRINT your details in capital letters and avoid contact with the edge of the boxes

**Matriculation Number**

**Name**

Approximately 180 litres of fluid are filtered through the kidneys every 24 hours, but only about 1.5 litres of urine are produced.

a) What is the average rate of filtration in ml/minute? (2 marks)

*Official  
use only*

0 - 4

b) What will happen to the rate of filtration if the glomerular blood pressure is increased? (1 mark)

0 - 2

c) What is the rate of urine production in ml/minute? (2 marks)

0 - 4

d) If the two kidneys together have two million nephrons, how many ml of fluid are filtered by each nephron in 24 hours? (2 marks)

0 - 4

e) The concentration of urea is 0.03g/ml both in the blood and in the glomerular filtrate, while its concentration in the urine is 2.0g/ml. Calculate what the expected urine concentration of urea would be if all urea in the glomerular filtrate entered the urine. What conclusion can you draw from your answer. (3 marks)

0 - 6

Total

--	--

5314016482

<b>Matric Number</b>	<input type="text"/>	<b>Draft answers here. Only entries on answer sheet will be assessed</b>
<b>Surname</b>	<input type="text"/>	

**Question 1.** Write the names for items a-e (upto 1 letter per box).

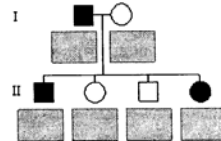
**Question 1a-e Draft boxes**

- a) an alternative form of a gene
- b) the NAME given to the number of chromosome sets in a mammalian sperm cell
- c) the NAME given to the number of chromosome sets in a mammalian somatic cell
- d) nuclear division in somatic cells
- e) nuclear division in germ cells

**Question 2.** Q2 Pedigree shows the inheritance of a human genetic disease. The allele responsible for the disease (*a*) is recessive to the normal allele (*A*).

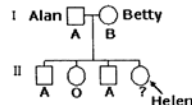
Enter the appropriate genotypes into the boxes beneath each family member (enter one genotype per box).

**Q2 Pedigree & Draft boxes**



**Question 3.** Q3 Pedigree shows ABO blood group types for several family members. In the boxes provided, write possible **genotype(s)** for Alan and Betty, and **phenotype(s)** for Helen. **An individual genotype or phenotype should be written in one box.** There are boxes for 5 *different* answers per member; not all need be filled.

**Question 3 Pedigree**



**Question 3 Draft boxes**

Alan	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Betty	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Helen	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Student Answer Sheet**

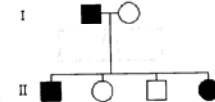
**Matric Number**

**Surname**

**Question 1 Answer Panel**

- Q1a
- Q1b
- Q1c
- Q1d
- Q1e

**Question 2 Answer Panel**



**Question 3 Answer Panel**

- Alan
- Betty
- Helen

**Question 4 Answer Panel**

**Autosomal Dominant**      **X-Linked Dominant**

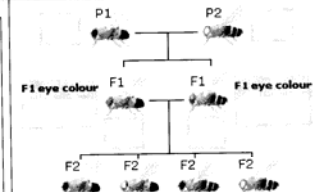
- |       |       |
|-------|-------|
| Carol | Carol |
| Bob   | Bob   |
| Fred  | Fred  |
| Mary  | Mary  |
| Tom   | Tom   |

**Question 5a Answer Panel**

**Q 5b Answer Panel**

- Brian
- Amy
- Dougie
- Iain
- Patrick
- Fiona
- Joanna

**Question 6 Answer Panel**



**Question 7 Answer Panel**

## **Formative assessment:**

- Genetics exercises (online; immediate feedback)
- Coursecompass (VLE) multiple choice question bank with immediate feedback
- Students design an experiment and write up a lab report which is peer marked with guidance/instructions
- Peer assessment of lab manuals (valuable to the student whose report is being peer reviewed AND the students who

## **Summative assessment:**

- Assessment marks/grades and final grades
- Annotated scripts
- Proforma
- Model answers posted on notice board

## Human Energy Metabolism Investigation Feedback Sheet

Matriculation Number	Name	Seat No										
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; height: 20px;"></td> <td style="width: 10%; height: 20px;"></td> <td style="width: 10%; height: 20px;"></td> <td style="width: 10%; height: 20px;"></td> <td style="width: 10%; height: 20px;"></td> <td style="width: 10%; height: 20px;"></td> <td style="width: 10%; height: 20px;"></td> <td style="width: 10%; height: 20px;"></td> </tr> </table>										<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; height: 20px;"></td> <td style="width: 10%; height: 20px;"></td> </tr> </table>		

Introduction	<p>General introduction to topic  <input type="checkbox"/> Excellent      <input type="checkbox"/> Good      <input type="checkbox"/> Adequate      <input type="checkbox"/> Poor</p> <p>Makes reference to (1) equation and (2) article(s) on energy metabolism  <input type="checkbox"/> Both (1) &amp; (2)    <input type="checkbox"/> (1) or (2)    <input type="checkbox"/> Neither</p>
Methods	<p>Clear &amp; understandable  <input type="checkbox"/> Excellent      <input type="checkbox"/> Good      <input type="checkbox"/> Adequate      <input type="checkbox"/> Poor</p> <p>Includes calculation steps  <input type="checkbox"/> All      <input type="checkbox"/> Some      <input type="checkbox"/> None</p>
Results	<p>Description of results  <input type="checkbox"/> Good      <input type="checkbox"/> Adequate      <input type="checkbox"/> Poor      <input type="checkbox"/> None</p> <p>Summary of own data  <input type="checkbox"/> Yes      <input type="checkbox"/> No</p> <p>Table of group data  <input type="checkbox"/> Yes      <input type="checkbox"/> No</p> <p>Histograms / graphs of differences between male/female, and trends (one factor versus another)  <input type="checkbox"/> Many      <input type="checkbox"/> Few      <input type="checkbox"/> None</p> <p>Quality of data presentations  <input type="checkbox"/> Excellent      <input type="checkbox"/> Good      <input type="checkbox"/> Adequate      <input type="checkbox"/> Poor</p>
Discussion / Conclusions	<p>Discussion of equation  <input type="checkbox"/> Discussed      <input type="checkbox"/> Mentioned      <input type="checkbox"/> Nothing</p> <p>Reference to articles on energy metabolism  <input type="checkbox"/> Discussed      <input type="checkbox"/> Mentioned      <input type="checkbox"/> Nothing</p> <p>Comments on shortcomings  <input type="checkbox"/> Several      <input type="checkbox"/> Any      <input type="checkbox"/> None</p> <p>Suggestions for improvements  <input type="checkbox"/> Several      <input type="checkbox"/> Any      <input type="checkbox"/> None</p> <p>Appropriateness of conclusions  <input type="checkbox"/> Excellent      <input type="checkbox"/> Good      <input type="checkbox"/> Adequate      <input type="checkbox"/> Poor</p>
References	<p>References given in correct format  <input type="checkbox"/> Fully      <input type="checkbox"/> Partly      <input type="checkbox"/> Nothing</p>
Overall Impression	<p>Presentation (layout, neatness, legibility, spelling etc.)  <input type="checkbox"/> Excellent      <input type="checkbox"/> Good      <input type="checkbox"/> Adequate      <input type="checkbox"/> Poor</p> <p>Content (Depth of discussion, Logic of arguments)  <input type="checkbox"/> Excellent      <input type="checkbox"/> Good      <input type="checkbox"/> Adequate      <input type="checkbox"/> Poor</p>

### Markers Comments - See over

Please note : You did not lose marks if your report was hand written rather than word processed. However, we encourage you to learn to word process; this is an important skill which will be required when you have achieved a place in an Honours course.



Lifestyle Problem Feedback Sheet

Matriculation Number 0602880

You should use the feedback sheet below to analyse how you might improve subsequent pieces of written work. These elements contribute to but are not the only criteria used in awarding marks to this piece of work.

	Excellent		Poor		
<b>Content</b>					
Answers the question	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Makes no attempt to answer the question
Covers all relevant material	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Covers little of the relevant material
<b>Structure</b>					
Correct format	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Inappropriate format
Grammatically correct sentences	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Poorly constructed sentences
Good spelling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Many spelling mistakes
Use of appropriate diagrams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No or inappropriate diagrams
Reference to figures in text	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
<b>Presentation</b>					
Legible and well set out	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Untidy and difficult to read
Double spaced / wide margins	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Single-spaced with no room for markers' comments
<b>Sources of information</b>					
Identification of references in text	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No sources identified in text
Bibliography correctly formatted	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Incorrect formatting of references / use of generic websites

Other comments Very nice report. Seems to be like everything is correct. Haven't covered the question



## **Feedback to Staff**

- Course evaluation questionnaires
- Staff-student liaison meetings (reps given credit on transcript)
- Informal conversation with students in labs
- Feedback from GTAs
- Feedback from staff

# Lifestyle Project

- project embedded in L1 curriculum
- develop generic skills (team-working, oral and visual presentational skills and researching independently topics of interest).
- 84 groups; 8-10 students per group; 6 groups per lab

## Group Activities:

- (a) compare the lifestyles of humans in different countries (poster)
- (b) investigate and evaluate the lifestyles of species other than humans (Darwin's Dilemma Debate)
- (c) peer marking process to redistribute marks awarded by staff

**Individual Lifestyle problem** undertake independent research on topic of interest

## Pilot Study:

implement the group activities through online discussion forums within Moodle (Funded by Re-Engineering assessment Practices (REAP))

## **Support the process:**

- capture study time and effort outwith the timetabled course programme
- provide consistent structured information by releasing tasks progressively along a timeline and setting deadlines for specific deliverables
- introduce more effective tutor interaction and motivational feedback
- enable staff to identify dysfunctional groups at an early stage

## **Empower the students:**

- enable students to participate in the group discussions regardless of their circumstances
- provide a permanent record of the group interactions for both students and staff
- enrich the students' learning experience (more active involvement in their own learning and improve the opportunities for discussion, reflection, self assessment and support)

## Evaluation of pilot study (February - June 2007):

- examining Moodle usage logs
- relating group and individual marks to Moodle usage
- completion of a “Lifestyle Project” questionnaire and “Moodle” questionnaire by the students
- Focus Group run by an evaluation team from the Department of Psychology, University of Glasgow

### Result:

“Overall, the students appeared to have enjoyed a positive learning experience enhanced by the strong social cohesion enabled by the redesign.” (Focus Group Report)

## **Making large classes seem smaller!**

- “Lack of interaction with faculty members (in and out of class)
- Lack of structure in lectures
- Lack of or poor discussion sections
- Inadequate contact with teaching assistants
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