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| Course Code: | 1005QBT |
| Course Name: | Genes & Disease |
| Trimester: | Trimester 3, 2017 |
| Program: | Diploma of Health Sciences |
| Credit Points: | 10 |
| Course Coordinator: | Dr Michael Hahn |
| Document modified: | 20/9/17 |

Teaching Team

Your lecturer/tutor can be contacted via the email system on the portal.

Michael Hahn - michael.hahn@staff.griffithcollege.edu.au

Staff Consultation

Your lecturer/tutor is available each week for consultation outside of normal class times. Times that your lecturer/tutor will be available for consultation will be given in the first week of lectures. A list of times and rooms will be published on the Griffith College Portal under the “myTimetable” link.

Prerequisites

To successfully enrol in this Course, you must provide evidence that you have completed the following Courses:

- 1014MSC - Cells, Tissues & Regulation
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Brief Course Description

Genes and Disease is a 10 Credit Point course situated within the second trimester of the Diploma of Health Science. The Diploma of Health Science is designed to provide students with a pathway to:

- further university studies in the Health Sciences or
- direct employment.

In this course students will explore the biological processes on which the continuity of life is based. These include cellular reproduction, in which the information carried in cells is passed on from cell to cell and organism to organism, and basic genetics which focuses on the storage, replication and transmission of such information and how it influences variation in living organisms. Procedures used to investigate biology and genetics at this level, and the strategy of taking advantage of biological processes clinically and commercially will be investigated.

The course then introduces the theme of evolution, discussing historic milestones and developments, evidence for evolution and how evolutionary processes impact populations. Students will participate in case studies and laboratory activities designed to enhance their understanding of the course material, providing a challenging opportunity to develop the practical and intellectual skills required of a scientist and/or health care worker.

Rationale

To appreciate the amazing potential of living organisms, and also to understand their limitations, it is essential to appreciate the body at a molecular level, and to understand the processes of cell division, inheritance and structure and function of the material that codes for life, DNA. Many of you will be pursuing careers in healthcare or biomedical research and you will encounter a range of pathologies at some stage in your career, for example cancer. Understanding cancer involves an understanding of many processes covered in this course – cell division and its control, gene expression, inheritance, DNA mutation etc. When we consider the impact of genes on the human condition, there are currently over 20,000 known human conditions/diseases that occur due to changes in our genomic sequence, and many more that occur due to alterations in how our genes are expressed. Understanding how to treat

disease, maintain health and optimise performance requires an appreciation of how our genetic inheritance influences disease and how interventions affect function at the molecular level. Thus, an understanding of cells, genetics and disease is essential for understanding the complexities of living organisms for a career in health.

Aims

The course aims to provide essential knowledge and understanding of cells, genetics, the study of heredity, and how it impacts human disease.

This course enhances skills by providing core knowledge and skills required for a career in the Health and Biomedical Sciences.

Learning Outcomes

On completion of this course you should be able to:

1. Describe how cellular information is relayed and the process of genetic replication is undertaken in cells.
 2. Demonstrate an understanding of the basic concepts of genetics, including Mendelian genetics, DNA and chromosome structure and gene expression and apply that knowledge to real life problems and case studies.
 3. Solve simple problems arising from changes in genetic and biochemical processes at the cellular level, especially as these may relate to the activities of whole organisms.
 4. Defend an opinion on ethical issues relating to controversial procedures, and offer informed comment on current views and hypotheses dealing with cell-level biology and biotechnology.
 5. Examine the scientific evidence to support evolution and the history of life on earth.
 6. Demonstrate an acceptable level of facility with a range of analytical techniques used in cytology (the study of cells) microscopy, staining and genetics.
 7. Demonstrate an ability to work in teams and/or pairs, analyse and evaluate information relating to your discipline or outside your discipline and communicate findings in writing.
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Texts and Supporting Materials

Required Texts:

1005MSC Customised text book: Genes and Disease.

ISBN 978148600275(Customised from Campbell Biology 10th Edition)

1005MSC Laboratory Manual: Available on the Griffith College student portal.

1005MSC Lecture Notes: Available from the Griffith College student portal.

The Laboratory Rules document available on the course site via the Griffith College Student Portal.

Required Support Materials (available from Science Store G26_3.12):

- Laboratory coat
- Laboratory kit

Please Note: It is only necessary to purchase one set of support materials for use across your Diploma program.

Organisation and Teaching Strategies

Teaching methods will include lectures, as well as practical laboratories and tutorials. The teaching methods aim to provide students with the necessary tools to develop a strong knowledge base in cell biology. Students will gain practical skills, and develop competence in team work and problem solving in the laboratory setting.

Lecture notes, lecture slides and laboratory requirements, together with advice and/or links to study skill assistance etc. will be included on the course site on the Griffith College Student Portal.

Class Contact Summary

Classes for Cell Biology include the following:

- **Lectures:** 3 hours per week.
- **Tutorials/Workshops:** 2 hours per week (week 1 - 12 inclusive)
- **Laboratories:** Four x 2 hour laboratory sessions as per the timetable (weeks 3, 4, 5 and 7).

Note: **ATTENDANCE AT LABORATORIES IS COMPULSORY.** These practical sessions provide learning activities that are essential to the learning outcomes in this course. Laboratories will assist students to develop their knowledge of cell structure and function, as well as the procedures used in cell biology at this level. Students will work in small groups to conduct experiments and develop problem solving skills. Students are expected to attend their

scheduled laboratory class except in extenuating circumstances.

An attendance roll will be maintained for all laboratories. Students must read the Laboratory Safety requirements prior to attending their first laboratory, and comply with the dress and behaviour codes as described; Students **MUST WEAR LABORATORY COATS AND CLOSED IN SHOES FOR ALL LABORATORIES**. Students will be required to bring their laboratory manuals to laboratories. Content covered in these laboratories complements lecture material and hence will be assessed in both laboratory reports and examinations.

IMPORTANT: All students must undertake the on-line health and safety training prior to being permitted entry into laboratories, and be familiar with the contents of the Laboratory Rules booklet.

Attendance

100% attendance is expected for all classes. You are reminded that your attendance in class will be marked for all elements. To receive full attendance, you must be present in the classroom on all occasions.

You are expected to bring work done at home to class for group and individual discussion. Further development of ideas is expected during tutorial time.

Preparation and Participation in Class

You are expected to read your text book and the lecture notes plus attempt any tutorial/workshop exercises before class so that each week you can actively contribute to your learning and the learning of others in your classes. You are expected to ask and answer questions and to initiate discussions and stimulate debate in group and class situations.

Consultation Times

Attendance during consultation times is optional but you are encouraged to use this extra help to improve your learning outcomes.

Course Materials

Lecture notes will be made available to you on the Learning @ Griffith College website and you are advised to print these out and bring them to each class so that extra notes can be added.

Independent Study

Independent study requires that you spend time outside classes engaged in research necessary to complete your assignments. Research includes reading the required text books, using library and internet facilities. For this 10 CP course, you will need to spend at least 10 hours per week engaged in activities that will help your learning and fulfil the course objectives. Thus, provided you have well used the formal contact hours each week, you would then complete any remaining hours engaged in independent study.

Program Progression

You are reminded that satisfactory Program Progression requires that attendance in classes is maintained at equal to or greater than 80%, and that GPA is maintained at equal to or greater than 3.5 in any trimester [please see Griffith College Policy Library - Program Progression Policy - for more information].

Content Schedule

Weekly Teaching Schedule

| Week | Topic | Activity | Readings |
|------|---|------------|--|
| | Introduction to the course and assessment Mitosis and the cell cycle | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Mitosis and the cell cycle | Tutorial | Week 1 Review Questions |
| | Mitosis and the cell cycle | Workshop | |
| | Meiosis and genetic variation | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Meiosis and genetic variation | Tutorial | Week 2 Review Questions |
| | Meiosis and genetic variation | Workshop | |
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| | Mendelian genetics | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Mendelian genetics | Tutorial | Week 3 Review Questions |
| | Mendelian genetics | Workshop | |
| | Introduction, Mitosis and Meiosis | Laboratory | Lab Manual |
| | Chromosomal basis of inheritance | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Chromosomal basis of inheritance | Tutorial | Week 4 Review Questions |

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| | Chromosomal basis of inheritance | Workshop | |
| | Polytene Chromosomes | Laboratory | Lab Manual |
| | Molecular basis of inheritance | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Molecular basis of inheritance | Tutorial | Week 5 Review Questions |
| | Molecular basis of inheritance | Workshop | |
| | Blood typing and human inheritance | Laboratory | Lab Manual |
| | Protein synthesis | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Protein synthesis | Tutorial | Week 6 Review Questions |
| | Protein synthesis | Workshop | |
| | . | . | . |
| | Regulating gene expression | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Regulating gene expression | Tutorial | Week 7 Review Questions |
| | Regulating gene expression | Workshop | |
| | Laboratory Exam | Laboratory | |
| | Developmental genetics | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Developmental genetics | Tutorial | Week 8 Review Questions |

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| | Developmental genetics | Workshop | |
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| | Biotechnology | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Biotechnology | Tutorial | Week 9 Review Questions |
| | Biotechnology | Workshop | |
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| | Evolution I | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Evolution I | Tutorial | Week 10 Review Questions |
| | Evolution I | Workshop | |
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| | Evolution II | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Evolution II | Tutorial | Week 11 Review Questions |
| | Evolution II | Workshop | |
| | Case studies | Lecture | Appropriate chapter from Campbell Biology 10th Edition |
| | Revision | Tutorial | Week 12 Review Questions |
| | Revision | Workshop | |
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| 13/1 | End of trimester exam | Examination | |

Assessment

This section sets out the assessment requirements for this course.

Summary of Assessment

| Item | Assessment Task | Weighting | Relevant Learning Outcomes | Due Date |
|------|-----------------|-----------|----------------------------|----------|
|------|-----------------|-----------|----------------------------|----------|

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|---|--|-----|---------|--------------------------|
| 1 | Mid trimester exam | 25% | 1,2,3 | Week 6 |
| 2 | Laboratory exam | 13% | 1,2,3&6 | Week 7 |
| 3 | End of trimester exam - <i>Students must pass this assessment with a mark of at least 20 out of 50 to pass the course</i> | 50% | 1-6 | Final examination period |
| 4 | Laboratory Workbook | 12% | 1,2,3,6 | Weeks 3-5 |

Assessment Details

Overall assessment in this course is designed to ensure students have attained the learning outcomes for the course.

Assessment Item 1 -

Task Description: Laboratory Workbook

Rationale: During each laboratory, students will complete questions to assess understanding of concepts covered in each laboratory session. This will be handed in at the end of each laboratory session.

Criteria & Marking:

Students will be assessed on the following:

Laboratory 1

- Recognise stages and describe the process of mitosis in plant and animal cells
- Describe consequences of errors in mitosis

- Outline the process and steps of meiosis and gametogenesis. Relate this to the human chromosome number.

- Compare and contrast spermatogenesis with oogenesis with attention to chromosome

number

Laboratory 2

- Describe the process for preparing a stained squash of polytene chromosomes from blowfly larvae
- Recognise and describe morphological features of polytene chromosomes
- Discuss the significance of polytene chromosomes

Laboratory 3

- Understand and describe the process of ABO and Rh blood typing
- Understand and describe the genetics of the ABO blood system
- Understand and describe the genetics of selected human traits

Assessment Item 2 - Mid-trimester exam

Rationale: This individual assessment item is designed to assess the knowledge and understanding of the core concepts covered in the first five weeks of the trimester. Content covered in laboratories will also be assessed, and may include problem solving activities and analysis of experiments.

Assessment strategy: This one (2) hour written examination will consist of multiple choice and short answer questions.

Marking criteria: The mid trimester examination will be marked against established model answers and undergo a full moderation process.

Note: Students who Fail or gain a borderline Pass in the first assessment are required to seek consultation with the Course Coordinator to discuss strategies for improvement.

Assessment Item 3 - Laboratory Exam

Rationale: assessment of knowledge gained from laboratories, including laboratory skills and procedures.

Assessment strategy: This will consist of a number of exercises as outlined below to be completed in the laboratory. Satisfactory completion of these tasks is required if students are to pass the course.

Laboratory (competency based) examination to cover material and skills that likely include:

1. Using a light microscope, identify and describe slides as either plant cells undergoing mitosis, animal cells undergoing meiosis or polytene chromosomes
2. Perform ABO blood typing on a blood sample
3. Undertake gene crosses related to ABO blood group, record genotypes and phenotypes
4. Represent the chromosomal display during various stages of mitosis/meiosis

Marking criteria: demonstration of procedures and written answers to questions

Please note carefully: Attendance at enrolled laboratory classes is mandatory. Students will forfeit quiz marks due to non-attendance at the laboratory sessions without a valid reason and evidence as outlined in the Griffith College Assessment Policy.

Assessment Item 3 - End of trimester exam

Rationale: This assessment item is designed to assess the knowledge and understanding of the core concepts covered throughout the later part of trimester. All content addressed from week one through to week thirteen inclusive will be examined, although more emphasis will be placed on information given in the later part of the trimester (and not examined in the mid-trimester exam).

Content covered in laboratories will be assessed; including problem solving activities and analysis of experiments.

Assessment strategy: The exam will consist of multiple choice questions, short answer questions and long answer questions.

Marking criteria: The end of trimester examination will be marked against established model answers and undergo a full moderation process.

Requirements to pass this course

In order to pass this course and in addition to meeting the laboratory requirements, students must:

- 1. attend and attempt all examinations, AND**
- 2. obtain at least 40% in the final, End of Trimester exam, AND**
- 3. achieve an overall course grade (sum of all assessments) of 50%.**

Submission and Return of Assessment Items

Normally you will be able to collect your assignments (if any submitted in the course) in class within fourteen [14] days of the due date for submission of the assignment.

Retention of Originals

You must be able to produce a copy of all work submitted (if any submitted) if so requested. Copies should be retained until after the release of final results for the course.

Extensions

To apply for an extension of time for an assignment, you must submit an Application for Extension of Assignment form to your teacher at least 24 hours before the date the assignment is due. Grounds for extensions are usually: serious illness, accident, disability, bereavement or other compassionate circumstances and must be able to be substantiated with relevant documentation [e.g. Griffith College Medical Certificate]. Please refer to the Griffith College website - Policy Library - for guidelines regarding extensions and deferred assessment.

Penalties for late submission without an approved extension

Penalties apply to assignments that are submitted after the due date without an approved extension. Assessment submitted after the due date will be penalised 10% of the TOTAL marks available for assessment (not the mark awarded) for each day the assessment is late. Assessment submitted more than five days late will be awarded a mark of zero (0) For example:

- > 5 minutes and \leq 24 hours 10%
- > 24 hours and \leq 48 hours 20%
- > 48 hours and \leq 72 hours 30%
- > 72 hours and \leq 96 hours 40%
- > 96 hours and \leq 120 hours 50%
- > 120 hours 100%

Note:

- Two day weekends will count as one day in the calculation of a penalty for late submission.
- When a public holiday falls immediately before or after a weekend, the three days will count as one day in the calculation of a penalty for late submission.
- When two public holidays (e.g. Easter), fall immediately before or after, or one day either side of a weekend, the four days will count as two days in calculating the penalty for late submission.
- When a single public holiday falls mid-week, the day will not be counted towards the calculation of a penalty.

Please refer to the Griffith College website - Policy Library > Assessment Policy for guidelines and penalties for late submission.

Assessment Feedback

Your assessment will be marked so that you can learn from your work. Feedback will be provided so that you can see the level you have reached in any skill. Your tutor will give you comments on your work and will be happy to discuss your assessment further, if you wish. You may see your tutor in his/her consultation time.

Marks awarded for in-trimester assessment items, except those being moderated externally with Griffith University, will be available on the Student Portal within fourteen [14] days of the due date. This does not apply to the final piece of assessment in this course - marks for this item will be provided with the final course result.

Generic Skills

Griffith College aims to develop graduates who have an open and critical approach to learning and a capacity for lifelong learning. Through engagement in their studies, students are provided with opportunities to begin the development of these and other generic skills.

Studies in this course will give you opportunities to begin to develop the following skills:

| Generic Skills | Taught | Practised | Assessed |
|----------------------------------|--------|-----------|----------|
| Written Communication | Yes | Yes | Yes |
| Oral Communication | | Yes | |
| Information Literacy | | Yes | |
| Secondary Research | | Yes | Yes |
| Critical and Innovative Thinking | Yes | Yes | Yes |
| Academic Integrity | Yes | Yes | Yes |
| Self Directed Learning | | Yes | Yes |
| Team Work | Yes | Yes | Yes |
| Cultural Intelligence | Yes | Yes | |
| English Language Proficiency | | Yes | Yes |

Additional Course Generic Skills

Additional Course Information

Your feedback is respected and valued by your lecturers and tutors. You are encouraged to provide your thoughts on the course and teaching, both positive and critical, directly to your lecturer and tutor or by completing course and lecturer evaluations on the Griffith College portal whenever these are available.

Student feedback on their courses can be found by going to ‘Student Feedback’ under Support in the QBT Student Portal.

Academic Integrity

Griffith College is committed to maintaining high academic standards to protect the value of its qualifications. Academic integrity means acting with the values of honesty, trust, fairness, respect and responsibility in learning, teaching and research. It is important for students,

teachers, researchers and all staff to act in an honest way, be responsible for their actions, and show fairness in every part of their work. Academic integrity is important for an individual's and the College's reputation.

All staff and students of the College are responsible for academic integrity. As a student, you are expected to conduct your studies honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is considered a breach of academic integrity and is unacceptable.

Some students deliberately breach academic integrity standards with intent to deceive. This conscious, pre-meditated form of cheating is considered to be one of the most serious forms of fraudulent academic behaviour, for which the College has zero tolerance and for which penalties, including exclusion from the College, will be applied.

However, Griffith College also recognises many students breach academic integrity standards without intent to deceive. In these cases, students may be required to undertake additional educational activities to remediate their behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your lecturers, tutors and academic advisors will provide you with guidance to understand and maintain academic integrity; however, it is also your responsibility to seek out guidance if and when you are unsure about appropriate academic conduct.

In the case of a breach of academic integrity made against a student he or she may request the guidance and support of a Griffith College Student Learning Advisor or Student Counsellor.

Please ensure that you are familiar with the [Griffith College Academic Integrity Policy](#); this policy provides an overview of some of the behaviours that are considered breaches of academic integrity, as well as the penalties and processes involved when a breach is identified.

For further information please refer to the Academic Integrity Policy on the Griffith College website – Policy Library.

Risk Assessment Statement

This course follows Griffith College and Griffith University Workplace Health and Safety Laboratory guidelines.

The aim of workplace health and safety is to make sure that people do not get sick or injured at the workplace. The legislation dealing with this in Queensland is called the Workplace Health and Safety Act, 1995. Anyone who can affect workplace health and safety has an obligation under this Act.

As a student, you have an obligation to yourself and others to undertake activities in a safe manner. You must follow instructions which are provided for safety. You must not put yourself or anyone else at risk. Care especially needs to be taken when you are performing activities which can affect others. Please refer to the Laboratory Rules document available on the course site via the Griffith College Student Portal.

Students must wear closed in shoes to all laboratory sessions for workplace health and safety reasons.

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