

**UNIT OUTLINE**

Year: 11 &12      Accreditation: T/A

Timetable Period: Semester 2, 2020

**Classroom Teachers:** Helen Souflias-Mantinaos (lines 3&4) /Natasa Radosavljevic (lines 5&7)

**Executive Teacher:** TBA

<b>Course Title</b>	Human Biology	<b>Course Code:</b>	2171-T/2176-A
<b>Semester Unit</b>	The Aging Body	<b>Unit Value/Code:</b>	1.0/23022-T/23453-A
<b>Term Unit (a)</b>	The Aging Body a	<b>Unit Value/Code:</b>	0.5/23023-T/23454-A
<b>Term Unit (b)</b>	The Aging Body b	<b>Unit Value/Code:</b>	0.5/23024-T/23455-A

**Specific Unit Goals:**

This unit investigates human reproduction and the development of the foetus in order to understand the sources of variation that make each of us unique individuals. Students learn about the mechanisms of transmission of genetic materials to the next generation, the role of gametes in reproduction, the development of the embryo and tests for screening both the embryo and the newly born child for abnormalities. The emphasis is on developing an understanding of the remarkable development and growth rate of the foetus. Advances in technology, such as modern imaging technology, mean that we can trace this development in detail and precisely mark developmental changes. Students will also study in vitro fertilisation (IVF), sexually transmitted diseases and contraception.

From birth to adulthood, the human body grows at different rates and changes in form. Students focus on a range of illnesses that relate to age and tissue types so that they gain a deep understanding of how disease relates to tissue function in the body. The phenomenon of autophagy is investigated in order to understand the underlying processes of materials from cell destruction being recycled in order to form new tissue. Uncontrolled growth of tissue that leads to cancer is also studied. Students will learn about a range of pathologies that may be age-related and that affect specific tissue types (for example, cystic fibrosis in the young affecting the epithelial tissue of the lungs and digestive systems). Specific instances are chosen in order to provide a wide variety of cases to study such as sensory deprivation in the newly born child through to such pathologies that are age-related such as Alzheimer's and Parkinson's diseases. Medical advances are continually improving the diagnosis of chronic illness and thereby increasing the chances of early intervention. Therapies are considered that may slow the advance of degenerative diseases, such as gene and stem cell therapies.

The unit provides opportunities to explore stem cell research which is an important area that providing opportunities for the development of therapies to treat degenerative diseases. This presents major ethical, social and legal issues. Students investigate how scientific knowledge is used to offer valid explanations and reliable predictions, and the ways in which scientific knowledge interacts with social, economic, cultural and ethical factors.

Students will use ICT to research the population dynamics of these conditions and develop skills in using models to describe and interpret data at the population level. They will also gain an insight into the emotional and mental costs of such diseases as dementia through interaction with practitioners in the field.

By the end of this unit, students:

A Course	T Course
<ul style="list-style-type: none"> <li>understand reproduction in the human body and the development of the foetus through the stages in pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>understand reproduction in the human body and the development of the foetus through the stages in pregnancy</li> </ul>
<ul style="list-style-type: none"> <li>understand the different stages of growth and how aging changes the human body</li> </ul>	<ul style="list-style-type: none"> <li>understand the different stages of growth and how aging changes the human body</li> </ul>
<ul style="list-style-type: none"> <li>understand how different stages of human development are susceptible to particular conditions and illnesses</li> </ul>	<ul style="list-style-type: none"> <li>understand how different stages of human development are susceptible to particular conditions and illnesses</li> </ul>
<ul style="list-style-type: none"> <li>use science inquiry skills to conduct and communicate investigations into the review of medical imaging, such as MRI and PET scan films</li> </ul>	<ul style="list-style-type: none"> <li>use science inquiry skills to design, conduct, evaluate and communicate investigations into reproduction and growth</li> </ul>
<ul style="list-style-type: none"> <li>compare the variety of medical isotopes and their use in the diagnosis and treatment of diseases</li> </ul>	<ul style="list-style-type: none"> <li>evaluate, with reference to empirical evidence, claims about the relationship between stage of human development and illness, disease or conditions that can develop</li> </ul>
<ul style="list-style-type: none"> <li>communicate human biological understanding using qualitative representations in appropriate modes and genres</li> </ul>	<ul style="list-style-type: none"> <li>communicate human biological understanding using qualitative and quantitative representations in appropriate modes and genres</li> </ul>
<b>Science Understanding</b>	
<ul style="list-style-type: none"> <li>differences between the structure and function of the male and female reproductive systems facilitate the production of offspring by producing and delivering gametes for fertilisation and providing resources for the developing embryo and foetus</li> <li>reproductive systems are regulated by hormones, including the regulation of the menstrual and ovarian cycles</li> <li>for pregnancy to occur, conception requires the fusion of viable sperm and ovum, either within the body or through in vitro fertilisation</li> <li>techniques available to genetically screen embryos before implantation or during early development, including blood tests, amniocentesis and chorionic villi sampling</li> </ul>	<ul style="list-style-type: none"> <li>differences between the structure and function of the male and female reproductive systems facilitate the production of offspring by producing and delivering gametes for fertilisation and providing resources for the developing embryo and foetus</li> <li>reproductive systems are regulated by hormones, including the regulation of the menstrual and ovarian cycles</li> <li>for pregnancy to occur, conception requires the fusion of viable sperm and ovum at the optimal time in the ovarian cycle, either within the body or through in vitro fertilisation</li> <li>techniques available to genetically screen embryos (for example to detect brca1 &amp; brca2 genes for breast cancer) before implantation or during early development, including blood tests, amniocentesis and chorionic villi sampling</li> </ul>

A Course	T Course
<ul style="list-style-type: none"> <li>contraception methods that reduce the probability of pregnancy all have limitations, risks and benefits</li> <li>sexually transmitted infections (STIs), diseases transmitted through unprotected sex or genital contact, can be prevented through safe sex methods; early detection and treatment of infection are important and, if left untreated, STI's can lead to serious health consequences</li> <li>the process where a baby goes from in utero to an external environment can be explained by looking at the changes in the circulatory system; moving from dependence on the mother's placenta to the baby relying on its own respiratory and cardiovascular systems.</li> <li>the Apgar score, the very first test given to a newborn, is designed to detect abnormalities in the baby</li> <li>autophagy describes the normal physiological process in the human body that deals with the destruction of cells and the turnover of building materials for new cells</li> <li>sensory deprivation affects childhood development especially in terms of physiological, emotional and intellectual development and shows the link between the social, psychological and physical environment in health</li> </ul>	<ul style="list-style-type: none"> <li>contraception methods that reduce the probability of the union of gametes or implantation all have limitations, risks and benefits</li> <li>sexually transmitted infections (STIs), diseases transmitted through unprotected sex or genital contact, can be prevented through safe sex methods; early detection and treatment of infection are important and, if left untreated, STI's can lead to serious health consequences</li> <li>the process where a baby goes from in utero to an external environment can be explained by looking at the changes in the circulatory system; moving from dependence on the mother's placenta to the baby relying on its own respiratory and cardiovascular systems.</li> <li>the Apgar score, the very first test given to a newborn, is designed to detect abnormalities in the baby</li> <li>autophagy describes the normal physiological process in the human body that deals with the destruction of cells and the turnover of building materials for new cells</li> <li>sensory deprivation affects childhood development especially in terms of physiological, emotional and intellectual development and shows the link between the social, psychological and physical environment in health</li> </ul>
A Course	T Course
<ul style="list-style-type: none"> <li>some diseases (both genetic and non-genetic) are currently incurable (cystic fibrosis, Coeliac disease and Huntington's disease, amyotrophic lateral sclerosis and childhood leukaemia) because of the degeneration of specific tissue types and/or current limits to scientific understanding of the disease</li> </ul>	<ul style="list-style-type: none"> <li>some diseases (both genetic and non-genetic) are currently incurable (cystic fibrosis, Coeliac disease and Huntington's disease, amyotrophic lateral sclerosis and childhood leukaemia) because of the degeneration of specific tissue types and/or current limits to scientific understanding of the disease</li> </ul>
<ul style="list-style-type: none"> <li>cystic fibrosis is a disease of the young which affects the epithelial tissue of the lungs and digestive systems</li> </ul>	<ul style="list-style-type: none"> <li>cystic fibrosis is a disease of the young which affects the epithelial tissue of the lungs and digestive systems</li> </ul>
<ul style="list-style-type: none"> <li>common human ailments during a lifetime can be explained by the interaction of different tissue types (for example, the deterioration of the nervous tissue plays a role in the development of Alzheimer's and Parkinson's diseases)</li> </ul>	<ul style="list-style-type: none"> <li>common human ailments during a lifetime can be explained by the interaction of different tissue types (for example, the deterioration of the nervous tissue plays a role in the development of Alzheimer's and Parkinson's diseases)</li> </ul>

• uncontrolled division of cells can result in the development of tumours/cancers	• uncontrolled division of cells can result in the development of tumours/cancers
• biological theories for ageing in the body (for example, the Hayflick limit, oxidative damage)	• biological theories for senescence and associated ageing in the body (for example, the Hayflick limit, oxidative damage, mitochondrial genome damage and telomere shortening)
• gerontology looks at old age, the medical problems specific to old age and the aging process	• gerontology looks at old age, the medical problems specific to old age and the aging process
• ethical and legal issues associated with disease treatment and life choices (e.g. euthanasia)	• ethical and legal issues associated with disease treatment and life choices (e.g. euthanasia)

### **Content Summary:**

Further elaboration on the content of this unit is available at:

<http://www.bsss.act.edu.au/curriculum/courses>

### **Prerequisite**

There are no prerequisites for this unit.

### **Specific Entry & Exit Requirements for Term Units**

This is a semester unit. It may not possible to enter this course at the commencement of Term 4. To exit at Term 3 you must complete and submit assignment 1 and exam 1.

**Cost of Materials:** There will be a cost for the term/semester work booklet.

### **Assessment:**

TASK	DUE DATE	WEIGHTING
Assignment	Week 6	40%
Exam 1	Week 9	30%
Exam 2	Week 17	30%

## ASSESSMENT CRITERIA FOR ASSESSMENT AND REPORTING OF STUDENT ACHIEVEMENT- Achievement Standards for Human Biology A courses

	A student who achieves an <b>A</b> grade typically	A student who achieves a <b>B</b> grade typically	A student who achieves a <b>C</b> grade typically	A student who achieves a <b>D</b> grade typically	A student who achieves an <b>E</b> grade typically
<b>Knowledge and Understanding</b>	<ul style="list-style-type: none"> <li>• demonstrates thorough knowledge and understanding of scientific concepts presented</li> <li>• selects and applies knowledge to solve challenging problems in a wide range of contexts, distinguishes ideas and assesses the significance of the scientific evidence presented</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates broad knowledge and understanding of scientific concepts presented</li> <li>• applies knowledge to solve problems in a range of contexts, identifies ideas and explains the significance of the scientific evidence presented</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates general knowledge and understanding of scientific concepts presented</li> <li>• applies knowledge to solve general problems in a narrow range of contexts, identifies ideas and describes the scientific evidence presented</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates basic knowledge of scientific ideas</li> <li>• applies knowledge to solve basic problems, identifies ideas and describes the scientific evidence presented</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates little knowledge of scientific ideas</li> <li>• demonstrates limited ability to solve basic problems, identifies scientific evidence presented</li> </ul>
<b>Critical Thinking</b>	<ul style="list-style-type: none"> <li>• recognises complex patterns and trends in data, observations and investigations to develop valid inferences</li> <li>• interprets and explains data/information collected</li> </ul>	<ul style="list-style-type: none"> <li>• recognises patterns and trends in data, observations and investigations to develop inferences</li> <li>• interprets and describes data/information collected</li> </ul>	<ul style="list-style-type: none"> <li>• recognises most patterns and trends in data, observations and investigations</li> <li>• identifies and describes data/information collected</li> </ul>	<ul style="list-style-type: none"> <li>• recognises simple patterns and trends in data, observations and investigations</li> <li>• identifies &amp;/or describes some data/information collected</li> </ul>	<ul style="list-style-type: none"> <li>• recognises little or no patterns and trends in data and observations</li> <li>• shows limited understanding of data/information</li> </ul>
<b>Investigative Skills</b>	<ul style="list-style-type: none"> <li>• performs scientific investigations with proficiency and effectiveness</li> <li>• selects and uses appropriate resources and equipment efficiently and in a safe and correct manner</li> </ul>	<ul style="list-style-type: none"> <li>• performs scientific investigations with proficiency</li> <li>• selects and uses appropriate resources and equipment in a safe and correct manner</li> </ul>	<ul style="list-style-type: none"> <li>• performs scientific investigations adequately</li> <li>• demonstrates general awareness of appropriate resources and safety requirements</li> </ul>	<ul style="list-style-type: none"> <li>• performs scientific investigations with inconsistencies</li> <li>• shows some understanding of using appropriate resources and equipment safely</li> </ul>	<ul style="list-style-type: none"> <li>• performs scientific investigations with limited understanding</li> <li>• uses equipment and resources with little awareness of safety</li> </ul>
<b>Communication</b>	<ul style="list-style-type: none"> <li>• presents and communicates scientific concepts in detail using scientific terminology accurately and documents all information correctly using a recognised referencing system</li> </ul>	<ul style="list-style-type: none"> <li>• presents and communicates scientific concepts in some detail using appropriate scientific terminology and documents information correctly using a recognised referencing system</li> </ul>	<ul style="list-style-type: none"> <li>• presents and communicates scientific concepts with some detail, using scientific terminology and a recognised referencing system inconsistently</li> </ul>	<ul style="list-style-type: none"> <li>• presents and communicates scientific concepts with little attention to detail, occasionally using scientific terminology and a recognised referencing system</li> </ul>	<ul style="list-style-type: none"> <li>• presents and communicates scientific concepts with limited or no attention to details including scientific terminology and a recognised referencing system</li> </ul>
<b>Work practices</b>	<ul style="list-style-type: none"> <li>• works highly effectively in both individual and collaborative contexts and understands risks</li> <li>• and acts safely in all investigations</li> </ul>	<ul style="list-style-type: none"> <li>• works effectively in collaborative and individual contexts and understands risks</li> <li>• and acts safely in all investigations</li> </ul>	<ul style="list-style-type: none"> <li>• works with a degree of effectiveness in individual and collaborative contexts, identifies risks and mostly acts safely in investigations</li> </ul>	<ul style="list-style-type: none"> <li>• works with limited effectiveness in individual and collaborative contexts &amp; inconsistently identifies risks and acts safely in investigations</li> </ul>	<ul style="list-style-type: none"> <li>• works in individual and collaborative contexts under direct supervision with minimal awareness of risks and appropriate safe behaviors in investigations</li> </ul>

## ASSESSMENT CRITERIA FOR ASSESSMENT AND REPORTING OF STUDENT ACHIEVEMENT- Achievement Standards for Human Biology T

	A student who achieves an <b>A</b> grade typically	A student who achieves a <b>B</b> grade typically	A student who achieves a <b>C</b> grade typically	A student who achieves a <b>D</b> grade typically	A student who achieves an <b>E</b> grade typically
<b>Knowledge and Understanding</b>	<ul style="list-style-type: none"> <li>• demonstrates thorough and extensive knowledge and understanding of scientific concepts</li> <li>• justifies and applies knowledge to familiar and unfamiliar contexts and across different concept areas and experiences, displays originality and lateral thinking in problem solving</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates broad and in-depth knowledge and understanding of scientific concepts</li> <li>• applies knowledge to familiar and unfamiliar contexts and across different concept areas and experiences, displaying originality and effective thinking in problem solving</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates broad and general knowledge and understanding of scientific concepts</li> <li>• is able to apply knowledge in a variety of contexts and different concept areas to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates general and basic knowledge and understanding of scientific concepts</li> <li>• is able to use knowledge in different areas to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates a limited knowledge of scientific concepts</li> <li>• displays emerging awareness of strategies to solve problems</li> </ul>
<b>Critical Thinking</b>	<ul style="list-style-type: none"> <li>• evaluates, synthesises and analyses patterns and trends in data, observations and investigations and makes valid and perceptive inferences</li> <li>• applies highly effective analytical and evaluative skills, makes perceptive connections between scientific concepts, draws accurate conclusions and proposes appropriate improvements</li> </ul>	<ul style="list-style-type: none"> <li>• analyses and synthesises patterns and trends in data, observations and investigations and makes valid inferences</li> <li>• applies effective analytical skills, makes insightful connections between scientific concepts, draws mostly accurate conclusions and proposes appropriate improvements</li> </ul>	<ul style="list-style-type: none"> <li>• describes and explains patterns and trends in data, observations and investigations and makes general inferences</li> <li>• describes and explains general connections between scientific concepts, draws conclusions and proposes improvements</li> </ul>	<ul style="list-style-type: none"> <li>• identifies and describes patterns in data, observations and investigations and makes simple inferences</li> <li>• describes connections between scientific concepts, draws conclusions and proposes improvements</li> </ul>	<ul style="list-style-type: none"> <li>• identifies patterns in data, observations and investigations</li> <li>• identifies connections between scientific concepts</li> </ul>
<b>Investigative Skills</b>	<ul style="list-style-type: none"> <li>• demonstrates logical and coherent investigations, acknowledges information using referencing conventions and operates equipment highly effectively and safely</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates well considered investigations, acknowledges information using referencing conventions and operates equipment effectively and safely</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates considered investigations, acknowledges information using referencing conventions and operates equipment safely with some general effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>• outlines investigations, inconsistently acknowledges information using referencing conventions and mostly operates equipment effectively and safely</li> </ul>	<ul style="list-style-type: none"> <li>• displays emerging skills in investigations, attempts to acknowledge information and operates equipment with limited awareness of safety procedures</li> </ul>
<b>Communication</b>	<ul style="list-style-type: none"> <li>• presents highly complex concepts accurately and coherently in a wide range of written and non-written formats using appropriate terminology with flair</li> </ul>	<ul style="list-style-type: none"> <li>• presents concepts clearly and logically in a range of written and non-written formats using appropriate terminology with confidence</li> </ul>	<ul style="list-style-type: none"> <li>• presents general concepts clearly in a range of written and non-written formats using appropriate terminology generally using terminology appropriately</li> </ul>	<ul style="list-style-type: none"> <li>• presents basic concepts in a narrow range of written and non-written formats using terminology inconsistently</li> </ul>	<ul style="list-style-type: none"> <li>• presents some basic concepts in a limited range of written &amp; non written formats using minimal terminology</li> </ul>
<b>Work practices</b>	<ul style="list-style-type: none"> <li>• organises time and resources to work in a highly productive and safe manner both independently and in a team</li> <li>• evaluates and analyses risks, acts highly appropriately in all investigations</li> </ul>	<ul style="list-style-type: none"> <li>• organises time and resources to work in a productive and safe manner both independently and in a team</li> <li>• analyses and explains risks and acts appropriately in all investigations</li> </ul>	<ul style="list-style-type: none"> <li>• organises time and resources to work in a generally productive and safe manner both independently and in a team</li> <li>• identifies and describes risks and acts appropriately in all investigations</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates inconsistent organisation of time &amp; resources, works with occasional productivity &amp; some awareness of safety independently or in a group</li> <li>• identifies risks and acts mostly appropriately in investigations</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates limited organisation of time &amp; resources to work with an emerging awareness of safety</li> <li>• demonstrates an emerging awareness of risks, developing approaches to investigations</li> </ul>

### **Attendance and Participation**

It is expected that students will attend and participate in all scheduled classes/contact time/structured learning activities for the units in which they are enrolled, unless there is due cause and adequate documentary evidence is provided. Any student whose attendance falls below 90% of the scheduled classes/contact time or 90% participation in structured learning activities in a unit, without having due cause with adequate documentary evidence will be deemed to have voided the unit. However, the principal has the right to exercise discretion in special circumstances if satisfactory documentation is supplied.

### **Completion of Assessment Items**

Students are expected to substantially complete and submit all assessment items. Exemption from an item and/or alternative assessment without penalty is available to students providing adequate documentary evidence. In order to meet the minimum assessment requirements of a unit, a student must substantially complete and submit at least 70% of the total assessment. However, the principal has the right to exercise discretion in the award of a grade or score in special circumstances where satisfactory documentation is supplied.

### **Late Submission of Assessment Items**

Students are encouraged to submit work on time as this is a valuable organisational skill. Students are also encouraged to complete work even if it is late as there are educational benefits in so doing. The following policy is to ensure equity for all students:

- All assessment tasks are expected to be submitted by the specified due date
- Where marks are awarded for assessment tasks, a late penalty will apply unless an extension is granted. The penalty for late submission is 5% of possible marks per calendar day late, including weekends and public holidays, until a notional zero is reached. If an item is more than 7 days late, it receives the notional zero. Submission on weekends or public holidays is not acceptable. Calculation of a notional zero is based on items submitted on time or with an approved extension (Refer to Notional Zeros)
- Where marks are not awarded, and a grade only is given for an assessment task, teachers will take into account the extent to which students have demonstrated their ability to complete and submit the task by the due date (taking into account any extensions granted) in awarding the grade
- Unless there are exceptional circumstances, students must apply for an extension to the specified due date in advance, providing due cause and adequate documentary evidence for late submission
- It may not be possible to grade or score work submitted late after marked work in a unit has been returned to other students
- The principal has the right to exercise discretion in the application of the late penalty in special circumstances where satisfactory documentation has been provided.

### **Notional Zeros**

Where students fail to hand in assessment items for which marks are awarded, they will be awarded a notional zero for that assessment item. The notional zero will be a score, which lies between 0.1 of a standard deviation below the lowest genuine score for that item and zero. Note: if the lowest genuine score is zero, the notional zero is zero.

### **Cheating and Dishonest Practice**

The integrity of the College's assessment system relies upon all involved acting in accordance with the highest standards of honesty and fairness. Plagiarism is the copying, paraphrasing or summarising of work, in any form, without acknowledgement of sources, and presenting this as a student's own work. Examples of plagiarism could include, but are not limited to:

- submitting all or part of another person's work with/without that person's knowledge
- submitting all or part of a paper from a source text without proper acknowledgement
- copying part of another person's work from a source text, supplying proper documentation, but leaving out quotation marks
- submitting materials which paraphrase or summarise another person's work or ideas without appropriate documentation
- submitting a digital image, sound, design, photograph or animation, altered or unaltered, without proper acknowledgement of the source.

### **Right to Appeal**

The ACT system operates a hierarchy of reviews and appeals:

- Student seeks review from teacher regarding assessment task mark/grade, unit score, unit grade, course score
- Student seeks review from head of department, if required following review by teacher
- Student appeals to her/his college principal for a review of college assessment relating to assessment task grade/mark, unit grade, unit score, course score, penalty imposed for breach of discipline in relation to assessment
- Student, who has been through the college appeal process, may appeal to the Board against the college procedures by which the appeal decision was reached.

**Executive Teacher: Debbie O'Brien**

**Class Teachers: Helen Souflias-Mantinaos and Natasa Radosavljevic**

FURTHER INFORMATION ON RELEVANT BSSS POLICIES CAN BE FOUND HERE:

[http://www.bsss.act.edu.au/The\\_Board/policy\\_and\\_procedures\\_manual](http://www.bsss.act.edu.au/The_Board/policy_and_procedures_manual)