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Cover image:
Confocal micrograph of fluorescently labelled HeLa cells.
Nuclei are labelled in blue, tubulin in green and actin fibres in red.

Courtesy of:
Kevin Mackenzie
Microscopy and Histology Core Facility
Institute of Medical Sciences
University of Aberdeen
http://www.abdn.ac.uk/ims/microscopy-histology
Course Summary

This module considers the physiological function of the major mammalian organ systems. With an emphasis on the human body, this course asks: How do the major body organs and systems work - both alone and in communication with one another? Using a combination of explanatory lectures and laboratory practical sessions, you will learn the function and control of: The cardiovascular system, including the actions of the heart and control of arterial blood pressure and blood flow; the respiratory system; the kidney and control of body fluid volume and composition; the gastrointestinal system as well as reproductive physiology. In each system the specific neural and hormonal control mechanisms are carefully considered.

The course consists of 3 lectures per week together with 3 practical classes and 5 problem solving sessions over the term. It is examined by continuous assessment of the practicals, a mid-term exam and a 2-hour MCQ examination at the end of the course.

Course Co-ordinator: Dr Steve Tucker (s.j.tucker@abdn.ac.uk)

Course Aims & Learning Outcomes

The specific aims of BI25B2 are:

- To define the roles of the stomach; small and large intestines; liver and pancreas, and explain how they are controlled by nerves and hormones.
- To explain the ways in which the heart is enabled to produce a controlled and variable flow of blood into the aorta that matches the variable demands of the human body.
- To describe the flow of blood and its distribution to organs according to energy requirements.
- To explain the functions of the cardiovascular system regulated by the nervous system and other mechanisms
- To explain the physical forces which distribute air in the lungs with each breath and the transport of oxygen and carbon dioxide from lung to tissue.
- To explain both the neural and chemical control of lung ventilation and how it is adjusted to meet specialised needs.
- To describe the distribution of body water and electrolytes and explain the role of the kidney in regulating extra cellular fluid volume and composition.
- To describe the processes of human reproduction and their hormonal control in both male and female.

The expected outcome is that the student will gain the core knowledge to:

1. Describe the processes of digestion and absorption of foodstuffs and the secretory role played by each part of the alimentary system.
2. Describe and explain the function and control of the cardiovascular system.
3. Know how the intake and distribution of oxygen (as well as the removal of unwanted carbon dioxide) is achieved and how it is controlled, by feedback mechanisms, according to demand.

4. Understand the role of the kidney in the control of extracellular fluid (ECF) volume and composition.

5. Outline the control mechanisms of male and female human reproductive processes from the embryo to birth.

6. Prepare a written report using common word processing, and data handling packages.

7. Demonstrate the variabilities that exist between individuals by comparing class data.

**Course Teaching Staff**

**Course Co-ordinator:**
Dr Steve Tucker (SJT)

**Other Staff:**
Dr John Barrow (JB)
Professor Stephen Davies (SND)
Dr Alison Jack (AJ)
Professor Gordon McEwan (GTAM)
Dr Derek Scott (DAS)
Dr Alasdair Mort (AXM)

**Assessments & Examinations**

You are expected to attend all lectures, laboratory classes, tutorials and assessments and to complete all class exercises by stated deadlines. Marks may be deducted for assessments submitted after the stated deadline without good cause. The minimum performance acceptable for the granting of a class certificate is attendance at 75% of the practical classes, and presentation of all set course work, written and oral.

The course will be assessed by continual assessment of the practical reports, a mid-term exam and by a two hour degree examination held in the April/May examination diet. The mid-term and degree examinations consists of multiple-choice questions. The continuous assessment component, including the mid-term exam mark, will contribute 30% to the final module mark, and the degree exam will contribute 70%. The overall performance of the student will be expressed as a grade awarded on the common grading scale (CGS).

The re-sit degree examination is in the June/July diet and your continuous assessment mark will be re-considered at this sitting. As with University regulations, class certificates are valid for two years only and extra sittings of an examination can only be considered if failure or absence from an examination is covered by a valid medical certificate.
Class Representatives

We value students’ opinions in regard to enhancing the quality of teaching and its delivery; therefore in conjunction with the Students’ Association we support the Class Representative system.

In the School of Medicine, Medical Sciences and Nutrition we operate a system of course representatives, who are elected from within each course. Any student registered within a course that wishes to represent a given group of students can stand for election as a class representative. You will be informed when the elections for class representative will take place.

What will it involve?
It will involve speaking to your fellow students about the course you represent. This can include any comments that they may have. You will attend a Staff-Student Liaison Committee and you should represent the views and concerns of the students within this meeting. As a representative you will also be able to contribute to the agenda. You will then feedback to the students after this meeting with any actions that are being taken.

Training
Training for class representatives will be run by the Students Association. Training will take place within each half-session. For more information about the Class representative system visit www.ausa.org.uk or email the VP Education & Employability vped@abdn.ac.uk. Class representatives are also eligible to undertake the STAR (Students Taking Active Roles) Award with further information about this co-curricular award being available at: www.abdn.ac.uk/careers.

Problems with Coursework
If students have difficulties with any part of the course that they cannot cope with alone they should notify the course coordinator immediately. If the problem relates to the subject matter general advice would be to contact the member of staff who is teaching that part of the course. Students with registered disabilities should contact Mrs Jenna Reynolds (j.reynolds@abdn.ac.uk) in the School Office (based in the IMS, Foresterhill), or Mrs Sheila Jones (s.jones@abdn.ac.uk) in the Old Aberdeen office associated with the teaching laboratories, to ensure that the appropriate facilities have been made available. Otherwise, you are strongly encouraged to contact any of the following as you see appropriate:

- Course student representatives
- Course co-ordinator
- Convenor of the Medical Sciences Staff/Student Liaison Committee (Prof Gordon McEwan)
- Personal Tutor
- Medical Sciences Disabilities Co-ordinator (Dr Derryck Shewan)

All staff are based at Foresterhill and we strongly encourage the use of email or telephone the Medical Sciences Office. You may have a wasted journey travelling to Foresterhill only to find staff unavailable.
If a course has been completed and students are no longer on campus (i.e. work from second semester during the summer vacation), coursework will be kept until the end of Fresher’s Week, during the new academic year. After that point, unclaimed student work will be securely destroyed.

Course Reading List
Recommended texts for course:


These texts are held at the Sir Duncan Rice Library.

The lecturer responsible for each section of the course may provide suggestions for chapters in certain textbooks, which will enable students to follow up topics of particular interest.

Lecture Synopsis

Lecture 1: First meeting & introduction to course - Dr Steve Tucker
Introduction to course, explanation of assessment criteria and distribution of course materials.

Lectures 2-6: The Digestive System - Professor Gordon McEwan
The role of the digestive system is the conversion of dietary proteins, fats and carbohydrates into simpler molecules, which can be absorbed into the body for tissue repair or as substrates for oxidative metabolism to release energy. This is achieved by the activity of the muscles of the tract itself and secretion of enzymes and electrolytes from both the tract and its accessory glands. The control of both movements and secretory activity by neural and endocrine systems is studied in detail.

Lecture 2: Anatomical Overview of the Gastrointestinal Tract
- Describe the basic cross-sectional structure.
- Understand the varied functions reflected by varied anatomy.
- Outline the various types of co-ordinated smooth muscle motility e.g. peristalsis, segmentation.
- Understand salivation - Autonomic control; different types of saliva with a variety of functions; beginning of enzymatic activity; ionic transport phenomena to elaborate saliva in duct/in acini.

Lecture 3: Stomach
- Describe the functions of the different regions
- Understand the motility patterns/secretory events and their control; both neurally/humorally.
- Describe the details of cellular events in elaboration of HCl.
Lecture 4: Pancreas and Liver
- Describe the neural/humoral control of secretions of enzymes (catalogued) and of bicarbonate, especially the cellular mechanisms underlying the latter.
- Discuss the Gall bladder in terms of: Location, function, mechanisms of water reabsorption; the role of bile; mechanisms of emulsification.
- Describe the anatomy of the liver.
- Outline the importance and nature of hepatic circulation.
- Understand the necessity to reabsorb and re-use bile salts.
- Describe the cellular production of bile.

Lectures 5-6: Small and Large Intestine
Describe the functions of the intestines, especially:
- Digestion/reabsorption.
- Breakdown and reabsorptive strategies for carbohydrates, fats and proteins.
- Storage; water reabsorption.

Lectures 7-12: The Cardiovascular System - Professor Stephen Davies
A series of lectures that introduces the human cardiovascular system, the principal transport system of the body for gases, nutrients, and much more. This system is incredibly clever, being able to monitor the needs of the body and then finely control the output of the heart to determine how much blood is pumped out, and the properties of the vessels to determine where that blood goes. How it manages to do this is the key question addressed in these lectures.

Lecture 7: Overview of the function of the CVS
- Define the function of the CVS
- Illustrate the overall structure of the heart and the cardiovascular system
- Justify the significance of pressure, resistance and capacitance in the CVS
- Explain the functions of elastic, resistance, exchange and capacitance vessels

Lecture 8: Electrical activity in the heart
- Describe the initiation and spread of electrical activity throughout the heart
- Correlate the various components of the electrocardiogram with events in the heart

Lecture 9: The cardiac cycle and the regulation of cardiac output
- Illustrate the sequence of pressure and volume changes in the chambers of the heart during the cardiac cycle
- Explain the generation of the heart sounds (phonocardiogram)
- Explain the extrinsic factors controlling heart rate
- Explain the extrinsic and intrinsic factors controlling stroke volume

Lecture 10: Pressure and flow in arteries and veins
- Explain the origin of the Korotkoff sounds and their use
- Describe how blood pressure and flow changes throughout the vascular tree
- Indicate the factors affecting pressure and flow in veins

Lecture 11: The microcirculation and regulation of the peripheral circulation
- Outline the process involved in transport between capillaries and tissues
- Explain the significance of Starling’s forces and the lymphatic system in relation to oedema
- Justify the importance of Poiseuille's Law in relation to the control of resistance
• Identify the intrinsic (local) and extrinsic (neural and hormonal) factors affecting arteriolar resistance
• Describe the dominant factors controlling arteriolar tone in the brain, cardiac muscle, skeletal muscle and lungs.

Lecture 12: Central control of the circulation
• Explain the relationship between cardiac output, total peripheral resistance and mean arterial pressure.
• Define the components and function of the arterial baroreflex.
• Describe the role of the arterial baroreflex in the CVS response to changes in posture and the Valsalva manoeuvre.

Lectures 13-17: Respiratory Physiology - Dr Alison Jack
The blood is an important vehicle for transport of a wide range of physiologically-significant substances, the most vital being the supply of oxygen to the cells of the body which require the gas for energy production via oxidative metabolism. Oxygen is acquired by the lungs which make up the main part of the respiratory system. As such the mechanical aspects of lung ventilation will be studied in detail, together with the transport of both oxygen and the carbon dioxide released as an endproduct of oxidative metabolism. Neural and chemical control of respiratory activity are also discussed as are the effects of breathing at altitude and underwater.

Lecture 13: Introduction to the Respiratory System:
• Breathing to supply O₂ to tissues and remove CO₂ produced. Respiratory anatomy.
• Gas exchange areas.
• Airway resistance and gas flow.

Learning Objectives:
• To understand why we breathe.
• To appreciate the gross anatomical structure of the respiratory system and how this relates to physiological function.
• To understand how the airflow into the alveoli depends on the characteristics of the airways.
• To recognise the many generations and types of airways.
• To understand how to measure respiratory function, and what the 'lung volumes' represent in respiratory terms.

Lecture 14: Structure to Function:
• Anatomy of the pleural cavity
• Conducting vs respiratory zones.
• Respiratory muscles and mechanics of breathing.
• Pressure and volume changes in a single breath. Intrapleural pressure and pleural fluid.
• Lung surfactant.
• Lung compliance. Work of breathing, including static and dynamic components of compliance.
• Active expiratory effort and gas flow problems.

Learning Objectives:
• To understand how the anatomy of the pleural cavity relates to physiological function.
• To appreciate the role of pleural fluid.
• To understand the mechanics of breathing i.e. the physical forces determining air movement in and out of the lungs.
• To understand how the changes in pressure (alveolar and intrapleural) drive the movement of air.
• To recognise the nature of the alveoli and the specific properties of pulmonary surfactant.
• To be able to relate surface tension, elastic recoil and lung compliance to the work of lung ventilation at all stages of life.
• To recognise that small airways may be closed by a strong expiratory effort.

Lecture 15: Lung volumes, capacities & blood flow
• Concept of dead space
• Pulmonary vs alveolar ventilation
• Partial pressures
• Structure and function of alveolar sacs.
• Pulmonary blood flow.
• Gas exchange between alveoli and blood in pulmonary capillaries - diffusing capacity of lung.
• Pathologies affecting gas exchange
• Ventilation/perfusion (V/Q) balance and inequalities of gas exchange throughout lungs.

Learning Objectives:
• To appreciate why pulmonary ventilation is different to alveolar ventilation and how dead space impacts upon this.
• To understand partial pressure of gases and how this varies through the lung for O₂ and CO₂.
• To understand that diffusion down partial pressure gradients is the basis of alveolar gas exchange, with CO₂ diffusing much more readily than O₂.
• To understand the route gases take as they travel to/from the atmosphere into/out of our bodies
• To appreciate how certain disease states alter the diffusion capacity of gases.
• To appreciate the need for balance between alveolar ventilation and blood flow, and the effects of imbalance.
• To understand how the imbalance between alveolar ventilation and perfusion is normally minimised.

Lecture 16: Gas transport in the blood:
• Carriage of oxygen and carbon dioxide in the blood.
• Importance of haemoglobin in gas transport.
• Factors contributing to oxygen delivery to cells. Uptake and dissociation curve for haemoglobin and oxygen.
• Effects of metabolites on haemoglobin function. Böhr effect.
• 'Shunted' blood and 'dead space' alveoli as contributors to imperfect oxygenation, but relatively minor effects of partial pressure differences on oxygen content of arterial blood, thanks to oxygen uptake pattern of Hb.
• Carbon dioxide transport:
  o in solution.
  o as plasma bicarbonate.
o in red blood cells.

Learning Objectives:
- To understand and appreciate the similarities and differences between oxygen and carbon dioxide transport in the blood.
- To appreciate the importance of haemoglobin in gas transport.
- To appreciate how different metabolic conditions can alter oxygen uptake/delivery to tissues.
- To appreciate the significance of the shape of the haemoglobin/oxygen uptake and dissociation curve for oxygen uptake and delivery.
- To recognise that carbon dioxide is carried in many forms in both arterial and venous blood.

Lecture 17: Regulation of ventilation:
- Driving of ventilation by raised PaCO₂.
- Location of central chemoreceptors in medulla, response in part to PaCO₂ and in part to acid/base status of cerebrospinal fluid and brain interstitial fluid.
- Driving by reduced PaO₂, detected by peripheral chemoreceptors of carotid and aortic bodies and effective below 60mmHg.
- Interaction between PaO₂ and PaCO₂.

Learning Objectives:
- To understand that the chief 'drive' for lung ventilation is derived from the chemoreceptors, with carbon dioxide the most potent 'input'.
- To understand that the central chemoreceptors respond to carbon dioxide only, the basis of this being a complex set of interactions. In contrast the peripheral chemo-receptors respond to falls in PaO₂, rises in PaCO₂ and [H⁺]ₐ.
- To appreciate the additional factors which can exert a more minor influence over ventilation.

Lecture 18: Respiration in extreme environments - Dr Alasdair Mort
Ever wondered what would happen to your alveolar gases if we were to expose you very rapidly to high altitude? Or why you can develop the 'bends' when diving? Then this lecture is for you. In the world around us there are a number of hazardous environments that will challenge our physiology, including low pressure (e.g. mountaineering/high altitude aircraft) and high pressure (e.g. diving). In some cases we can adapt to the environment, even train for it, and in others we need protection systems to help us cope with it. This lecture will discuss human respiratory physiology in extreme environments using a number of visual examples, including a clip of a famous Scottish soft drink boiling spontaneously at 70,000 feet in a low-pressure chamber! It will describe to you the key hazards of ascent to altitude and diving to depth, physiologic adaptations that occur (e.g. altitude acclimatisation), and methods of protection under extreme circumstances (e.g. 100 % oxygen following decompression of commercial aircraft).

Learning Objectives:
- To appreciate that ascent to high altitudes at low PO₂ creates many physiological problems, which can be resolved to reach the top!
- To appreciate too much oxygen is as bad as too little.
- To understand the different, but equally serious, respiratory challenges faced at altitude and underwater.

Lectures 19-24: The Renal System - Dr Derek Scott
A series of lectures that introduces the regulation of the volume and composition of the body fluids by the kidneys. This necessitates the study of the functional anatomy of the nephron, the roles of the individual segments and the variety of the control mechanisms applied to the renal system.

**Lecture 19: Introduction to the renal system - Glomerular Absorption and Peritubular Reabsorption**

During this lecture, a brief review of renal anatomy and physiology will be given. In order to maintain the composition and volume of the extracellular fluid, as well as excreting toxins, the kidneys need to be able to filter the plasma portion of blood, removing unwanted substances, whilst retaining necessary ones. After this lecture, you should be able to:

- List the three basic renal processes.
- Explain why normally only filtration occurs at the glomerular capillaries.
- Explain why normally only reabsorption occurs at the peritubular capillaries.
- List some of the factors that can influence glomerular filtration.

**Lecture 20: Renal Handling of Na\(^+\), K\(^+\) and glucose**

One of the more important roles of the renal system is to maintain the levels of Na\(^+\), K\(^+\) and glucose within the body within acceptable levels. Too little of these substances is detrimental to normal physiological function, as is too much. We will explore what is meant by the renal plasma threshold for glucose and explain the significance of the active reabsorption of Na\(^+\) ions at the proximal tubule. The mechanisms used for the secretion of organic acids such as PAH will be described, as will the way in which K\(^+\) ions are handled by the kidney. Finally, we will review the crucial importance of maintaining K\(^+\) homeostasis.

**Lecture 21: The Countercurrent Multiplier**

The average human filters approximately 180 litres/day through the renal glomeruli, but we only excrete about 1-2 litre/day of urine. How do we manage to minimise our fluid losses and generate a small volume of concentrated urine? The kidneys use an elegant system of osmotic gradients at the Loop of Henle in order to reabsorb vital ions and water, whilst still excreting enough fluid to carry out metabolic wastes in the urine. This is the countercurrent multiplier system. During this lecture, the essential features of the Loops of Henle which enable them to act as countercurrent multipliers will be reviewed, as will the effects of loop diuretics such as furosemide on this system.

**Lecture 22: Antidiuretic Hormone (ADH) and the regulation of H\(_2\)O**

The site of water regulation is the collecting duct, whose permeability is under the control of ADH (Anti-Diuretic Hormone/Vasopressin). Whether or not the dilute urine delivered to the distal tubule is concentrated and to what extent depends on the presence or absence of the posterior pituitary hormone, ADH. This increases the permeability of the collecting ducts to H\(_2\)O, by incorporating H\(_2\)O channels into the luminal membrane. The pathway involved in the synthesis and release of ADH will be illustrated during this lecture, and some of the factors that influence release of ADH will be considered. We will also cover how baroreceptors and osmoreceptors respond to changes in ADH secretion in order to maintain extracellular volume and composition.

**Lecture 23: The renin-angiotensin-aldosterone system (RAAS)**

The RAAS promotes Na\(^+\) retention via the actions of both angiotensin II and aldosterone, so plays an important role in the integration of salt and water balance in the body. The components of the renin-angiotensin-aldosterone system will be described, focusing on the effects of angiotensin II and analysing the renal responses to hypovolaemia. Finally, we will review how the renal system finally controls the excretion of urine by investigating the process of micturition.

**Lecture 24: Acid-Base Balance**
All biochemical reactions can only work efficiently within limited pH values. The optimum for the majority of biochemical reactions within the body is approximately pH 7.4. Too far away from this optimum pH, and physiological problems start to develop. Since we are continually generating metabolic wastes from hundreds of biochemical reactions within our cells, we must have a way of neutralising acids or bases when the levels get too high. In the final lecture of this series, the relationship between $[\text{HCO}_3^-]$ and $\text{pCO}_2$ which determines the pH will be explored. The mechanisms employed by the kidney in the maintenance of $[\text{HCO}_3^-]$ will be described, and we will briefly cover how the respiratory and renal systems work together in order to maintain acid-base balance. After this lecture, you should be able to define respiratory acidosis, respiratory alkalosis, metabolic acidosis, metabolic alkalosis and suggest possible causes for each of these conditions.

**Lectures 25-29: The Reproductive System - Dr Steve Tucker**

The reproductive system is a key component of our continued survival on the planet. These lectures consider the physiology of reproduction and focus on the controlled secretion and modes of action of reproductive hormones. Successful sexual maturation follows co-ordinated activities of a number of organs and systems that are vital control mechanisms in reproduction and these will be covered in detail. Reproductive dysfunction, rising infertility and IVF strategies are a constant source of topical discussion and are issues that will also be covered herein.

**Lecture 25: Reproductive endocrinology and male reproductive physiology**

- Introduction to reproductive endocrinology.
- The hypothalamic-pituitary-gonad axis.
- Male reproductive anatomy.
- Spermatogenesis and the role of Sertoli and Leydig cells.
- Endocrine control of spermatogenesis.

**Learning objectives:**

- Understand the basis of reproductive endocrinology.
- Appreciate the central role that the hypothalamic-pituitary-gonad axis plays in controlling reproduction.
- Appreciate the main structures associated with the male reproductive system.
- Understand the process of spermatogenesis in the testis and the specific location of each progressive stage.
- Appreciate the role of Sertoli and Leydig cells in spermatogenesis.
- Understand the endocrine mechanisms driving spermatogenesis involving luteinising hormone (LH), follicle-stimulating hormone (FSH) and testosterone.
- Be able to describe the targets of male sex hormones and the physiological responses they attain.

**Lecture 26-27: Female reproductive physiology**

- Female reproductive anatomy.
- The ovarian cycle, follicular development and the corpus luteum.
- The uterine cycle and the endometrium.
- The complex endocrine control of the menstrual cycle.

**Learning objectives:**

- Appreciate the main structures associated with the female reproductive system.
- Be able to identify the ovaries and uterus as key endocrine organs in female reproductive physiology.
- Be able to describe the hormones involved in the menstrual cycle.
• Understand the control, site of release, feedback targets and function of the menstrual cycle hormones.
• Be able to describe hormonal changes, endometrial changes, follicular development and body temperature changes in a typical menstrual cycle.
• Be able to describe the processes involved with human follicular development from primordial follicles to mature Graffian follicles.
• Understand the role of oestradiol, follicle-stimulating hormone (FSH) and luteinising hormone (LH) in follicular development and how they feedback onto one another.
• Appreciate the underlying mechanisms controlling the LH surge and how this controls ovulation.
• Understand the importance of the corpus luteum and progesterone in maintaining the endometrium and the role of luteolysis in bringing the cycle to a close.
• Be able to describe the targets for female sex hormones and the wider physiological processes they regulate.

Lecture 28: Human reproduction, pregnancy and parturition
• Gametogenesis, haploid gametes and sex determination.
• Fertilisation, embryonic development and implantation.
• Pregnancy, parturition and lactation and their endocrine control.
• Embryonic sexual development and its control.
• Understand the importance of meiosis within the gonads in producing haploid gametes.
• Appreciate that the genetic control of sex determination lies with the male gamete.
• Appreciate the process of copulation and sexual reproduction in humans.
• Understand the process and sites of fertilisation and that gamete fusion produces a diploid zygote.
• Be able to describe the early stages of embryonic development and implantation.
• Be able to describe endocrine control of human pregnancy.
• Describe the basis of an endocrine feed-forward reflex and how this relates to parturition.
• Describe the endocrine control of lactation through oxytocin and prolactin.
• Describe the control of sexual differentiation in the embryo and the important factors and hormones that drive genital development.

Lecture 29: Reproductive dysfunction
• Overview of reproductive disease.
• Detailed examples of reproductive dysfunction.
• Infertility, its causes and in vitro fertilisation.
• Testicular dysgenesis syndrome, endocrine disrupting chemicals and declining fertility rates.
• Be able to summarise key causes of reproductive disease (genetic, developmental, structural, endocrine, gestational, cancer, infertility).
• Be able to describe examples of these as follows:
  o Genetic - understand that abnormal sex chromosome organisation severely disrupts sexual characteristics and fertility.
  o Developmental - dysregulation can result in pseudohermaphroditism or precocious puberty.
  o Structural/endocrine – endometriosis.
  o Infertility – understand both male and female forms.
• Understand the theory and practise of In vitro fertilisation (IVF).
• Appreciate recent improvements in IVF.
• Appreciate that Scotland (and the wider world?) has a declining fertility rate and that testicular dysgenesis syndrome (TDS) is a major contributory factor.
• Understand the concept of endocrine disrupting chemicals (EDCs) and where these originate from.
• Be able to describe how EDCs can affect development and programming of foetal testis and how this is linked to TDS and decreasing fertility.

Lecture 30: Looking forward to honours? - Dr Steve Tucker
This meeting will serve to explain the importance of Physiology as an advanced degree subject and the possible career paths that are open to students of this discipline. The outline of the course at levels 3 and 4 will also be explained.

Practical/Lab/Tutorial Work
You should bring a white lab coat to all laboratory-based practicals. For laboratory practicals you will select a group through MyTimetable that will dictate when you attend these classes (PRAC group), you will also select a group for attending the problem solving sessions (TUT group) and a group for attending the mid-term exam (TEST group). Make sure you check the timetable carefully to ensure you select the groups that work best with your other courses.

For some practical sessions you will be required to complete and hand in a form of data tables and short questions. For others you will be given time to complete the write-up after the class – details of assessment will be noted in the practical schedule. Marks from each of these will contribute to your Continuous Assessment (see Assessment section).

Students are asked to make themselves familiar with the information on key institutional policies which been made available within MyAberdeen


These policies are relevant to all students and will be useful to you throughout your studies. They contain important information and address issues such as what to do if you are absent, how to raise an appeal or a complaint and how seriously the University takes your feedback.

These institutional policies should be read in conjunction with this programme and/or course handbook, in which School and College specific policies are detailed. Further information can be found on the University’s Infohub webpage or by visiting the Infohub.

The information included in the institutional area for 2016/17 includes the following:

• Absence
• Academic Appeals & Complaints
• Assessment (Common Grading Scale)
• Codes of Practice on Student Discipline (Academic and Non-Academic)
• Class Certificates
• Recording of Lectures
• Exam Results
• Transcripts
• MyAberdeen
• TurnitinUK
• Feedback
• Communication
• Aberdeen Graduate Attributes
• The Co-Curriculum
# Medical Sciences Common Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade Point</th>
<th>% Mark</th>
<th>Category</th>
<th>Honours Class</th>
<th>Description</th>
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| A1    | 22          | 90-100 | Excellent  | First         | • Outstanding ability and critical thought  
• Evidence of extensive reading  
• Superior understanding  
• The best performance that can be expected from a student at this level |
| A2    | 21          | 85-89  |            |               |                                                                                                                                           |
| A3    | 20          | 80-84  |            |               |                                                                                                                                           |
| A4    | 19          | 75-79  |            |               |                                                                                                                                           |
| A5    | 18          | 70-74  |            |               |                                                                                                                                           |
| B1    | 17          | 67-69  | Very Good  | Upper Second  | • Able to argue logically and organise answers well  
• Shows a thorough grasp of concepts  
• Good use of examples to illustrate points and justify arguments  
• Evidence of reading and wide appreciation of subject |
| B2    | 16          | 64-66  |            | Third         |                                                                                                                                           |
| B3    | 15          | 60-63  |            |               |                                                                                                                                           |
| C1    | 14          | 57-59  | Good       | Lower Second  | • Repetition of lecture notes without evidence of further appreciation of subject  
• Lacking illustrative examples and originality  
• Basic level of understanding |
| C2    | 13          | 54-56  |            |               |                                                                                                                                           |
| C3    | 12          | 50-53  |            |               |                                                                                                                                           |
| D1    | 11          | 47-49  | Pass       | Third         | • Limited ability to argue logically and organise answers  
• Failure to develop or illustrate points  
• The minimum level of performance required for a student to be awarded a pass |
| D2    | 10          | 44-46  |            |               |                                                                                                                                           |
| D3    | 9           | 40-43  |            |               |                                                                                                                                           |
| E1    | 8           | 37-39  | Fail       | Fail          | • Weak presentation  
• Tendency to irrelevance  
• Some attempt at an answer but seriously lacking in content and/or ability to organise thoughts |
| E2    | 7           | 34-36  |            |               |                                                                                                                                           |
| E3    | 6           | 30-33  |            |               |                                                                                                                                           |
| F1    | 5           | 26-29  | Clear Fail | Not used for Honours | • Contains major errors or misconceptions  
• Poor presentation |
<p>| F2    | 4           | 21-25  |            |               |                                                                                                                                           |
| F3    | 3           | 16-20  |            |               |                                                                                                                                           |
| G1    | 2           | 11-15  | Clear Fail |               | • Token or no submission |
| G2    | 1           | 1-10   | Clear Fail/Abysmal |               |                                                                                                                                           |
| G3    | 0           | 0      |            |               |                                                                                                                                           |</p>
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**Week 32**

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**Week 33**

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**Week 34**

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<td>Thu 30 Mar</td>
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<td>King’s College Chapel</td>
<td>Anatomy Memorial Service (BM2509 students to attend)</td>
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<td>End of Term Review and Exam Information</td>
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Staff

- Dr Steve Tucker (SJT) – Course Co-ordinator
- Prof Stephen Davies (SND)
- Dr Alison Jack (AMJ)
- Prof. Gordon McEwan (GTAM)
- Dr. Derek Scott (DAS)
- Dr Alasdair Mort (AXM)
- Dr John Barrow (JB)