Contents

Course Summary
Course Aims & Learning Outcomes
Course Teaching Staff
Assessment
Class Representatives
Problems with Coursework
Course Reading List
Course Schedule
Lecture/Course content synopsis
Tutorials, Practical Workbook and other Coursework
Medical Sciences Common Grading Scale
Course Timetable

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 is a 15 credit Level 3 course which is provided in Semester 1 Weeks 9-13.

It has been designed to support the degree programme in BSc Biomedical Sciences (Anatomy) for which it is compulsory. However, students on other degree programmes in the Biological Sciences and Medical Sciences may take this course.

This course involves the study of the relationship between structure and function in the organisation of body tissues. We will first describe the four primary tissues of the body: epithelium, connective, muscle and nerve. Using this basis, we will then investigate the anatomical organisation of other body structures including each aspect of the gastrointestinal system, specialised tissues including the skin, bone and cartilage and the respiratory and cardiovascular systems.

Course Aims & Learning Outcomes

Aims
To study the relationship between structure and function in the organisation of body tissues

Learning Outcomes
Students should have an understanding of tissue organisation in a variety of body locations and how these relate to function. They should be able to:

• Explain how cellular and extracellular components combine to form a cohesive structurally and functionally organised tissue.
• Describe and discuss a variety of tissue structural formats within the human body.
• Explain how variations to the structural formats of body surfaces, tubes and musculoskeletal structural components are modified from a basic format and the functional effects of such structural variations in normal and disease situations.
• Use the skills necessary to interpret microscopic slides through use of a virtual microscope
• Use the skills necessary to interpret histological images and use their findings to solve problems.
• Use the skills necessary to relate structural information and functional activity.
• Use the above to develop transferable skills, e.g. team work, presentation and communication skills.

Course Teaching Staff

Course Co-ordinator: Dr Bahgat Sami, bahgat.sami@abdn.ac.uk
Mr David Chorn (DC), d.j.chorn@abdn.ac.uk
Dr Asha Venkatesh (AV), a.venkatesh@abdn.ac.uk
Dr Flora Gröning (FG), f.groening@abdn.ac.uk
Dr Shahida Shahana (SS), s.shahana@abdn.ac.uk
Ms Hazel Allardyce (HA), h.allardyce.19@abdn.ac.uk
Ms Katie Hanna (HA), k.hanna.19@abdn.ac.uk
Students are expected to attend all online lectures, demonstrations and tutorials, complete practical workbook sections and to meet deadlines of assessments and assignments provided. The minimum acceptable performance is attendance at 75% of the practical classes, and presentation of all set course work, written and oral.

**Assessment**

This will be conducted by 4 in course assessments spread evenly throughout the duration of the course. These will each contribute 25% to the total course mark. There will not be a degree examination in December 2020. A resit assessment will be held in July 2021. This will take the form of the in-course assessments 1-3 combined.

**In course assessment breakdown:**

- **In course assessment 1 - 25% of total CM**
- **In course assessment 2 - 25% of total CM**
- **In course assessment 3 - 25% of total CM**

In course assessments 1-3 will include the following components:

- **a- Practical Tissue Identification - 50% of **ICA mark**
- **b- ***SBA/SAQ/MCQ/T-F/MAQ - 50% of **ICA mark**

**In course assessment 4 - 25% of total CM** *(Online PowerPoint mini-symposium Presentation)*

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*CM = Total Course Mark = 100%  
**ICA = In course assessment  
***SBA/SAQ/MCQ/T-F/MAQ = Single Best Answer; Short Answer Questions; Multiple Choice Questions; True/False Questions; Matching Answer Questions.

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The Online PowerPoint mini-symposium Presentation will be from a choice of histopathology topics to be provided.

More details of the above will be provided at appropriate stages in the course. Key submission dates for in-course work will be communicated during the course.

(From 2010/11 class certificates will be valid for two years and permit a total of three attempts at the required examination within that two-year period i.e. the first attempt plus up to two resits).

The resit examination is held in July. The continuous assessment mark will also be included at a student's resit and subsequent diets of examination. Failure to
submit this work without due cause can severely hamper the overall mark for the course.

**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](http://www.ausa.org.uk) or email the VP Education & Employability [vped@abdn.ac.uk](mailto: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](http://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 ([medsci@abdn.ac.uk](mailto:medsci@abdn.ac.uk)) in the Medical Sciences Office (based in the Polwarth Building, Foresterhill), or Mrs Sheila Jones ([s.jones@abdn.ac.uk](mailto: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 (Professor Gordon McEwan)
All teaching 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 Welcome Week, during the new academic year. After that point, unclaimed student work will be securely destroyed.

**Course Reading List**

The recommended text for this course is:

**Histology at a Glance, by Michelle Peckham**  Wiley-Blackwell  ISBN 9781444333329
Or, any other quality Histology text (or online, e.g., [www.histology.leeds.ac.uk](https://www.histology.leeds.ac.uk))

In addition, you will be expected to read around the subject matter presented in lectures and tutorials using the range of texts available in the Sir Duncan Rice Library at King’s College or the Medical library in the Polwarth Building at Foresterhill and other online resources.

Additionally, specific references may be provided by individual members of the teaching staff.
Course Schedule (subject to possible rearrangement - a full timetable is posted at the end of this course manual)

Week 9 (1)

Lectures
1. Welcome, Course Introduction
2. Cells/Tissues/Organs/Systems, Tissue Staining & Viewing
3. Tissue Types: Epithelia and Glands (E&G), Connective Tissue (CT), Muscle & Nerve (M&N)

Practical Workbook:
Practical 1: Tissues – Epithelium, Connective, Muscle, Nerve

Tutorial/Q&A – 1 and Virtual Symposium Instruction
In-course assessment 1 (25% of total course mark)

Week 10 (2)

Lectures
1. Architecture of GI system and Histology of the Oesophagus
2. Histology of the Stomach
3. Histology of the Small intestine & Large intestine

Practical workbook:
Practical 2: Histology of Oesophagus, Stomach, Small intestine, Large Intestine

Tutorial/Q&A – 2 and Assessment 1 feedback
In-course assessment 2 (25% of total course mark)

Week 11 (3)

Lectures
1. Histology of the Liver
2. Histology of the Pancreas and gallbladder
3. Histology of the Cardiovascular System: Heart and Blood vessels

Practical workbook:
Practical 3: Histology of the Pancreas, Appendix, Liver, and Gallbladder
Histology of the Cardiovascular System

Tutorial/Q&A – 3 and Assessment 2 feedback
**Week 12 (4)**

**Lectures**
1. Specialised Connective Tissue: Bone & Cartilage
2. Respiratory System: Trachea to Lungs

**Practical workbook:**
Practical 4: Histology of Bone & Cartilage
Histology of the Respiratory System

**Tutorial/Q&A – 4**
**In-course assessment 3** (25% of total course mark)

**Course review**

**Week 13 (5)**

**In-course assessment 4** - Virtual Symposium presentation (25% of total course mark)

**Assessment 3 and 4 Feedback**

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**Lecture/Course Content Synopsis**

All lectures will be recorded on Panopto and uploaded on MyAberdeen on the course site. They can be accessed at any time, asynchronously, but some will require compulsory online synchronous attendance. The times for these will be posted on the Course Timetable at the end of this course manual. (Online live attendance at all Tutorials, Question & Answer sessions is compulsory, and attendance will be monitored, as will submission of all coursework and in course assessments).

The lectures will be between about 10-30 minutes in length and provide an overview to the course content and the material set out in the practical workbook, in conjunction with which they should be used. They will all describe/ explain the normal histology and identification of the tissues and emphasise structure-function relationships.

**Links** to additional online learning material and resources to augment the lectures and the material in the practical workbook are provided in the practical workbook as appropriate.

1. **Welcome, Course Introduction, Cells/Tissues/Organs/Systems, tissue staining and viewing**
   Course administration, plan of course, how body is divided into tissues, Defining Characteristics of the Primary Tissues
   How dyes enhance tissue contrast and visualisation under the microscope and assist tissue components in yielding up their secrets

2. **Tissue Types**
   Detailed overview of the 4 primary tissue types found in the body, including their distinguishing features and how these can be recognised under a microscope.
Tissue types 1: Epithelia and glands. The important tissue-lining cells at the interface between the tissue and its immediate surrounds. The relationship between epithelial structure and function is particularly emphasised in regard to substance secretion, location, architecture, arrangement, modes of secretion, locus of secretion. The smaller secretory glands residing within GIT walls are described and contrasted structurally and functionally with the specialised large GIT glands lying outside its walls.

Connective Tissue. Classification, characterisation, and distinguishing features of general connective tissue types seen in the GIT and in other structures.


3. Architecture of GIT, Oesophagus
You will use your knowledge of the primary tissues using the oesophagus as an example for understanding the general architecture of GIT tissue arrangement.

4. Stomach
This lecture will help students reflect and build on Practical 2: How the tissues and cells of the stomach are specifically structured and arranged to enable it to fulfil its primary function – digestion.

5. Small intestine
This lecture will help students reflect and build on Practical 2. How the tissues and cells of the different parts of the small intestine are specifically structured and arranged to enable it to fulfil its primary function – absorption.

6. Large intestine, Liver, Pancreas and Gallbladder
This lecture will build on practical 3 and look at the architecture of these structures. The histological structure of the Pancreas, Liver and Gallbladder will be studied as specialised large GIT glands lying outside its walls in relation to their digestive, storage and endocrine functions.

7. Cardiovascular system - Heart and Blood vessels
A brief overview of the cardiovascular system including the heart and the different types of blood vessels will be given.

8. Specialised Connective Tissue - Bone and Cartilage
Architecture and types of bone and cartilage.

9. Respiratory System Histology
Tissue organisation and arrangement in the respiratory system.
Tutorials, Practical Workbook and other Coursework

Tutorials 1 – 3
- Introduction to Systems Histology and online resources.
- Distribution of virtual symposium topics, instructions, and preparation.
- Thinking in 3D.
- Approach to learning histology, question and answer sessions, quizzes, and in-course assessments.
- Highlighting of key points and difficulties in the week’s work. Revision and question answering.
- Aids for memory
- Use of MyAberdeen discussion board for additional question posting.

Tutorial 4
- Course evaluation and feedback.
- Questions from the week.
- Virtual symposium preparation and finalisation.

Practical Workbook
Diligent completion of all practicals in the Practical Workbook classes as well as all assigned coursework forms the key component of this course.

You will be supplied with a workbook for all practical classes at the commencement of the course. The workbook as well as all other details concerning the course will be posted to the course site on MyAberdeen. Other coursework will be assigned at the appropriate times.
The relevant pages in the Practical workbook to be completed each week will be made known to you at the beginning of each week. The work required in this course may present difficulties to students with special educational or other special needs. Any student with special needs should make these known to the Course Co-ordinator when registering for the class and should also then discuss their needs with the School Disabilities Co-ordinator, to ensure that they have the best possible outcome.

Course Coordinator Virtual Office Hours
Please use the course website Discussion Board on MyAberdeen to post any queries relating to the course or course content. Or you can use the live Question & Answer sessions at the end of the week for this purpose. For any personal or private queries use the email address: bahgat.sami@abdn.ac.uk on Friday afternoons between 2-3pm only, unless otherwise very urgent.
University Policies

Students are asked to make themselves familiar with the information on key education policies, available here. 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 the University will calculate your degree outcome.

These University wide education policies should be read in conjunction with this programme and/or course handbook, in which School specific policies are detailed. These policies are effective immediately, for the 2021/22 academic year. Further information can be found on the University’s Infohub webpage or by visiting the Infohub.

The information included in the institutional area for 2021-22 includes the following:

- Absence
- Appeals & Complaints
- Avoiding Plagiarism
- Assessment
- Email Use
- Feedback
- Graduate Attributes
- Late Submission of Work
- MyAberdeen
- Professional and Academic Development
- Student Learning Service (SLS)
- Student Monitoring/Class Certificates
- Student Discipline
- The Co-curriculum
# Medical Sciences Common Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade Point</th>
<th>Category</th>
<th>Honours Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>22</td>
<td>Excellent</td>
<td>First</td>
<td>Outstanding ability and critical thought</td>
</tr>
<tr>
<td>A2</td>
<td>21</td>
<td></td>
<td></td>
<td>Evidence of extensive reading</td>
</tr>
<tr>
<td>A3</td>
<td>20</td>
<td></td>
<td></td>
<td>Superior understanding</td>
</tr>
<tr>
<td>A4</td>
<td>19</td>
<td></td>
<td></td>
<td>The best performance that can be expected from a student at this level</td>
</tr>
<tr>
<td>A5</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>17</td>
<td>Very Good</td>
<td>Upper Second</td>
<td>Able to argue logically and organise answers well</td>
</tr>
<tr>
<td>B2</td>
<td>16</td>
<td></td>
<td></td>
<td>Shows a thorough grasp of concepts</td>
</tr>
<tr>
<td>B3</td>
<td>15</td>
<td></td>
<td></td>
<td>Good use of examples to illustrate points and justify arguments</td>
</tr>
<tr>
<td>C1</td>
<td>14</td>
<td>Good</td>
<td>Lower Second</td>
<td>Repetition of lecture notes without evidence of further appreciation of subject</td>
</tr>
<tr>
<td>C2</td>
<td>13</td>
<td></td>
<td></td>
<td>Lacking illustrative examples and originality</td>
</tr>
<tr>
<td>C3</td>
<td>12</td>
<td></td>
<td></td>
<td>Basic level of understanding</td>
</tr>
<tr>
<td>D1</td>
<td>11</td>
<td>Pass</td>
<td>Third</td>
<td>Limited ability to argue logically and organise answers</td>
</tr>
<tr>
<td>D2</td>
<td>10</td>
<td></td>
<td></td>
<td>Failure to develop or illustrate points</td>
</tr>
<tr>
<td>D3</td>
<td>9</td>
<td></td>
<td></td>
<td>The minimum level of performance required for a student to be awarded a pass</td>
</tr>
<tr>
<td>E1</td>
<td>8</td>
<td>Fail</td>
<td>Fail</td>
<td>Weak presentation</td>
</tr>
<tr>
<td>E2</td>
<td>7</td>
<td></td>
<td></td>
<td>Tendency to irrelevance</td>
</tr>
<tr>
<td>E3</td>
<td>6</td>
<td></td>
<td></td>
<td>Some attempt at an answer but seriously lacking in content and/or ability to organise thoughts</td>
</tr>
<tr>
<td>F1</td>
<td>5</td>
<td>Clear Fail</td>
<td>Not used for Honours</td>
<td>Contains major errors or misconceptions</td>
</tr>
<tr>
<td>F2</td>
<td>4</td>
<td></td>
<td></td>
<td>Poor presentation</td>
</tr>
<tr>
<td>F3</td>
<td>3</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>G1</td>
<td>2</td>
<td>Clear Fail/ Abysmal</td>
<td>-</td>
<td>Token or no submission</td>
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<tr>
<td>G2</td>
<td>1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>G3</td>
<td>0</td>
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</tbody>
</table>
# Course Timetable AN3009: 2021-22
(subject to last-minute changes)

USE **ONLY THIS TIMETABLE FOR THE COURSE – NOT THE ONE IN MYTIMETABLE OR ANY OTHER**

<table>
<thead>
<tr>
<th>Week Number/Date</th>
<th>Time</th>
<th>Subject</th>
<th>Session type - sync or async/Attendance</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 9:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mon 27 Sep</td>
<td>14:00-15:00</td>
<td>1. Welcome, Course Introduction</td>
<td>Lecture-sync/Compulsory</td>
<td>DC, HA</td>
</tr>
<tr>
<td></td>
<td>In your own time</td>
<td>1. Cells/Tissues/Organs, Staining, Viewing</td>
<td>Lecture- async</td>
<td>DC AV, DC DC DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Tissue Types 1 - Epithelium &amp; CT</td>
<td>Lecture- async</td>
<td>DC AV, DC DC DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Tissue Types 2 - Muscle &amp; Nerve</td>
<td>Lecture- async</td>
<td>DC AV, DC DC DC</td>
</tr>
<tr>
<td>Tues 28 Sep</td>
<td>10am-1pm</td>
<td>1st practical</td>
<td>Zoology Bldg. ZG11</td>
<td>DC, KH</td>
</tr>
<tr>
<td>Wed 29 Sep</td>
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<tr>
<td>Thurs 30 Sep</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Fri 1 Oct</td>
<td>15:00-17:00</td>
<td><strong>Tutorial 1</strong> Virtual Symposium instruction</td>
<td>Tutorial – BBC via MyAb sync/Compulsory</td>
<td>DC, KH</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>In-course assessment 1 release</strong></td>
<td>1 Week to complete</td>
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<tr>
<td><strong>Week 10:</strong></td>
<td></td>
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</tr>
<tr>
<td>Mon 4 Oct</td>
<td>In your own time</td>
<td>3. Architecture of GIT, Oesophagus</td>
<td>Lecture-async</td>
<td>AV</td>
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<td></td>
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<td>4. Histology of the Stomach</td>
<td>Lecture-async</td>
<td>AV</td>
</tr>
<tr>
<td></td>
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<td>5. Histology of Small intestine</td>
<td>Lecture-async</td>
<td>DC</td>
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<td></td>
<td></td>
<td>6. Histology of Large intestine</td>
<td>Lecture-async</td>
<td>DC</td>
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<tr>
<td>Tues 5 Oct</td>
<td>10am-1pm</td>
<td>2nd practical</td>
<td>Zoology Bldg. ZG11 TBC</td>
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<tr>
<td>Wed 6 Oct</td>
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<td>Thurs 7 Oct</td>
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<tr>
<td>Fri 8 Oct</td>
<td>15:00-16:00</td>
<td><strong>Tutorial 2</strong></td>
<td>Tutorial – BBC via MyAb sync/Compulsory</td>
<td>DC, HA</td>
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<td><strong>In-course assessment 2 release</strong></td>
<td>1 Week to complete</td>
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<tr>
<td><strong>Week 11:</strong></td>
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<tr>
<td>Mon 12 Oct</td>
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<tr>
<td>Wed 13 Oct</td>
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<tr>
<td>Thurs 14 Oct</td>
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<tr>
<td>Fri 15 Oct</td>
<td>14:00-16:00</td>
<td>Tutorial 3</td>
<td>Tutorial – BBC via MyAb sync/Compulsory</td>
<td>DC, HA</td>
</tr>
</tbody>
</table>

**Week 12:**

| Mon 19 Oct |          |          |          |          |          |          |
| Wed 20 Oct |          |          |          |          |          |          |
| Thurs 21 Oct |          |          |          |          |          |          |
| Fri 22 Oct | 14:00-16:00 | Tutorial 4 Course review, Feedback | Tutorial – BBC via MyAb sync/Compulsory | DC, HA |
|            |          | Virtual symposium finalisation | Own work |          |
|            | In-course assessment 3 release | 1 Week to complete |          |          |

**Week 13:**

| Mon 25 Oct | 14:00-17:00 | Virtual Symposium Presentations = In-course assessment 4 | Presentation- sync/Compulsory | DC, HA |
| Tue 26 Oct | 14:00-17:00 | Virtual Symposium Presentations = In-course assessment 4 | Presentation- sync/Compulsory | DC, HA |
| Wed 27 Oct |          |          |          |          |
| Thurs 28 Oct |          |          |          |          |
| Fri 29 Oct | 14:00-17:00 | Assessment 3 and 4 Feedback | Powerpoint notes only – uploaded on MyAberdeen | DC, HA |

**Staff:**

Dr Bahgat Sami (BS) (Course Coordinator) (Anatomy)

Mr David Chorn (DC) (Anatomy)
Dr Asha Venkatesh (AV) (Anatomy)
Dr Shahida Shahana (SS) (Anatomy)
Dr Flora Gröning (FG) (Anatomy)
Ms Hazel Allardyce (HA) (PGR) (Anatomy)
Ms Katie Hanna (KH) (PGR)
Mrs Hazel Fyfe (Technical support, Zoology)