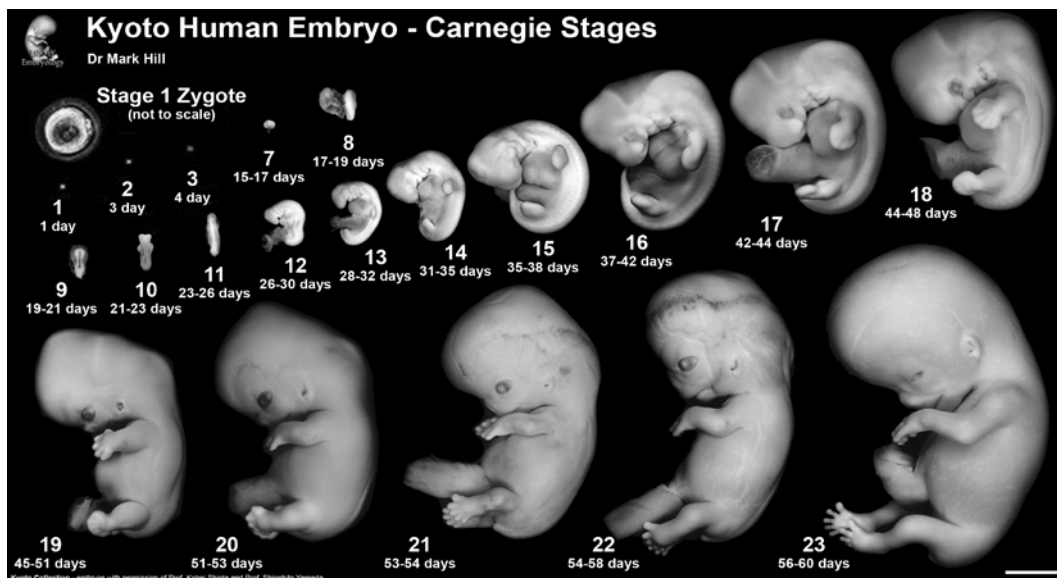


# ANAT 2341 Embryology



The first 8 weeks of human embryological development.

## COURSE OUTLINE

Trimester 3 - 2019

## GLOSSARY

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### [ONLINE TIMETABLE](#)

### [OLINE 2019 HOMEPAGE](#)

### [COURSE MOODLE PAGE](#)

Please read this manual/outline in conjunction with the following pages on the [School of Medical Sciences website](#):

- [Advice for Students](#)
- [Learning Resources](#)

(or see "STUDENTS" tab at [medicallsciences.med.unsw.edu.au](http://medicallsciences.med.unsw.edu.au) )

# ANAT2341 Course Information

## OBJECTIVES OF THE COURSE

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The lecture content of this course will provide students with a robust understanding of early human embryogenesis, and the anatomy and development of the major organs and organ systems of the body. Students will also acquire a basic understanding of how major birth abnormalities arise.

In the practical classes, students will actively apply the lecture content by completion of online modules, through modelling of embryonic development using playdough, by digital embryo dissections using online resources, by working with animal models of development in laboratory classes, and in a journal club. Furthermore, students will be exposed to cutting-edge developmental and stem cell biology research presented by experts in the field.

### How the course relates to the Medical Sciences Program

The embryology course is appropriate for a Medical Sciences pathway that includes anatomy, cell biology, histology, and pathology courses, and it prepares for an Honours project in a developmental biology, stem cell or cancer research lab.

### Applications of Embryology in Future Careers

The embryology course prepares graduates for a wide range of careers. Graduates can apply their knowledge of anatomy and developmental biology directly, such as by choosing a career in the biomedical sphere. Some of these include biomedical research scientist, science educator, policy advisor, IVF scientist and forensic scientist. Alternatively, graduates can use the general skills and knowledge acquired to pursue careers in other areas.

## COURSE CO-ORDINATOR AND STUDENT ADMIN SUPPORT

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Course Coordinator / Lecturer

- Dr Annemiek Beverdam [A.Beverdam@unsw.edu.au](mailto:A.Beverdam@unsw.edu.au)

Room 234, Wallace Wurth East

T: +61 2 9385 0019

Students wishing to see the course coordinator should make an appointment *via* email as offices are not readily accessible. We will organize to meet you in a convenient location elsewhere in the building.

For SOMS students administrative matters, please submit enquiries online via UNSW Student Portal Web Forms: <http://unsw.to/webforms>.

Student policy/resource information:

<https://medicallsciences.med.unsw.edu.au/students/undergraduate/advice-students>

For Special Consideration Inquiries: <https://student.unsw.edu.au/special-consideration>

## **COURSE STRUCTURE and TEACHING STRATEGIES**

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Learning activities occur on the following days, times and locations:

- Lectures 1 and 2: Trimester 3, Wednesdays 9-11 am: [Mathews 227](#)
- Practicals: Trimester 3, Wednesdays 11 am – 1 pm: Anatomy Lab 8B, Biosciences Building D26, Level 1 (except in Weeks 4 and 7: teaching labs, Wallace Wurth 120)

Students are expected to attend all scheduled activities for their full duration (2 hours of face-to-face lectures per week, and 2 hours of practical class).

Students are reminded that UNSW recommends that a 6 units-of-credit course should involve about 150 hours of study and learning activities. The formal learning activities are approximately 60 hours throughout the semester and students are expected (and strongly recommended) to do at least the same number of hours of additional study.

### **Lectures:**

Lectures will provide students with the concepts and theory essential for a robust understanding of embryology. Students are encouraged to ask questions or for clarification during the lectures. But also Sli.do events will be created so that students can ask questions anonymously during the lectures and afterwards.

### **Practical classes:**

Practical classes and collaborative learning sessions will help students to revise and consolidate lecture content, to develop their insights in developmental processes in 3D and 4D, and to assist them in their development of research and analytical skills. These classes will allow students to engage in a more interactive form of learning than is possible in the lectures. The skills students will learn in practical classes are relevant to their development as professional scientists.

The 2-hour practical classes will consist of various elements:

1. Each lab will start with a 10-minute quiz to assess knowledge of the previous week's lecture and lab content (part of students' ongoing individual assessment).
2. Each lab, we will take time to revisit the current week's lecture content using questions asked in class, and posted on Sli.do and on Moodle.
3. We will further develop your insight in developmental processes in 3D and 4D using playdough activities, completing SmartSparrow modules and online, by performing virtual embryo dissections using the 3DEmbryo atlas, and by using the online Virtual Human Embryo resource and UNSW Virtual Slides.
4. In some of the labs, guest lecturers will present their developmental biology research on a topic relevant to preceding lecture content.
5. We will have two wet lab practical classes where students will dissect and investigate life chicken embryos, determine the developmental stages, and annotate the structures.

### **Devices:**

Students are expected to bring their own devices (Laptop, MacBook, and/or smart phone with Moodle) to all the practical classes. There are limited loan iPads available in case students do not have their own device. Please contact [Annemiek](#) asap in case you require a loan iPad during the practical classes.

**3D Atlas of Human Development:**

In the practical classes we will be performing digital dissections of human embryos using the [3D Atlas of Human Development](#). This atlas consists of 14 3D-PDF files representing Carnegie stages 7 through to 23. The compressed files are freely available through [this link](#). Please download this 84Mb file at home before the practical classes.

**The Virtual Human Embryo:**

In practical classes we will use the online [Virtual Human Embryo](#) resource. The Virtual Human Embryo Project generated nearly 34 gigabytes of embryonic imagery encompassing all 23 stages of the human embryo. This \$3.2 million, 11-year initiative tapped the world's largest collection of human embryos to identify, digitize, and catalogue some of the best serial sections of normal human embryos ever seen. These images were then reviewed and labeled by one of the leading embryologists of the last half century, and are now available to researchers and educators everywhere.

**Protective Gear in Wet Lab Classes:**

Students should bring lab coats, safety glasses and fully enclosed shoes to the two fertile chicken egg practical classes.

**Revision opportunities:**

The embryology course has significant theory content. Therefore, time has been set apart in the practical classes for course content revision. It is highly recommended that students take advantage of these revision opportunities by asking questions in the lectures, in the practical classes, and on Sli.do and Moodle, and per email.

## COURSE PROGRAM (draft program, subject to changes)

[https://embryology.med.unsw.edu.au/embryology/index.php/ANAT2341\\_Course\\_Timetable\\_2019](https://embryology.med.unsw.edu.au/embryology/index.php/ANAT2341_Course_Timetable_2019)

Week	Lecture 1 Wednesday 9-10 am <a href="#">Mathews 227</a>	Lecture 2 Wednesday 10-11 am <a href="#">Mathews 227</a>	Lab Wednesday 11-1 pm Anatomy Lab 8B (unless advised otherwise)
1	Introduction	Fertilization	No practical class in week 1
2	Week 1/2	Week 3	Quiz, Smart sparrow (fertilization to implantation) Playdough embryo reconstruction activities The Virtual Human Embryo
3	Ectoderm and neural development	Mesoderm	Quiz 3DEmbryo dissections: implantation, cavitation, gastrulation, early embryogenesis Playdough embryo reconstruction activities The Virtual Human Embryo  Guest lecture: Rob Gilchrist
4	Endoderm, GI, respiratory tracts	Research technologies	Location: <a href="#">Wallace Wurth 120 (K-C27-120)</a> Quiz  Fertile egg prac: early embryogenesis Back up activity: Smart sparrow (GI tract)
5	Neural crest	Head	Midterm exam  Fabien Delerue – Transgenic technologies
6	Heart Lecturer: Nalini Pather	musculoskeletal	Quiz 3DEmbryo dissections: heart, musculoskeletal The Virtual Human Embryo Smart sparrow (GI tract and Head)  Guest lecture: Sally Dunwoodie
7	placental	endocrine	Location: <a href="#">Wallace Wurth 120 (K-C27-120)</a> Quiz  Fertile egg prac: organogenesis
8	genital	renal	Quiz 3DEmbryo dissections: urogenital system Smart Sparrow (sexual differentiation) The Virtual Human Embryo  Guest lecture: Kirsty Walters
9	integumentary	sensory	Quiz Smart sparrow exercises (implantation to 8 weeks) The Virtual Human Embryo  Guest lecture: Stuart Fraser
10	Fetal and birth Lecturer: Nalini Pather	Stem cells	Quiz Stem cell journal club

## **APPROACH TO LEARNING AND TEACHING**

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The learning and teaching philosophy underpinning this course is centred on student learning and aims to create an environment which interests and challenges students. The teaching is designed to be engaging and relevant to prepare students for future careers.

Although the primary source of information for this course is the lecture material, effective learning can be enhanced through self-directed use of other resources such as textbooks and Web based sources, and attendance of the practical classes. It is up to you to ensure you perform well in each part of the course; preparing for classes; completing assignments; studying for exams and seeking assistance to clarify your understanding.

## **TEXTBOOKS AND OTHER RESOURCES**

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These resources will take the form of textbooks, journal articles or web-based resources. Links to resources will be provided in the online Wiki and Moodle.

### **Textbooks:**

There are two embryology textbooks, either of which can be used for this course, both are online accessible through UNSW Library.

1. Moore, K.L., Persaud, T.V.N. & Torchia, M.G. (2015). The developing human: clinically oriented embryology (10th ed.). Philadelphia: Saunders.
2. Schoenwolf, G.C., Bleyl, S.B., Brauer, P.R., Francis-West, P.H. & Philippa H. (2015). Larsen's human embryology (5th ed.). New York; Edinburgh: Churchill Livingstone.

### **UNSW Embryology wiki pages:**

Content of each of the lectures is summarized on the [online embryology wiki pages](#). This is examinable material together with Annemiek's lecture slides, which are uploaded on the relevant lecture wiki page and on Moodle before each lecture. Please note that only the content of the main lecture page is examinable. Material available through links on the lecture page is provided for interest and will not be examined.

### **3D Atlas of Human Development:**

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## STUDENT LEARNING OUTCOMES

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1. Be able to describe human development, stem cell biology, regenerative medicine and organoid biology, and how major congenital abnormalities arise.
2. Be able to apply basic practical laboratory skills and work with embryo and regeneration models annotate embryonic structures, and define developmental stages.
3. Be able to communicate the contents of primary research articles in the field of stem cell research effectively and appropriately to an audience.
4. Be able to work effectively within a small team to complete academic tasks.
5. Demonstrate critical thinking and problem-solving skills in diverse contexts.
6. Be able to self-manage and work independently with an ability to take responsibility for their own learning, and an appreciation of the value of learning.

## ASSESSMENT PROCEDURES

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Assessments:

- |  |            |
|--|------------|
| • Individual assessment: weekly quizzes                      | <b>20%</b> |
| • Group project assessment: stem cell journal club (week 10) | <b>10%</b> |
| • Mid-term exam (1-hour duration, week 5)                    | <b>30%</b> |
| • End of session examination (2 hours duration)              | <b>40%</b> |

Exam dates for Term 3, 2019:

- Mid-term exam: Week 5 T3: 16 October 2019
- Final Exam: 29 November – 14 December 2019
- Supplementary exam: 13 – 17 January 2020

## COURSE EVALUATION AND DEVELOPMENT

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Each year constructive feedback is sought from students about the course and continual improvements are made based on this feedback.

The “[myExperience](#)” process of UNSW linked through Moodle or student email is the way in which student feedback is evaluated and significant changes to the course will be communicated to subsequent cohorts of students.

Furthermore, at the end of the course, we will also ask your feedback on specific aspects of the course in an independent and anonymous Survey Monkey survey.

Students are also welcomed to provide constructive feedback at any time in person or by email.

Course content, structure and assessment are continuously updated and revised based on the students’ feedback.

## LECTURE and PRACTICAL OUTLINES

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The [course timetable](#) is available online and shows references to the relevant textbook chapters for each lecture. Both textbooks are available online through the UNSW Library or as hardcopies.



Practical classes are linked from the online timetable and relate to either the weekly lecture content, specialised research topics or student assessment work.

## **PRACTICAL CLASSES**

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The wet lab practical classes are an opportunity for students to work with and observe life chicken embryos, which allows them to actively apply the knowledge obtained in the lectures. Safety information will be provided at the start of these classes and in the relevant practical class manuals.

Students must take due care with biological and hazardous material. They should wear lab coats, safety glasses and fully enclosed shoes. They have to make sure all equipment is left clean and functional. In the interests of safety, special attention should be paid to any precautionary measures recommended in the notes. If any accidents or incidents occur, they should be reported immediately to the demonstrator in charge of the class who will record the incident and recommend what further action is required.

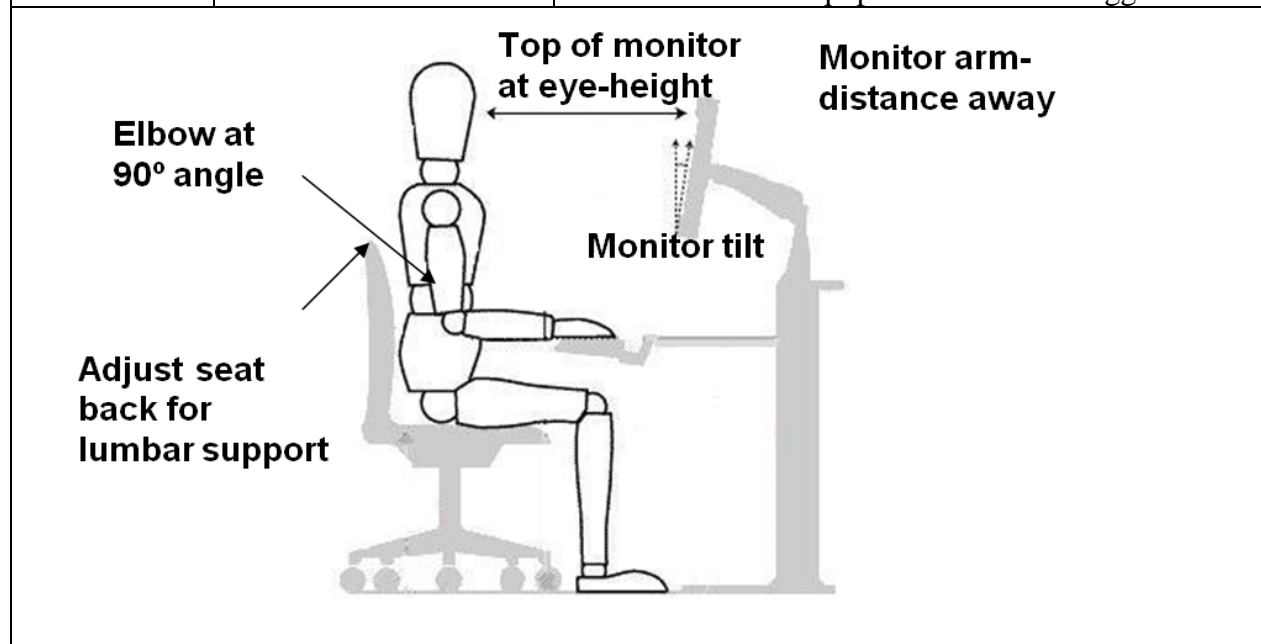
For more details see [Advice for Students-Practical Classes](#)

## HEALTH & SAFETY GUIDELINES

Generic safety rules for UNSW can be found at: [SAFETY.UNSW.EDU.AU](http://SAFETY.UNSW.EDU.AU) and for the School of Medical Sciences at [MEDICALSCIENCES.MED.UNSW.EDU.AU/STAFF/HEALTH-SAFETY](http://MEDICALSCIENCES.MED.UNSW.EDU.AU/STAFF/HEALTH-SAFETY)  
 Additional safety information will be provided for classes at other locations.

ScienceTeaching Laboratory Student Risk Assessment		ANAT2341 Wallace Wurth East G6-7 Term 3, 2019.
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Workstation set-up		
Ergonomics	Musculoskeletal pain.	Correct workstation set-up.
Electrical	Shock/fire	Check electrical equipment in good condition before use. All electrical equipment tested and tagged.



Personal Protective Equipment
Not necessary in these practicals. (specimens are fully sealed)

Emergency Procedures
In the event of an alarm, follow the instructions of the demonstrator. The initial sound is advising you to prepare for evacuation and during this time start packing up your things. The second sound gives instruction to leave. The Wallace Wurth assembly point is the lawn in front of the Chancellery. In the event of an injury, inform the demonstrator. First aiders contact details and Kit locations are on display by the lifts.

Clean up and waste disposal
No apparatus or chemicals used in these practicals.

Declaration
I have read and understand the safety requirements for these practical classes and I will observe these requirements. Student Number:..... Signature:..... Date:.....