Course outline

Code: BIM371
Title: Clinical Embryology

Faculty of: Science, Health, Education and Engineering
Teaching Session: Session 8
Year: 2016
Course Coordinator: Dr Anna Kuballa Email: akuballa@usc.edu.au
Course Moderator: Dr Mark Holmes Email: mholmes@usc.edu.au

1. What is this course about?

1.1 Course description
Clinical embryology introduces you to the application of Assisted Reproductive Technology (ART) used by in-vitro fertilisation (IVF) laboratories throughout the world. On completion of this course, you will be able to demonstrate and evaluate current knowledge of human reproduction; molecular genetics in clinical embryology; regulation, ethics and quality management of ART; early reproductive events and ART; assessment of embryo quality; and cryopreservation. You will be trained under the guidance of experienced IVF scientists and you will be placed for two days in a clinical IVF laboratory.

1.2 Course content
- Introduction to clinical embryology
- Physiology, anatomy, histology and endocrinology of human reproductive systems
- Molecular genetics in human clinical embryology
- Regulations and ethics in clinical embryology
- Early reproductive events and ART
- Assessment of embryo quality
- Cryopreservation techniques
- Quality management in clinical IVF laboratories
- Critical review of clinical embryology literature

2. Unit value

12 units
3. How does this course contribute to my learning?

<table>
<thead>
<tr>
<th>The specific learning outcomes that you will achieve by successful completion of this course:</th>
<th>You will be assessed on the learning outcome in task/s:</th>
<th>Completing these tasks successfully will contribute to you becoming:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate current knowledge of human male and female reproductive systems.</td>
<td>Task 1. Review Quiz Task 2. Literature Review</td>
<td>Knowledgeable.</td>
</tr>
<tr>
<td>Demonstrate an understanding of the skills and competencies used in ART as observed in Australian IVF laboratories.</td>
<td>Task 3. Oral Presentation</td>
<td>Empowered.</td>
</tr>
</tbody>
</table>

4. Am I eligible to enrol in this course?

Refer to the Undergraduate Coursework Programs and Awards - Academic Policy for definitions of “pre-requisites, co-requisites and anti-requisites”

4.1 Enrolment restrictions
Instructor consent required – Note: Due to restrictions on available clinical placements in industry, places in this course will be limited. Preference will be given to students enrolling into the Minor in Clinical Embryology.

4.2 Pre-requisites
LFS202 Systemic Physiology II

4.3 Co-requisites
Nil

4.4 Anti-requisites
Nil

4.5 Specific assumed prior knowledge and skills (optional)
It is recommended that students have prior knowledge and skills in advanced human physiology, human genetics, molecular biology and biochemistry.

5. How am I going to be assessed?

5.1 Grading scale
Standard – High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL)
5.2 Assessment tasks

<table>
<thead>
<tr>
<th>Task No.</th>
<th>(BIM371) Assessment Tasks</th>
<th>Individual or Group</th>
<th>Weighting</th>
<th>What is the duration/length?</th>
<th>When should I submit?</th>
<th>Where should I submit it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Review Quiz</td>
<td>Individual</td>
<td>30%</td>
<td>Multi-choice and short answer questions</td>
<td>Week 3 of Session 8</td>
<td>Held in class – venue to be determined</td>
</tr>
<tr>
<td>2</td>
<td>Literature review</td>
<td>Individual</td>
<td>40%</td>
<td>3000 words ± 10%</td>
<td>End of Week 7 of Session 8</td>
<td>Electronic via SafeAssign</td>
</tr>
<tr>
<td>3</td>
<td>Oral presentation</td>
<td>Individually or Pairs</td>
<td>30%</td>
<td>15 min + 5 min for questions</td>
<td>Exam week of Session 8</td>
<td>Held in class – venue to be determined</td>
</tr>
</tbody>
</table>

Assessment Task 1: Review Quiz (30%)

**Goal:** Demonstrate your knowledge of the theory associated with the physiology, anatomy/histology, endocrinology and molecular genetics associated with human male and female reproductive systems.

**Product:** Review quiz.

**Format:** The review quiz will contain multiple-choice questions and short answer questions. It will examine the course material covered during the lectures and practicals held during the first week of the course. The review quiz will be held during Week 3 of Session 8. You will complete your answers on a mark sense sheet and in an exam booklet. The review quiz is closed book.

**Criteria**

- You will be assessed on your ability to:
  - apply theoretical knowledge about the physiology, anatomy, histology, endocrinology and molecular genetics associated with human reproduction
  - analyse information and explain important elements of human reproduction
  - provide correct answers to multiple-choice and short answer questions

**Generic skill assessed**

- Problem solving: Graduate
- Communication: Graduate

Assessment Task 2: Literature Review (40%)

**Goal:** Demonstrate your understanding of the latest clinical research, ethical issues and regulatory considerations associated with an emerging ART in clinical embryology.

**Product:** Written literature review.

**Format:** You will be expected to prepare and submit a literature review in which you will review the most recent clinical research related to the technical, ethical and regulatory aspects associated with an emerging ART in clinical embryology. Your assignment will have an abstract, introduction and orientation, main body and conclusion. The literature review question and guidance on how to prepare the literature review will be provided to you at the beginning of the course. Your literature review will be a maximum of 3000 words (± 10%) in text, not including references, and is due at the end of Week 7 of Session 8.
**Course Outline:**  BIM371 Clinical Embryology

**Criteria**
You will be assessed on your level of achievement on:

- preparation of an abstract for the review (10%)
- introduction and orientation to the review (10%)
- analysis of the literature and depth of understanding of the topic, and use of primary and secondary sources of literature selected for the review (50%)
- concluding remarks to the review (5%)
- overall presentation and formatting of the review (15%), including word count, structure and formatting, quality of written expression, citations and referencing
- writing style (10%), including sentence structure, spelling and grammar.

<table>
<thead>
<tr>
<th>Generic skill assessed</th>
<th>Skill assessment level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information literacy</td>
<td>Graduate</td>
</tr>
<tr>
<td>Communication</td>
<td>Graduate</td>
</tr>
</tbody>
</table>

**Assessment Task 3: Oral Presentation (30%)**

**Goal:** Research and develop your understanding of an ART that you experienced while on placement in a clinical IVF laboratory.

**Product:** Completion individually or in pairs of a 15-minute oral presentation, followed by a 5-minute open question time.

**Format:** You will be required to prepare and deliver either individually or in pairs an oral presentation that critically analyses the scientific basis of an ART that you experienced while on 2-day placement in a clinical IVF laboratory. Guidance on how to prepare the oral presentation will be provided to you during the course.

**Criteria**
Your group will be assessed according to their:

- synthesis of information and understanding of the ART chosen (30%)
- critical analysis of the ART chosen (30%)
- communication skills in delivering the oral presentation (30%),
- time management (10%)

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<tr>
<td>Organisation</td>
<td>Graduate</td>
</tr>
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</table>

**5.3 Additional assessment requirements**

**Blackboard**
As a student enrolled in this course you will have access to course information on the Blackboard site. You are strongly recommended to log onto the course site on a regular basis. All course announcements, course changes, posting of course materials and grades (via My Interim Results) will be accessed through Blackboard. It is your responsibility to ensure you have adequate internet access (either off campus or on-campus) in order to access Blackboard regularly and to complete required assessment tasks.

**Safe Assign**
In order to minimise incidents of plagiarism and collusion, this course may require that some of its assessment tasks are submitted electronically via Safe Assign. This software allows for text comparisons to be made between your submitted assessment item and all other work that Safe Assign has access to. If required, details of how to submit via Safe Assign will be provided on the Blackboard site of the course.
Eligibility for Supplementary Assessment
A student’s eligibility for supplementary assessment in a course is dependent on the following conditions applying:

a) The final mark is in the percentage range 47% to 49.4%
b) The course is graded using the Standard Grading scale
c) The student has not failed an assessment task in the course due to academic misconduct.

5.4 Submission penalties
Late submission of assessment tasks will be penalised at the following maximum rate:

- 5% (of the assessment task’s identified value) per day for the first two days from the date identified as the due date for the assessment task.
- 10% (of the assessment task’s identified value) for the third day
- 20% (of the assessment task’s identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.
- A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task.

Weekdays and weekends are included in the calculation of days late.

To request an extension you must contact your course coordinator to negotiate an outcome.

6. How is the course offered?

6.1 Directed study hours
Lectures: 2 hrs per day (total 20hrs) Weeks 2 and 5 of session 8
Practicals: 2hrs for 8 days (total 16hrs) Weeks 2 and 5 of session 8
Tutorials: 2hrs for 2 days (total 4hrs) Weeks 2 and 5 of session 8
Clinical placement: 2-day full-time placement at a clinical IVF laboratory in Brisbane

6.2 Teaching semester/session(s) offered
Session 8 each year

6.3 Course activities

<table>
<thead>
<tr>
<th>Teaching Week / Module</th>
<th>What key concepts/content will I learn?</th>
<th>Directed Study Activities</th>
<th>Independent Study Activities</th>
</tr>
</thead>
</table>
| Day 1                  | Lecture 1: Overview of the physiology, anatomy, histology and endocrinology of the human male reproductive system  
- Male reproductive anatomy and endocrinology  
- Spermatogenesis  
- Conception and implantation  
Fertilisation and pronuclear development, parthenogenesis, triploidy  
Practical 1: Histology of the male and female reproductive systems  
Fleming & Cooke (2005), Chapter 2.  
Also familiarise yourself with the additional readings provided for Lecture 2 and Practical 2. |
| Day 2                  | Lecture 2: Overview of the physiology, anatomy, histology and endocrinology of the human female reproductive system  
- Female reproductive anatomy and endocrinology  
- The menstrual cycle  
- Oocyte maturation, ovulation and meiosis  
Practical 2: Determination of reproductive hormones in blood serum using immunoassays.  
Fleming & Cooke (2005), Chapter 1.  
Also familiarise yourself with the additional readings provided for Lecture 3. and Practical 3. |
| Day 3 | Lecture 3: Genetics in Assisted Reproductive Technology  
- DNA concept overview  
- Genetics - heredity  
- Chromosomal sex determination  
- Mosaicism  
- Mitochondrial disorders  
- Genomic imprinting  
- Molecular diagnostic techniques | Practical 3:  
The role of PGD in ART | Familiarise yourself with the readings provided for Lecture 4 and Practical 4.  

| Day 4 | Lecture 4: Introduction to clinical embryology  
- ART in Australia  
- IVF laboratory set-up  
- Occupational health and safety  
- Aseptic technique and infection control  
- RTAC technical bulletin 4 – patient and sample identification | Practical 4:  
The application of aseptic techniques in ART | Fleming & Cooke (2005), Chapter 6.  
Also familiarise yourself with the additional readings provided for Lecture 1 and Practical 1.  

| Day 5 | Lecture 5: Regulations and ethics in clinical embryology  
- Historical overview of ART Regulation worldwide  
- Regulation of ART in Australia- RTAC Code of Practice  
- State legislation within Australia  
- Impact of regulation in ART  
- Ethical considerations in ART treatment  
- Research and future developments in ART | Tutorial 1:  
Regulatory and ethical case studies in clinical embryology | Fleming & Cooke (2005), Chapter 21.  
Also familiarise yourself with the provided readings for Lecture 5 and Tutorial 1, and refer to the RTAC Code of Practice:  
www.fsa.au.com/rtac  

| Day 6 | Lecture 6: Early reproductive events and ART (Part A)  
- Female infertility factors, diagnosis and treatment options  
- Ovarian stimulation regimes and cycle planning  
- Oocyte maturation, ovulation and resumption of meiosis in ART  
- Oocyte pick-up | Practical 5:  
Working in the IVF laboratory | Fleming & Cooke (2005), Chapters 2 and 3.  
Also familiarise yourself with the additional readings provided for Lecture 6 and Practical 5.  

| Day 7 | Lecture 7: Early reproductive events and ART (Part B)  
- Male factor diagnosis and treatment options  
- Capacitation, acrosome reaction, seminal analysis, hyaluronan binding and clinical significance  
- Semen preparation  
- Testicular sperm  
- Sperm-oocyte interaction, fertilisation and pronuclear development | Practical 6:  
Sperm quality assessment for IVF | Fleming & Cooke (2005), Chapters 7, 8 and 9.  
Also familiarise yourself with the additional readings provided for Lecture 7 and Practical 6.  

Fleming & Cooke (2005), Chapters 2, 3, 6, 7, 8 and 9.
|-------|------------------------------------------------|--------------------------------------|---------------------------------------------  
|       | Early embryo development                        |                                      | Also familiarise yourself with the additional readings provided for Lecture 8 and Practical 7.  
|       | Embryo grading system                           |                                      |                                               
|       | Assessing embryo quality                        |                                      |                                               
|       | Embryo developmental markers                    |                                      |                                               
|       | Embryo selection for transfer/freezing          |                                      |                                               
|       | Culture systems and media                       |                                      |                                               
|       | Incubation systems                              |                                      |                                               
|       | Insemination methods                            |                                      |                                               
|       | Embryo culture                                  |                                      |                                               
|       | Embryo biopsy and assisted hatching             |                                      |                                               
|       | Principals of slow freezing and vitrification   |                                      | Also familiarise yourself with the additional readings provided for Lecture 9 and Practical 8.  
|       | Techniques of semen, oocyte,                    |                                      |                                               
|       | embryo and blastocyst freezing                  |                                      |                                               
|       | Freezing media and storage devices              |                                      |                                               
|       | Long-term storage systems                       |                                      |                                               
|       | Maintenance and auditing storage                |                                      |                                               
|       | Thawing survival and pregnancy results          |                                      |                                               
| Day 9 | Lecture 10: Quality Management in Australian IVF Laboratories | Tutorial 2: Clinical case studies in ART | Familiarise yourself with the readings provided for Lecture 10 and Tutorial 2.  
|       | Overview of Quality Management Systems (QMS) in ART |                                      |                                               
|       | Why is a QMS Important?                         |                                      |                                               
|       | Implementation of QMS in ART                    |                                      |                                               
|       | At the completion of Lecture 10, your course lecturers will be discussing the requirements for the 2-day clinical placements. |                                      |                                               
| Day 10| Lecture 10: Quality Management in Australian IVF Laboratories | Tutorial 2: Clinical case studies in ART | Familiarise yourself with the readings provided for Lecture 10 and Tutorial 2.  
|       | Students will complete in pairs a 2-day work-placement at a Fertility Clinic in Brisbane. These placements will be supervised by an experienced IVF scientist. | Students will be allocated to one of four groups (Groups 1-4) and must be available to attend the placement on the allocated dates. | Familiarise yourself with BIM371 lecture and tutorial theory, practical notes and readings for the course while on placement.  

Please note that the course activities may be subject to variation.
7. What resources do I need to undertake this course?

7.1 Prescribed text(s)
Please note that you need to have regular access to the resource(s) listed below:

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Title</th>
<th>Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. Fleming and S. Cooke</td>
<td>2005</td>
<td>Textbook of Assisted Reproduction for Scientists in Reproductive Technology</td>
<td>Vivid Publishing, Fremantle, WA, Australia (Note: a copy of this textbook will be purchased for you as it is published by the Fertility Society of Australia).</td>
</tr>
</tbody>
</table>

7.2 Required and recommended readings
Lists of required and recommended readings may be found for this course on its Blackboard site. These materials/readings will assist you in preparing for tutorials and assignments, and will provide further information regarding particular aspects of your course.

7.3 Specific requirements
You will be expected to purchase the BIM371 Course Practical Manual from USC Mail and Print Services (MaPS) on the ground floor of Building J. In addition, you will be required to bring along a laboratory coat, safety glasses and closed non-slip footwear to the course practical classes. For the 2-day clinical placements, you will be expected to travel to a Brisbane-based fertility centre at your own cost, and you will be expected to dress professionally for the placement; all personal protective equipment (lab coat, safety glasses etc) will be provided by the fertility centre laboratory staff. You will be referred to government websites that contain important documents that outline guidelines and information associated with clinical embryology in Australia, and you will be referred to the following journals:
4. Molecular Biology
5. Fertility and Sterility (www.fertstert.org)
6. Other journals in human and animal reproductive biology

7.4 Risk management
There is minimal health and safety risk in this course. It is your responsibility to familiarise yourself with the Health and Safety policies and procedures applicable within campus areas.

8. How can I obtain help with my studies?
In the first instance you should contact your tutor, then the Course Coordinator. Additional assistance to all students through Peer Advisors and Academic Skills Advisors. You can drop in or book an appointment. To book: Tel: +61 7 5430 2890 or Email: student_central@usc.edu.au
9. **Links to relevant University policies and procedures**

For more information on Academic Learning & Teaching categories including:
- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Administration of Central Examinations
- Deferred Examinations
- Student Academic Misconduct
- Students with a Disability


10. **Faculty specific information**

**In person:**
- **Sippy Downs** - Student Central, Ground Floor, Building C
- **USC SouthBank** - Student Central, Building B, Ground floor (level 1)
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **USC Fraser Coast** - Student Central, Building A

**Tel:** +61 7 5430 2890

**Email:** studentcentral@usc.edu.au