1. **What is this course about?**

1.1 **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 topics**
- 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 Assisted Reproductive Technology (ART)
- Assessment of embryo quality
- Cryopreservation techniques
- Quality management in clinical IVF laboratories
- Critical review of clinical embryology literature

2. **What level is this course?**
300 level Graduate - Independent application of graduate knowledge and skills. Meets AQF and professional requirements. May require pre-requisites and developing level knowledge/skills. Normally taken in the 3rd or 4th year of an undergraduate program

3. **Unit value**
12 units
4. **How does this course contribute to my learning?**

<table>
<thead>
<tr>
<th>Specific Learning Outcomes</th>
<th>Assessment Tasks</th>
<th>Graduate Qualities or Professional Standards mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>On successful completion of this course you should be able to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate current knowledge of human male and female reproductive systems.</td>
<td>Task 1. Mid-semester Exam 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>

5. **Am I eligible to enrol in this course?**

Refer to the [USC Glossary of terms](#) for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1 **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.

5.2 **Pre-requisites**

LFS202

5.3 **Co-requisites**

Nil

5.4 **Anti-requisites**

Nil

5.5 **Specific assumed prior knowledge and skills (where applicable)**

It is recommended that students have prior knowledge and skills in advanced human physiology, human genetics, molecular biology and biochemistry.

6. **How am I going to be assessed?**

6.1 **Grading scale**

Standard – High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL)

6.2 **Details of early feedback on progress**

In week 2 of this course you will participate in tutorial and laboratory classes which have formative questions based on the topics and content covered to date, these will be discussed in class. This will provide an opportunity to revise your understanding of each topic and prepare you for the mid-semester exam.
6.3 Assessment tasks

<table>
<thead>
<tr>
<th>Task No.</th>
<th>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>Mid-semester exam</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 6 of Session 8</td>
<td>Electronic via SafeAssign</td>
</tr>
<tr>
<td>3</td>
<td>Oral presentation</td>
<td>Individual 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>

100%

Assessment Task 1: Mid-semester exam (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:** Mid-semester exam

**Format:** The mid-semester exam 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 mid-semester exam 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 mid-semester exam 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

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%), not including references, and is due at the end of Week 6 of Session 8.

**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%)
- Creativity and flow (15%) - Creativity of the visual component and appropriate link to (and flow of) the written text. Ability of your assignment to evoke interest in, and understanding of, the topic in the reader.
- writing style (10%), including sentence structure, spelling and grammar
- presentation and formatting of the review (5%), including word count, in-text citations and referencing
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 5-minutes of 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, critical analysis and understanding of the ART chosen (50%)
- creativity and flow of the presentation (20%)
- communication skills in delivering the oral presentation (25%),
- time management (5%)

7. What are the course activities?

7.1 Directed study hours

The directed study hours listed here are a portion of the workload for this course. A 12 unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Directed study hours may vary by location. Student workload is calculated at 12.5 learning hours per one unit.

<table>
<thead>
<tr>
<th>Location:</th>
<th>Directed study hours for location:</th>
</tr>
</thead>
</table>
| USC Sunshine Coast | Lecture: 2hrs per day (total 20hrs) Weeks 2 and 6 of session 8 (comprised of 1-hr lecture followed by 1-hr lectorial)  
Practical: 2hrs for 8 days (total 16hrs) Weeks 2 and 6 of session 8  
Tutorial: 2hrs for 2 days (total 4hrs) Weeks 2 and 6 of session 8  
Placement: 2-day full-time placement at a clinical IVF laboratory |

7.2 Course content

<table>
<thead>
<tr>
<th>Week # / Module #</th>
<th>What key concepts/content will I learn?</th>
</tr>
</thead>
</table>
| Day 1 | Lecture 1: Introduction to Embryology Techniques  
- Introduction to embryology lab skills and equipment  
- Aseptic techniques and infection control  
**Practical 1:** Introduction to IVF Laboratory Equipment and Techniques |
| 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. |
| Day 3 | Lecture 3: 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 3:** Histology of the male and female reproductive systems |
| Day 4 | Lecture 4: Genetics in Assisted Reproductive Technology  
- DNA concept overview  
- Genetics - heredity  
- Chromosomal sex determination  
- Mosaicism  
- Mitochondrial disorders  
- Genomic imprinting  
- Molecular diagnostic techniques  
**Practical 4:** The role of PCD in ART |
| 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 |
| Day 6 | Lecture 6: Introduction to clinical embryology  
- What are ARTs?  
- IVF laboratory set-up  
- Culture systems and media  
- Incubation systems  
- Oocyte recovery  
- Sperm preparation for IVF/ICSI  
- Insemination methods  
- Fertilisation & Embryo culture  
- Embryo biopsy and assisted hatching  
- RTAC technical bulletin 4 – patient and sample identification  
**Practical 5:** Working in the IVF laboratory |
| Day 7 | Lecture 7: Male and female infertility factors  
- Male & female infertility factors, diagnosis and treatment options  
**Practical 6:** Sperm quality assessment for IVF |
| Day 8 | Lecture 8: Early reproductive events and ART  
- Ovarian stimulation regimes and cycle planning  
- Oocyte maturation, ovulation and resumption of meiosis in ART  
- Oocyte pick-up  
- Capacitation, acrosome reaction, seminal analysis, hyaluronan binding and clinical significance  
- Semen preparation  
- Testicular sperm  
- Insemination methods  
- Sperm-oocyte interaction, fertilisation and pronuclear development  
- Early embryo development  
- Embryo grading system  
- Assessing embryo quality  
- Embryo developmental markers  
- Embryo selection for transfer/freezing  
- Embryo culture  
- Embryo biopsy and assisted hatching  
**Practical 7:** Sperm preparation for IVF |
| Day 9 | Lecture 9: Cryopreservation |
Course Outline: BIM371 Clinical Embryology

- Principals of slow freezing and vitrification
- 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

Practical 8: Techniques in cryopreservation: Vitrification

Day 10

Lecture 10: Quality Management in Australian IVF Laboratories
- 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.

Tutorial 2: Clinical case studies in ART

2-Day Clinical Placement (Held during wk 7 of Session 8)

Students will complete in pairs a 2-day work-placement at a Fertility Clinic. These placements will be supervised by an experienced IVF scientist.

Please note course content is subject to variation.

8. What resources do I need to undertake this course?

Please note that course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Blackboard site. Please log in as soon as possible.

8.1 Prescribed text(s)

Please note that you need to have regular access to the resource(s) listed below as they are required:

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Title</th>
<th>Publisher</th>
</tr>
</thead>
</table>

8.2 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 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 cost, 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
9. **Risk management**

Health and safety risks have been assessed as low.

It is your responsibility as a student to review course material, search online, discuss with lecturers and peers, and understand the health and safety risks associated with your specific course of study. It is also your responsibility to familiarise yourself with the University’s general health and safety principles by reviewing the online [Health Safety and Wellbeing training module for students](#), and following the instructions of the University staff.

10. **What administrative information is relevant to this course?**

10.1 **Assessment: Academic Integrity**

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Blackboard, are electronically checked through SafeAssign. This software allows for text comparisons to be made between your submitted assessment item and all other work that SafeAssign has access to.

10.2 **Assessment: Additional requirements**

**Eligibility for Supplementary Assessment**

Your eligibility for supplementary assessment in a course is dependent of 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) You have not failed an assessment task in the course due to academic misconduct

10.3 **Assessment: 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 and supply the required documentation to negotiate an outcome.
10.4 Study help
In the first instance, you should contact your tutor, then the Course Coordinator. Additional assistance is provided to all students through Academic Skills Advisers. To book an appointment or find a drop-in session go to Student Hub.
Contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au

10.5 Links to relevant University policy 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

Visit the USC website:
http://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching

10.6 General Enquiries
In person:
- USC Sunshine Coast - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- USC South Bank - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- USC Gympie - Student Central, 71 Cartwright Road, Gympie
- USC Fraser Coast - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay
- USC Caboolture - Student Central, Level 1 Building J, Cnr Manley and Tallon Street, Caboolture

Tel: +61 7 5430 2890
Email: studentcentral@usc.edu.au