



Course Curriculum

MASTER OF SCIENCE (Clinical Embryology) Sem-3 and 4

The Course Curriculum of Master of Science (Clinical Embryology) was proposed and drafted by **Academic and Curriculum Committee of Biotechnology** under the Faculty of Science in the meeting held on 22-07-2025 and recommended to '**BOARD OF STUDIES**' for approval.

Dr. Jay Bergi

**Chairman, Academic
& Curriculum Committee
Science**

**Place of the meeting
Sarvajani University Office**


Sign

The proposed Course Curriculum was approved by **Board of Studies; Science** under the Faculty of Science in the meeting held on 08-08-2025 and was recommended to the '**FACULTY**' for approval.

Dr. Chaulami Desai

**Chairman,
Board of Studies- Science**

**Place of the meeting
Sarvajani University Office**


Sign

The Course Curriculum approved by the **Faculty of Science** in the meeting held on 16-05-2025 and was recommended to '**ACADEMIC COUNCIL**' for approval.

Dr. Chaulami Desai

**Chairman &
Dean, Faculty of
Science**

**Place of the meeting
Sarvajani University Office**


Sign

The Course Curriculum approved by the '**Academic Council of Sarvajani University**' in the meeting held on 28-05-2025.

Mr. Ashish Desai

**Member Secretary,
Academic Council
& I/c. Registrar,
Sarvajani University**

**Place of the meeting
Sarvajani University Office**


Sign

- *The approved curriculum of Master of Science (Clinical Embryology) is with effect from the Academic year 2025-26 and to be reviewed before 2027-28*



CURRICULUM FOR

“MASTER OF SCIENCE (CLINICAL EMBRYOLOGY)”

M.Sc. (Clinical Embryology)

SEM – 3 and 4

w.e.f. Academic Year 2025-26

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VISION

To provide equal opportunities for value based global education for creating an Enlightened Society

MISSION

To establish and facilitate educational institutions in the region for providing affordable value based global education to all who aspire to study and to create opportunities to educators, social workers and philanthropists to serve society



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creating an enlightened society...

UNIVERSITY OFFICE

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Constituent Institute:

**Shree Ramkrishna Institute of
Computer Education and Applied
Sciences (SRKI)**



SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE



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Department of Biotechnology
M.Sc. Clinical Embryology
in collaboration with
BLISS IVF - Fertility & Andrology
Institute, Surat



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FACULTY OF SCIENCE



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Faculty of Science
M. Sc. (Clinical Embryology)
SEM 3 and 4

DETAILED CURRICULUM

(W.E.F. 2025-26)



SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE

Semester 3



Sarjanik University
Faculty of Science
Exam Scheme for M.Sc. (Clinical Embryology) A.Y. 2025-26

Semester - III (2025-26)													
Sr No	Course Code	Group	Subjects	Credit	Hours / Week			Internal				External	Total
					Lecture	Practical	Total	CCE/ Internal Practical Test and Viva Voce	Attendance	Assignment/ Practical continuous evaluation	Total		
1	MSBT11323	DSC-5	Assisted Reproductive Technology (ART) - II	4	4		4	40	10	20	70	30	100
2	MSBT11324	DSC-6	Infertility Counseling and Ethical Regulations	4	4		4	40	10	20	70	30	100
3	MSBT13310	SEC-3	Oocyte and Embryology Lab Techniques	4	4		4	40	10	20	70	30	100
4	MSBT16312		Practical	8	-		16	60	10	70	140	60	200
5	MSBT12313	DSE-3	Lifestyle and Non-communicable Diseases	4	4		4	40	10	20	70	30	100
		Total		24	16	8	32	220	50	150	420	180	600



Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	M.Sc.CE		
Year	II		Version	1		
Semester	III		Effective From	July 2025		
Course Code	MSBT11323	Course Name	Assisted Reproductive Technology (ART) - II			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CCE)	Term end examinations (SEE)	Total
4	4	0	0	70	30	100



Name of Faculty: Science	Department: Biotechnology
Program: M.Sc. Clinical Biotechnology	Type: Core
Subject: DSC-5 Assisted Reproductive Technology (ART) - II	Semester: 3
Credit: 04 + 02	Total Learning Hours: 60 h + 60 h
Course Description: The course encompasses the advanced techniques used in the Assisted Reproductive Technology laboratory. The future aspects of the development in the field of ART is also covered here.	
Student Learning Outcome: After completion of this course student will be able to: <ol style="list-style-type: none"> 1. Understand about the regimen for hormones and the administration protocols for IVF patients. 2. Learn preparation of media and set up for Embryo culture in IVF center. 3. Learn assessment and preparation of patients for IVF cycle. 4. Know recent advancements and future developments in the ART techniques. 	

Unit 1 In vitro fertilization & Treatments (6 hours)

- 1.1 Selection and Preparation of Patients
- 1.2 Clinical Management of Treatment Cycle
- 1.3 Troubleshooting in COH (Controlled Ovarian Hyperstimulation) for IVF
- 1.4 Advantages and Disadvantages of COH in IVF

Unit 2 Gonadotropins and antagonists in ART (7 hours)

- 2.1 Gonadotropin preparations and choice of dosage and monitoring
- 2.2 GnRH Agonist (GnRH-A)-Mechanism of action, administration protocols, Advantages and side effects
- 2.3 GnRH Antagonist
- 2.4 Recombinant Gonadotropins

Unit-3 OHSS & Multifetal Pregnancy Reduction (7 Hours)

- 3.1 OHSS (Ovarian Hyper Stimulation Syndrome)
- 3.2 Fertility preservation Oncology
- 3.3 Ovarian Rejuvenation from Innovation to Intervention
- 3.4 Incidences & Methods of Multifetal Pregnancy Reduction

Unit-4 Culture media in IVF and Embryo culture (7 Hours)

- 4.1 Types of Embryo Culture Media and composition
- 4.2 Physiology of Sequential Culture Media
- 4.3 Quality Control for Culture Media
- 4.4 Essentials of Handling Media & Culture Media

Unit-5 Endometrial receptivity and luteal support (9 Hours)

- 5.1 Endometrial receptivity and factors affecting implantation
- 5.2 Proteomics, Secretomics, and Lipidomics of Endometrial Receptivity
- 5.3 Strategies to assess Endometrial receptivity
- 5.4 Treatment of Poor Uterine Receptivity



Unit-6 Selection and preparation of IVF patients (8 Hours)

6.1 Indications of IVF

6.2 Infection Screen

6.3 Assessment of Female and treatment of specific pathology

6.4 Assessment of Male

Unit-7 Stem cells; Therapeutic and Regenerative Medicine (8 Hours)

7.1 Stem cells - Types, Differentiation and Localization

7.2 Pluripotent cells and Multipotent cells - It's sources

7.3 Germ cell differentiation from ESCs / iPSCs- Future Challenges and Implications

7.4 Current lines of Research in Infertility

Unit-8 Future development in ART (8 Hours)

8.1 3D Bioprinting and organoids

8.2 Automation in ICSI & Advanced Techniques in ART

8.3 AI in IVF

8.4 Simplifying IVF program satellite module

8.5 Personalized IVF protocols

References:

1. Textbook of Assisted Reproductive Techniques Volume 1: Lab Perspectives by David Gardner, Areil Weissman, Colin M Howles, Zeev Shoham, CRC Press, 5th Edition
2. Varghese, Alex C., Peter Sjoblom, and K. Jayaprakasan. A Practical Guide To Setting Up An Ivf Lab, Embryo Culture Systems and Running the Unit. JP Medical Ltd, 2013.
3. Nagy, Zsolt Peter, Alex C. Varghese, and Ashok Agarwal, eds. "In Vitro Fertilization: A Textbook Of Current And Emerging Methods And Devices." (2019).

Practicals:

- 1) Study of protocols for aseptic handling.
- 2) To study the preparation of culture media and labwares for culture in the IVF center.
- 3) To study Total Viability Count of animal cells.



Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	M.Sc.CE		
Year	II		Version	1		
Semester	III		Effective From	July 2025		
Course Code	MSBT11324	Course Name	Infertility Counseling and Ethical Regulations			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CCE)	Term end examinations (SEE)	Total
4	4	0	0	70	30	100



Name of Faculty: Science	Department: Biotechnology
Program: M.Sc. Clinical Biotechnology	Type: Theory + Practical
Subject: DSC-6 Infertility Counselling And Ethical Regulations	Semester: 3
Credit: 04 + 02	Total Learning Hours: 60 h + 60 h
Course Description: This Course will make students ready with all relevant background of Counselling & Ethics in ART. It will provide fundamental knowledge about key concepts of Infertility, Counselling & ART bills.	
Student Learning Outcome: After completion of this course student will be	
<ul style="list-style-type: none"> ● well informed about Counselling Skills, Infertility, Regulations & Bioethical issues of IVF. ● will be able to identify the psychological issues of infertile couples. ● will be skilled for counselling infertile patients & manage social, legal, ethical problems related to IVF. 	

Unit -1 Introduction to Counselling (06 hours)

- 1.1 Definition, Need & Importance of Counselling
- 1.2 Goals of Counselling
- 1.3 Dos & Don't s of a Counsellor
- 1.4 Process of Counselling

Unit 2 Counselling Skills (08 Hours)

- 2.1 Active Listening & Art of Questioning
- 2.2 Communication Skills
- 2.3 Reflective & Assessment Skills
- 2.4 Collaborative Approach & Group counselling

Unit 3 Introduction to Infertility (07 Hours)

- 3.1 Definition & types of Infertility
- 3.2 Causes of Infertility
- 3.3 Male & Female Infertility
- 3.4 Diagnosis, Treatment & Prevention of Infertility

Unit-4 Infertility Counselling (05 Hours)

- 4.1 Infertile Couple Counselling
- 4.2 Genetic Counselling of Infertile Patient & Sexual Counselling of patient
- 4.3 Recipient Counselling for Donor Insemination
- 4.4 Recipient Counselling for Egg, Sperm & Embryo donation.

Unit-5 Introduction to Ethics (08 Hours)

- 5.1 Definitions & History of Ethics & Bioethics
- 5.2 Branches of Ethics
- 5.3 Need of Bioethics
- 5.4 Applications of Bioethics



Unit-6 Legislations in ART (07 Hours)

- 6.1 ART Regulation Bill (2020)
- 6.2 Surrogacy Regulation Bill (2020)
- 6.3 Guidelines for ART Clinics by ICMR
- 6.4 Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act

Unit-7 Ethical, Legal & Social Aspects in ART - 1 (09 Hours)

- 7.1 Infertility Counselling
- 7.2 Regulations in Clinical Practices
- 7.3 PGD & PCPNDT
- 7.4 Surrogacy

Unit-8 Ethical, Legal & Social Aspects in ART - 2 (08 Hours)

- 8.1 Gametes, Ovarian Cortex Freezing & Embryo Donation & Cryopreservation
- 8.2 AI, Bio-bank & Big data
- 8.3 Rights of a child born by Donor Gametes
- 8.4 Reproductive Rights

References:

1. Basic Counselling Skills by Richard Nelson- Jones, Sage Publication
2. Counseling & Guidance by S Narayana Rao & Prem Sahajpal , McGraw Hill Pub.
3. Step by Step Protocols in Clinical Embryology & ART – Pankaj Talwar & Surveen Ghumman Sindhu, Jaypee Brothers medical Pub
4. IVF Techniques for the beginners – Kuldeep Jain & Pankal Talwae, Jaypee Brothers Medical Pub.
5. A Practical Guide To Setting Up An Ivf Lab, Embryo Culture Systems & Running The Unit – Alex C Varghese, peter Sjoblom & K Jayaprakasan, Jaypee brothers' medical Pub
6. Textbook of Assisted Reproductive Techniques Volume 1: Lab Perspectives by David Gardner, Areil Weissman, Colin M Howles, Zeev Shoham, CRC Press, 5th Edition
7. Textbook of Assisted Reproductive Techniques Volume 2: Clinical Perspectives by David Gardner, Areil Weissman, Colin M Howles, Zeev Shoham, CRC Press, 5th Edition
8. https://main.icmr.nic.in/sites/default/files/art/ART_Pdf.pdf
9. <https://www.indiacode.nic.in/bitstream/123456789/8399/1/pre-conception-pre-natal-diagnostic-techniques-act-1994.pdf>
10. <http://artsurrogacy.gov.in/>

Practicals:

- 1) Practice session & Demo of Counselling
- 2) Visit to a Psychological Counselling Center
- 3) Case Study on ELSI related to IVF



Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	M.Sc.CE		
Year	II		Version	1		
Semester	III		Effective From	July 2025		
Course Code	MSBT16312	Course Name	Practical			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CCE)	Term end examinations (SEE)	Total
8	0	0	8	140	60	200



Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	M.Sc.CE		
Year	II		Version	1		
Semester	III		Effective From	July 2025		
Course Code	MSBT13310	Course Name	Oocyte and Embryology Lab Techniques			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CCE)	Term end examinations (SEE)	Total
4	4	0	0	70	30	100



Name of Faculty: Science	Department: Biotechnology
Program: M.Sc. Clinical Embryology	Type: Theory + Practical
Subject: SEC- 3 Oocyte And Embryology Lab Techniques	Semester: 3
Credit: 04 + 02	Total Learning Hours: 60 h + 60 h
Course Description: This course covers advanced techniques in oocyte and embryology labs, including ovum pick-up, oocyte selection, intracytoplasmic sperm injection (ICSI), embryo transfer, embryo grading, assisted hatching, ovarian hyper stimulation syndrome (OHSS), multifetal pregnancy reduction, and biopsy procedures.	
Student Learning Outcome: By the end of this course, students will be able to understand, link, apply, and learn the various laboratory techniques associated with oocyte and embryology like OPU, ICSI, ET, OHSS, Biopsy etc	

Unit -1 Ovum Pick Up (OPU) (8 hours)

- 1.1 Important Issues, Equipment & reagents needed for OPU
- 1.2 Process of Ovum Retrieval
- 1.3 Common Problems of OPU
- 1.4 Complications During OPU

Unit 2 Oocyte Selection (6 hours)

- 2.1 Oocyte Maturity Assessment
- 2.2 Cumulus-Oocyte Complex (COC) Assessment
- 2.3 Polar Body & Zona Pellucida Assessment, Cytoplasm Assessment
- 2.4 Genetic Screening & Quality Grading

Unit 3 Introduction to ICSI (9 hours)

- 3.1 Instrumentations, Microscope set up & Microtools for ICSI
- 3.2 Preparation of Culture dish & Sperm
- 3.3 Process of ICSI
- 3.4 Special Circumstances of Applying ICSI

Unit-4 Embryo Transfer (ET) (8 Hours)

- 4.1 Factors Affecting ET
- 4.2 Issues to be Addressed Before & During ET
- 4.3 Process of ET
- 4.4 Issue to be Addressed Post ET

Unit-5 Embryo Grading (8 Hours)

- 5.1 Implantation potential
- 5.2 Fertilization Assessment
- 5.3 Pronuclei & Blastocyst Scoring
- 5.4 Evaluation of Embryo Quality Grading

Unit-6 Assisted Hatching (AH) (7 Hours)

- 6.1 General Principles for AH
- 6.2 Excessive Fragmentation
- 6.3 Poor Embryo Growth Rate/Morphology
- 6.4 Assisted Hatching using Acidic Tyrode's Solution



Unit-7 Multiplication of Embryos and Gametes (7 Hours)

- 7.1 Embryo Cloning and Gamete Cloning
- 7.2 Nuclear Transplant Methodology
- 7.3 Reversibility of Differentiated Status
- 7.4 Applications

Unit-8 Biopsy & Other Techniques (7 Hours)

- 8.1 Artificial Gametes: The Oocyte
- 8.2 Polar Body Biopsy & its Clinical Applications
- 8.3 Human Embryo Biopsy Procedures
- 8.4 In Vitro Maturation
- 8.5 Fertility Preservation in Female Cancer Patients

References:

1. Textbook of Assisted Reproductive Techniques Volume 1: Lab Perspectives by David Gardner, Areil Weissman, Colin M Howles, Zeev Shoham, CRC Press, 5th Edition ISBN 13: 978-1-4987-4014-2
2. Step by Step Protocols in Clinical Embryology & ART – Pankaj Talwar & Surveen Ghumman Sindhu, Jaypee Brothers medical Pub
3. IVF Techniques for The Beginners – Kuldeep Jain & Pankal Talwae, Jaypee Brothers Medical Pub.
4. A Practical Guide To Setting Up An Ivf Lab, Embryo Culture Systems & Running The Unit – Alex C Varghese, Peter Sjoblom & K Jayaprakasan, Jaypee brothers' medical Pub

Practicals:

- 1) Demonstration of Oocyte Pickup & Oocyte Screening
- 2) Demonstration of ICSI/Conventional IVF
- 3) Dish Preparation for ICSI/Conventional IVF
- 4) Grading of Ovum & Embryo (Fertilization Check & PN Scoring)
- 5) Cryopreservation of Oocytes & Embryos
- 6) Demonstration of Embryo Transfer



SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE

Semester 4



Semester - IV (2025-26)													
Sr No	Course Code	Group	Subjects	Credit	Hours / Week			Internal				External	Total
					Lecture	Practical	Total	CCE/ Internal Practical Test and Viva Voce	Attendance	Assignment/ Practical continuous evaluation	Total		
1	MSBT11425	DSC-7	Internship at IVF Center/ Dissertation on ART	16	-	-	4	140	10	50	200	100	300
2	MSBT12414	DSE-4	Seminar Presentation	4	-	-	4	60	10	30	100	50	150
3	MSBT13411	SEC-4	Review of Published case studies in ART/Research Paper/Review Paper	4	-	-	4	60	10	30	100	50	150
		Total		24	0	0	12	260	30	110	400	200	600

SYLLABUS FOR M.Sc. (Clinical) Embryology

TITLE OF PAPERS

M.Sc. First Year				
Semester-1				
Sr. No.	Paper Type	Paper Code	Title of Paper	Credits (Th+ Pr)
1.	Discipline Specific Core Course	DSC-1	Cell Biology and Molecular Techniques with Proteomics and Metabolomics	4+2
		DSC-2	Human Reproductive Biology	4+2
2.	Skill Enhancement Course	SEC 1	Assisted Reproductive Technology (ART) - I	4+2
3.	Discipline Specific Elective	DSE-1	Select from "***"	4+2
***Elective (Open Course Pool) For DSE-1: Select any one from following or from MOOC:				
Basic Course in Biomedical Research/ Cancer Fundamentals				
Semester-2				
Sr. No.	Paper Type	Paper Code	Title of Paper	Credits
1.	Discipline Specific Core Course	DSC-3	Andrology Lab Techniques and Cryobiology	4+2
		DSC-4	Endocrinology and Developmental Biology	4+2 d
2.	Skill Enhancement Course	SEC 2	Genetics and Preimplantation Genetic Diagnosis (PGD)	
3.	Discipline Specific Elective	DSE-2	Select from "***"	4+2
* Elective (Open Course Pool) For DSE-2: Select any one from following or from MOOC:				
Basic Course in Vector-Borne Diseases for Health Professionals/Ethics Review of Health Research				



M.Sc. Second Year

Semester-3

Sr. No.	Paper Type	Paper Code	Title of Paper	Credits (Th+Pr)
1.	Discipline Specific Core Course	DSC-5	Assisted Reproductive Technology (ART) - II	4+2
		DSC-6	Infertility Counseling and Ethical Regulations	4+2
2.	Skill Enhancement Course	SEC 3	Oocyte and Embryology Lab Techniques	4+2
3.	Discipline Specific Elective	DSE-3	Select from "*"	4+2

Elective (Open Course Pool) For DSE-3: Select any one from following or from MOOC:

Lifestyle and Non-communicable Disease

Semester-4

Sr. No.	Paper Type	Paper Code	Title of Paper	Credits (Th+Pr)
1.	Discipline Specific Core Course	DSC 7	Internship at IVF Center / Dissertation on ART	16
2.	Discipline Specific Elective	DSE 4	Seminar Presentation	4
3.	Skill Enhancement Course	SEC 4	Review of published case studies in ART / Research paper / Review paper	4



Teaching Scheme for M.Sc. (Clinical) Embryology
Semester 1,2,3 and 4

Sem.	Course Category	Credits			Theory (Hrs/Week)	Theory Total	Lab. Total	Experiential learning
		Th	Pr.	Total				
1	DSC-1	4	2	6	4	60	60	
	DSC-2	4	2	6	4	60	60	
	SEC-1	4	2	6	4	60	60	
	DSE-1	4	2	6	4	60	60	
	Total	16	8	24	16	240	240	
2	DSC-3	4	2	6	4	60	60	
	DSC-4	4	2	6	4	60	60	
	SEC-2	4	2	6	4	60	60	
	DSE-2	4	2	6	4	60	60	
	Total	16	8	24	16	240	240	
3	DSC-5	4	2	6	4	60	60	
	DSC-6	4	2	6	4	60	60	
	SEC-3	4	2	6	4	60	60	
	DSE-3	4	2	6	4	60	60	
	Total	16	8	24	16	240	240	
4	DSC 7			16				720
	SEC-4			4				180
	DSE-4			4				180

