

CHETTINAD ACADEMY OF RESEARCH & EDUCATION

(Deemed to be University under section 3 of the U.G.C. Act 1956)



POST GRADUATE DIPLOMA IN CLINICAL EMBRYOLOGY

2022 - 23

REGULATIONS & SYLLABUS

Program Outcome

Program Name	Post Graduate Diploma in Clinical Embryology
Program Award	PGDCE
Program Aims:	<ul style="list-style-type: none"> • Aimed at training medical/ dental graduates in the evolving and emerging growing field of Clinical embryology to understand the concept of assisted reproductive technologies and its application in medicine and other areas.
Program Learning Outcomes: Knowledge and Understanding	<p>Knowledge about:</p> <ul style="list-style-type: none"> • Male infertility • Female infertility • Genetics in infertility • Semen analysis • Sperm preparation • Semen/ Testicular tissue freezing and thawing • Culture media • Oocyte pick up and screening • Oocyte denudation • Micro manipulative techniques • Embryo culture • Oocyte freezing and thawing • Embryo freezing and thawing • Embryo transfer • Assisted hatching and embryo biopsy • Fertility Preservation • Documentation and maintenance • Quality control and quality assurance • Statistics • Consumables
Program Learning Outcomes: Skills	<p>Skills:</p> <ul style="list-style-type: none"> • Semen analysis • Sperm preparation • Semen/ Testicular tissue freezing and thawing • IUI loading technique • Dish preparation • Culture Media incubation • Oocyte pick up and screening • Oocyte denudation • Oocyte maturation and quality assessment • Oocyte freezing and thawing • Micro manipulative techniques • Embryo culture, grading • Embryo freezing and thawing • Embryo transfer • Assisted hatching and embryo biopsy • Documentation and maintenance • Quality control and quality assurance • Statistics and audit

CHETTINAD ACADEMY OF RESEARCH AND EDUCATION
Regulations for Postgraduate Diploma in Clinical Embryology
CONTENTS

S.No.	Title	Page no.
1.	Short title and commencement	1
2.	Eligibility for admission	1
3.	Recognition fee and eligibility certificate	1
4.	Registration	2
5.	Duration of the Program	2
6.	Commencement of the Program	2
7.	Curriculum	2
8.	Medium of instruction	2
9.	Working days	2
10.	Attendance	2
11.	Condonation of lack of attendance	2-3
12.	Commencement of the examinations	3
13.	Cut-off dates for admission to the examinations	3
14.	Credits	3
15.	Course weightage	4
16.	Grading system	4-5
17.	Classification of successful candidates	5
18.	Internal assessment	6
19.	University examination	6
20.	Pattern of semester University examination	7
21.	Marks qualifying for a pass	8
22.	Carryover of failed subjects	7
23.	Revaluation of answer papers	7
24.	Temporary break of study	7-8
25.	Scheme of examination	9-10
26.	Syllabus	11

CHETTINAD ACADEMY OF RESEARCH AND EDUCATION

Regulations for Postgraduate Diploma in Clinical Embryology

Introduction: The Postgraduate Diploma in Clinical Embryology, a one-year postgraduate program under the Faculty of Medicine, is aimed at training medical / dental graduates in the evolving and emerging growing field of Clinical Embryology to understand the concept of assisted reproductive technologies and its application in medicine and other areas. This program is a taught course with the syllabus formulated in accordance with the European and American societies of reproductive medicine. It covers relevant topics and a research project in the area of specialization. The aim of this Postgraduate Diploma program is to provide a thorough training in Clinical Embryology through formal lectures and / or seminars and practical programs. The project provides training in assisted reproductive technologies through original exploration and experiment culminating in the preparation of a project report that summarizes the project undertaken. This program shall impart advanced theoretical and practical aspects of subjects previously studied in a more general manner at the undergraduate level.

In exercise of the powers conferred by Rule 8(b) (a) of Memorandum of Association & Rules and clause 2.1, Chapter III of Bye-laws of Chettinad Academy of Research and Education, the Academic Council of the University hereby makes the following regulations: -

1. Short Title and Commencement:

These Regulations shall be called the "Regulations for Postgraduate Diploma in Clinical Embryology" of Chettinad Academy of Research and Education.

2. Eligibility for Admission:

Postgraduate in Life Sciences and Biotechnology

3. Recognition Fee and Eligibility Certificate:

Candidates who have passed the Bachelor's/ Master's Degree examination from any other University other than that conducted by Chettinad Academy of Research and Education shall obtain Eligibility Certificate from the University at the time of admission and also remit recognition fee as prescribed.

4. Registration:

A candidate admitted to the Course shall register with the University by submitting the prescribed application form for registration, duly filled in along with the prescribed fee, through the Head of the Institution within the stipulated time.

5. Duration of the Program:

The duration of the course shall be one year consisting of two semesters. The candidate for the Postgraduate Diploma is required to pursue the course on a full time basis and must complete the course within five years from the date of provisional registration.

6. Commencement of the Program:

The course shall ordinarily commence from 1st August of the academic year. Admission for the said course shall be completed by 31st August.

7. Curriculum:

The Curriculum and the Syllabus for the course shall be as specified in the annexure to these Regulations.

8. Medium of Instruction:

English shall be the medium of instruction for all the subjects of study and for examination.

9. Working Days:

Each semester shall consist of not less than 90 working days.

10. Attendance:

The candidate shall have not less than 80% attendance in Theory, Practical and Project separately. Each semester shall be taken as a unit for the purpose of calculating the attendance. The candidate lacking attendance in a subject shall be denied permission to appear for the University Examination in that subject alone.

11. Condonation of Lack of Attendance:

The discretionary power of condonation of shortage of attendance to appear for University Examination rests with the Vice Chancellor.

Lack of attendance can be condoned up to a maximum of 5% of the minimum attendance required in the following exceptional circumstances:

- (i) Any illness/ accident (for which Medical certificate from a registered medical practitioner must be produced)
- (ii) Any unforeseen tragedy in the family (should produce the letter from the parent/guardian)
- (iii) Participation in NCC/NSS and other co curricular activities representing the Institution / University. (Certificate from competent authority is required)

For any of the above reasons, request shall be made by the candidate with prescribed fees to the Controller of Examination through proper channel, ten days prior to the commencement of the theory examination. Based on the recommendation of the Course Coordinator concerned, the Controller of Examination shall obtain the approval of the Vice Chancellor for admission of the candidate to the University Examination.

12. Commencement of the examinations:

There shall be two sessions of University examinations in an academic year, viz., December and June.

13. Cut-off dates for admission to the examinations:

- (a) The candidates admitted from 1st August to 31st August of the academic year shall be registered to take their first semester examination, after fulfillment of the regulations concerned, in the month of December of that academic year.
- (b) The candidate admitted from 1st September to 31st December of the academic year shall be registered to take up their first semester examinations, after fulfillment of the regulations concerned, in the month of June of the next year.

(c) The candidate admitted from 1st January to 31st May of the academic year shall be registered for the academic year but they have to undergo the course to take up their first semester examinations along with students admitted in the next academic year.

14. Credits:

The term credit is used to describe the quantum of syllabus for various programs in terms of hours of study. It indicates differential weightage given according to the contents and duration of the courses in the curriculum design. The minimum credit requirement for Postgraduate Diploma in Clinical Embryology course shall be 48.**

15. Course Weightage:

For this course, credits will be assigned on the basis of the lectures/tutorials/laboratory work and other forms of learning. A course carrying one credit for lectures will have instruction of one hour per week during the semester.

E.g.: - If three hours of lecture is necessary in each week, then 3 credits will be the weightage.

Credits assigned for the whole semester (not less than 90 working days).

- (i) One credit for each lecture hour per week.
- (ii) One credit for each tutorial hour per week.
- (iii) One credit for every two hours of laboratory or practical work per week.
- (iv) One credit for one and a half hours of project work in a week.
- (v) One credit for every two hours of seminar.

16. Grading system:

All assessments of a course shall be done on absolute marks basis. However, for the purpose of reporting the performance of a candidate, letter grades, each carrying certain points, will be awarded as per the range of total marks (out of 100) obtained by the candidate, as detailed below:

Sl No.	Marks	Grade Points	Letter Grade	Explanation
01	90 – 100	10.0	O	Outstanding
02	80 – 89	9	A+	Excellent
03	70 – 79	8	A	Very Good
04	60 – 69	7	B +	Good
05	50 – 59	6	B	Satisfactory
06	<50	0	RA	Reappear
		0	NA	Not Appeared

“RA” Reappearance- denotes failure and the candidate is required to reappear for that examination.

“NA” Not appeared - denotes that the student did not appear for the examination although eligible.

“O” Outstanding.

After results are declared, Grade Statement will be issued to each student which will contain the following details:

- The college in which the candidate has studied

- The list of subjects enrolled during the semester and the grades scored.
- The Credits awarded and accumulated.
- The Grade Point Average (GPA) for the semester and
- The Cumulative Grade Point Average (CGPA) of all subjects enrolled from first semester onwards.

GPA is the ratio of, the sum of the products of the number of credits of subjects (C) and the grade points scored in those subjects (GP), to the sum of the credits of all the subjects in that semester.

$$\text{GPA} = \frac{\text{Sum of [C x GP]}}{\text{Sum of C}}$$

CGPA will be calculated using the above formula, considering all the subjects enrolled from first semester onwards. "RA" and "NA" grades will be excluded for calculating GPA and CGPA.

17. Classification of successful candidates:

The CGPA arrived at the completion of the course shall be the criteria for the classification of successful candidates as below:

CGPA	Classification
10.0 (90-100)	First class with honours
8.0 – 9.9(75-89)	First class with Distinction
6.5 to 7.9(60-74)	First class
5.5 to 6.4(50-59)	Second class

a) Successful candidates who secure 75% marks and above as a course aggregate in the first appearance taking University theory, practical, project evaluation and viva shall alone be awarded Distinction. This will also apply for award of University rank.

b) Successful candidates who secure 60% marks and above as a course aggregate in the University theory, practical, project evaluation and viva shall be awarded First Class.

c) All others who secure 50 – 59% in gross percentage will be classified to have passed in Second Class, even though the gross percentage exceeds 59% beyond the prescribed period of study.

18. Internal Assessment:

Minimum of three internal assessment tests shall be conducted for theory and practical separately. Assignments, seminars, project work, record work and other components of learning methods shall also contribute to Internal Assessment.

Pattern of evaluation of Internal Assessment:

Theory:	Written test (average of the best two out of three), assignments, seminars etc.	: 25 marks
Practicals:	Practical tests (average of the best two out of three)	: 20 marks
	Record work(five marks may be allotted for record)	: 5 marks
Project:		: 100 marks

The laboratory record note books shall be submitted two weeks prior to the commencement of the University Theory Examinations. The project shall be completed and two printed

copies shall be submitted to the Head of the Department two weeks prior to the commencement of the University theory examination.

The internal marks list shall be submitted to the Controller of Examination of the University with the endorsement of the Head of the Department/Course Coordinator through the Head of the Institution 15 days prior to the commencement of the University theory examination. There is no passing minimum for internal assessment in theory and practical. However, a minimum of 50 % marks in internal assessment is required for passing in project work. The marks scored by each student shall be displayed in the notice board, prior to the University Examination. Internal assessment tests are compulsory and students shall not reappear for the tests unless otherwise due to unforeseen circumstances. The right to conduct a repeat internal assessment test for such cases shall rest with the Course coordinator /Head of the concerned Department.

19. University Examination:

The examination in Postgraduate Diploma in Clinical Embryology Course shall consist of Written Theory papers and Practical Examinations. The University Examinations shall be conducted at the end of each semester.

20. Pattern of Semester University Examination:

There shall be a written examination of duration of 3 hrs. for a maximum of 75 marks at the end of the semester in each theory subject. There shall be a practical examination for a maximum of 75 marks at the end of the semester in each practical.

Questions from each unit (15 marks x 5 units = 75 marks)

- | | | |
|---------------------------------|-----------|---------------------------------|
| i) Short answer | (2 marks) | (5 units x 2 marks = 10 marks) |
| ii) Short notes | (5 marks) | (5 units x 5 marks = 25 marks) |
| iii) Descriptive type questions | (8 marks) | (5 units x 8 marks = 40 marks) |

Total – 75 marks

21. Marks qualifying for a Pass:

For University examination subjects:

Theory - 50% of the marks in each theory examination, 50 % of marks in aggregate of written theory and internal assessment;

Practical - 50% of marks in each practical examination, 50 % of marks in aggregate of practical and internal assessment;

For Project evaluation:

50% of marks in internal project evaluation.

22. Carryover of failed subjects:

Candidate who has failed in a university theory or practical examination shall reappear for that particular component only. Candidate is permitted to proceed to the next semester irrespective of his/her failure in the earlier semester.

23. Revaluation of answer papers:

There shall be no revaluation of answer papers of failed candidates. Failed candidates are however permitted to apply to the University within 15 days of publication of the results for retotalling of their answer papers.

24. Temporary break of study:

- (a) A candidate is not normally permitted to temporarily break the study.
- (b) If a candidate is continuously absent from the institute for four or more weeks,
- i) having notified the Dean/Principal within this period, this absence shall be treated as "Temporary Break of Study".
 - ii) without notifying the Dean/Principal, his/her name will be removed from the institute rolls.
- (c) If a candidate is compelled to temporarily break study for valid reasons (such as accident or hospitalization due to prolonged ill health), he/she shall apply for condonation of the same to the Dean/Principal through the Head of the Department.
- (d) For condonable break of study:
- i. if the lack of attendance is within condonable limits as per Clause No. 10 & 11, the candidate shall be permitted to write the examination for the current semester.
 - ii. if there is non-condonable lack of attendance, the candidate shall rejoin the program at the respective semester as and when it is offered after the break and shall be governed by the rules and regulations in force at the time of rejoining.
- (e) The total period for completion of the program reckoned from the commencement of the semester to which the candidate was first admitted shall not exceed the maximum period specified in Clause No.5 irrespective of the period of break of study in order that he/she may be qualified for the award of the degree.
- (f) In any case, a candidate shall be permitted to temporarily break the study only once during the entire duration of the program. The candidate shall forfeit the registration in case of a second break or in case of a non-condonable break of study.
- (g) Without prejudice to the above rules, the candidate who has completed the attendance requirement for a semester but has proceeded on a condonable break of study without appearing for the University Examination, shall be permitted to appear for the examinations without repeating the semester and thereafter continue the subsequent semester.

SCHEME OF EXAMINATION
Postgraduate Diploma in Clinical Embryology

Semester – I

S. code	Paper	Credits		Hours Per Semester		Evaluation (Marks)					Total
						Internal Assessment		University Exam			
		Theor y	Practic al	Theor y	Practica l	Theor y	Practic al	Theor y	Practica l	Orals	
CE001C	Human Reproduction	5	-	80	-	25	-	75	-	-	100
CE002C	Clinical Embryology	5	-	80	-	25	-	75	-	-	100
CE003C	Semenology & Cryopreservation	5	-	80	-	25	-	75	-	-	100
CE004L	Laboratory Andrology	-	5	-	160	-	25	-	75		100

Total credits - 20

SCHEME OF EXAMINATION
Postgraduate Diploma in Clinical Embryology

Semester – II

S. code	Paper	Credits		Hours Per Semester		Evaluation (Marks)					Total
						Internal Assessment		University Exam			
		Theory	Practical	Theory	Practical	Theory	Practical	Theory	Practical	Orals	
CE005C	Genetics in infertility	5	-	80	-	25	-	75	-	-	100
CE006C	Fertility & assisted conception	5	-	80	-	25	-	75	-	-	100
CE007C	Assisted reproductive technology	5	-	80	-	25	-	75	-	-	100
CE008L	IVF and micromanipulation techniques	-	5	-	160	-	25	-	75		100
CE009P	Project/Dissertation	-	8	-	100 (SEM I) + 150 (SEM II)	-	50	-	50	-	100

Total credits - 28

Grand Total of Credits - 48

Post Graduate Diploma in Clinical Embryology

Syllabus- Semester – 1

Paper I- Human Reproduction

Unit-1

Anatomy:

1. Male reproductive system
2. Female reproductive system
3. Cell migration
4. Gonadal differentiation
5. Descent of testes
6. Histology of testes and ovary

Unit -2

Physiology:

1. Cell structure and organelles and their functions
2. Spermatozoa and oocyte morphology
3. Hypothalamo pituitary gonadal axis
4. Menstrual cycle and Ovulation
5. Corpus luteum and its function
6. Folliculogenesis, Oogenesis, Spermatogenesis
7. Male and Female Reproductive hormones
8. Steroid Metabolism

Unit-3

Biochemistry:

1. Acid base balance and pH estimation
2. Reproductive hormone receptors and its pathway
3. Plasma membrane receptors
4. Hormonal assay
5. Genes and Mutagenesis
6. DNA Structure and abnormalities
7. Transcription and Translation
8. Chromosomal Aberrations
9. Role of glycolytic pathway and TCA cycle in embryo development

Statistics:

1. Basic statistics

2. Research methodology
3. Research work software

Unit-4

Pathology:

1. Microscopy - types and application
2. Histopathological examination of Testicular Specimen
3. FNAC
4. Haemocytometer

Microbiology:

1. Sterilization and disinfection
2. Basic Immunology and its application in infertility
3. Implantation and Immunology of Fetal Rejection

Unit-5

Genetics: Theory Classes

1. Introduction to cell biology
2. Cell structure, functions, cell cycle and Cell to Cell interaction
3. Mitosis and meiosis
4. Chromosomes and gene.

Observations and demonstrations

Where ever necessary observation of the procedures and demonstrations will be carried out like:

1. Specimen observation- anatomy

Biochemistry

2. Molality and Molarity estimation
3. pH calibration
4. ELISA- Enzyme Linked Immuno Sorbent Assay demonstration
5. Micropipette Handling

Pathology

6. Processing and examination of testicular tissue (demonstration)
7. Sperm counting – Dilution Method (demonstration + 2 practical Classes)

Microbiology

8. Sterilization and disinfection- demonstration
9. General media preparation- demonstration
10. Semen culture demonstration

Paper-II Clinical Embryology

Unit-1

Introduction to Assisted Reproductive Technology

1. History, prevalence and over view of Assisted Reproductive Technology
2. Over view and Divisions of embryology

Unit-2

Gametogenesis

1. Folliculogenesis
2. Oogenesis & Spermatogenesis
3. Oocyte maturation
4. Gene expression in early embryos
5. Genomic imprinting
6. Epigenetics

Unit-3

Fertilization

1. Oocyte retrieval and oocyte morphology
2. In Vitro oocyte Maturation
3. Sperm-oocyte interaction
4. Fertilization Failure
5. Artificial Oocyte Activation

Unit-4

Embryo quality assessment

1. Fertilization and cleavage
2. Embryo morphology and cleavage assessment
3. Embryo grading till Blastocyst

Unit-5

Embryo culture:

1. Types and Constituents of culture media
2. Culture system for embryos
3. Time lapse imaging of embryos

Paper-III Semenology and Cryopreservation

Unit-1

Spermatogenesis and its disorder

1. Spermatogenesis
2. Hormone regulation for spermatogenesis
3. Structure of spermatozoa
4. Disorders of spermatogenesis

Unit-2

Semen analysis

1. General principles and characteristics of semen
 - Patient instruction
 - Physical characteristics
 - Nomenclature
2. Assessment of spermatozoa

Concentration

Motility

Vitality

Morphology

Computer Aided Semen Analysis

3. Assessment of seminal plasma and its constituents

Round cells

Biochemistry of spermatozoa and seminal plasma

Unit-3

Azoospermia

1. Causes
2. Types
3. Management
4. Sperm retrieval techniques

Unit-4

Semen preparation and sperm function tests

1. Semen preparation technique
Types
Culture media
Choice of method for different semen parameters
Clinical applications
2. Special test for sperm function
Assessment of capacitation
Assessment of acrosome reaction

- Assessment of sperm zona binding
- Sperm mucus interaction tests
- 3. Sperm DNA fragmentation and detection Test

Unit-5

Cryopreservation

1. Basic principles
2. Cryopreservation Techniques
3. Cryopreservation of Oocyte, Spermatozoa, Embryo, Testicular and Ovarian Tissue

Paper-IV Laboratory Andrology

1. Semen analysis- 25 cases
2. Sperm preparation tech- 5 times of each tech
3. HOS & vitality test – demonstration+ 1 case
4. Fructose Test demonstration and two cases
5. Semen freezing and thawing – demonstration+ 2 case
6. Vitrification and Thawing (Oocyte and Embryo) –demonstration
7. Pipette pulling
8. Embryology laboratory observation

Special classes:

Library:

1. Use of library books
2. How to write references
3. How to access journals through internet
4. Microsoft office

Internal mark works:

Theory – 25 marks

1. Written internal theory exam(average of the best two out of three)
2. Two journal club presentation per student
3. Two essay writing
4. Log book maintenance –daily
5. 80% attendance

Practical-25 marks

1. Practical internal tests(average of the best two out of three)
2. Practical report – semen analysis, sperm preparation techniques, semen freezing and thawing, media preparation and ph estimation.
3. Project work- literature review and methodology

Post Graduate Diploma in Clinical Embryology

Syllabus- Semester II

Paper- I Genetics in Infertility

Unit -1

Molecular biology:

1. Mendelian Inheritance
2. Concepts in genetic medicine

Unit-2

Molecular and Genetic assessment

1. Proteomics and metabolomics
2. Preimplantation Genetics Testing (PGT)
 - a. Preimplantation Genetic Testing for Aneuploidy(PGT-A)
 - b. Preimplantation Genetic Testing for Monogenic disorders(PGT-M)
 - c. Preimplantation Genetic Testing for Structural Rearrangements (PGT-SR)

Unit-3

Modalities for Genetic analysis:

1. Genetic karyotyping
2. Principles of PCR- Polymerase Chain Reaction
3. Fluorescent In Situ Hybridization (FISH)
4. NGS (Next Generation Sequencing)

5. CGH (Comparative Genomic Hybridization)

Unit-4

Advanced techniques in Assisted Reproductive Technology:

1. Stem cell technology- Types, Origin, Characteristics and Clinical Application
2. Cloning
3. Gene Editing (Designer babies)
4. Automated IVF

Unit-5

Management of genetic disorders:

1. Pedigree analysis
2. Genetic counseling
3. Pre Natal-Diagnosis

Observations and demonstrations

Where ever necessary observation of the procedures and demonstrations will be carried out like:

Genetics

1. PCR demonstration
2. FISH- demonstration
3. Karyotyping-demonstration

Paper –II Fertility and Assisted conception

Unit-1

Evaluation and Treatment of infertile couples:

1. Etiology of male and female infertility
2. Investigation of male and female infertility
3. Principles of ultrasound
4. Ultrasound in infertility
5. Assessment of Ovarian reserve
6. Treatment options in male and female infertility
7. Unexplained infertility
8. Indications for IUI- Intra Uterine Insemination and Assisted Reproductive Technology

Unit-2

Stimulation protocol in ART & Fertility preservation:

1. Endocrinology of natural and stimulated cycles
2. Ovarian stimulation and monitoring in Assisted Reproductive Technology
3. Ovarian stimulation and monitoring for IUI- Intra Uterine Insemination
4. Drugs used in Assisted Reproductive Technology
5. Fertility preservation – Indications and methods in men
6. Fertility preservation – Indications and methods in women
7. Fertility preservation – stimulation protocols

Unit-3

Implantation:

1. Uterine receptivity and embryo transfer- tubal and uterine
2. Frozen embryo transfer in natural and stimulated cycle
3. Endometrial scratching
4. ERA
5. Embryo Glue
6. Luteal Phase and its support

Unit-4

Assisted Reproductive Technology - Pregnancy & Outcomes:

1. Complications in Assisted Reproductive Technology
2. Recurrent implantation failure
3. Pregnancy Hormones
4. Pregnancy Tests
5. Miscarriage
6. Extra uterine Pregnancies

Unit-5

Third party reproduction:

1. Semen donation
2. Oocyte donation
3. Embryo donation
4. Surrogacy
5. Screening of donors

Observations and demonstrations

Where ever necessary observation of the procedures and demonstrations will be carried out like:

Radiology and reproductive medicine

1. Basic ultra sound observation
2. Follicular ultrasound observation
3. Male investigation observation
4. Case discussion of one batch

Paper- III Assisted Reproductive Technology

Unit-1

Instrumentation and micromanipulation:

1. Laminar flow hoods
2. Incubators
3. Microscopes
4. Laser
5. Disposables used in Assisted Reproductive Technology
6. Micromanipulator- Micromanipulation components and mechanics
Installing and alignment of micromanipulator

Unit-2

Embryology laboratory:

1. Setting up of an Assisted Reproductive Technology lab
2. Air quality in IVF- In Vitro Fertilization lab
3. Quality control in Assisted Reproductive Technology lab
4. Documentation and record maintenance
5. Mixing up of gametes and loss of gametes during handling
6. Troubleshooting in ART

Unit-3

IVF and Embryo transfer:

1. Dish preparation
2. Conventional human IVF- In Vitro Fertilization
3. Assisted hatching
4. Embryo Biopsy
5. Embryo culture
6. Embryo transfer
7. Embryo Freezing and Thawing

8. Oocyte freezing and thawing
9. Consequences of Assisted Reproductive Technology

Unit-4

Micromanipulation techniques in Assisted Reproductive Technology:

1. Sperm immobilization techniques
2. Micro assisted fertilization techniques
3. ICSI- Intra Cytoplasmic Sperm Injection technique
4. Advanced micro assisted fertilization techniques
5. IMSI-Intracytoplasmic morphologically selected sperm injection
6. PICSI-Physiological intracytoplasmic sperm injection

Unit-5

Regulation in Assisted Reproductive Technology:

1. Ethical consideration in Assisted Reproductive Technology
2. Semen and Oocyte banking
3. Social Oocyte freezing
4. Counseling in Assisted Reproductive Technology
5. ICMR guidelines for Assisted Reproductive Technology
6. HFEA guidelines for Assisted Reproductive Technology
7. ASRM guidelines for Assisted Reproductive Technology
8. Biomedical waste segregation and staff safety protocols
9. Follow up of ART babies

Paper-IV IVF and micromanipulation techniques

1. IVF- In Vitro Fertilization
 - A. Handling and manipulation of gametes and embryos
 - B. Media and dish preparation
 - C. Oocyte and embryo grading
 - D. Gamete and embryo culturing technique
2. ICSI - Intra Cytoplasmic Sperm Injection
 - A. Dish preparation
 - B. Oocyte screening
 - C. Denudation
 - D. Sperm immobilization
 - E. ICSI- Intra Cytoplasmic Sperm Injection

F. Embryo Culture

3. Embryo loading in embryo transfer catheter
4. Embryo vitrification and thawing
5. Oocyte vitrification and thawing

Observations and demonstrations

Where ever necessary observation of the procedures and demonstrations will be carried out like:

Embryology laboratory

1. Embryology laboratory observation
2. Sperm retrieval technique observation
3. Embryo transfer technique observation

Reproductive medicine

ART -Assisted Reproductive Technique counseling observation

Thesis

Research project- completion and report submission