PROGRAM OUTCOME (POs)	
Course Code	**M. Sc. CLINICAL EMBRYOLOGY**
PO1	**Knowledge**– Acquire and comprehend foundational and advanced scientific and clinical concepts in embryology to support industrial applications, healthcare practices, and entrepreneurial ventures.
PO2	**Comprehension & Application**– Apply critical thinking skills to analyze and interpret complex problems in reproductive science and implement systematic, evidence-based solutions.
PO3	**Analysis & Evaluation**– Develop decision-making capabilities to assess and manage challenges in clinical and research settings, ensuring precision and ethical integrity.
PO4	**Research Skills**– Demonstrate proficiency in planning, designing, executing, and utilizing research methodologies for advancements in reproductive healthcare and community well-being.
PO5	**Collaboration & Leadership**– Cultivate the ability to function effectively as an individual and as part of a multidisciplinary team, ensuring collaborative success in clinical, industrial, and research domains.
PO6	**Communication Skills** – Exhibit strong written and oral communication skills to articulate scientific and clinical concepts effectively in healthcare, industry, academia, and research environments.
PO7	**Ethical & Professional Integrity** – Uphold ethical principles and professional responsibilities in both clinical and research practices, ensuring adherence to regulatory and social frameworks.
PO8	**Lifelong Learning & Adaptability** – Foster a continuous learning mindset and adaptability to technological advancements, enhancing professional growth and societal contributions.
Course Outcomes (COs)	
Course Code	**M. Sc. CLINICAL EMBRYOLOGY**
SEMESTER I	
MCE 101 T	**Relevent Gross Anatomy**
CO1	To demonstrate and understand the relevant gross anatomy of male and female reproductive system
CO2	To understand the relevant gross anatomy of urinary bladder
CO3	To understand the relevant gross anatomy of endocrine system
MCE 102 T	**Histology**
CO1	To describe the histology of male and female reproductive system
CO2	To identify and study the histology of urinary system
CO3	To understand the histology of endocrine system
MCE 103 T	**Genetics in Assisted Reproduction**
CO1	To have detail knowledge about chromosomes, Molecular Genetics, Developmental genetics, Prenatal diagnosis and genetic counselling,
CO2	To study the importance and basics of Genetics in infertility
CO3	To understand Epigenetis and The Human Genome Project.
MCE 104 T	**General & Systemic Embryology**
CO1	To able to understand in detail general embryology as week wise development from 1st week to 4th week and trophoblast development with twinning
CO2	To understand trophoblast development with twinning
CO3	To able to understand in detail systemic embryology under urinary system, MRS, FRS
CC 001 T	**Research Methodology & Biostatistics (Core Course)**
CO1	Student will be able to understand develop statistical models, research designs with the understating of background theory of various commonly used statistical techniques as well as analysis interpretation & reporting of Results and use of statistical software.

MCE 105 P	Practical Lab I
CO1	**Recall and describe** the structural organization of general tissues (epithelial, connective, muCscle, and nervous) and their functional significance in human anatomy
CO2	**Identify and analyze** the histological and gross anatomical features of the male reproductive system, including the testis, epididymis, spermatic cord, vas deferens, seminal vesicle, and prostate, correlating their functions with reproductive physiology.
CO3	**Illustrate and evaluate** the histological and anatomical organization of the female reproductive system, including the mammary gland, ovary, fallopian tube, uterus, and vagina, and relate them to menstrual and reproductive physiology.
CO4	**Examine and interpret** the structural and functional characteristics of the urinary system, particularly the urinary bladder, to understand its role in excretion and homeostasis.
CO5	**Analyze and integrate** the histological and anatomical aspects of the endocrine glands (pituitary, thyroid, suprarenal) with their hormonal functions, emphasizing their clinical significance in reproductive and metabolic health.
MCE 106 P	**Practical Lab II**
CO1	**Demonstrate foundational knowledge of embryonic development** by recalling key stages such as gametogenesis, fertilization, implantation, neural tube formation, and placental development using models and charts.
CO2	**Apply systemic embryology concepts** by illustrating the development of the urinary and reproductive systems, including nephron formation, gonadal differentiation, and testicular descent, while analyzing congenital anomalies.
CO3	**Perform and interpret genetic analysis techniques** such as karyotyping, PCR, and FISH to detect chromosomal abnormalities and assess their relevance in assisted reproduction
CO4	**Evaluate and integrate embryology and genetics in clinical applications** by analyzing ART procedures, embryo biopsy techniques, and preimplantation genetic diagnosis (PGD) for reproductive medicine.
CO5	**Correlate developmental processes with clinical implications** by identifying congenital anomalies, genetic disorders, and their inheritance patterns, justifying their impact on reproductive health.
MCE 107 CP	**MCE Directed Clinical Education- I**
CO1	Demonstrate comprehensive understanding of assisted reproductive technologies (ART), laboratory workflows, quality control measures, and ethical guidelines governing clinical embryology.
CO2	Develop proficiency in key embryology laboratory techniques, including gamete handling, embryo culture, micromanipulation, and cryopreservation, while adhering to quality assurance protocols.
CO3	Exhibit ethical decision-making, patient-centered communication, and professional responsibility in clinical embryology practice, ensuring adherence to regulatory and ethical standards.
SEMESTER II	
MCE 108 T	**Reproductive Hormones & Infertility**
CO1	Students should be able to understand hormonal regulation of reproduction
CO2	To explain infertility types and causes, interpret diagnostic tests for infertility.
CO3	Students should recognize appropriate management strategies for infertility.
MCE 109 T	**Ovulation Induction Methods**
CO1	Students should be able to understand patient selection and hormone use in ART.
CO2	To explain ovulation induction, stimulation protocols, and monitoring, identify complications of ovarian stimulation, and
CO3	To describe ovum pick-up, equipment, and quality control in ART.
MCE 110 T	**Quality Assessment, Quality Control & Handling data in ART**
CO1	Understand QA & QC in ART labs.
CO2	Explain lab practices, equipment maintenance, and safety.
CO3	Identify quality control measures and regulatory standards.
CO4	Apply risk management strategies in ART procedures

MCE 111 T	IVF procedures
CO1	Students should be able to understand IVF, in-vitro maturation, and related ART procedures
CO2	To explain sperm and embryo preparation, grading, and selection methods, describe embryo transfer techniques, patient preparation, and post-transfer care
CO3	To identify IVF complications and the role of patient counseling.
MCE 112 P	**Practical Lab III**
CO1	**Explain the role of reproductive hormones**, including testicular, ovarian, and placental hormones, in regulating fertility and reproductive physiology.
CO2	**Identify and analyze the causes, investigations, and management of male and female infertility**, incorporating techniques such as semen analysis, sperm function tests, tubal patency tests, and ovulation assessment methods.
CO3	**Demonstrate knowledge of ovulation induction methods**, including the pharmacological basis, stimulation protocols, ovulation triggers, and patient monitoring techniques.
CO4	**Evaluate the risks and complications of ovarian stimulation**, including ovarian hyperstimulation syndrome (OHSS), and formulate strategies for its prevention and management.
CO	**Integrate ovum retrieval techniques** with clinical protocols, assessing their role in assisted reproductive technologies (ART) and optimizing patient outcomes.
MCE 113 P	**Practical Lab IV**
CO1	**Explain and apply quality assurance protocols** in the IVF laboratory, including good lab practices, biomedical waste management, and risk assessment to ensure compliance with safety and ethical guidelines.
CO2	**Analyze the legal and ethical aspects** of ART, including PC-PNDT Act, MTP Act, and surrogacy-related cases, ensuring adherence to national and international reproductive regulations.
CO3	**Demonstrate proficiency in advanced ART techniques**, including in-vitro maturation, pre-implantation genetic screening (PGS), assisted hatching, and embryo reduction, for optimizing clinical outcomes.
CO4	**Evaluate sperm preparation, gamete grading, and embryo selection techniques**, assessing their impact on embryo development, metabolism, and implantation success.
CO5	**Integrate and apply embryo culture and transfer techniques**, including ZIFT, GIFT, and embryo transfer methodologies, while identifying and managing potential complications in ART procedures.
CO	**Develop patient-centered counseling strategies**, addressing potential IVF complications and psychological aspects to enhance patient care in assisted reproduction.
MCE 114 CP	**MCE Directed Clinical Education- II**
CO1	Demonstrate comprehensive understanding of assisted reproductive technologies (ART), laboratory workflows, quality control measures, and ethical guidelines governing clinical embryology.
CO2	Develop proficiency in key embryology laboratory techniques, including gamete handling, embryo culture, micromanipulation, and cryopreservation, while adhering to quality assurance protocols.
CO3	Exhibit ethical decision-making, patient-centered communication, and professional responsibility in clinical embryology practice, ensuring adherence to regulatory and ethical standards.
Skill Ehancement Courses	
SEC 001 T	**Nutrition and Reproductive Health**
CO1	Understand the relationship between nutrition and reproductive health.
CO2	Analyze the role of macro- and micronutrients in fertility and pregnancy also assess the impact of dietary patterns on reproductive disorders.
CO3	Evaluate the influence of nutrition on Assisted Reproductive Outcomes (ART) outcomes.
SEC 002 T	**Data Analysis for Biologists**
CO1	Understand the basic principles of probability and statistical analysis in biological research.
CO2	Use R programming for data manipulation, visualization, and statistical computations.
CO3	Perform correlation and regression analysis for biological datasets.
CO4	Apply clustering and classification techniques to categorize biological data.
CO5	Analyze high-dimensional biological data using advanced statistical approaches.