



MGM SCHOOL OF BIOMEDICAL SCIENCES, NAVI MUMBAI
(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)

(Deemed to be University u/s 3 of UGC Act 1956)

Grade “A⁺⁺” Accredited by NAAC

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CHOICE BASED CREDIT SYSTEM (CBCS)

(Academic Year 2025 - 26)

Curriculum for

M.Sc. Allied Health Sciences

M. Sc. Clinical Embryology

Semester I & II

DIRECTOR'S MESSAGE

Welcome Message from the Director

Dear Postgraduate Students,

Welcome to **MGM School of Biomedical Sciences (MGMSBS), MGMIHS**, a premier institution dedicated to advancing allied and health sciences education. As you embark on this transformative academic journey, you are joining a community that fosters excellence in research, clinical expertise, and innovation.

MGMIHS, accredited with **NAAC 'A⁺⁺' Grade (CGPA 3.55, 2022)** and recognized as a **Category I Institution by UGC**, offers an ecosystem that nurtures both academic and professional growth. With **NIRF (151-200 rank band) recognition, NABH-accredited hospitals, NABL-accredited diagnostic labs, and JCI accreditation for MGM New Bombay Hospital**, we uphold global benchmarks in education and healthcare.

At MGMSBS, our **15 postgraduate programs** are meticulously designed to align with the National Commission for Allied and Healthcare Professionals (NCAHP) standards, National Education Policy (NEP) 2020, and the National Credit Framework (NCrF). We have implemented the **Choice-Based Credit System (CBCS)** to provide academic flexibility while ensuring rigorous training in clinical and technical skills. **Our** state-of-the-art research laboratories, digital classrooms, and the Central Research Laboratory (CRL) foster an environment that encourages innovation and evidence-based learning.

Postgraduate education at MGMSBS goes beyond theoretical learning—our curriculum integrates **hands-on clinical training, interdisciplinary collaboration, and exposure to real-world healthcare challenges**. We emphasize **research-driven education**, encouraging students to actively participate in **scientific discoveries, publications, and international collaborations**.

Beyond academics, we believe in **holistic development**, with initiatives such as the **AARAMBH Science and Wellness Club**, which promotes **mental well-being, leadership, and professional networking**.

As you step into this **next phase of academic and professional growth**, we encourage you to explore new ideas, engage in impactful research, and contribute meaningfully to the **healthcare ecosystem**. We are confident that your journey at MGMSBS will shape you into **skilled, compassionate, and visionary professionals**, ready to lead in the ever-evolving healthcare landscape.

We look forward to witnessing your achievements and contributions!

Dr. Mansee Thakur

Director, MGM School of Biomedical Sciences
MGM Institute of Health Sciences, Navi Mumbai

ABOUT MGM SCHOOL OF BIOMEDICAL SCIENCES

Mission

To improve the quality of life, both at individual and community levels by imparting quality medical education to tomorrow's doctors and medical scientists and by advancing knowledge in all fields of health sciences through meaningful and ethical research.

Vision

By the year 2020, MGM Institute of Health Sciences aims to be top-ranking Centre of Excellence in Medical Education and Research. Students graduating from the Institute will have the required skills to deliver quality health care to all sections of the society with compassion and benevolence, without prejudice or discrimination, at an affordable cost. As a research Centre, it shall focus on finding better, safer and affordable ways of diagnosing, treating and preventing diseases. In doing so, it will maintain the highest ethical standards.

About – School of Biomedical Sciences

MGM School of Biomedical Sciences is formed under the aegis of MGM IHS with the vision of offering basic Allied Science and Medical courses for students who aspire to pursue their career in the Allied Health Sciences, teaching as well as research.

School of Biomedical Sciences is dedicated to the providing the highest quality education in basic medical sciences by offering a dynamic study environment with well-equipped labs. The school encompasses 24 courses each with its own distinct, specialized body of knowledge and skill. This includes 8 UG courses and 16 PG courses. The college at its growing years started with mere 100 students has recorded exponential growth and is now a full-fledged educational and research institution with the student strength reaching approximately **800** at present.

Our consistent theme throughout is to encourage students to become engaged, be active learners and to promote medical research so that ultimately they acquire knowledge, skills, and understanding so as to provide well qualified and trained professionals in Allied Health Sciences to improve the quality of life.

As there is increased need to deliver high quality, timely and easily accessible patient care system the collaborative efforts among physicians, nurses and allied health providers become ever more essential for an effective patient care. Thus the role of allied health professionals in ever-evolving medical system is very important in providing high-quality patient care.

Last but by no means least, School of Biomedical Sciences envisions to continuously grow and reform. Reforms are essential to any growing institution as it fulfills our bold aspirations of providing the best for the students, for us to serve long into the future and to get ourselves updated to changing and evolving trends in the health care systems.

Name of the Degree: M.Sc. Clinical Embryology**Objectives of the program -**

1. To acquire and comprehend foundational and advanced scientific and clinical concepts in embryology to support industrial applications, healthcare practices, and entrepreneurial ventures.
2. To apply critical thinking skills to analyze and interpret complex problems in reproductive science and implement systematic, evidence-based solutions.
3. To develop decision-making capabilities to assess and manage challenges in clinical and research settings, ensuring precision and ethical integrity.
4. To demonstrate proficiency in planning, designing, executing, and utilizing research methodologies for advancements in reproductive healthcare and community well-being.
5. To 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.
6. To Exhibit strong written and oral communication skills to articulate scientific and clinical concepts effectively in healthcare, industry, academia, and research environments.
7. To uphold ethical principles and professional responsibilities in both clinical and research practices, ensuring adherence to regulatory and social frameworks.
8. To foster a continuous learning mindset and adaptability to technological advancements, enhancing professional growth and societal contributions.

Teaching Strategies and Learning Activities:

Different teaching strategies and learning activities practiced in the institute assist the teacher in choosing the appropriate educational method for conveying knowledge and influencing attitudes and behavior.

Duration of Study: The duration of the study for M.Sc. Clinical Embryology will be of four semesters spread over two years.

Eligibility Criteria: As a minimum criterion of eligibility, aspiring candidates are needed to have attained a B.Sc. in any discipline of Life Sciences, Biosciences, Bachelor's degree in any of Biological Sciences, M.B.B.S, BDS, BAMS, BHMS, B.Pharm, B.Tech (Biotechnology), Bachelor's Degree in Veterinary Sciences, or equivalent examination with a minimum aggregate score of 50%.

For any query visit the website: www.mgmsbsnm.edu.in

M.Sc. Clinical Embryology

Program Outcomes (PO)

Program Code	Program Objective(s)
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.

Semester I

MCE 101 T	Relevant Gross Anatomy	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	To demonstrate and understand the relevant gross anatomy of male and female reproductive system	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO2	To understand the relevant gross anatomy of urinary bladder	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO3	To understand the relevant gross anatomy of endocrine system	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
MCE 102 T	Histology	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	To describe the histology of male and female reproductive system	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO2	To identify and study the histology of urinary system	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO3	To understand the histology of endocrine system	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
MCE 103 T	Genetics in Assisted Reproduction	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	To have detail knowledge about chromosomes, Molecular Genetics, Developmental genetics, Prenatal diagnosis and genetic counselling.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO2	To study the importance and basics of Genetics in infertility	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO3	To understand Epigenetics and The Human Genome Project.	PO1, PO2, PO3,	Lecture, Practical, Demonstration,	Theory Exam, Internal assessment, University

		PO4, PO5, PO6, PO7, PO8	Assignment, Seminar, Group discussion	exam, seminar presentation, MCQ
MCE 104 T	General & Systemic Embryology	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	To able to understand in detail general embryology as week wise development from 1st week to 4th week and trophoblast development with twinning	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO2	To understand trophoblast development with twinning	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO3	To able to understand in detail systemic embryology under urinary system, MRS, FRS	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CC 001 T	Research Methodology & Biostatistics (Core Course)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
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.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Group Discussion, Workshops	Theory Exam, Practical Exam, Viva-voce, Internal assessment, University exam, Station exercise, seminar presentation, MCQ
MCE 105 P	Practical Lab I (MCE 101 & MCE 102)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Recall and describe the structural organization of general tissues (epithelial, connective, muscle, and nervous) and their functional significance in human anatomy	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
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	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book

	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.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
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.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
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.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
MCE 106 P	Practical Lab II (MCE 103 & MCE 104)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
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.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
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.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book

CO3	Perform and interpret genetic analysis techniques such as karyotyping, PCR, and FISH to detect chromosomal abnormalities and assess their relevance in assisted reproduction	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
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.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
CO5	Correlate developmental processes with clinical implications by identifying congenital anomalies, genetic disorders, and their inheritance patterns, justifying their impact on reproductive health.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
MCE 107 CP	MCE Directed Clinical Education- I	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Demonstrate comprehensive understanding of assisted reproductive technologies (ART), laboratory workflows, quality control measures, and ethical guidelines governing clinical embryology.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos, Case-Study, Problem based learning, Seminar, Workshops, Industrial Visit, Guest lecture	University exam, Practical Exam, Station Exercise, Viva-voce, Log book, Seminar Presentation, Case- study presentation
CO2	Develop proficiency in key embryology laboratory techniques, including gamete handling, embryo culture, micromanipulation, and cryopreservation, while adhering to quality assurance protocols.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos, Case-Study, Problem based learning, Seminar, Workshops, Industrial Visit, Guest lecture	University exam, Practical Exam, Station Exercise, Viva-voce, Log book, Seminar Presentation, Case- study presentation
CO3	Exhibit ethical decision-making, patient-centered communication, and professional responsibility in clinical embryology practice, ensuring adherence to regulatory and ethical standards.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos, Case-Study, Problem based learning, Seminar, Workshops, Industrial Visit, Guest lecture	University exam, Practical Exam, Station Exercise, Viva-voce, Log book, Seminar Presentation, Case- study presentation

Semester II				
MCE 108 T	Reproductive Hormones & Infertility	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Students should be able to understand hormonal regulation of reproduction	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO2	To explain infertility types and causes, interpret diagnostic tests for infertility.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO3	Students should recognize appropriate management strategies for infertility.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz, case study	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
MCE 109 T	Ovulation Induction Methods	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Students should be able to understand patient selection and hormone use in ART.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO2	To explain ovulation induction, stimulation protocols, and monitoring, identify complications of ovarian stimulation, and	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO3	To describe ovum pick-up, equipment, and quality control in ART.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
MCE 110 T	Quality Assessment, Quality Control & Handling Data in ART	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand QA & QC in ART labs.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO2	Explain lab practices, equipment maintenance, and safety.	PO1, PO2, PO3, PO4, PO5, PO6, PO7,	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz,	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ

		PO8	case study, Flip classroom	
CO3	Identify quality control measures and regulatory standards.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO4	Apply risk management strategies in ART procedures.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
MCE 111 T	IVF Procedures	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Students should be able to understand IVF, in-vitro maturation, and related ART procedures,	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO2	To explain sperm and embryo preparation, grading, and selection methods, describe embryo transfer techniques, patient preparation, and post-transfer care	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom, posters/ videos	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
CO3	To identify IVF complications and the role of patient counseling.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Internal assessment, University exam, seminar presentation, MCQ
MCE 112 P	Practical Lab III (MCE 108 & MCE 109)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Explain the role of reproductive hormones, including testicular, ovarian, and placental hormones, in regulating fertility and reproductive physiology.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
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.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
CO3	Demonstrate knowledge of ovulation induction methods, including the pharmacological basis, stimulation protocols, ovulation triggers, and patient	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book

	monitoring techniques.			
CO4	Evaluate the risks and complications of ovarian stimulation, including ovarian hyperstimulation syndrome (OHSS), and formulate strategies for its prevention and management.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
CO5	Integrate ovum retrieval techniques with clinical protocols, assessing their role in assisted reproductive technologies (ART) and optimizing patient outcomes.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
MCE 113 P	Practical Lab IV (MCE 110 & MCE 111)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
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.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
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.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
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.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
CO4	Evaluate sperm preparation, gamete grading, and embryo selection techniques, assessing their impact on embryo development, metabolism, and implantation success.	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
CO5	Integrate and apply embryo culture and transfer techniques, including ZIFT, GIFT, and embryo transfer methodologies, while identifying and managing	PO1, PO2,PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book

	potential complications in ART procedures.			
CO6	Develop patient-centered counseling strategies, addressing potential IVF complications and psychological aspects to enhance patient care in assisted reproduction.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos,	Internal Assessment, University exam, Practical Exam, Station Exercise, Viva-voce, Log book
MCE 114 CP	MCE Directed Clinical Education- II	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Demonstrate comprehensive understanding of assisted reproductive technologies (ART), laboratory workflows, quality control measures, and ethical guidelines governing clinical embryology.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos, Case-Study, Problem based learning, Seminar, Workshops, Industrial Visit, Guest lecture	University exam, Practical Exam, Station Exercise, Viva-voce, Log book, Seminar Presentation, Case- study presentation
CO2	Develop proficiency in key embryology laboratory techniques, including gamete handling, embryo culture, micromanipulation, and cryopreservation, while adhering to quality assurance protocols.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos, Case-Study, Problem based learning, Seminar, Workshops, Industrial Visit, Guest lecture	University exam, Practical Exam, Station Exercise, Viva-voce, Log book, Seminar Presentation, Case- study presentation
CO3	Exhibit ethical decision-making, patient-centered communication, and professional responsibility in clinical embryology practice, ensuring adherence to regulatory and ethical standards.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Practical, Demonstration, Group Discussion, Quiz, Posters/ Videos, Case-Study, Problem based learning, Seminar, Workshops, Industrial Visit, Guest lecture	University exam, Practical Exam, Station Exercise, Viva-voce, Log book, Seminar Presentation, Case- study presentation
SEC 001 T	Nutrition and Reproductive Health	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand the relationship between nutrition and reproductive health.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Viva-voce, University exam, MCQ
CO2	Analyze the role of macro- and micronutrients in fertility and pregnancy also assess the impact of dietary patterns on reproductive disorders.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Viva-voce, University exam, MCQ
CO3	Evaluate the influence of nutrition on Assisted Reproductive Outcomes (ART) outcomes.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8	Lecture, Assignment, Seminar, Group discussion, Quiz, case study, Flip classroom	Theory Exam, Viva-voce, University exam, MCQ

SEC 002 T	Data analysis for Biologists	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand the basic principles of probability and statistical analysis in biological research.	PO1, PO2, PO3, PO4, PO5, PO7, PO8	Lecture, Assignment	University exam, MCQ
CO2	Use R programming for data manipulation, visualization, and statistical computations.	PO1, PO2, PO3, PO4, PO5, PO7, PO8	Lecture, Assignment	University exam, MCQ
CO3	Perform correlation and regression analysis for biological datasets.	PO1, PO2, PO3, PO4, PO5, PO7, PO8	Lecture, Assignment	University exam, MCQ
CO4	Apply clustering and classification techniques to categorize biological data.	PO1, PO2, PO3, PO4, PO5, PO7, PO8	Lecture, Assignment	University exam, MCQ
CO5	Analyze high-dimensional biological data using advanced statistical approaches.	PO1, PO2, PO3, PO4, PO5, PO7, PO8	Lecture, Assignment	University exam, MCQ

OUTLINE OF COURSE CURRICULUM														
M.Sc. CLINICAL EMBRYOLOGY														
Semester I														
Code No.	Core Course	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total
Discipline Specific Core Theory														
MCE 101 T	Relevant Gross Anatomy	3	-	-	-	3	45	-	-	-	45	20	80	100
MCE 102 T	Histology	3	-	-	-	3	45	-	-	-	45	20	80	100
MCE 103 T	Genetics in Assisted Reproduction	3	-	-	-	3	45	-	-	-	45	20	80	100
MCE 104 T	General & Systemic Embryology	3	-	-	-	3	45	-	-	-	45	20	80	100
CC 001 T	Research Methodology & Biostatistics (Core Course)	3	-	-	-	3	45	-	-	-	45	-	50	50
Discipline Specific Core Practical														
MCE 105 P	Practical Lab I (MCE 101 & MCE 102)	-	-	4	-	2	-	-	60	-	60	10	40	50
MCE 106 P	Practical Lab II (MCE 103 & MCE 104)	-	-	2	-	1	-	-	30	-	30	10	40	50
MCE 107 CP	MCE Directed Clinical Education-I	-	-	-	9	3	-	-	-	135	135	-	50	50
CC 001 P	Research Methodology & Biostatistics (Core Course)	-	-	4	-	2	-	-	60	-	60	-	50	50
Total		15	0	10	9	23	225	0	150	135	510	100	550	650

OUTLINE OF COURSE CURRICULUM														
M.Sc. CLINICAL EMBRYOLOGY														
Semester II														
Code No.	Core Course	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total
Discipline Specific Core Theory														
MCE 108 T	Reproductive Hormones & Infertility	3	-	-	-	3	45	-	-	-	45	20	80	100
MCE 109 T	Ovulation Induction Methods	3	-	-	-	3	45	-	-	-	45	20	80	100
MCE 110 T	Quality Assessment, Quality Control & Handling data in ART	3	-	-	-	3	45	-	-	-	45	20	80	100
MCE 111 T	IVF Procedures	3	-	-	-	3	45	-	-	-	45	20	80	100
Discipline Specific Core Practical														
MCE 112 P	Practical Lab III (MCE 108 & MCE 109)	-	-	1	-	2	-	-	60	-	60	10	40	50
MCE 113 P	Practical Lab IV (MCE 110 & MCE 111)	-	-	1	-	2	-	-	60	-	60	10	40	50
MCE 114 CP	MCE Directed Clinical Education-II	-	-	-	12	4	-	-	-	180	180	-	50	50
Skill Enhancement Course														
SEC 001 T	Nutrition and Reproductive Health	2	-	-	-	2	30	-	-	-	30	-	50	50
SEC 002 T	Data analysis for Biologists													
Total		14	0	2	12	22	210	0	120	180	510	100	500	600