

| PROGRAM OUTCOME (POs) | |
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| 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 | Relevant 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 Epigenetics 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. |

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| MCE 105 P | Practical Lab I (MCE 101 & MCE 102) |
| 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 (MCE 103 & MCE 104) |
| 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 |
| 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 |

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| 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 (MCE 108 & MCE 109) |
| 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. |
| CO5 | 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 (MCE 110 & MCE 111) |
| 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. |
| CO6 | 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 ENHANCEMENT 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 (NPTEL) |
| 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. |



MGM SCHOOL OF BIOMEDICAL SCIENCES, NAVI MUMBAI

(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)

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

Grade "A++" Accredited by NAAC

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Annexure-3.18 of AC-51/2025

CO PO Mapping

Program - M.Sc. Clinical Embryology

Semester I and II

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|------------|---|
| 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. |

PO Mapping same with correlation level 3,2,1 The notation of 1 - low, 2 - moderate , 3 - high

| Semester | Course | Course Outcome | Course Outcome | Knowledge | Comprehension & Application | Analysis & Evaluation | Research Skills | Collaboration & Leadership | Communication Skills | Ethical & Professional Integrity | Lifelong Learning & Adaptability | Average |
|------------|------------------------------------|----------------|---|-----------|-----------------------------|-----------------------|-----------------|----------------------------|----------------------|----------------------------------|----------------------------------|---------|
| | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | |
| Semester I | Relevant Gross Anatomy (MCE 101 T) | CO1 | To demonstrate and understand the relevant gross anatomy of male and female reproductive system | 3 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1.8 |
| | | CO2 | To understand the relevant gross anatomy of urinary bladder | 3 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 1.6 |
| | | CO3 | To understand the relevant gross anatomy of endocrine system | 3 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 1.6 |
| | | Average | | 3.0 | 1.3 | 1.0 | 2.0 | 1.0 | 2.0 | 1.0 | 2.0 | 1.7 |
| | Histology (MCE102 T) | CO1 | To describe the histology of male and female reproductive system | 3 | 2 | 1 | 2 | 1 | 2 | 0 | 2 | 1.6 |
| | | CO2 | To identify and study the histology of urinary system | 3 | 1 | 1 | 2 | 1 | 0 | 0 | 2 | 1.3 |
| | | CO3 | To understand the histology of endocrine system | 3 | 1 | 1 | 2 | 1 | 0 | 0 | 2 | 1.3 |
| | | Average | | 3 | 1.3 | 1.0 | 2 | 1.00 | 0.67 | 0 | 2 | 1.4 |

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|--|---------|---|-----|------|------|-----|-----|------|------|-----|-----|
| Genetics in Assisted Reproduction (MCE 103 T) | CO1 | To have detail knowledge about chromosomes, Molecular Genetics, Developmental genetics, Prenatal diagnosis and genetic counselling. | 3 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 2.0 |
| | CO2 | To study the importance and basics of Genetics in infertility | 3 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1.9 |
| | CO3 | To understand Epigenetis and The Human Genome Project. | 3 | 2 | 2 | 3 | 1 | 2 | 1 | 2 | 2.0 |
| | Average | | 3 | 2.3 | 1.0 | 2.3 | 1 | 0.67 | 1.00 | 2.0 | 2.0 |
| General & Systemic Embryology (MCE 104 T) | CO1 | To able to understand in detail general embryology as week wise development from 1st week to 4th week and trophoblast development with twinning | 3 | 3 | 2 | 3 | 1 | 2 | 1 | 2 | 2.1 |
| | CO2 | To understand trophoblast development with twinning | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1.6 |
| | CO3 | To able to understand in detail systemic embryology under urinary system, MRS, FRS | 3 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 2.0 |
| | Average | | 3 | 2.67 | 1.67 | 2.0 | 1 | 2 | 1 | 2.0 | 1.9 |
| Research Methodology & Biostatistics (Core Course) (CC 001 T) | 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. | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 3 | 2.6 |
| | Average | | 3.0 | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | 1.0 | 3.0 | 2.6 |
| Practical Lab I (MCE 105 P) | CO1 | Recall and describe the structural organization of general tissues (epithelial, connective, muCscle, and nervous) and their functional significance in human anatomy | 3 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 1.6 |
| | 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. | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 2 | 1.8 |
| | 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. | 3 | 2 | 3 | 1 | 1 | 3 | 1 | 2 | 2.0 |
| | 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. | 3 | 3 | 3 | 1 | 1 | 2 | 1 | 2 | 2.0 |
| | 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. | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 2 | 1.9 |
| | Average | | 3.0 | 2.2 | 2.8 | 1.0 | 1.0 | 1.8 | 1.0 | 2.0 | 1.9 |
| | 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. | 3 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1.9 |

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| Practical Lab II (MCE 106 P) | 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. | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 1.9 | |
| | CO3 | Perform and interpret genetic analysis techniques such as karyotyping, PCR, and FISH to detect chromosomal abnormalities and assess their relevance in assisted reproduction | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 2.1 | |
| | 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. | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 2.1 | |
| | CO5 | Correlate developmental processes with clinical implications by identifying congenital anomalies, genetic disorders, and their inheritance patterns, justifying their impact on reproductive health. | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 2.1 | |
| | Average | | 3.0 | 2.0 | 2.8 | 2.0 | 1.6 | 1.8 | 1.0 | 2.0 | 2.0 | |
| MCE Directed Clinical Education-I (MCE 107 CP) | CO1 | Demonstrate comprehensive understanding of assisted reproductive technologies (ART), laboratory workflows, quality control measures, and ethical guidelines governing clinical embryology. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 | |
| | CO2 | Develop proficiency in key embryology laboratory techniques, including gamete handling, embryo culture, micromanipulation, and cryopreservation, while adhering to quality assurance protocols. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 | |
| | CO3 | Exhibit ethical decision-making, patient-centered communication, and professional responsibility in clinical embryology practice, ensuring adherence to regulatory and ethical standards. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 | |
| | Average | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Semester 2 | Reproductive Hormones & Infertility (MCE 108 T) | CO1 | Students should be able to understand hormonal regulation of reproduction | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 1.9 |
| | | CO2 | To explain infertility types and causes, interpret diagnostic tests for infertility. | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 2.1 |
| | | CO3 | Students should recognize appropriate management strategies for infertility. | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2.3 |
| | | Average | | 3.0 | 2.7 | 2.7 | 2.3 | 1.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| | Ovulation Induction Methods (MCE 109 T) | CO1 | Students should be able to understand patient selection and hormone use in ART. | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2.5 |
| | | CO2 | To explain ovulation induction, stimulation protocols, and monitoring, identify complications of ovarian stimulation, and | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2.5 |
| | | CO3 | To describe ovum pick-up, equipment, and quality control in ART. | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2.4 |
| Average | | | 3.0 | 3.0 | 2.7 | 2.0 | 1.0 | 2.0 | 3.0 | 2.0 | 2.5 | |

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|---|---------|---|-----|------|-----|------|---|------|-----|------|-----|
| Quality Assessment, Quality Control & Handling data in ART (MCE 110 T) | CO1 | Understand QA & QC in ART labs. | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 2.5 |
| | CO2 | Explain lab practices, equipment maintenance, and safety. | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2.5 |
| | CO3 | Identify quality control measures and regulatory standards. | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2.6 |
| | CO4 | Apply risk management strategies in ART procedures | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2.5 |
| | Average | | 3.0 | 3 | 2.8 | 1.3 | 2 | 2 | 2.5 | 2 | 2.5 |
| IVF procedures (MCE 111 T) | CO1 | Students should be able to understand IVF, in-vitro maturation, and related ART procedures | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2.6 |
| | CO2 | To explain sperm and embryo preparation, grading, and selection methods, describe embryo transfer techniques, patient preparation, and post-transfer care | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2.5 |
| | CO3 | To identify IVF complications and the role of patient counseling. | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 2.5 |
| | Average | | 3 | 2.67 | 3 | 2.67 | 2 | 2.33 | 2 | 2.67 | 2.5 |
| Practical Lab III (MCE 112 P) | CO1 | Explain the role of reproductive hormones , including testicular, ovarian, and placental hormones, in regulating fertility and reproductive physiology. | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 2.5 |
| | 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. | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 2.5 |
| | CO3 | Demonstrate knowledge of ovulation induction methods , including the pharmacological basis, stimulation protocols, ovulation triggers, and patient monitoring techniques. | 3 | 2 | 2 | 3 | 2 | 1 | 3 | 3 | 2.4 |
| | CO4 | Evaluate the risks and complications of ovarian stimulation , including ovarian hyperstimulation syndrome (OHSS), and formulate strategies for its prevention and management. | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 2.5 |
| | CO5 | Integrate ovum retrieval techniques with clinical protocols, assessing their role in assisted reproductive technologies (ART) and optimizing patient outcomes. | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 2.5 |
| | Average | | 3 | 2 | 2.8 | 3 | 2 | 1 | 3 | 3 | 2.5 |
| | 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. | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 2.6 |
| | 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. | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 2.6 |

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| Practical Lab IV (MCE 113 P) | 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. | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 2.6 |
| | CO4 | Evaluate sperm preparation, gamete grading, and embryo selection techniques , assessing their impact on embryo development, metabolism, and implantation success. | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 2.6 |
| | 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. | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 2.6 |
| | CO6 | Develop patient-centered counseling strategies , addressing potential IVF complications and psychological aspects to enhance patient care in assisted reproduction. | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 2.6 |
| | Average | | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 2.6 |
| MCE Directed Clinical Education- II (MCE 114 CP) | CO1 | Demonstrate comprehensive understanding of assisted reproductive technologies (ART), laboratory workflows, quality control measures, and ethical guidelines governing clinical embryology. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 |
| | CO2 | Develop proficiency in key embryology laboratory techniques, including gamete handling, embryo culture, micromanipulation, and cryopreservation, while adhering to quality assurance protocols. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 |
| | CO3 | Exhibit ethical decision-making, patient-centered communication, and professional responsibility in clinical embryology practice, ensuring adherence to regulatory and ethical standards. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 |
| | Average | | 3.0 | 2.67 | 2.7 | 2 | 2 | 2 | 2.0 | 2.67 | 2.4 |
| Nutrition and Reproductive Health (SEC 001 T) | CO1 | Understand the relationship between nutrition and reproductive health. | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 2.1 |
| | CO2 | Analyze the role of macro- and micronutrients in fertility and pregnancy also assess the impact of dietary patterns on reproductive disorders. | 3 | 3 | 2 | 2 | 1 | 2 | 1 | 3 | 2.1 |
| | CO3 | Evaluate the influence of nutrition on Assisted Reproductive Outcomes (ART) outcomes. | 3 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 1.8 |
| | Average | | 3 | 2.0 | 2 | 3 | 1 | 2.33 | 1.33 | 2.67 | 2.0 |

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| Data Analysis for Biologists (NPTEL) (SEC 002 T) | CO1 | Understand the basic principles of probability and statistical analysis in biological research. | 3 | 3 | 3 | 3 | 2 | 0 | 2 | 3 | 2.4 |
| | CO2 | Use R programming for data manipulation, visualization, and statistical computations. | 3 | 3 | 3 | 3 | 2 | 0 | 2 | 3 | 2.4 |
| | CO3 | Perform correlation and regression analysis for biological datasets. | 3 | 2 | 3 | 3 | 2 | 0 | 2 | 3 | 2.3 |
| | CO4 | Apply clustering and classification techniques to categorize biological data. | 3 | 3 | 3 | 3 | 2 | 0 | 2 | 3 | 2.4 |
| | CO5 | Analyze high-dimensional biological data using advanced statistical approaches. | 3 | 1 | 3 | 3 | 2 | 0 | 2 | 3 | 2.1 |
| | Average | | 3 | 2.4 | 3 | 3 | 2 | 0.00 | 2.00 | 3.00 | 2.3 |

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| 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 III | |
| MCE 115 T, MCE 121 P | Introduction to IVF Lab |
| CO1 | Explain the design, layout, and setup of IVF, andrology, and cryopreservation labs |
| CO2 | Identify and manage essential laboratory equipment, consumables, and environmental parameters. |
| CO3 | Apply maintenance, sterilization, and quality control protocols in ART labs |
| CO4 | Maintain lab records, ensure traceability, and follow regulatory requirements |
| CO5 | Evaluate ethical considerations and implement national/international ART guidelines. |
| CO6 | Participate in lab planning, work rosters, and collaborative problem-solving |
| MCE 116 T, MCE 122 P | Cryopreservation Techniques in Assisted Reproduction |
| CO1 | Explain the physiological principles, history, and role of cryoprotectants in cryobiology, and compare different types for specific applications. |
| CO2 | Apply appropriate techniques for semen, oocyte, embryo, and gonadal tissue cryopreservation, including slow freezing and vitrification, ensuring sample quality and viability. |
| CO3 | Maintain and manage cryopreserved sample inventories using best practices, quality control protocols, and regulatory compliance. |
| CO4 | Analyze the effects of cryopreservation on embryo survival, implantation, and pregnancy outcomes using evidence-based data. |
| CO5 | Evaluate and integrate emerging cryopreservation and cryo-storage technologies for clinical and research applications. |

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| MCE 117 T, MCE 123 P | Culture System in ART |
| CO1 | Explain the historical evolution, types, and components of embryo culture media, and their interactions with gametes and embryos. |
| CO2 | Apply optimal handling techniques for culture media, preparation of culture dishes, and use of oils, buffers, and incubators to maintain embryo viability. |
| CO3 | Perform and interpret quality control tests for IVF media, troubleshoot culture-related problems, and control key variables affecting embryo development. |
| CO4 | Compare monoculture, sequential culture, blastocyst culture, co-culture, and time-lapse systems for their impact on embryo development and clinical outcomes. |
| CO5 | Evaluate advances in culture media and emerging embryo culture technologies for integration into clinical practice. |
| MCE 118 T, MCE 124 P | ICSI (Intracytoplasmic Sperm Injection) and Advanced Sperm Selection Techniques |
| CO1 | Explain the history, philosophy, indications, contraindications, and underlying principles of ICSI, including micromanipulation physics and workstation setup. |
| CO2 | Apply techniques for sperm retrieval (PESA, MESA, TESA, TESE), immobilization, selection, and preparation from ejaculates or testicular biopsies for ICSI. |
| CO3 | Operate, calibrate, and maintain micromanipulators, micropipettes, and related ICSI equipment, ensuring precision and troubleshooting technical issues. |
| CO4 | Perform oocyte denuding, ICSI dish preparation, gamete micromanipulation, fertilization assessment (fert check), and handle specialized ICSI media. |
| CO5 | Evaluate advanced sperm selection techniques (IMSI, PICSI, Piezo-ICSI, MACS, microfluidics, HBA, Raman spectroscopy, AI-assisted selection) for their clinical applicability and outcomes. |

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| MCE 119 | Research Project/ Dissertation |
| CO1 | Identify and define a relevant research problem in reproductive science or related fields, based on current scientific literature |
| CO2 | Design and execute an experimental or analytical study using appropriate methodologies and ethical standards |
| CO3 | Analyze and interpret research data using suitable statistical and analytical tools to derive evidence-based conclusions |
| CO4 | Present research findings effectively through written dissertation and oral defense, adhering to academic and professional guidelines |
| MCE 120 CP | MCE Directed Clinical Education-III |
| 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 IV | |
|--------------------|---|
| MCE 125 T | Bioethics, IPR and Biosafety |
| CO1 | Evaluate ethical concerns in biomedical and biotechnological practices. |
| CO2 | Understand different types of IPR and their applications. |
| CO3 | Apply various national and international guidelines in biomedical and health research. |
| MCE 126 T | Stem Cell in Human Reproduction |
| CO1 | Explain the fundamental concepts of stem cell biology, including their role in gamete generation, germline stem cell function, and reproductive potential. |
| CO2 | Apply molecular biology principles to study gamete development, genetic characteristics, and controlled differentiation from embryonic stem cells to gamete-like cells. |
| CO3 | Evaluate the influence of growth factor signaling in germline specification and maintenance of pluripotency. |
| CO4 | Analyze stem cell–based therapeutic approaches for male infertility, including applications of trophoblast, Wharton’s jelly, amniotic fluid, and bone marrow stem cells. |
| CO5 | Critically appraise recent advances in human embryonic stem cell (hESC) research and their translational potential in reproductive medicine. |
| MCE 127 T | Quality Control and Audit in ART |
| CO1 | Explain the principles of Quality Management Systems (QMS) in ART, including regulatory requirements, accreditation processes, and the importance of internal and external quality control. |
| CO2 | Apply QC protocols and auditing practices in embryology, andrology, and cryopreservation, including equipment calibration, maintenance, and validation. |
| CO3 | Analyze and set Key Performance Indicators (KPIs) for ART laboratories, compare them to benchmark values, and implement corrective actions for quality improvement. |
| MCE 128 P | Internship/Training (Clinical/ Industrial) |



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CO PO Mapping
Programme - M.Sc. Clinical Embryology
Semester III and IV

| | |
|------------|---|
| 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. |

PO Mapping same with correlation level 3,2,1 The notation of 1 - low, 2 - moderate , 3 - high

| Semester | Course | Course Outcome | Course Outcome | Knowledge | Comprehension & Application | Analysis & Evaluation | Research Skills | Collaboration & Leadership | Communication Skills | Ethical & Professional Integrity | Lifelong Learning & Adaptability | Average | |
|------------|---|----------------|--|-----------|-----------------------------|-----------------------|-----------------|----------------------------|----------------------|----------------------------------|----------------------------------|---------|-----|
| | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | | |
| Semester 3 | Introduction to IVF Lab (MCE 115 T, MCE 121 P) | CO1 | Explain the design, layout, and setup of IVF, andrology, and cryopreservation labs | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0.9 | |
| | | CO2 | Identify and manage essential laboratory equipment, consumables, and environmental parameters. | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 2 | 1.4 | |
| | | CO3 | Apply maintenance, sterilization, and quality control protocols in ART labs | 2 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 1.5 | |
| | | CO4 | Maintain lab records, ensure traceability, and follow regulatory requirements | 0 | 2 | 3 | 2 | 0 | 0 | 3 | 2 | 1.5 | |
| | | CO5 | Evaluate ethical considerations and implement national/international ART guidelines. | 0 | 0 | 3 | 0 | 2 | 0 | 3 | 2 | 1.3 | |
| | | CO6 | Participate in lab planning, work rosters, and collaborative problem-solving | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 2 | 0.9 | |
| | | Average | | | 1.3 | 1.7 | 1.8 | 0.3 | 0.8 | 0.3 | 1.6 | 2.0 | 1.2 |
| | Cryopreservation Techniques in Assisted Reproduction (MCE 116 T, MCE 122 P) | CO1 | Explain the physiological principles, history, and role of cryoprotectants in cryobiology, and compare different types for specific applications. | 3 | 2 | 1 | 0 | 1 | 2 | 0 | 2 | 1.4 | |
| | | CO2 | Apply appropriate techniques for semen, oocyte, embryo, and gonadal tissue cryopreservation, including slow freezing and vitrification, ensuring sample quality and viability. | 0 | 3 | 3 | 0 | 1 | 0 | 2 | 2 | 1.4 | |
| | | CO3 | Maintain and manage cryopreserved sample inventories using best practices, quality control protocols, and regulatory compliance. | 0 | 0 | 3 | 3 | 0 | 0 | 3 | 3 | 1.5 | |
| | | CO4 | Analyze the effects of cryopreservation on embryo survival, implantation, and pregnancy outcomes using evidence-based data. | 0 | 2 | 3 | 3 | 0 | 0 | 0 | 2 | 1.3 | |
| | | CO5 | Evaluate and integrate emerging cryopreservation and cryo-storage technologies for clinical and research applications. | 3 | 1 | 1 | 3 | 1 | 0 | 0 | 3 | 1.5 | |
| | | Average | | | 1.2 | 1.6 | 2.2 | 1.8 | 0.6 | 0.4 | 1.0 | 2.4 | 1.4 |
| | Culture System in ART (MCE 117 T, MCE 123 P) | CO1 | Explain the historical evolution, types, and components of embryo culture media, and their interactions with gametes and embryos. | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0.8 |
| | | CO2 | Apply optimal handling techniques for culture media, preparation of culture dishes, and use of oils, buffers, and incubators to maintain embryo viability. | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 1.0 |
| | | CO3 | Perform and interpret quality control tests for IVF media, troubleshoot culture-related problems, and control key variables affecting embryo development. | 0 | 0 | 3 | 0 | 2 | 0 | 3 | 3 | 1.4 | |

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| 123 P) | CO4 | Compare monoculture, sequential culture, blastocyst culture, co-culture, and time-lapse systems for their impact on embryo development and clinical outcomes. | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 3 | 1.1 | |
| | CO5 | Evaluate advances in culture media and emerging embryo culture technologies for integration into clinical practice. | 3 | 2 | 3 | 3 | 1 | 0 | 0 | 3 | 1.9 | |
| | Average | | 3.0 | 1.0 | 2.2 | 1.2 | 0.6 | 0.0 | 0.6 | 3.0 | 1.5 | |
| ICSI (Intracytoplasmic Sperm Injection) and Advanced Sperm Selection Techniques (MCE 118 T, MCE 124 P) | CO1 | Explain the history, philosophy, indications, contraindications, and underlying principles of ICSI, including micromanipulation physics and workstation setup. | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 1 | 1.1 | |
| | CO2 | Apply techniques for sperm retrieval (PESA, MESA, TESA, TESE), immobilization, selection, and preparation from ejaculates or testicular biopsies for ICSI. | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 2 | 1.0 | |
| | CO3 | Operate, calibrate, and maintain micromanipulators, micropipettes, and related ICSI equipment, ensuring precision and troubleshooting technical issues. | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 2 | 1.0 | |
| | CO4 | Perform oocyte denuding, ICSI dish preparation, gamete micromanipulation, fertilization assessment (fert check), and handle specialized ICSI media. | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0.6 | |
| | CO5 | Evaluate advanced sperm selection techniques (IMSI, PICSI, Piezo-ICSI, MACS, microfluidics, HBA, Raman spectroscopy, AI-assisted selection) for their clinical applicability and outcomes. | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 3 | 1.1 | |
| | Average | | 0.6 | 1.6 | 2.4 | 0.6 | 0.0 | 0.0 | 0.6 | 2.0 | 1.0 | |
| Research Project/ Dissertation MCE 119 | CO1 | Identify and define a relevant research problem in reproductive science or related fields, based on current scientific literature. | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 1.1 | |
| | CO2 | Design and execute an experimental or analytical study using appropriate methodologies and ethical standards. | 0 | 3 | 3 | 3 | 0 | 3 | 3 | 3 | 2.3 | |
| | CO3 | Analyze and interpret research data using suitable statistical and analytical tools to derive evidence-based conclusions. | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 3 | 1.5 | |
| | CO4 | Present research findings effectively through written dissertation and oral defense, adhering to academic and professional guidelines. | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 3 | 1.1 | |
| | Average | | 0.8 | 2.3 | 1.5 | 1.5 | 0.8 | 1.5 | 0.8 | 3.0 | 1.5 | |
| MCE Directed Clinical Education- III (MCE 120 CP) | CO1 | Demonstrate comprehensive understanding of assisted reproductive technologies (ART), laboratory workflows, quality control measures, and ethical guidelines governing clinical embryology. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 | |
| | CO2 | Develop proficiency in key embryology laboratory techniques, including gamete handling, embryo culture, micromanipulation, and cryopreservation, while adhering to quality assurance protocols. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 | |
| | CO3 | Exhibit ethical decision-making, patient-centered communication, and professional responsibility in clinical embryology practice, ensuring adherence to regulatory and ethical standards. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 | |
| | Average | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Semester 4 | Bioethics, IPR, and Biosafety (MCE 125 T) | CO1 | Evaluate ethical concerns in biomedical and biotechnological practices. | 2 | 2 | 3 | 1 | 1 | 2 | 3 | 2 | 2.0 |
| | | CO2 | Understand different types of IPR and their applications. | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 2.0 |
| | | CO3 | Apply various national and international guidelines in biomedical and health research. | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2.5 |
| | | Average | | 2.7 | 2.3 | 2.7 | 1.3 | 1.3 | 2.0 | 2.7 | 2.3 | 2.2 |
| | Stem Cell in Human Reproduction (MCE 126 T) | CO1 | Explain the fundamental concepts of stem cell biology, including their role in gamete generation, germline stem cell function, and reproductive potential. | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 |
| CO2 | | Apply molecular biology principles to study gamete development, genetic characteristics, and controlled differentiation from embryonic stem cells to gamete-like cells. | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0.8 | |
| CO3 | | Evaluate the influence of growth factor signaling in germline specification and maintenance of pluripotency. | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0.8 | |
| CO4 | | Analyze stem cell-based therapeutic approaches for male infertility, including applications of trophoblast, Wharton's jelly, amniotic fluid, and bone marrow stem cells. | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 0.8 | |

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|---|---------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | CO5 | Critically appraise recent advances in human embryonic stem cell (hESC) research and their translational potential in reproductive medicine. | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 3 | 1.1 |
| | Average | | 0.6 | 0.6 | 1.2 | 2.4 | 0.0 | 0.0 | 0.0 | 1.2 | 0.8 |
| Quality Control and Audit in ART (MCE 127 T) | CO1 | Explain the principles of Quality Management Systems (QMS) in ART, including regulatory requirements, accreditation processes, and the importance of internal and external quality control. | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2.5 |
| | CO2 | Apply QC protocols and auditing practices in embryology, andrology, and cryopreservation, including equipment calibration, maintenance, and validation. | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2.5 |
| | CO3 | Analyze and set Key Performance Indicators (KPIs) for ART laboratories, compare them to benchmark values, and implement corrective actions for quality improvement. | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2.4 |
| | Average | | 3.0 | 3.0 | 2.7 | 0.6 | 0.0 | 0.0 | 3.0 | 2.0 | 1.8 |
| Internship/Training (Clinical/ Industrial) (MCE 128 P) | CO1 | Demonstrate in-depth knowledge of assisted reproductive technologies (ART), laboratory workflows, and clinical embryology concepts, including their applications in healthcare, industry, and entrepreneurial ventures. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 |
| | CO2 | Apply critical thinking and problem-solving skills to analyze complex reproductive science challenges and implement evidence-based solutions in laboratory and clinical settings. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 |
| | CO3 | Perform key embryology laboratory techniques—gamete handling, embryo culture, micromanipulation, and cryopreservation—while adhering to quality assurance protocols and research methodologies | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 |
| | CO4 | Design, execute, and interpret research studies in reproductive healthcare, utilizing scientific methodologies to advance clinical practice and community well-being | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 |
| | CO5 | Demonstrate professional integrity, ethical decision-making, and patient-centered communication in clinical embryology practice, ensuring adherence to regulatory, social, and ethical frameworks | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 |
| | CO6 | Exhibit leadership and collaborative skills to function effectively in multidisciplinary teams, while communicating scientific concepts clearly in clinical, academic, and industrial environments | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3.0 |
| | Average | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Research Project/ Dissertation MCE 119 | CO1 | Identify and define a relevant research problem in reproductive science or related fields, based on current scientific literature. | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 1.1 |
| | CO2 | Design and execute an experimental or analytical study using appropriate methodologies and ethical standards. | 0 | 3 | 3 | 3 | 0 | 3 | 3 | 3 | 2.3 |
| | CO3 | Analyze and interpret research data using suitable statistical and analytical tools to derive evidence-based conclusions. | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 3 | 1.5 |
| | CO4 | Present research findings effectively through written dissertation and oral defense, adhering to academic and professional guidelines. | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 3 | 1.1 |
| | Average | | 0.8 | 2.3 | 1.5 | 1.5 | 0.8 | 1.5 | 0.8 | 3.0 | 1.5 |