Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001

FACULTY OF PHARMACY

SYLLABUS

FOR

M.SC. (CLINICAL EMBRYOLOGY)

(2 YEARS PROGRAMME)

2023 BATCH ONWARDS

SCHEME

1st Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject**	**L**	**T**	**P**	**Int.**	**Ext**	**Total**	
MCEMS1-101	Introduction of Clinical Embryology	3	1	0	40	60	100	4
MCEMS1-102	Biochemistry including Steroid Metabolism	3	1	0	40	60	100	4
MCEMS1-103	Embryology and Physiology of Human Reproductive System	3	1	0	40	60	100	4
MCEMS1-104	Basic Concept of Cell Biology & Molecular Biology	3	1	0	40	60	100	4
MCEMS1-105	Introduction to Clinical Embryology-Practical	0	0	4	60	40	100	2
MCEMS1-106	Embryology and Physiology of Human reproductive system-Practical	0	0	4	60	40	100	2
MCEMS1-107	Basic concept of cell biology & molecular biology-Practical	0	0	4	60	40	100	2
Total		**12**	**4**	**12**	**340**	**360**	**700**	**22**

2nd Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject**	**L**	**T**	**P**	**Int.**	**Ext**	**Total**	
MCEMS1-201	IVF Procedure: Fertilization, Embryo Production & Cryopreservation Techniques	3	1	0	40	60	100	4
MCEMS1-202	Reproductive Disorders and Histology	3	1	0	40	60	100	4
MCEMS1-203	Infertility, and its Clinical Management, Andrology	3	1	0	40	60	100	4
MCEMS1-204	Cytogenetic	3	1	0	40	60	100	4
MCEMS1-205	IVF Procedure: Fertilization, Embryo Production & Cryopreservation Techniques -Practical	0	0	4	60	40	100	2
MCEMS1-206	Reproductive Disorders and Histology -Practical	0	0	4	60	40	100	2
MCEMS1-207	Cytogenetic -Practical	0	0	4	60	40	100	2
Total		**12**	**4**	**12**	**340**	**360**	**700**	**22**

3rd Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject**	**L**	**T**	**P**	**Int.**	**Ext**	**Total**	
MCEMS1-301	Assisted Reproductive Techniques	3	1	0	40	60	100	4
MCEMS1-302	Research methodology -Quality Control, Research Ethics, Scientific Writing	3	1	0	40	60	100	4
MCEMS1-303	Clinical Biochemistry	3	1	0	40	60	100	4
MCEMS1-304	Assisted Reproductive Techniques - Practical	0	0	4	60	40	100	2
MCEMS1-305	Clinical Biochemistry - Practical	0	0	4	60	40	100	2
MCEMS1-306	Research methodology - Quality control, Research ethics, Scientific writing -Practical	0	0	8	60	40	100	4
Total		**9**	**3**	**16**	**300**	**300**	**600**	**20**

4th Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject**	**L**	**T**	**P**	**Int.**	**Ext**	**Total**	
MCEMS1-401	Internship and Dissertation	0	0	40	80	120	200	20
Total		**0**	**0**	**40**	**80**	**120**	**200**	**20**

The candidate shall undergo internship in relevant department. The internship report shall be submitted to the parent institute & Viva-Voce examination shall be conducted by external expert.

or

The candidates will be supervised by the concerned faculty & the project report will be submitted to the institute. The Viva-Voce examination shall be conducted by external expert.

Overall Marks / Credits

Semester	Marks	Credits
1st	700	22
2nd	700	22
3rd	600	20
4th	200	20
Total	2200	84

FIRST SEMESTER

INTRODUCTION OF CLINICAL EMBRYOLOGY

Subject Code: MCEMS1-101 **L T P C** **Duration: 60 Hrs.**
3 1 0 4

Course Outcomes: After completing this module students will be able

- To know about clinical embryology
- Application and scope of clinical embryology
- To learn and solve the problems regarding reproduction and reproductive systems.
- To know about the different techniques of clinical embryology

UNIT-I (15 hrs)

Introduction of clinical embryology, application, scope, concept of embryology,
Historical review of embryology, type of embryology (descriptive, comparative, experimental, chemical, analytical embryology)
Significance of Embryology.

UNIT-II (15 hrs)

Gametogensis: Primordial germ cell, events of gametogenesis,
Oogenesis: time, duration, stages, structure of mature Ovum,
Spermatogenesis: time, duration, stages, structure of Sperm.

Unit-III (15 hrs)

Fertizalization: Site of Fertilization,
Approximation of gametes, contact and fusion of gametes, effect of fertilization,
Early embryonic development: Cleavage, implantation, formation of germ layers,

Unit-IV (15 hrs)

Implantation and placentation
Preimplantation, Development of reproductive organs
Anatomy of Sperms Embryonic fields

Recommended books

1. Balinsky, B.I and Fabian, B.C. (2012) An Introduction to Embryology, 5th Edition. CengagePublishers
2. Sastry, K.V. and Shukla, V. (2018) Developmental Biology. Rastogi Publications.
3. Mishra, S. (2010) Langman's Medical Embryology, South Asia Edition
4. Williams, Text Book of Endocrinology, 10th edition (2002), W.B. Saunders Publications

BIOCHEMISTRY INCLUDING STEROID METABOLISM

Subject Code: MCEMS1-102 **L T P C** **Duration: 60 Hrs.**
3 1 0 4

Course Outcomes:

- Biochemistry Majors will gain proficiency in basic laboratory techniques in both chemistry and biology,
- Students will be able to apply the scientific method to the processes of experimentation and hypothesis testing.
- The course aims to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis, and
- It will enable the students to acquire specialized knowledge and understanding of selected aspects by means of a stem/branch lecture series and a research project.

UNIT-I (15 hrs)

Chemical structures of biomolecules: Starch, Glycogen, Cellulose, Chitin, Hyaluronate, Chondroitin sulphate and Keratin sulphate,

UNIT-II (15 hrs)

Basic structure and classification of Amino acids., Biologically active peptides- Glutathione, Aspartame, Enkephalins, Oxytocin & Vasopressin, Super secondary structures in Protein, Protein denaturation and folding Abnormal Hemoglobin.

UNIT-III (15 hrs)

Degradation and Biosynthesis: Degradation of glucose and Palmitic acid, Biosynthesis of urea, Gluconeogenesis, Glycogen synthesis

UNIT-IV (15 hrs)

Structure and Functions of Enzymes, Immobilized enzymes and their applications. Steroid hormones, biochemistry of steroid hormones, classification, their functions, metabolism of steroid hormones

RECOMMENEDED BOOK

1. Biochemistry by Mary K. Campbell Saunders and Harcourt Brace company. Florida (1999)
2. Principles of Biochemistry by Albert Lehninger, David L. Nelson and Michael M.Cox. CBSPublishers. Delhi. (2000)
3. Harper's Biochemistry, International l 25th ed. Robert K. Murrary, peter A. Mayes, Daryl K.Granner. Victor W. Rodwell. McGraw Hill. Lange Medical books (1999)
4. Outline of Biochemistry, Eric. C. Conn, Paul K. Stump. George Bruening, Roy, H. Ooi, Johnwiley and sons, New York.
5. A Text-book of Biochemistry by Edward Staunton, Wilbert, K. Todd, Howard S. Mason, John T. Van Bruggen. Macmillon Publishing Co. (1974).

EMBRYOLOGY AND PHYSIOLOGY OF HUMAN REPRODUCTIVE SYSTEM

Subject Code: MCEMS1-103 **L T P C** **Duration: 60 Hrs.**
3 1 0 4

Course Outcomes:

- The student will be able to identify the key concepts of the structure and function of human reproductive system.
- The student will be able to build communication skills while involved in peer teaching of clinical embryology.
- The students will get a comprehensive overview of the morphology and functional reproductive system of the human body.
- The course will provides an insight to the implications of disruption of normal structure and function.

UNIT-I (15 hrs)

Physiology of male reproductive System: testosterone synthesis, function, its regulation, semen composition, and its analysis, Sex determination, differentiation, physiology of Puberty, Physiology of Female reproductive System, Sex hormones

UNIT-II (1 5hrs)

Oesterogen Synthesis, function, its regulation, Progesterone: Synthesis, function and its regulation, Female reproductive Cycle, ovarian cycle, Uterine cycle, Cervical and vaginal changes.

UNIT-III (15 hrs)

Hormonal regulations of menstrual cycle, abnormalities of menstrual cycle, menopause, Ovulation and test for ovulation

UNIT-IV (15 hrs)

Physiology of pregnancy and test, physiology of Labor and lactation, Physiology of Fetus and New born, placenta: hormones.

Recommended books

1. Guyton, Text Book of Medical Physiology, 12th edition(2011), Elseveir Publication
2. Prof .G.K.Pal, Text Book of medical Physiology, 2nd Edition(2015), Ahuja Publication
3. Indu Khurana, Medical Physiology,1st Edition (2012), Elsevier Publication
4. A.K.Jain, Text Book of Physiology , 6th edition vol i&ii, Avichal publishing company, 2016
5. Williams, Text Book of Endocrinology , 10th edition (2002), W.B. Saunders Publications

BASIC CONCEPT OF CELL BIOLOGY & MOLECULAR BIOLOGY

Subject Code: MCEMS1-104 **L T P C** **Duration: 60 Hrs.**
3 1 0 4

Course Outcomes:

- To make aware the students regarding various cell organelles and their functioning with special stress on human chromosome.
- Students will get a comprehensive overview of the structure of cell and organelles functions
- Students will get knowledge about DNA replication and genetic expression.
- Students will be able to understand the basic mechanisms behind cell growth and division

UNIT-I (15 hrs)

The Cell : cell organization, organelles, Intracellular compartments Cytoskeleton & Cell Dynamics Cell junctions; Cell adhesion; Extracellular Matrix; Cell migration, Cell signaling – Typical ligand-receptor systems; Intracellular signaling systems; Signal transduction,

UNIT-II (15 hrs)

Cell growth & Division – Basic mechanism of mitosis & apoptosis, Oncogenes, Tumor Suppressor Genes, and Programmed Cell Death.

UNIT-III (15 hrs)

DNA Replication; Mutations &Repair Mechanisms; Recombination Transcription – Synthesis of RNA; RNA Processing; Regulation Translation – Mechanism; Regulation Protein Metabolism – Synthesis;

UNIT-IV (15 hrs)

Targeting and Degradation Regulation of Gene Expression Hormonal Regulation and Metabolism, Genetic code, karyotyping and PCR

Recommended books

1. Watson, Hopkins, Roberts, Steitz and Weiner, Molecular Biology of the Gene 1984, TheBenjaman/Cumming Pub. Co. Inc. California.
2. Alberts, Bray, Lewis, Raff., Roberts and Wtson (1983) Molecular Biology of the Cell,Garland pub. Inc. New York
3. Benjamin Lewin Gene IV, V, VI and VII 1997, Oxford Univ. Press. U.K.
4. Mayers R.A. Molecular Biology and Biotechnology, A comprehensive desk reference (Ed)VCH Pub. Inc. New York.
5. Brown T.A. Molecular Biology, Bios Scientific Pub. Ltd. Oxford.
6. Walker and Ginglod 1992. Molecular Biology & Biotechnology, Royal Society of Chemistry Cambridge.
7. Gardener, Simmons and Snustad. Principles of Genetics 1991, Wiley & Sons. Inc. NewYork

BASIC CONCEPT OF CELL BIOLOGY & MOLECULAR BIOLOGY PRACTICAL

Subject Code: MCEMS1-107 **L T P C** **Duration: 30 Hrs.**
0 0 2 1

Course Outcomes

- Students will be able to get information regarding various cell organelles and their functioning with special stress on human chromosomes.
- Students will get a comprehensive overview of the structure of cell and organelles functions
- Students will be able to understand the basic process behind cell growth
- Students will learn about DNA replication.

PRACTICALS

1. To study the structure of cell
2. Permanent slides of mitosis and meiosis
3. Protocol of DNA Replication
4. Polymerase chain reaction (PCR)
5. Karyotyping

Recommended books

1. Watson, Hopkins, Roberts, Steitz and Weiner, Molecular Biology of the Gene 1984, TheBenjaman/Cumming Pub. Co. Inc. California.
2. Alberts, Bray, Lewis, Raff., Roberts and Wtson (1983) Molecular Biology of the Cell,Garland pub. Inc. New York

INTRODUCTION OF CLINICAL EMBRYOLOGY PRACTICAL

Subject Code: MCEMS1-105 **L T P C** **Duration: 30 Hrs.**
0 0 2 1

Course Outcomes:

- Students will be able to understand about clinical embryology after completing this module,
- Students will understand the application and scope of clinical embryology
- The student will learn to solve the problems regarding reproduction and reproductive systems.
- The student will be introduced to the different techniques of clinical embryology

PRACTICALS:

1. To study permanent slides of spermatogenesis, oogenesis
2. T.S of ovary
3. T.S of sperm
4. To study development of embryo from permanent slides
5. Demonstration of male reproductive system with the h
6. Demonstration of female reproductive system

Recommended books

1. Balinsky, B.I and Fabian, B.C. (2012) An Introduction to Embryology, 5th Edition. CengagePublishers
2. Sastry, K.V. and Shukla, V. (2018) Developmental Biology. Rastogi Publications.
3. Mishra, S. (2010) Langman's Medical Embryology, South Asia Edition
4. Williams, Text Book of Endocrinology, 10th edition (2002), W.B. Saunders Publications

EMBRYOLOGY AND PHYSIOLOGY OF HUMAN REPRODUCTIVE SYSTEM PRACTICAL

Subject Code: MCEMS1-106 **L T P C** **Duration: 30 Hrs.**
0 0 2 1

Course Outcomes:

- The student will be able to identify the key concepts of the structure and function of human reproductive system.
- The student will be able to build communication skills while involved in peer teaching of clinical *embryology*.
- The students will get a comprehensive overview of the morphology and functional reproductive system of the human body.
- The course will provide an insight into the implications of disruption of normal structure and function.

PRACTICALS:

1.To study menstrual cycle
2. To study diseases related to menstrual cycle
3. To study different months of human embryo
4. To study different types of pregnancy tests
5. Demonstration of Embryology Models
6. Histology Slides of Testes and Ovary

Reference Books

1. Guyton, Text Book of Medical Physiology, 12th edition(2011), Elseveir Publication
2. Prof .G.K.Pal, Text Book of medical Physiology, 2nd Edition(2015), Ahuja Publication
3. Indu Khurana, Medical Physiology,1st Edition (2012), Elsevier Publication
4. A.K.Jain, Text Book of Physiology , 6th edition vol i&ii, Avichal publishing company, 2016
5. Williams, Text Book of Endocrinology , 10th edition (2002), W.B. Saunders Publications

SECOND SEMESTER

IVF PROCEDURE: FERTILIZATION, EMBRYO PRODUCTION& CRYOPRESERVATION TECHNIQUES

Subject Code: MCEMS1-201 **L T P C** **Duration: 60 Hrs.**
3 1 0 4

Course Objectives:

- After completing this module students will be able to know about clinical embryology lab techniques
- Application and scope

Course Outcomes:

The student will learn to solve the problems regarding reproduction and reproductive systems. The student will be introduced to the lab set up methods that's is useful in field of clinical embryology

UNIT-I (15 Hours)

Lab Set-up for IVF, Requirements and Protocols, Quality Control and Quality Assurance, Health and safety in the laboratory, Introduction to culture media, Handling and culture techniques, Preparation of media and buffer, Sequential culture media, Co-culture

UNIT –II (15 Hours)

Normal embryo development, abnormal embryo development, Metabolism of embryo, Grading of oocyte, Selection of embryo, Grading of embryo, Blastocyst culture –technique

UNIT –III (15 Hours)

Embryo transfer technique, USG guided embryo transfer, Embryo Reduction
Complication of IVF, Anesthesia, Patient Counseling, History of cryobiology, Physiology of cryobiology

UNIT –IV (15 Hours)

Cryoprotectant and its role, Lab Set-up for cryopreservation, Embryo freezing, Slow freezing technique, Vitrification of gamete of embryo, Recent development in cryobiology.

Recommended Books

1. David K. Gardner, Ariel,W, Coliin M. Howles, Textbook of Assisted reproductive Techniques,Vol.II ,5th Edition,2018
2. Pandy Manish R, The Techniques of IVF made easy with DVD-ROM, 1st Edition, Jaypee Brothers Medical Publisher
3. Chaitanya N., Sonal ,P., Practical Guide to Infertility Management & IVF, Jaypee Brothers Medical Publisher
4. Hirishekesh ,P., Manal on Advanced Infertility and Assisted Reproductive Techniques, Jaypee Brothers Medical Publisher 2013
5. Carol, T., Encyclopedia of Fertilty And Infertility, Viva Books Private Limited, 2010

REPRODUCTIVE DISORDERS AND HISTOLOGY

Subject Code: MCEMS1-202 **L T P C** **Duration: 60 Hrs.**
3 1 0 4

Course Objectives:

The student will be able to identify the key concepts of the structure and function of human reproductive system and its disorder.

Course Outcomes:

The aim of this course is to provide students with a comprehensive overview of the morphology and functional anatomy of the human reproductive system. The course provides an insight to the abnormalities od reproductive system

UNIT-I (15 Hours)

Sexual differentiation & developmental abnormalities – male & female Menstrual disorders – Precocious, delayed or absent puberty

UNIT-II (15 Hours)

Amenorrhea Fertility disorders – Sexual dysfunction; Infertility; Spontaneous pregnancy loss Pregnancy disorders – Pre-eclampsia, IUGR, Labour abnormalities

UNIT-III (15 Hours)

Endocrine disorders – Hyperprolactinemia Autoimmune disorders Genetic disorders (mutations and syndromes),

UNIT-IV (15 Hours)

Cancers and biomarkers – Testicular; Prostate; Ovarian; Endometrial; Cervical; Breast Reproductive pathology,

Recommended books

1. Balinsky, B.I and Fabian, B.C. (2012) An Introduction to Embryology, 5th Edition. CengagePublishers
2. Sastry, K.V. and Shukla, V. (2018) Developmental Biology. Rastogi Publications.
3. Mishra, S. (2010) Langman's Medical Embryology, South Asia Edition

INFERTILITY AND ITS CLINICAL MANAGEMENT, ANDROLOGY

Subject Code: MCEMS1-203 **L T P C** **Duration: 60 Hrs.**
3 1 0 4

Course Objectives:

- The student will be able to identify the key concepts of the Physiology of Ovulation.
- The student will be able to know about the Hormonal control of reproduction

Course Outcomes:

The aim of this course is to provide students information about Physiology of Ovulation, Folliculogenesis and the lab set up methods that's is useful in field of clinical embryology

UNIT -I (15 Hours)

Physiology of Ovulation, Folliculogenesis, Physiology of Menses, Hormonal control of human, Natural Cycle, Various stimulation protocols, Ovarian Hyperstimulation syndrome (OHSS), Complication of stimulation, Monitoring of patients, Reproductive function and causes of subfertility, Investigating male and female patients

UNIT -II (15 Hours)

Infertility and its management, Ultrasound, Elderly Patients, reproduction, Miscarriage, Ectopic Pregnancies, Multiple Gestation, Heterotrophic Pregnancies, Oocyte Donation Programme, Surrogacy

UNIT -III (15 Hours)

Physiology of Sperm, Spermatogenesis, Male Factor, Lab Set-up for andrology, Sperm separation, Semen analysis, Semen analysis as per WHO criteria, Sperm morphology assessment according to Strict (Kruger) criteria. Sperm survival test, Grading of Sperm

UNIT -IV (15 Hours)

Sperm preparation for IUI,Sperm preparation for IVF, Semen preparation for IUI-Classical method, Standard method and Density gradient method, Semen cryopreservation-both neat and processed sample, Sperm freezing, Donor Sperm Programme

Recommended Books:

1. David K. Gardner, Ariel,W, Coliin M. Howles, Textbook of Assisted reproductive Techniques,Vol.II ,5th Edition,2018
2. Pandy Manish R, The Techniques of IVF made easy with DVD-ROM, 1st Edition, Jaypee Brothers Medical Publisher
3. Chaitanya N., Sonal ,P., Practical Guide to Infertility Management & IVF, Jaypee Brothers Medical Publisher
4. Hirishekesh ,P., Manal on Advanced Infertility and Assisted Reproductive Techniques, Jaypee Brothers Medical Publisher 2013
5. Carol, T., Encyclopedia of Fertilty And Infertility, Viva Books Private Limited, 2010

CYTOGENETIC

Subject Code: MCEMS1-204 **L T P C** **Duration: 60 Hrs.**
3 1 0 4

Course Objectives:

The student will be able to identify the key concepts of the molecular biology, chromosome structure, sex chromosome and different techniques of molecular biology.

Course Outcomes:

The aim of this course is to provide students information about molecular biology, chromosome and Genetic techniques that's is useful in field of clinical embryology

UNIT-I (15 Hours)

Biology of chromosomes: Metaphase chromosomes, Centromere, Kinetochore, Telomere & its maintenance Heterochromatin & Euchromatin, Sex determination: Sex chromosomes & Sex determining mechanisms, Dosage compensation in Man.

UNIT-II (15 Hours)

Cytogenetic implications and consequences of Structural changes and Numerical change, Role of genetics in infertility, Chromosomal and genetic analysis in IVF,

UNIT –III (15 Hours)

Genetic techniques, FISH, Preparation of blastomeres for FISH, CGH, Flow ctyometry, Automated Karyotyping, Embryo biopsies Role of genetics in OATS, Genes and RPL (Recurrent pregnancy losses)

UNIT –IV (15 Hours)

Somatic cell geneti: Cell fusion, hybrid agents and mechanism of fusion, Heterokaryon-selective hybrids and chromosome segregation.

RECOMMENDED BOOK:

1. Edwin H. Mcconkey, 1993. Human genetics, the molecular revolution.
2. Peter J. Russel, 1998, Genetics.
3. Avers C.J., 1984, Genetics
4. Gardner, E.J., Simmons, M.J. & Snustad, P. Principles of Genetics, 1991, 1991, John Wiley& Sons Inc. New York.
5. Monroe W. Strickberger Genetics, 1985, Macmillan Publishing Company, New York.
6. Seth, P.K. & Seth, S. 1994, Human Genetics, New perspectives, Omega Scientific Publishers.
7. Strachan, Tom and Read, A.W. Human Molecular Genetics 2004, Garlandjd Science London, New York.

IVF PROCEDURE: FERTILISZATION, EMBRYO PRODUCTION& CRYOPRESERVATION TECHNIQUES PRACTICAL

Subject Code: MCEMS1-205 **L T P C** **Duration: 60 Hrs.**
0 0 4 2

Course Objectives:

- After completing this module students will be able to know about clinical embryology lab techniques
- Application and scope

Course Outcomes:

The student will learn to solve the problems regarding reproduction and reproductive systems. The student will be introduced to the lab set up methods that's is useful in field of clinical embryology

PRACTICALS

1. Introduction to lab
    a. Lab ethics
    b. Aseptic precaution
2. Introduction to instruments
    a. Handling of instruments
    b. Insemination technique
3. Identification of oocyte
    a. Grading of oocyte
    b. Insemination of oocyte
4. Denuding
5. Ferti-check on day 1
6. Classification of 2PN
7. Growth of embryo on day 2
8. Shifting of embryos
9. Quality of embryo on day 3
10. Grading of blastocyst
11. Selection of blastocyst for embryo transfer
12. Vitrification of blastocyst
13. Vitrification of cleaving embryos
14. Retrieval of vitrified embryos

REPRODUCTIVE DISORDERS AND HISTOLOGY PRACTICAL

Subject Code: MCEMS1-206 **L T P C** **Duration: 60 Hrs.**
0 0 4 2

Course Objectives:

The student will be able to identify the key concepts of the structure and function of human reproductive system and its disorder.

Course Outcomes:

The aim of this course is to provide students with a comprehensive overview of the morphology and functional anatomy of the human reproductive system. The course provides an insight to the abnormalities od reproductive system

PRACTICALS

1. Histology of male reproductive system Testis, Epididymis, Ductus deferens and accessory reproductive glands of male; Seminal vesicles, Prostate gland, Cowper's gland
2. Histology of female reproductive system: Ovary, Oogenesis, Structure of Ovum and Corpus luteum
3. Study of Permanent slides: Spermatogenesis, Mammary gland and Placenta.

CYTOGENETIC PRACTICAL

Subject Code: MCEMS1-207 **L T P C** **Duration: 60 Hrs.**
0 0 4 2

Course Objectives:

The student will be able to identify the key concepts of the molecular biology, chromosome structure, sex chromosome and different techniques of molecular biology.

Course Outcomes:

The aim of this course is to provide students information about molecular biology, chromosome and Genetic techniques that's is useful in field of clinical embryology

PRACTICALS

1. To study the human karyotype.
2. Genetic techniques, FISH, Preparation of blastomeres for FISH,CGH, Flow ctyometry,
3. Chromosome mapping
4. To study the sex chromatin body in the human neutrophil cells.
5. To study the sex chromatin body in the human buccal mucosal cells