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UNIVERSITY OF MYSORE

Estd.1916

Vishwavidyanilaya Karyasoudha
Crawford Hall, Mysuru- 570 005

(Re-accredited by NAAC at 'A')

(NIRF-2023 Ranked 44 in University Category & 71 in Overall Category)

No.: PMEB-1/Spl./10(2)/2023-24 **Date: 06-01-2024**

NOTIFICATION

Sub.: Syllabus and Examination pattern of **M.Sc. (Reproductive Biology & Clinical Embryology-IVF)** course under Specialized Programmes from the academic year 2023-24-reg.

Ref.: 1. Decision of the BOS Meeting held on 03-06-2023.
2. Decision of the Academic Council meeting held on 10-11-2023.

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The Board of Studies in **M.Sc. (Reproductive Biology & Clinical Embryology-IVF) (PG)** at its meeting held on 03-06-2023 has recommended to approve the scheme of examination and the syllabus of **M.Sc. (Reproductive Biology & Clinical Embryology-IVF)** course in University of Mysore under specialized/specified programs as per CBCS Scheme from the academic year 2023-24.

The Academic Council has also approved the above said proposals at its meeting held on 10-11-2023 and the same is hereby notified.

The syllabus of **M.Sc. (Reproductive Biology & Clinical Embryology-IVF)** course may be downloaded from the University website **https://uni-mysore.ac.in/PMEB/.**

18/1/24

REGISTRAR

REGISTRAR
University of Mysore
MYSURU - 570 005

To,

1. The Registrar (Evaluation), University of Mysore, Mysuru.
2. The Dean, Faculty of Science & Technology, DoS in Earth Science, Manasagangothri, Mysuru.
3. Prof. Kemparaju K, DoS in Bio chemistry, Manasagangothri, Mysuru.
4. The Principal, Cauvery College of Life Science & Management, #131/1, 2D, 2E, 2F, KBL Layout, Near Devegowda Circle, Alanahalli, Mysuru.
5. The Deputy Registrar/ Asst. Registrar/ Superintendent, Examination Branch, UOM, Mysuru.
6. The PA to Vice-Chancellor/Registrar/Registrar (Evaluation), University of Mysore, Mysuru.
7. Office Copy.

Annexure-1

Cauvery College of Life Sciences and Management

Specialized PG programme by University of Mysore Credit Pattern(2022-2023)

M.Sc.(Reproductive Biology and Clinical Embryology (IVF)) (PG) Regulations and Syllabus

ThecreditpatternforAssistedReproductionandEmbryologyissimilartotheUniversity's choice based credit system. However, the syllabus does not have soft coreand open elective papers. All subjects are mandatory. The total credit for course is same as that of PG programme of the University.

Followingshallbetheminimumandmaximumcreditspersemester.

Thecreditpatternislecture(L);Tutorial(T);Practical(P);(L:T:P)Pattern.

Lecture: Onehoursessionoftheoryclassperweekinasemesteris1credit.

Tutorialandpractical: Twohoursessionoftutorialorpracticalperweekinasemesteris 1credit .

Onesemesterperiod:16weeksofteachingandlearning.

Durationofsemester:20weeksthatincludessemesterendexaminations.

- ACandidatecan enrollforaminimumof19creditspersemester.
- ACandidatehastoearn aminimumof76creditsfor successfulcompletionofamasterDegree.

Continuousassessmentpattern:

Continuousassessment	Timeduration	Marks		Minimum 30%and anaggregate of40%todeclar epass
		Max	Min	
C1	1week to8weeks	15	4.5	
C2	9weeks to16weeks	15	4.5	
C3	Complete16weeks	70	21	

Eligibility for Admission: Students of Bachelor of Science Degree (B Sc) from any UGC recognized Universities with life Science subjects or any equivalent bachelordegree/MBBS/BDS/BAMS/BHMS/B.Pharma/BScNursing/Engineering with sciences (Biotechnology and life science related) and Students from foreign nationals are also eligible, subjected to eligibility from University of Mysore. Admissions will be done as per University of Mysore norms.

SEMESTERI **(20)CREDITS**

SLNO	**TITLEOFTHEPAPER**	CREDITPATTERN			TOTALC REDITS
		L	T	P	
1.1	**Cellularbiology&biophysicalt echniques**	2	0	0	2
1.2	**HumanReproductivebiology**	4	0	0	4
1.3	**Andrology LaboratoryTechnique s-1**	0	0	6	6
1.4	**Andrology laboratoryTechnique s-2**	0	0	8	8
		6	**0**	**14**	**20**

SEMESTERII **(20)CREDITS**

SLNO	**TITLEOFTHEPAPER**	CREDITPATTERN			TOTALCREDITS
		L	T	P	
2.1	**Genetics&Reproductive Endocrinology**	2	0	0	2
2.2	**AssistedReproduction**	2	0	0	2
2.3	**In-VitroFertilizationtechniques**	0	0	8	8
2.4	**ClinicalEmbryology**	0	0	8	8
		4	**0**	**16**	**20**

SEMISTERIII **(20)CREDITS**

SLNO	TITLEOFTHEPAPER	CREDITPATTERN			TOTALCREDITS
		L	T	P	
3.1	**InfertilityCounseling**	2	0	0	2
3.2	**HumanGametesandEmbryoculture System**	2	0	0	2
3.3	**MicromanipulationinART**	0	0	8	8
3.4	**CryobiologyandTechniques**	0	0	8	8
		4	**0**	**16**	**20**

SEMISTERIV **(20)CREDITS**

SLNO	TITLEOFTHEPAPER	CREDITPATTERN			TOTALCREDITS
		L	T	P	
4.1	**PreimplantationGenetic Screening(PGS)**	2	0	0	2
4.2	**Quality control and riskmanagementinART**	4	0	0	4
4.3	**Writingandpresentationskill**	0	4	0	4
4.4	**ProjectWork**	0	0	10	10
		4	2	**10**	**20**

Semester1 **(20Credits)**

Paper1.1CellularBiologyandBiophysicalTechniques

(2credits-2hours/Week)-32Hours

UnitI.CellBiology

Basic Characteristics of the Cell: Diversity of cell size and shape, Cell theory,Structure, organization and composition of prokaryotic and eukaryotic cell. Structureandfunctionsofcellorganelles,Celldivision-mitosisandmeiosis.Plasmamembrane-structureandfunctions,**chromosomes-**TypesofChromosomesandmolecularanatomy of eukaryotic chromosomes – nucleosomes, organization and significance ofpolyteneandlampbrushchromosomes,Numericalchangesinchromosomes.Moleculare ventsofcelldivisionandcellcycle,regulationofcellcycle. **8Hours**

UnitII.Biochemistry

Structures of atoms, molecules and bonds, chemical foundations of biology, pH, pK,acids, bases and buffers, Covalent and non-covalent interactions, Vander – Wallforces, electrostatic and Hydrogen bonding and hydrophobic interactions, Laws ofthermodynamics,

Classification, structure and Properties of carbohydrates, amino acids and proteins,and lipids.Nucleic acids- Structure and properties- Bases, Nucleosides, Nucleotides,Polynucleotides. Structure of double stranded DNA (B, A, and Z-DNA. Types ofRNAsandtheirbiologicalsignificance. **8Hours**

UnitIII.BiophysicalTechniques

Introduction to Biophysics: Scope of Biophysics, Interaction of living and non-livingmatters,chemicalfoundationsofBiophysics.

Microscopic techniques: Principle and application of light, Phase contrast, Dark field,Fluorescencemicroscopy,ScanningandTransmissionElectronMicroscopy.
Chromatographytechniques:Principleandapplicationofpaperchromatography,TLC,Gelfi ltration,chromatography,Ion–Exchangechromatography,Affinitychromatography,Gas-liquidchromatography,HPLC. **8Hours**

Centrifugation: Principle, techniques of preparative, analytical and ultracentrifugesElectrophoresisandBlottingTechniques,PrincipleandapplicationofPAGE, SDS-PAGE,Southern,NorthernandWestern blottingtechniques.
Spectroscopic techniques: Electromagnetic spectrum of light, Beer-Lambert's law,PrincipleandapplicationofUV,VisibleandIRspectroscopy,Fluorescencespectrosco py ,NMR, Atomic absorption spectroscopy, Massspectroscopy, Flowcytometry.

Radioisotopetechniques:Natureofradioactivity,detectionandmeasurement.Auto radiographyanditsapplications,BiologicalimportanceofLasers,MicrowavesandRadiations. **8hours**

SEMESTER I

Paper1.2HumanReproductiveBiology (2credits- 2hours/Week)-32Hours

UNIT1 16Hours

- BiomedicalbackgroundofBournHallClinic
- The BournHallstory
- Gonadalchangesfrombirthtopuberty,Pubertyanditstiming,Environmentalfactorsandpuberty,PubertyandPsychological adjustment
- Anatomyofmaleandfemalereproductivesystems
- Gametebiology:Spermatogenesisandoogenesis
- Andrology:DetailedCompositionofseminalplasma,
- SemenExamination;Introduction,samplecollectionmethods,samplecollectionfordiagnosticorresearchpurposes
- Sterilecollectionofsemenforassistedreproductionandmicrobiologicalanalysis
- Samplecollectionathome,collectionofsemenbycondom
- Safehandlingofspecimens
- Initialexamination:Liquefaction,semenviscosity,semenappearance,semenvolume andPH
- Initialmicroscopicexamination:Thoroughmixingofthesample,makingwetpreparation,
- Cellularelementsotherthanspermatozoa
- Spermmotility:categoriesofspermmovements,preparationandassessmentofsperm motility
- Spermvitalitytest:Usingeosin-nigrosin,eosinaloneandhypo-osmoticswellingtest.
- SpermConcentrationestimation:Typesofcountingchambers
- SpermMorphologyassessment:Preparationofspermsmear,assessmentofspermmorphology,stainingproceduresforsperm morphology
- Assessmentofspecificspermdefects
- Assessmentofspermleukocytesinsemen
- Assessmentofimmaturegermcellsinsemen

- Biomedicalassayforaccessorysexorganfunction:measurementoffructoseandzincin seminalplasma
- Ultrastructureofspermatozoa,

UNIT2 **16Hours**

- Maleandfemalereproductivesystem:congenitalordevelopmentaldisordersasso ciatedwithprimarytesticulardisorder,
- KlinefelterSyndrome,chryptorchism.
- Varicocele,infection,Drugandradiation
- Spermtransportdisorders
- Poorsemen parameters
- Causesoffemaleinfertility:Failuretoovulate,Probleminmenstrualcycle,infection,failure tomatureeggproperly,endometriosis,
- Primaryovaryinsufficiency,
- Uterineanomalyandfibroid.
- InfertilitytrendsworIdwide,infertilityinIndia
- VariousEnvironmentalfactoreffectonmaleandfemaleinfertility
- Clinicalexaminationofmaleandfemale
- Femaleinfertility:Disordersoffemalereproductivesystem,Fallopiantubalbloc k,hydrosalpinx
- Polycysticovarysyndrome(PCOS)
- Ovulationandanovulation
- Ovarianstimulationprotocol

SEMESTER I

Practicalpaper-1.3 (6Credits -

12hours/weekx16weeks)Papertitle:Andrologylaboratorytechniques-1

1. SettingupofanIUILaboratory,
2. Equipmentandsafety:BasicsuppliesneededinandAndrologylaboratory,
3. PotentialbiohazardsinAndrologylaboratory,safetyprocedure,
4. SafetyProcedureoflaboratoryEquipments,precautionswhenhandlingliquidnitrogen.
5. BriefAccountofequipments:laminarairflow,varioustypesofmicroscope,stereozoommicroscope, inverted microscope, Incubator used for IUI/dry bath, Centrifuge unit,Refrigerator,Makler chamber,Neuber chamber,spermconcentration
6. UseofCASAtospermmorphologyassessment
7. UseofCASAtoassessspermmotility,
8. Spermpreparation:Introduction,Choiceofmethod,efficiencyofspermseparationfromseminal plasma and infectious organism, simple washing procedure, Direct swim-up,Discontinuousdensitygradient,
9. PreparationofHIVinfectedsemensample
10. Preparationoftesticularandepididymalspermatozoa
11. Preparationofretrogradeejaculationsample
12. Antispermantibodytest
13. BiomedicalwasteManagement

SEMESTER I

Practicalpaper-1.4 (8Credits -16hours

/weekx16weeks)Paper title:Andrologylaboratorytechniques-II

1. SemenexaminationwithKruger'scriteria
2. Semencryopreservationprotocol:standardprocedure,modifiedfreezingprotocolsforpoor semensamples,labelling ofstrawsand record
3. Assessmentofspermchromatin:anilinebluetest,acridineorangetest,spermchromatinstructu reassay(SCSA),Comet assayandTUNELassay.
4. QualityControlintheAndrologylaboratory
5. AssessmentoftheAcrosomereaction
6. Assessmentofnucleardecondensationofspermandotherfunctionaltest
7. Measurementofreactiveoxygenspeciesgeneratedbyleukocytesandspermsusp ension
8. Spermsurvivaltest
9. AdvancedtypesofspermpreparationforART
10. MousereproductiveAnatomy
11. Mousereproductivephysiology
12. Extractionoftheoocytesfromtheovary(Slaughterhouse)

Semester II **(20Credits)**

Paper2.1:GeneticsandReproductive Endocrinology

(2Credits -2hours/week)-**32Hours**

UNIT1 **16Hours**

- Reproductive endocrinology: Hormones and their function, principles ofhormoneassay,variousequipmentto dohormone assay,
- Immunoassay,Hypothalamicpituitaryfunction,thyroidhormones,
- Hirsutismprimaryandsecondaryamenorrhea.
- MaleandfemaleEndocrinology
- Hormonalregulationofspermatogenesisandovariancycle
- Lutealphasedefect,Physiologyofimplantation.

UNIT2 **16Hours**

- Basicgeneticsofthecell,
- Chromosomalvariations,Chromosomalsyndromes,Geneticbasisofevo lution.
- Generegulation:Translation,transcription,Expression,imprinting
- BasicGenetics:GenotypePhenotype,Mendelianinheritancepattern,
- Humankaryotyping,
- DNAchromatinandChromosomes,

- GeneMutationanditseffect,
- Epigenetics,
- Monogenicdiseases,Chromosomalabnormalitiesnumericalandstructural.
- HumangenomeProject

SEMESTERII

Paper2.2:Assistedreproduction (2Credits -2hours/week)-32Hours

UNIT1 16Hours

- Historyofassistedreproduction
- GonadotropinsinART;FolliclestimulationHormone(FSH),Estradiol,progesteroneandlutealhormone
- RemovalofhydrosalpingestoimproveIVFoutcome,
- Ovarianreservetest,byAMH
- Antralfolliclecount

UNIT2 16Hours

- OvarianendometriomasandIVFoutcome.
- UterinecavityabnormalityandIVFoutcome,
- VariouskindofspermretrievaltechniqueforART
- UltrasoundInovarianstimulationandfolliclemonitoring
- Ovarianhyperstimulationsyndrome
- Oocytemarkersofcompetence:N
  uclear maturityCytoplasmic
  maturity
  Polar
  bodiesZonaPe
  llucidaCumulu
  scells

SEMESTER II

Paper2.3:In-Vitrofertilisationtechniques(IVFtechniques)

Practicalpaper-1 (8credits-16hours/weekx16weeks)

1. PreparationforIVFprocedure:Goingthroughpatientfiletoknowaboutkindofstimulationprotocol, Gonadotrophinsused.
2. previoushistoryIVFifpatientunderwentIVFelsewhere
3. Culture Medium in ART: Media preparation for ART, detailed account of culturemedium,spermsurvivaltest,mediapreparationforintrauterineinsemination(IUI)andIVF-ET
4. Methodoffertilization,numberofgoodqualityoocytes,fertilizationandnumberofembryos,andqualityofembryosavailable.
5. PreparationfortheIVFprocedure:Mediumaliquotingintosteriletube,DishpreparationforIVF andICSI,
6. IVFwitnessing
7. DishpreparationforIVF:closeandopenculturesystem
8. SpermconcentrationcalculationforIVF
9. InseminationofIVFdropletwithspermandco-incubation
10. Follicularfluidscreening
11. Identificationofoocytes,washingandpre-incubation
12. AssessmentofOocytequality,IVFandfertilizationcheck
13. Pronucleusgrading
14. Fragmentationandgradingtheembryo

SEMESTER II

Paper2.4:ClinicalEmbryology

Practicalpaper-2 (8Credits -16hours/weekx16weeks)

1. SettingupofARTUnitwithvariousfacilitiesanddetailAccountonembryologylaboratoryandequipments.
2. Qualitycontrol,qualityassuranceandtroubleshootinginIVFlab
3. EquipmentstocontrolairqualityinEmbryologylaboratory
4. Sterilizationmethods
5. Goodlaboratorypractice(GLP)
6. Tissueculturetechniques
7. PreparationofstandardoperationprotocolforallproceduresintheIVFlaboratory.
8. Culturesystem:Openandcloseculturеadvantagesanddisadvantages
9. Preparationforfollicularfluidaspiration,culturemediumdisposables
10. Inseminationofprocessedsample,ConventionalIVF,
11. shortterminseminationandlongterminsemination,fertilizationcheck,observationoffertilizedOocyte tillBlastocyst development.
12. Cleavagestageembryograding
13. Blastocystgrading
14. Blastocystcultureadvantagesanddisadvantages

Semester III **(20Credits)**

Paper3.1:Infertilitycounseling **(2Credits -2hours/week)-32Hours**

UNIT1 **16Hours**

- Basicsofcounseling
- Infertilitycounseling
- Psychologyofinfertility
- Medicalaspectsoftheinfertilityforthecounselor
- Crossculturalissuesininfertilitycounseling
- Psychologicalevaluationoftheinfertilitycouple
- Evidencebasedapproachtoinfertilitycounseling
- Individualcounselingandpsychotherapy
- Counselingtheinfertilecouple

UNIT2 **16Hours**

- GroupapproachtoinfertilityCounseling
- Sexualcounselingandinfertility
- Geneticcounselingandtheinfertilepatient
- RecipientcounselingforDonorinsemination
- RecipientcounselingforEGGdonation
- Embryodonationcounseling
- Ethicalaspectsofinfertilitycounseling
- LegalissuesininfertilityCounseling
- AssistedreproductivetechnologyandtheimpactonChildren

Paper3.2:HumangameteandEmbryoculturesystem

(2Credits-2hours/week)-32Hours

UNIT1 **16Hours**

- Historicalbackgroundofgametesandembryoculture
- UtilityofanimalmodelsforHumanembryocultureMediacomposition
- Saltsandosmolarity,energysourceandmetabolism,

- aminoacidsandcellularhomeostasis,
- Macromoleculesandembryogrowth,
- antioxidantchelaterandcellularfunction,
- PHandbuffers,Growthfactors.

UNIT2 **16Hours**

- Culturesystem:Singlestepandsequential
- Embryoco-culture
- Low-OxygenCculture
- Culturesystem:Embryodensity
- Culturesystem:airquality
- Culturesystemmineroiloverlay
- HumanembryoCulturemediacomparison
- EmbryoCultureandepigenetic

Semester III

Paper3.3:MicromanipulationInART (8 credits - 16 hours/week x 16 weeks)Practical-1

1. Historyofmicromanipulation,
2. variouskindsofmicromanipulationunit,
3. detailAccountofallmicromanipulationunit,
4. Microtoolpreparationequipments,
5. Handsonpracticeofvariousmicromanipulationunit,
6. Microtoolalignment,
7. ICSIdishpreparation
8. BriefAccountonPVPandhyaluronidase
9. Oocytedenudation
10. Oocyteassessment
11. Spermimmobilisationwithvarioustechnique

12. IntraCytoplasmicsperminjection
13. Assistedhatching:Zonadrilling,Zonathinning,Chemicalandlaserassistedhatching
14. Intra-Cytoplasmicmorphologicallyselectedsperminjection(IMSI)
15. PhysiologicalselectionofspermandintraCytoplasmicsperminjection(PICSI)
16. Spindleview(Polo-scope)
17. Timelapsevideomonitoringofdevelopingembryo

Semester III

Paper3.4:CryobiologyandTechniques(8credits-16hours/weekx16weeks)Practical-2

1. Historyofgametecryopreservation
2. Psychologicalandpsychosocialissuessurroundingspermandegbanking
3. Legalandethicalaspectsofgametebanking
4. Methodofspermretrievalandbankingincancerpatient
5. DetailedAccountofcryoprotectantforslowfreezingandvitrificationmethod
6. Dishpreparationforfreezing/vitrification
7. Dishpreparationforthawing/warming
8. Advantageanddisadvantagebetweenslowfreezingandvitrificationmethod
9. Oocyte/spermvitrification
10. Cleavagestageembryovitrification
11. Blastocystcollapseandvitrification
12. Troubleshootinginvitrification
13. Ovariantissuecryopreservation:Harvestingovary
14. Preparationandprocessingofovariancortex
15. Vitrificationofovariancortex

16. Storageofvitrifiedovariancortex
17. Warmingofovariancortex
18. Variousequipmentusedforslowfreezing

Semester IV (20Credits)

Paper4.1:PreimplantationGeneticScreening(PGS)

(2Credits-2hours/week)-32hours

UNIT1 **16Hours**

- HistoryofPGS:Animalstudiesandpreclinicalwork,developmentofhumanembryobiopsy
- Geneticbasisofinheritedtechnologies
- Prenatalscreeninganddiagnosis
- Preimplantationembryodevelopment
- Preimplantationgenetics
- ClinicalaspectsofPreimplantationgenetics

UNIT2 **16Hours**

- Polarbodybiopsy
- Cleavagestageembryobiopsy
- Blastocystbiopsy
- Preimplantationgeneticdiagnosisforinfertility(PGS)
- Preimplantationgeneticdiagnosisforsex-linkeddiseaseandsexselectionfornon-medicalreasons
- Geneticcounseling.

Paper4.2:QualitycontrolandriskManagementinART

(4Credits-2hours/week)- 64Hours

UNIT1 **32 Hours**

- QualityandqualitymanagementinARTlaboratory
- Regulation,licensingandaccreditation
- RiskandRiskmanagementinARTlaboratory
- Qualityandriskmanagementtool
- Riskeducation/riskminimization
- Howdowemanage risk,thebenefitofriskmanagement
- DevelopingRiskmanagementprogramme
- Howarewedoingbenchmarking
- Humanresources

UNIT2 **32Hours**

- Parameterstorunsuccessfullaboratory
- MitochondrialreplacementtherapyinART
- ProteomicsandMetabolomics
- ICMRguidelineforARTunit,andregulationinassistedreproduction
- SurrogacyBill
- PCPNDAct
- Regulationandethicsinclinicalpractice
- Gameteandembryodonation
- RegulationofARTBank

Paper4.3:Writingandpresentationskill (4credits)

Students will select the appropriate topics related to ART under the guidance ofteacherandpreparethepowerpointpresentation.PreparedPPTwillbepresenteddur ingmonthlyseminar.

Paper4.4:PROJECTWORK (10credits)

Students pursuing M.Sc in Assisted Reproduction and Embryology Degree course isrequired to carry out work on a selected research project under the guidance of postgraduate teacher. This is to train a post graduate student in research methods andtechniques.Projectworkincludesidentificationofaproblem,formulationofahypothesi s, search and review of literature, getting acquainted with recent advances,designing research study, collection of data, data analysis and comparison of resultsandfinallydrawingconclusions.

Theprojectshouldbewrittenunderthefollowingheadings

- Introduction
- Aimsofobjectiveofthestudy
- Reviewofliterature
- MaterialandMethods
- Results
- Discussion
- Conclusion
- Summary
- Tables
- Annexure

Four copies of the project prepared. shall be submitted to thedepartment/universitybeforethefinalexaminationdatenotified.

Schemeofexamination

C3Totalmarks **70marks**

Part-1 Simpleanswer questions(**1to12numbers**)

2x10Questions(12questions) **20**

marksAnsweranyten ofthefollowing

Part-2 Descriptivequestions. (**13to20**)

5X6Questions **30Marks**

Answeranysixof the following

Part-3

10x2Questions **20Marks**

WriteLonganswerquestions (21 to24)

Answeranytwoofthefollowing

RECOMMENDEDREADINGBOOKS

Sl.No.	NameOfTheBook	Authors	EditionAndYear
1	AndrologyLaboratoryManual	AshokAgarwal,KaminiARao,MSSrinivas.	2010
2	APracticalGuideToSelectingGametesAndEmbryos	MarkusMontag.	2014
3	A Guide To Basic Laboratory Practical Andrology	ChristopherLRBarratt ,David Mortimer , JoseAntonio Castilla ,JuanG.Alvarez,LarsBjorn dahl.	2010
4	A WorkbookOnHumanSpermatozoaAndAssistedConception	AshokAgarwal,Sonia Malik.	2012
5	BiennialReviewOfInfertility	BartCFauser,CatherineRacowsky , Douglas TCarell,PeterNSchegel.	2013
6	Biochemistry	DavidRawn,J.	1989
7	Biochemistry	Voet,D.AndVoet,J.G.	1999
8	Biochemistry-The Chemical Reactions OfLivingCells-Vol-2.	DavidE.Metzle	1977
9	BiophysicalChemistryPart-2	CantorAndSchmmel.	1980
10	Biophysical Chemistry-Principles AndTechniques.	UpadyayaAndUpadyaya.	2003
11	Chemistry– AnIntroductionToGeneral,OrganicAndBiologicalChemistry.	KarenC.Timberlake	1999
12	EmbryoCulture:MethodsAndProtocols,	GaryDSmith,JasonE.Swain,ThomasB.Pool.	2013
13	EmbryoTransfer	GautamNAllahbadia	2008

14	Handbook Of Human OocyteCryopreservation	EleonoraPorcu,Patrizia Maria Ciotti, StefanoVenturoli	2013
15	HarrisonsEndocrinology	JLarryJameson	2010
16	Harper'sReviewOfBiochemistry,,(1997)	MurrayEt.Al.	1997
17	HumanAssistedReproductiveTechnology:FutureTrendsInLaboratoryAndClinicalPractice.	BotrosR.M.B.Rizk,DavidK Gardner , , TommasoFlcone.	2011
18	Infertility Counseling-A ComprehensiveHandbook ForClinicians.	LindaHammerBurns, SharonNCovington	2006
19	Lehninger:PrinciplesOfBiochemistry	DavidLNelson,MichaelMCox	2015
20	MaleInfertility,2nd Edition,	TBHargreave.	1997
21	MedicalLaboratoryTechnologyPart-	SK.MizanurRahman.	2009
22	MolecularBiologyOfTheCell.	BruceAlberts	2002
23	NettersAtlasOfHumanEmbryology	LarryRCochard	2002
24	QualityAndRiskManagementInTheIVFLaboratory	DavidMortimerAndT. Mortimer	2008
25	OocyteBiologyInFertilityPreservation	S.SamuelKim	2013
26	SpermBanking–TheoryAndPractice	AllanAPacey,MathewJTomlinson	2009
27	TextbookOfIUIAndART	HrishikeshPai,KinjalR Shah,Nanditha Palshetkar,RishmaDhillon Pai.	2016
28	TextBookOfBiochemistryWithClinicalCorrelations.	ThomasDevlin	1999
29	TextbookOfInVitroFertilizationAndAssistedReproduction:TheBournHallGuide To Clinical And Laboratory Practice.3rd Edition	PeterRBrinsden	2005
30	TheSubfertilityHandbook-AClinicians	GabKovacs .	2011

	Guide,2ND Edition,		
31	Textbook Of Assisted ReproductiveTechnologies:LaboratoryAndClinicalPerspectives.3rd Edition	ArielWeissman,ColinMHoweles,DavidKGardner,ZeevShoham.	2009
32	PracticalManualOfInVitroFertilization.	AlexC.Varghese,AshokAgarwal,ZsoltPeter Nagy	2013
33	Practical Biochemistry; Principles AndTechniques;	K.Wilson And J. Walker(1995)4ThEdn.	1995
34	Preimplantation Genetic Diagnosis 2nd Edition	JoyceHarper	2009