



SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

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Department of Biotechnology	LP: BT22066
B.E/B. Tech/M.E/M.Tech : Biotechnology Regulation: 2022	Rev. No: 00
UG Specialization : Biotechnology	Date: 09.06.2026
Sub. Code / Sub. Name : BT22066/ Reproductive Biotechnology	
Unit : I	

Unit Syllabus:**Introduction to Reproductive Biology****6 hours**

Male and female reproductive systems, gametogenesis, hormones. Menstrual cycle, ovulation, fertilization, and implantation. Causes and diagnosis of infertility in humans and animals.

OBJECTIVE: Acquire a fundamental understanding of the principles and applications of reproductive biotechnology in humans and animals.

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Male reproductive systems and female reproductive systems	T1 (13-16)	BB & LCD
2.	Gametogenesis, hormones. Menstrual cycle	T1 (14) R4 (101-105)	BB & LCD
3.	Ovulation in reproduction	T1 (19-21) J1 (133-137)	BB & LCD
4.	Fertilization in reproduction	T3 (21-22)	BB & LCD
5.	Implantation in reproduction	T3 (23-31)	BB & LCD
6.	Causes and diagnosis of infertility in humans and animals	T3 (34-41)	BB & LCD
Content beyond syllabus covered (if any): Nil			

* Session duration: 50 minutes



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Sub. Code / Sub. Name : BT22066/ Reproductive Biotechnology
Unit : II

Unit Syllabus: Assisted Reproductive Technologies (ART) 10 hours

In vitro fertilization (IVF), intracytoplasmic sperm injection (ICSI), and embryo transfer. Gamete and embryo, cryopreservation, pre-implantation genetic diagnosis (PGD), ARTs in animal breeding and conservation programs.

OBJECTIVE: Explore the mechanisms underlying assisted reproductive technologies (ARTs) like IVF, ICSI, and cryopreservation.

Session No *	Topics to be covered	Ref	Teaching Aids
7.	In vitro fertilization	T2 (73-132) R5 (71-79)	BB & LCD
8.	Intracytoplasmic sperm injection	T1 (177-179)	BB & LCD
9.	Embryo transfer in reproduction	T2 (365-387)	BB & LCD
10.	Gamete in reproduction	T2 (333-363)	BB & LCD
11.	Embryo in reproduction	T1 (138-145)	BB & LCD
12.	Cryopreservation in reproduction	T1 (160-179) R4 (85-89)	BB & LCD
13.	Pre-implantation genetic diagnosis	T2 (569-617)	BB & LCD
14.	Assisted Reproductive Technologies in animal breeding I	T2 (543-569)	BB & LCD
15.	Assisted Reproductive Technologies in animal breeding II	T1 (310-319)	BB & LCD
16.	Conservation programs	T1 (180-195)	BB & LCD

Content beyond syllabus covered (if any): Nil

* Session duration: 50 mins



Sub. Code / Sub. Name : BT22066/ Reproductive Biotechnology
Unit : III

Unit Syllabus: Genetic Engineering in Reproductive Biotechnology 10 hours

Genome editing with CRISPR-Cas9 for genetic disorders in embryos. Mitochondrial replacement therapy to prevent mitochondrial diseases. Artificial ovaries and testes: Tissue engineering and regenerative medicine approaches. Advanced assisted hatching techniques and pre-implantation diagnostics.

OBJECTIVE: Explore the applications of genetic engineering in reproductive biotechnology.

Session No *	Topics to be covered	Ref	Teaching Aids
17.	Genome editing with CRISPR-Cas9 for genetic disorders in embryos	T1 (193-196) J5 (406-424)	BB&LCD
18.	Mitochondrial replacement therapy to prevent mitochondrial diseases	T1 (188-193)	BB & LCD
19.	Artificial ovaries	T1 (188-190)	BB & LCD
20.	Artificial testes	T1 (212-215)	BB & LCD
21.	Tissue engineering	T1 (216-217)	BB & LCD
22.	Regenerative medicine approaches	T2 (171-195)	BB & LCD
23.	Advanced assisted hatching techniques I	T2 (196-226)	BB & LCD
24.	Advanced assisted hatching techniques II	T2 (196-226)	BB & LCD
25.	Pre-implantation diagnostics I	T2 (618-641)	BB & LCD
26.	Pre-implantation diagnostics II	T2 (190-195)	BB & LCD

Content beyond syllabus covered (if any): Nil

* Session duration: 50 mins



Sub. Code / Sub. Name : BT22066/ Reproductive Biotechnology
Unit : IV

Unit Syllabus: Reproductive Genetics and Screening 10 hours

Introduction to Cells, Tissues, Organs and ECM, In-Vitro Cell Handling for 3D Bioprinting, Types of Cells used in 3D Bioprinting and their limitations, In-Depth Understanding of Hydrogels and Biomaterials.

OBJECTIVE: Analyze the potential and limitations of advanced technologies like genome editing and stem cell technologies in reproductive medicine.

Session No *	Topics to be covered	Ref	Teaching Aids
27.	Preimplantation genetic testing (PGT) for genetic disorders I	T2 (469-487)	BB & LCD
28.	Preimplantation genetic testing (PGT) for genetic disorders II	T2 (488-509)	GCR / BB & LCD
29.	Preimplantation genetic testing (PGT) for genetic disorders III	T2 (687-702)	BB & LCD
30.	Chromosomal abnormalities I	T2 (520-527)	BB & LCD
31.	Chromosomal abnormalities II	T2 (527)	BB & LCD
32.	Non-invasive prenatal testing (NIPT) I	T2 (528)	GCR / BB & LCD
33.	Non-invasive prenatal testing (NIPT) II	T2 (531-532)	BB & LCD
34.	Carrier screening in reproduction	T2 (789-822)	BB & LCD
35.	Case studies	T3(1060-1086)	BB & LCD
36.	discussions on emerging technologies and controversies	T2 (529-555)	BB & LCD
Content beyond syllabus covered (if any): Nil			

* Session duration: 50 mins



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Sub. Code / Sub. Name : BT22066/ Reproductive Biotechnology

Unit : V

Unit Syllabus:**Ethical and Societal Considerations****9 hours**

Ethical considerations in assisted reproduction and genetic manipulation. Societal implications of reproductive biotechnology. Gender and cultural perspectives on reproductive biotechnology. Regulatory frameworks and public policies governing reproductive technologies.

OBJECTIVE: Discuss the ethical and societal considerations surrounding reproductive biotechnology advancements.

Session No *	Topics to be covered	Ref	Teaching Aids
37.	Ethical considerations in assisted reproduction I	R5 (1-18)	GCR / BB & LCD
38.	Ethical considerations in genetic manipulation II	R5 (48-55)	BB & LCD
39.	Societal implications of reproductive biotechnology	T1 (820-825)	BB & LCD
40.	Gender and cultural perspectives on reproductive biotechnology I	T1 (188-190)	BB & LCD
41.	Gender and cultural perspectives on reproductive biotechnology II	T1 (207-212)	BB & LCD
42.	Gender and cultural perspectives on reproductive biotechnology III	T1 (207-212)	GCR / BB & LCD
43.	Regulatory frameworks and public policies governing reproductive technologies I	R4 (857-859)	BB & LCD
44.	Regulatory frameworks and public policies governing reproductive technologies II	T1 (231-233)	BB & LCD
45.	Regulatory frameworks and public policies governing reproductive technologies III	T3 (959-963)	BB & LCD

Content beyond syllabus covered (if any): Nil

* Session duration: 50 mins



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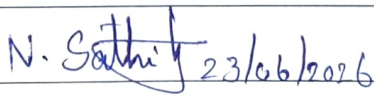
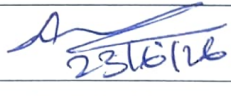
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TEXT BOOKS:

1.	Gardner, David K., Ariel Weissman, and Colin M. Howle. "Assisted Reproductive Technologies: A Practical Guide." 4th Edition, 2012.
2.	Kovacs, Gab, and John R. Davies. "Principles of Assisted Reproductive Technology." 1st Edition, 2010.
3.	Brown, T.A. "Gene Cloning and DNA Analysis: An Introduction." 8th Edition, 2020.
4.	Jones, Richard, and Peter J. J. Quinn. "Mammalian Reproductive Biology." 1st Edition, 2019
5.	Jones, Richard E., and Kristin H. Lopez. "Human Reproductive Biology." 4th Edition, 2013.

REFERENCE BOOKS:

1.	Honaramooz, Tom K. "Reproductive Biology and Biotechnology." 1st Edition, 2016.
2.	Onuchic, Jose A., Peter G. Wolynes, and David Thirumalai. "Advanced Techniques in Biophysics." 1st Edition, 2017.
3.	Glick, Bernard R., and Jack J. Pasternak. "Molecular Biotechnology: Principles and Applications of Recombinant DNA." 5th Edition, 2019.
4.	Roberts, Anthony E. "Reproductive Biotechnology in Animals." 1st Edition, 2014.
5.	Yount, Lisa. "The Ethics of Biotechnology." 2nd Edition, 2021.

	Prepared by	Approved by
Signature		
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Designation	Assistant Professor	HOD
Date	09.06.2026	09.06.2026
Remarks *: The Same lesson plan will be followed in the subsequent year		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD