

DEPARTMENT OF BOTANY
Teaching Plan 2022-23 (Odd Semester)
Sem V
Dr Pratibha Thakur

Course : B.Sc. (H) Botany, 3rd year, Sem. V
Paper : Reproductive Biology of Angiosperms - THEORY
(Session : 20th July to 16th Nov. 2022)

Name of Paper & Code	Allocation of Lectures	Month-wise schedule	Reading suggestions
UNIT- 1 Introduction History (contributions of G.B. Amici, W. Hofmeister, E. Strasburger, S.G. Nawaschin, P. Maheshwari, B.M. Johri, W.A. Jensen, J. Heslop-Harrison, H.Y. Mohan Ram) and scope of Reproductive Biology.	2 lectures	20 th July–31 st July	1. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, Vikas Publishing House. Delhi. 5th edition. 2. Shivanna, K.R. (2003). Pollen Biology and Biotechnology. Oxford and IBH Publishing Co. Pvt. Ltd. Delhi. 3. Raghavan, V. (2000). Developmental Biology of Flowering plants, Springer, Netherlands. 4. Johri, B.M. 1 (1984). Embryology of Angiosperms, Springer-Verlag, Netherlands.
UNIT- 2 Anther Anther wall: Structure and functions, microsporogenesis, callose deposition and its significance; Polyspory	4 lectures	1 st Aug. – 7 th Aug.	
UNIT- 3 Pollen biology Micro-gametogenesis; Pollen wall structure, MGU (male germ unit) structure, NPC system (no details but table to be included); Palynology and scope (a brief account); Pollen wall proteins; Pollen viability, storage and germination; Unique features: Pseudomonads, polyads, massulae, pollinia, pollen embryo sacs.	8 lectures	8 th Aug. – 17 th Aug.	
UNIT- 4 Ovule Structure; Types; Special structures–endothelium, obturator, aril, caruncle and hypostase; Female gametophyte– megasporogenesis (monosporic, bisporic and tetrasporic) and megagametogenesis (details of Polygonum, Allium and Fritillaria type); Organization and ultrastructure of mature embryo sac; Female germ unit.	9 lectures	18 th Aug. – 31 st Aug.	
UNIT- 5 Pollination and fertilization Mechanism of anther dehiscence, Pollination types and significance; adaptations; structure of stigma and style; path of pollen tube in pistil; structure of pollen tube; double fertilization.	6 lectures	1 st Sep. – 11 th Sep.	
UNIT- 6 Self incompatibility Basic concepts (interspecific, intraspecific, homomorphic, heteromorphic, GSI and SSI); Recognition and rejection reaction, Methods to overcome self- incompatibility: mixed pollination, bud pollination, stub pollination; Intra-ovarian and in vitro pollination; Modification of stigma surface, parasexual hybridization (in brief with examples); in vitro fertilization.	7 lectures	12 th Sep. – 25 th Sep.	
UNIT- 7 Endosperm Types (2 examples each), development, structure and functions.	4 lectures	26 th Sep. – 11 th Oct.	
Unit - 8 Embryo Six types of Embryogeny (no details); General pattern of development of dicot and monocot embryo; Suspensor: Ultrastructure and functions; Embryo-endosperm relationship; Nutrition of embryo; Unusual features: Embryo development in Paconia.	6 lectures	12 th Oct. – 23 rd Oct.	
Unit - 9 Seed Structure, importance and dispersal mechanisms (Adaptations – Autochory, Anemochory, Hydrochory, Zoochory with 2 examples each).	4 lectures	24 th Oct. – 30 th Oct.	

Name of Paper & Code	Allocation of Lectures	Month-wise schedule	Reading suggestions
Units -10 Polyembryony and apomixes Introduction; Classification (given by Bhojwani and Bhatnagar); Causes and applications.	6 lectures	31 st Oct. – 8 th Nov.	
Unit – 11 Germline transformation Transformation of male gametes (MAGELITR method) and egg cell through pollen tube pathway method (irradiated pollen, DNA application on cut end), floral dip method. (Methods of gene transfer not to be taught.)	4 lectures	9 th Nov. – 12 th Nov.	
Revision Assignment/Presentation Mock Test		1 st Nov. – 16 th Nov.	

Course : B.Sc. (H) Botany, 3rd year, Sem. V

Paper : Reproductive Biology of Angiosperms (PRACTICAL) - Group 2

(Session : 20th July to 16th Nov. 2022)

Name of Paper & Code	Allocation of Lectures	Month-wise schedule	Reading suggestions
1. Anther: Wall layers including tapetum (amoeboid and glandular); MMC, spore tetrads, uninucleate, bicelled and dehiscent anther stages through slides/micrographs, male germ unit (MGU) through photographs and schematic representations.	4	20 th July – 3 rd Aug.	1. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, Vikas Publishing House. Delhi. 5th edition. 2. Shivanna, K.R. (2003). Pollen Biology and Biotechnology. Oxford and IBH Publishing Co. Pvt. Ltd. Delhi.
2. Pollen grains: Fresh pollen showing ornamentation and aperture, pseudomonads, polyads, pollinia, massulae (slides/photographs, fresh material), ultrastructure of pollen wall (micrograph); Pollen viability: Tetrazolium test; Pollen germination: Calculation of percentage germination in different media using hanging drop and or sitting drop method; Study of pollen cytology of 2-celled and 3-celled pollen using DNA flurochormes or acetocarmine stain.	8	4 th Aug. – 17 th Aug.	
3. Ovule: Types: anatropous, orthotropous, amphitropous/campylotropous, circinotropous, unitegmic, bitegmic; Tenuinucellate and crassinucellate; Special structures: Endothelium, obturator, hypostase, caruncle and aril (permanent slides/specimens/photographs).	8	18 th Aug. – 31 st Aug.	
4. Female gametophyte through permanent slides/photographs: Types, ultrastructure of mature egg apparatus, central cell, antipodals.	6	1 st Sep. – 7 th Sep.	3. Raghavan, V. (2000). Developmental Biology of Flowering plants, Springer, Netherlands. 4. Johri, B.M. 1 (1984). Embryology of Angiosperms, Springer-Verlag, Netherlands.
5. Intra-ovarian pollination; Test tube pollination through photographs.	4	8 th Sep. – 14 th Sep.	
6. Endosperm: Dissection of young seeds for endosperm with free-nuclear haustoria.	8	15 th Sep. – 28 th Sep.	
7. Embryogenesis: Study of development of dicot embryo through permanent slides; dissection of young seeds for embryos at various developmental stages; Study of suspensor through electron micrographs.	8	29 th Sep. – 19 th Oct.	
8. Pollination and Seed dispersal mechanisms (through photographs / specimens).	6	20 th Oct. – 2 nd Nov.	
Revision Mock Exam		1 st Nov. – 16 th Nov.	