

**SARDAR PATEL UNIVERSITY**  
**Programme: MSC (Integrated Biotechnology)**  
**Semester: IV**  
**Syllabus with effect from: December 2011**

<b>Paper Code:</b> PS04CIGB04	<b>Total Credits: 3</b>
<b>Title Of Paper:</b> Developmental Biology	

Unit	Description in detail	Weightage (%)
1	<p>Morphology of an Angiosperm plant with the understanding of evolution</p> <ul style="list-style-type: none"> <li>• Compound leaf is advanced than the simple leaf</li> <li>• Apetalae is advanced than the gamopetalae and polypetalae</li> <li>• Fibrous root is advanced than the tap root system</li> <li>• Parallel venation is advanced than the reticulate venation</li> <li>• Herbs are advanced than the shrubs and trees</li> <li>• Annuals are advanced than the perennials</li> <li>• Monocots are advanced than the dicots</li> <li>• Aquatic plants and epiphytes are advanced than the terrestrial</li> </ul> <p>Evolution of angiosperm leaf and flower (Telome theory &amp; flower is a modified shoot)</p> <p>Evolution of seed through heterospory (comparison of Nephrolepis and Selaginella with Cycus)</p> <p>Life cycle of an angiosperm plant showing alternation of generation</p> <p><b>Experimental and Applied Embryology :</b> Artificial pollination and sexual incompatibility, methods to overcome incompatibility</p> <p>Scope of Embryology and Palynology in reference to plant biotechnology.</p>	
2	<p>Evolution of megasprophyll into gynoecium and microsporophyll into androecium</p> <p>Structure and development of microsporangium and male gametophyte</p> <p>Structure and development of megasporangium and female gametophyte</p> <p>Endosperm with types, Embryogeny in Monocot and Dicot</p> <p>Polyembryony</p> <p>Apomixis</p> <p>Parthenocarpy</p> <p><b>Applications of Embryology in Crop improvement</b> – Haploid production, Nucellus, Ovule, Ovary, Seed culture, Parthenocarpy, Genetic transforamtion</p>	
3	<p>Introduction to animal development</p> <p>Gametogenesis - Spermatogenesis, Oogenesis</p> <p>Types of eggs, Egg membranes</p> <p>Fertilization</p> <p>Parthenogenesis</p>	
4	<p><b>Cleavage:</b> Patterns and Types of cleavage Blastulation</p> <p>Brief account on Holoblastic and Meroblastic cleavages</p> <p>Gastrulation (Epiboly and Emboly)</p> <p>Growth and Differentiation</p> <p><b>Medical implications of Animal Development Biology:</b> Genetic errors of Human development, Infertility, Teratogenesis</p>	
	<b>Practical:</b>	
	<ul style="list-style-type: none"> <li>• Demonstration of homosporous Nephrolepis, heterosporus Selaginella, Cycus micro- and megasporangium, the evidences for the evolution of flower from shoot as gynandrophore in Capparidaceae &amp; Passifloraceae</li> </ul>	



	<p>and staminods in <i>Cana indica</i> and wild rose, cotyledon morphology.</p> <ul style="list-style-type: none"> <li>• Floral morphology of dicot and monocot flower</li> <li>• T.S. of an anther of <i>Hibiscus rosa-sinensis</i> and Meiosis.</li> <li>• T.S. of an ovary and embryo dissection</li> <li>• Artificial pollination by emasculation (bagging method)</li> <li>• Pollen germination (in vitro/ in vivo)</li> <li>• Pollen viability test</li> <li>• Different stages of Embryogenesis in animal</li> <li>• Sperm viability test</li> <li>• Embryology of Frog</li> <li>• Embryology of Chick</li> <li>• Demonstration of Chick embryo</li> </ul>	
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### Basic Text & Reference Books:

- A textbook of Botany (Vol. 1&2) by Bhattacharya, Hait and Ghosh. Pub. New Central Book Agency (P) Ltd., ISBN: 8173815500
- Morphology of an Angiosperms by Eames
- Taxonomy Evolution at Work by M. Daniel. Pub. Narosa Publishing House, ISBN:9788173199592
- Structure, Development and Reproduction in Angiosperms by RC Pandey and DK Jain, Rastogi Publications, Meerut (ISBN: 81-7133-706-6)
- Embryology of Angiosperms by SS Bhojwani and SP Bhatnagar, 4<sup>th</sup> Revised & Enlarged Ed., Sangam Books Pvt. Ltd., New Delhi (ISBN: 978-0706999129)
- Embryology by P Maheshwari, Rastogi Publications, Meerut (ISBN: 0070396205)
- Developmental Biology by Scott F Gilbert, 8<sup>th</sup> Ed., Sinaur Publishers, USA (ISBN: 0-87893-250-X)
- A Introduction to Embryology by BI Balinsky, 5<sup>th</sup> Ed., East-West Press Pvt. Ltd., New Delhi (ISBN: 981-254-284-1)
- Chordate Embryology (Developmental Biology) by PS Verma and VK Agarwal, S.Chand Publishers, New Delhi (ISBN: 81-219-0261-4)
- Developmental Biology by Sastry and Shukal, Rastogi Publications, Meerut (ISBN: 81-7133-734-1)
- Introduction to Embryology by AK Berry, S. Chand Publications, New Delhi (ISBN: 8185712352)

