SRI SAI RAGHAVENDRA (SSR) DEGREE COLLEGE (AUTONOMOUS)

TELANGANA STATE COUNCIL OF HIGHER EDUCATION
PROPOSED CBCS COMMON CORE SCHEME FOR B.SC. COURSE
BOTANY

CODE	PAPER TITTLE	Course Type	HPW	Credits
	FIRSTYEAR SEMSTER - I			
BS 104	PAPER-I : Microbial Diversity and Early Land Plants	DSC-1A	4T+2P=6	4+1=5
	FIRST YEAR SEMSTER – II			
BS 204	PAPER-II: Gymnosperms, Anatomy and Embryology of Angiosperms	DSC-1B	4T+2P=6	4+1=5
	SECONDYEAR SEMSTER – III			
BS 302	PAPAR-III: Plant Taxonomy, Ecology and Medicinal Botany	DSC-1C	4T+2P=6	4+1=5
	SECOND YEAR SEMSTER – IV			
BS 402	PAPER-IV : Cell Biology, Genetics & Plant Physiology	DSC-1D	4T+2P=6	4+1=5
	THIRD YEAR SEMESTER - V			
BS 501	**SEC: 1-**	SEC-1	2	2
BS 502	**SEC: 2-**	SEC-2-	2	2
BS 503	**VAC-1:**	VAC-1	3	3
BS 504	**Multi-Disciplinary Course (MDC)**	MDC	4T	4
BS 505	DSE -1A: Biodiversity & Conservation DSE -1B: Tissue Culture and Biotechnology DSE -1C.Economic Botany	DSE-1A / DSE-1B / DSE-1C	4 +2	4+1=5
	THIRD YEAR SEMESTER – VI			
BS601	**SEC: 3**	SEC: 3-	2	2
BS602	**SEC: 4**	SEC: 4-	2	2
BS603	**VAC-2**	VAC-2	3	3
BS 604	DSE -2A: Plant Molecular Biology DSE -2B:Seed Technology DSE -2C: Analytical Techniques in Plant Sciences	DSE-2A / DSE-2B / DSE-5E	4T+2P=6	4+1=5
	PROJECT			4

SEC: Skill Enhancement Course, VAC: Value added Course; **MDC**: Multi-DisciplinaryCourse ,**DSC**: Discipline Specific Core, **DSE**: Discipline Specific Elective.

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BOTANY

CBCS Pattern with effect from the Academic Year 2025-26

Structure of the Curriculum

Code	Course Title	Hours/Week		Credits		
		Theory	Practical	Theory	Practical	Total
Semester – I						
BS 104	PAPER -I: Microbial Diversity and Early Land Plants	4	2	4	1	5
Semester – II						
BS 204	PAPER –II : Gymnosperms, Anatomy and Embryology of Angiosperms	4	2	4	1	5
Semester – III						
BS 302	PAPER – III : Plant Taxonomy, Ecology and Medicinal Botany	4	2	4	1	5
Semester – IV						
BS 402	PAPER – IV : Cell Biology, Genetics & Plant Physiology	4	2	4	1	5
Semester – V						
BS 501	SEC : 1 -	2		2		2
BS 502	SEC : 2 -	2		2		2
BS 503	VAC : 1 -	3		3		3
BS 504	Multi - Disciplinary Course (MDC)	4		4		4
BS 505	DSE – 1 A: Biodiversity & Conservation	4	2	4	1	5
	DSE – 1 B: Seed Technology	4	2	4	1	5
	DSE – 1 C: Economic Botany	4	2	4	1	5
Semester – VI						
BS 601	SEC : 3	2		2		2
BS 602	SEC : 4	2		2		2
BS 603	VAC : 2	3		3		3
BS 604	DSE – 2A : Plant Molecular Biology	4	2	4	1	5
	DSE – 2B : Tissue Culture and Biotechnology	4	2	4	1	5
	DSE – 2C : Analytical Techniques in plant Sciences	4	2	4	1	5
	PROJECT					4

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SRI SAI RAGHAVENDRA (SSR) DEGREE COLLEGE (AUTONOMOUS)

B.Sc. BOTANY
I Year: I -Semester
Paper-I: Microbial Diversity and Early Land Plants

DSC - 1A (4 hrs./week) Credits- 4

Course outcome:

1. A course on Microbial diversity and Early land plants aims to provide students with a comprehensive understanding vest array of micro organisms and the evolution of plants on to land.

2. Including the ability to classify and identify microbes, understand their ecological roles and economic importance, and learn about the evolutionary transition from aquatic and terrestrial plant life.

Theory Syllabus **(60 hours)** IE - 40M

UNIT – I **(15 hours)**

1) Brief account of Archaebacteria, Actinomycetes and Mycoplasma with reference to little leaf of Brinjal and Papaya leaf curl.
2) **Viruses**: Structure, replication and transmission; plant diseases caused by viruses and their control with reference to Tobacco Mosaic and Rice Tungro.
3) **Bacteria**: Structure, nutrition and reproduction. Plant diseases caused by bacteria and their control with reference to Angular leaf spot of cotton and Bacterial blight of Rice.

UNIT-II **(15 hours)**

4) General characters, structure, reproduction and classification of Algae (Fritsch)
5) **Cyanobacteria**: General characters, cell structure their significance as biofertilizers with special reference to *Oscillatoria, Nostoc*and *Anabaena.*
6) Structure and reproduction of the following:
   Chlorophyceae- *Volvox,* and*Chara.*
   Phaeophyceae- *Ectocarpus*
   Rhodophyceae- *Polysiphonia.*

UNIT-III **(15 hours)**

7) General characters and classification of fungi (Ainsworth).
8) Structure, reproduction and life cycle of the following:
   (a) Mastigimycotina- *Albugo*
   (b) Zygomycotina- *Mucor*
   (c) Ascomycotina- *Penicillium.*
   (d) Basidiomycotina- *Puccinia*
   (e) Deuteromycotina- *Cercospora.*

9) Economic importance of Lichens

UNIT-IV **(15 hours)**

10) **Bryophytes**:Structure, reproduction, life cycle and systematic position of *Marchantia,* and *Polytrichum,* Evolution of Sporophyte in Bryophytes.

11) **Pteridophytes**: Structure, reproduction, life cycle and systematic position of *Rhynia, Equisetum* and*Marsilea.*

12) Stelar evolution, heterospory and seed habit in Pteridophytes.

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Suggested Readings:

1) Alexopolous, J. and W. M. Charles. 1988. Introduction to Mycology. Wiley Eastern, New Delhi.
2) Mckane, L. and K. Judy. 1996. Microbiology – Essentials and Applications. McGraw Hill, New York.
3) Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
4) Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, CellBiology and Genetics. S. Chand & Company Ltd, New Delhi.
5) Sambamurthy, A. V. S. S. 2006. A Textbook of Plant Pathology. I. K. International Pvt Ltd., New Delhi.
6) Sambamurthy, A. V. S. S. 2006. A Textbook of Algae. I. K. International Pvt. Ltd., New Delhi.
7) Sharma, O. P. 1992. Textbook of Thallophyta. McGraw Hill Publishing Co., New Delhi.
8) Thakur, A. K. and S. K. Bassi. 2008. A Textbook of Botany: Diversity of Microbes andCryptogams. S. Chand & Company Ltd, New Delhi.
9) Vashishta, B. R., A. K. Sinha and V. P. Singh. 2008. Botany for Degree Students: Algae. S.Chand& Company Ltd, New Delhi.
10) Vashishta, B. R. 1990. Botany for Degree Students: Fungi. S. Chand & Company Ltd, New Delhi.
11) Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
12) Watson, E. V. 1974. The structure and life of Bryophytes. B. I. Publications, New Delhi.
13) Pandey, B. P. 2006. College Botany, Vol. II: Pteridophyta, Gymnosperms and Paleobotany. S. Chand & Company Ltd, New Delhi.
14) Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany - Pteridophyta (Vascular Cryptogams). . Chand & Company Ltd, New Delhi.
15) Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
16) Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd, New Delhi.
17) Thakur, A. K. and S. K. Bassi. 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.
18) Vashishta, B. R., A. K. Sinha and Adarsha Kumar. 2008. Botany for Degree Students: Bryophyta. S. Chand & Company Ltd, New Delhi.

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B.Sc. BOTANY

I Year: I -Semester

Paper-I: Microbial Diversity and Early Land Plants

DSC - 1A Credits- 1

Practical Syllabus (45 hours)

1. Study of viruses and bacteria using electron micrographs (photographs).
2. Gram staining of Bacteria.
3. Study of symptoms of plant diseases caused by viruses, bacteria, Mycoplasma and fungi:
   Viruses: Tobacco mosaic; Bacteria: Angular leaf spot of cotton and Rice tungro.
   Mycoplasma: Little leaf of Brinjal and Leaf curl of papaya
   Fungi: White rust on Crucifers, Rust on wheat &Tikka disease of Groundnut.
4. Vegetative and reproductive structures of the following taxa:
   Algae: *Oscillatoria, Nostoc, Volvox, Chara ,Ectocarpus* and Polysiphonia.
   Fungi: *Albugo, Mucor, Penicillium, Puccinia and Cercospora*
5. Section cutting of diseased material infected by Fungi and identification of pathogens as per theory syllabus. White rust of Crucifers, Rust on wheat &Tikka disease of Groundnut.
8. Field visits to places of algal / microbial / fungal interest (e.g. Mushroom cultivation, water bodies).
9. Study of Morphology (vegetative and reproductive structures) and anatomy of the following Bryophytes: *Marchantia, and Polytrichum.*
10. Study of Morphology (vegetative and reproductive structures) and anatomy of the following Pteridophytes, *Equisetum and Marsilea.*
11. Study of Anatomical features of *Equisetum* stem and *Marsile*a petiole & rhizome by preparing double stained permanent mounts.

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SRI SAI RAGHAVENDRA (SSR) DEGREE COLLEGE (AUTONOMOUS)

B.Sc., BOTANY
I Year, II -Semester
Paper-II . Gymnosperms, Anatomy and Embryology of Angiosperms

DSC-1B (4 hrs./week) Credits-4

Course outcome:

1. A Gymnosperms, Anatomy and Embryology aims to provide students with comprehensive undrstanding of the structure development evolutionary relationships of gymnosperms, which are seed bearing plants with naked seeds.

2. Including the ability to classify gymnosperms describe the unique anatomical features and explain their embryological development.

Theory Syllabus **(60 hours)**

UNIT-I **(15 hours)**

1, Gymnosperms: Distribution, General characters, structure, reproduction and classification (Sporne, 1965) Economic importance of Gymnosperms.

2. Morphology of vegetative and reproductive parts, systematic position and life cycle of *Pinus*and *Gnetum*.

3. Introduction to Palaeobotany, Types of fossils and fossilization, Importance of fossils.

UNIT –II **(15h)**

4.Meristems: Types, histological organization of shoot and root apices and theories.

5.Tissues and Tissue systems: Simple, complex and special tissues.

6. Leaf: Internal structure of dicot and monocot leaf. Stomata structure and types.Epidermal outgrowths.

UNIT -III **(15h)**

7. Secondary Growth:Vascular cambium – structure and function, Secondary growth in root and stem, Wood (heartwood and sapwood).
8. Anomalous secondary growth of Stem - *Achyranthes*, *Boerhaavia*, *Dracaena*; Root– *Beta*.
9. Wood structure: General account. Study of local timbers – Teak (*Tectonagrandis*), Red sanders (*Pterocarpussantalinus*) and Neem (*Azadirachtaindica*).

UNIT-IV (15 h)

10. Structure of Anther, Microsporogenesis and development of male gametophyte.
11. Ovule structure and types; Megasporogenesis and development of female gametophyte.
12. Pollination mechanisms, Pollen - pistil interaction; Double fertilization
13. Types of Endosperm. Embryo structure- Dicot and Monocot.Polyembryony andApomixis - an outline.

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Suggested Readings:

1. Watson, E. V. 1974. The structure and life of Bryophytes, B. I. Publications, New Delhi.
2. Pandey, B. P. 2006. College Botany, Vol. II: Pteridophyta, Gymnosperms and Paleobotany. S. Chand & Company Ltd, New Delhi.
3. Sporne, K. R. 1965. Morphology of Gymnosperms. Hutchinson Co., Ltd., London.
4. Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany - Pteridophyta (Vascular Cryptogams). . Chand & Company Ltd, New Delhi.
5. Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant
6. Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
7. Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd, New Delhi.
8. Thakur, A. K. and S. K. Bassi. 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.
9. Vashishta, B. R., A. K. Sinha and Adarsha Kumar. 2008. Botany for Degree Students: Bryophyta. S. Chand & Company Ltd, New Delhi.
10. Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany for Degree Students: Gymnosperms. Chand & Company Ltd, New Delhi.
11. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
12. Pandey, B. P. 2007. Botany for Degree Students: Diversity of Seed Plants and their Systematics, Structure, Development and Reproduction in Flowering Plants. S. Chand & Company Ltd, New Delhi.
13. Bhattacharya et. al. 2007. A textbook of Palynology, Central, New Delhi.
14. Bhojwani, S. S. and S. P. Bhatnagar. 2000. The Embryology of Angiosperms (4th Ed.), Vikas Publishing House, Delhi.
15. M.R.Saxena- A textbook of Palynology. 4. Vashista- A textbook of Anatomy.
16. P.K.K.Nair- A textbook of Palynology
17. Evert, R.F. (2006) Esau's Plant Anatomy: Meristems, Cells, and Tissues of the Plant Body: Their Structure, Function and Development. John Wiley and Sons, Inc.
18. Esau, K. 1971. Anatomy of Seed Plants. John Wiley and Son, USA.
19. Johri, B. M. 1984. Embryology of Angiosperms. Springer-Verleg, Berlin.
20. Kapil, R. P. 1986. Pollination Biology. Inter India Publishers, New Delhi.
21. Maheswari, P. 1971. An Introduction to Embryology of Angiosperms. McGraw Hill Book Co., London.
22. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
23. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, Vikas Publishing House. Delhi. 5th edition
24. Shivanna, K.R. (2003). Pollen Biology and Biotechnology. Oxford and IBH Publishing Co. Pvt. Ltd. Delhi.
25. Raghavan, V. (2000). Developmental Biology of Flowering plants, Springer, Netherlands. 4. Johri, B.M. l (1984). Embryology of Angiosperms, Springer-Verlag, Netherlands.

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B.Sc., BOTANY

I Year, II -Semester

Paper-II . Gymnosperms, Anatomy and Embryology of Angiosperms

DSC-1B **Credit1**

Practical Syllabus **(45 hours)**

1. Study of Morphology (vegetative and reproductive structures) of the following taxa: Gymnosperms - *Pinus and Gnetum.*
2. Study of Anatomical features of *Pinus* needle and *Gnetum* stem by preparing double stainedpermanent mounts.
3. Fossil forms using permanent slides / photographs: Cycadeoidea.
4. Demonstration of double staining technique.
5. Tissue organization in root and shoot apices using permanent slides.
6. Study of different tissue systems - Simple, complex and special tissues
7. Preparation of double stained Permanent slides Primary structure: Root - *Cicer, Canna*; Stem – *Tridax, Sorghum.*
8. Secondary structure: Root – *Tridax* sp.; Stem –*Pongamia*
9. Anomalous secondary structure: Examples as given in theory syllabus.
10. Stomatal types using epidermal peels.
11. Structure of anther and microsporogenesis using permanent slides.
12. Structure of pollen grains using whole mounts - *Hibiscus, Acacia* and *Grass)*
13. Pollen viability test using Evans Blue
14. Study of ovule types and developmental stages of embryo sac.
15. Structure of endosperm (nuclear and cellular);
16. Developmental stages of dicot and monocot embryos using permanent slides.

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