

**Raja Narendralal Khan Women's College
(Autonomous)**



Syllabus: 1st-2nd Semesters

Department of BOTANY (UG)

Programme under NEP-2020

w.e.f. 2024-2025 Academic Session

Department Of Botany (UG)

BOTANY UG Programme under NEP-2020: w.e.f. 2024-2025 Academic Session

Raja Narendralal Khan Women's College
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Major Course

Full Marks=75(Theory-40; Practical-20); Cumulative Assessment-15(10+05)

Sl No.	Paper Code	Title of the Paper	Sem.	Credit	Allot. Class	
					Th.	Prac.
1	BOTMJ101	Plants and Microbial Diversity and its Evolution	I	04	03	01
2	BOTMJ201	Morphology, Anatomy and Plant Taxonomy	II	04	03	01

SEC Course

Full Marks=50 (Practical-40; Cumulative Assessment-10(05+05))

Sl No.	Paper Code	Title of the Paper	Sem.	Credit	Prac
1	BOTSEC101	Biofertilizers	I	03	03
2	BOTSEC201	Floriculture	II	03	03
Total Credits=				06	

Minor Courses

Full Marks=75(Theory-40; Practical-20); Cumulative Assessment-15(10+05)

Sl No	Paper Code	Title of the Paper	Sem.	Credit	Allot. Class	
					Th.	Prac.
1	BOTMI-1	Plants Sciences-1	I(MI-1)	04	03	01
2	BOTMI-2	Plants Sciences-2	II(MI-2)	04	03	01
Total Credits=				16		

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Programme Outcomes of the Academic Programme of B.Sc. (Major) in Botany

Under the National Education Policy (NEP) 2020, the outcomes of the B.Sc. (Major) in Botany program are intended to be inclusive and aligned with modern-day requirements in the field of botany and related sciences. Here are the key outcomes envisioned for this academic program:

1. **Integrated Curriculum:** The NEP 2020 emphasizes a multidisciplinary approach, encouraging integration of subjects across disciplines. In B.Sc. Botany, this translates to a curriculum that includes foundational courses in biology, chemistry, and environmental sciences alongside specialized courses in botany. Students will gain an all-inclusive understanding of plant sciences within the broader context of natural sciences.
2. **Critical Thinking and Research Skills:** The program aims to cultivate analytical and critical thinking skills among students. They will be trained in scientific inquiry, experimental design, and data analysis through laboratory work, field studies, and research projects. This prepares them for careers in research institutions, academia, or industries related to agriculture, biotechnology, environmental conservation, and pharmaceuticals.
3. **Practical Knowledge and Application:** Hands-on learning is emphasized to bridge the gap between theory and practice. Students will engage in practical sessions, botanical expeditions, and internships to develop practical skills such as plant identification, specimen collection, and experimental techniques. This experiential learning approach ensures they are well-prepared for real-world challenges.
4. **Ethical and Sustainable Practices:** With a focus on environmental sustainability, students will be educated on ethical practices in plant research, conservation, and biodiversity preservation. They will understand the importance of sustainable agriculture and ecological balance, preparing them to contribute responsibly to environmental stewardship.
5. **Communication and Collaboration:** The program fosters communication skills through presentations, seminars, and scientific writing. Collaborative projects and group work encourage teamwork and interpersonal skills, essential for collaborative research and professional settings.
6. **Career Readiness:** Graduates will be equipped with skills highly valued in various sectors including agriculture, pharmaceuticals, biotechnology, environmental consultancy, and education. They will possess the knowledge and competencies to adapt to emerging trends and technologies in botany and allied fields.

Overall, the B.Sc. (Major) in Botany under NEP 2020 aims to produce well-rounded professionals who are not only proficient in botanical sciences but also adaptable problem-solvers and innovators capable of contributing meaningfully to society and the environment.

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Semester-I
Course Structure

Sl. No.	Name of the Courses	No. of Papers	Credits
1	Major	01	04
2	Minor(1 st paper of 1 st Minor)	01	04
3	IDC/MDC	01	03
4	AECENGLISH	01	02
5	SEC	01	03
6	VAC	02	04
<i>Total=</i>		<i>07</i>	<i>20</i>

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Semester-I Major Course

BOTMJ101: Title: Plants and Microbial Diversity and its Evolution Credits: 04

Course Outcome: The course "Plants and Microbial Diversity and its Evolution" aims to enable students to comprehend the evolutionary processes and diversity within plant and microbial kingdoms. By the end of the course, students should demonstrate an understanding of the principles governing the evolution, classification, and ecological roles of plants and microbes. They will be able to analyze evolutionary relationships through phylogenetic tools, interpret diversity patterns, and appreciate the significance of microbial interactions in plant health and ecosystem dynamics. Additionally, students will develop critical thinking skills to evaluate current research and contribute to discussions on biodiversity conservation and sustainable practices.

BOTMJ-101T: Plants and Microbial Diversity and its Evolution Credits 03

Course Content:

UNIT	Topic	No. of Lectures
1	Introduction to microbial diversity; Whittaker's five-kingdom system and Carl Richard Woese's three-domain system.	2
2	Virus: General characteristics; classification (Baltimore), idea about viroids and prions; detailed structure T4-phage and SARS-COV2, lytic and lysogenic cycle; Economic importance of viruses.	4
3	Bacteria: General characteristics; Types-archaeobacteria, eubacteria, wall-less forms (mycoplasma and spheroplasts); Bergey's classification, Cell structure; Nutritional types; vegetative and Reproductive structure- asexual and recombination (conjugation, transformation and transduction). Economic Importance of bacteria.	4
4	Algae: General characteristics; Ecology and distribution; range of thallus organization; Classification (VanDenHoek, 1995), reproduction and life cycles Of <i>Nostoc</i> , <i>Oedogonium</i> , <i>Chara</i> , and <i>Polysiphonia</i> .	3
5	Fungi: General characteristics; Affinities with plants and animals; Thallus organization; Heterothallism and parasexuality. Classification Ainsworth (up to Order). Life cycles of <i>Synchytrium</i> , <i>Saccharomyces</i> , <i>Ascobolus</i> , <i>Agaricus</i> . Symbiotic associations: Lichen and Mycorrhiza. Economic importance.	4
6	Archegoniate: Unifying features of archegoniates, Bryophytes: General characteristics; Adaptations to land habit; Range of thallus organization. Idea about different orders. Outline classification (Mishler), Morphology, anatomy and reproduction of <i>Marchantia</i> , <i>Porella</i> , <i>Anthoceros</i> , <i>Notothylas</i> and <i>Funaria</i> ; Economic importance with special reference to <i>Sphagnum</i> .	4
7	Pteridophytes: General characteristics; Idea about different orders. Classification (Sporne, 1975), Early land plants (<i>Rhynia</i> and <i>Asteroxylon</i>) Morphology, anatomy and reproduction of <i>Lycopodium</i> , <i>Selaginella</i> , <i>Equisetum</i> and <i>Pteris</i> . Economic importance.	4

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8	Gymnosperms: General characteristics, idea about different orders, Classification (Sporne,1965), morphology, anatomy and reproduction of <i>Cycas</i> , <i>Pinus</i> and <i>Gnetum</i> ; Economic importance.	3
9	Palaeobotany: Geological time scale and important events, Types of plant fossils -impressions,compressions,petrification. Stromatolites,Factorsforfossilization.	2

Suggested readings

1. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4th edition.
2. Wiley JM, Sherwood LM and Woolverton CJ. (2013) Prescott's Microbiology. 9th Edition. McGraw
3. Hill International.
4. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West Press, Delhi.
5. Sahoo, D. (2000). Farming the ocean: seaweeds cultivation and utilization. Aravali International, New Delhi.
6. Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A. Minorsky P.V., Jackson
7. R.B. (2008). Biology, Pearson Benjamin Cummings, USA. 8th edition.
8. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata McGraw-Hill Co, New Delhi

BOTMJ-101P: Plants and Microbial Diversity and its Evolution (Practical) Credits01

Course contents:

1. Electron micrographs/Models of viruses–T-Phage and Sars-CoV2,
2. Sketches of Lytic and Lysogenic Cycle.
3. Study of curd organisms curd through Gram staining.
4. Endospore staining.
5. Study of vegetative and reproductive structures of *Nostoc*, *Oedogonium* and *Polysiphonia*.
6. Study of reproductive structures of *Ascobolus*, and *Agaricus*.
7. Study of reproductive structure of *Saccharomyces* and *Penicillium*.
8. Lichens: Photomicrographs of different types of Lichens.
9. *Marchantia*-Morphology of thallus, wholemout ofrhizoids & Scales, vertical section of thallus through Gemma cup, whole mount of Gemmae (all temporary slides), vertical section of antheridiophore, archegoniophore, longitudinal section of sporophyte (all permanent slides).
10. *Anthoceros*-Morphology of thallus, dissection of sporophyte (to show spores, pseudoelaters, columella) (temporary slide), vertical section of thallus (permanent slide).
11. *Pogonetum*-Morphology, whole mount of leaf, rhizoids, operculum, peristome, annulus, spores (temporary slides); Permanent slides showing antheridial and archegonial heads, longitudinal section of capsule and protonema.
12. *Selaginella*- Morphology, whole mount of leaf with ligule, transverse section of stem, wholemout of strobilus, whole mount of microsporophyll and megasporophyll (temporary slides), longitudinal section of strobilus (permanent slide).
13. *Equisetum*- Morphology, transverse section of internode, longitudinal section of strobilus,

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transverse section of strobilus, whole mount of sporangiophore, whole mount of spores, transverse section of rhizome (all permanent slide).

14. *Pteris*- Morphology, transverse section of rachis, vertical section of sporophyll, wholemount of sporangium, whole mount of spores (temporary slides), transverse section of rhizome, wholemount of prothallus with sex organs and young sporophyte (permanent slide).
15. *Cycas*- Morphology (leaf), vertical section of leaflet, vertical section of microsporophyll, wholemount of spores (temporary slides), longitudinal section of ovule, transverse section of root (permanent slide).
16. *Pinus*- Morphology (long and dwarf shoots, whole mount of dwarf shoot, male and female cones), transverse section of Needle (temporary slide), transverse section of stem, longitudinal section of/transverse section of male cone, wholemount of microsporophyll, whole mount of Microspores (temporary slides), longitudinal section of female cone, tangential longitudinal section & radial longitudinal sections stem (permanent slide).
17. *Gnetum*-Morphology (stem, male & female cones), transverse section of stem, vertical section of ovule (all permanent slide)
18. Study of fossil genera - *Rhynia*, *Cooksonia*, *Lepidodendron* and *Lepidocarpon* through photographs.

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Minor Course

BOTMI-1T: Title: Plant Science-I

Credits: 04

Course Outcome: Enable students to integrate practical knowledge of microbial diversity with plant groups, exploring symbiotic relationships, disease interactions, and ecological roles, enhancing their understanding of plant-microbe interactions crucial for sustainable agriculture, biodiversity conservation, and biotechnological applications.

Course Content:

BOTMI-1T: Plant Science-I

Credits03

UNIT	Topic	No.of Lectures
1	Introduction to microbial world- Whittaker's five-kingdom system Virus: General characteristics, classification (Baltimore), Economic importance. Bacteria: General characteristics, Bergey's Classification, Economic importance. Algae: General characteristics; habitat, classification (VanDenHoek,1995), life cycle patterns of <i>Volvox</i> and <i>Batrachospermum</i> , Economic importance. Fungi: General characteristics,Classification (Ainsworth, up to Order), life cyclepatterns of <i>Rhizopus</i> and <i>Agaricus</i> , economic importance. Brief account of lichen andmycorrhiza.	10
2	Bryophytes: General characteristics, classification (Proskauer, 1957), morphology,anatomy and reproduction of <i>Riccia</i> , <i>Anthoceros</i> and <i>Funaria</i> , economic importance ofbryophytes. Pteridophytes: Generalcharacteristics, Classification (Sporne,1975), morphology, anatomy and reproduction of <i>Lycopodium</i> , <i>Adiantum</i> and <i>Marsilea</i> . Economicimportance	10
3	Gymnosperms: Generalcharacteristics,Classification(Sporne,1965),morphology,anatomy and reproductionof <i>Cycas</i> and <i>Pinus</i> . Economic importance. Paleobotany: Geologicaltimescaleandimportantevents, Typesofplantfossils.	10

Suggested Readings:

1. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West. Press Pvt. Ltd. Delhi. 2nd edition.
2. Tortora, G.J., Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction, Pearson Benjamin Cummings, U.S.A. 10th edition.
3. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi & Their Allies, MacMillan Publishers Pvt. Ltd., Delhi.
4. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley and Sons (Asia), Singapore. 4th edition.
5. Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R., (2005). Biology. Tata McGraw Hill, Delhi, India.
6. Vashishta, P.C., Sinha, A.K., Kumar, A., (2010). Pteridophyta, S. Chand. Delhi, India.
7. Bhatnagar, S.P. and Moitra, A. (1996). Gymnosperms. New Age International (P) Ltd Publishers,

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New Delhi, India.

8. Parihar, N.S. (1991). An introduction to Embryophyta. Vol. I. Bryophyta. Central Book Depot, Allahabad

BOTMI-1P: Plant Science-I [Practical]

Credit- 01

Course Content:

1. Electron micrographs /Models of viruses–T-PhageandSars-CoV2.
2. Study of Curd organisms through Gram staining.
3. Study of vegetative and reproductive structure of *Volvox*, and *Batrachospermum*.
4. Study of morphology and reproductive structure of *Rhizopus* and *Agaricus*.
5. Study of morphology of thallus and reproductive structure of *Riccia*, *Anthoceros* and *Funaria*.
6. Study of morphology vegetative and reproductive structure of *Lycopodium*, *Adiantum* and *Marsilea*.
7. Study of morphology and vegetative structure of *Cycas* and *Pinus*.
8. Study of fossil types (impressions, compressions, petrification).

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SEC Course

BOTSEC101: Title: Biofertilizers

Credits: 03

Objectives: Equip students with hands-on skills in the production, application, and evaluation of biofertilizers, emphasizing sustainable agricultural practices and enhancing proficiency in microbial ecology and nutrient cycling essential for careers in agricultural research, environmental science, and sustainable farming.

Course Content:

BOTSEC101P: Biofertilizer

Full Marks: 50

Course Outline:

1. Study of *Rhizobium* from root nodules of leguminous plants by Gram staining method.
 2. Study of *Azotobacter* from rhizospheric soil by gram staining method.
 3. Study of *Azospirillum* by Sudan Black staining method.
4. Isolation of *Anabaena* from *Azolla* leaf.
5. Preparation of temporary slides: *Nostoc*, *Anabaena*
6. Photomicrographs/photographs of ectomycorrhiza, endomycorrhiza, arbuscules vesicles, earthworm, *Azolla*
7. Staining of Mycorrhizal fungi [AMF] colonized roots
8. Isolation of arbuscular mycorrhizal spores from rhizospheric soil
9. Photographs of bio-compost methods.
10. Test for pH, N, P, K content of different composts.
11. Projects on any topic: green manuring, AMF technology, Organic farming, vermicomposting. Students will be required to submit a project report on their activity [maximum ten A4 size pages]
12. Field visit to vermicomposting/bio-composting/organic farming/green manuring site/centre/unit and preparation of field note-book. [maximum five A4 size pages]

Suggested Readings:

1. Biofertilizers for Sustainable Agriculture" by M.K. Rai, CRC Press
2. Biofertilizers: A Step Towards Organic Farming" edited by Bhavdish Narain Johri and Gurdeep Singh Springer
3. Handbook of Microbial Biofertilizers" edited by Jai Prakash Verma, A.K. Sarma, and Jitendra Kumar, CRC Press
4. Microbial Inoculants in Sustainable Agricultural Productivity: Vol. 2: Functional Applications" edited by Dhananjaya Pratap Singh, Harikesh Bahadur Singh, Ratna Prabha, Springer

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Semester-II
Course Structure

Sl. No.	Name of the Courses	No. of Papers	Credits
1	Major	01	04
2	Minor(2 nd paper of 1 st Minor)	01	04
3	IDC/MDC	01	03
4	AEC MIL (Beng./ Hindi)	01	02
5	SEC	01	03
6	VAC	02	04
7	Commu. Engagement	01	02
	<i>Total=</i>	<i>08</i>	<i>22</i>

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Semester-II Major Course

BOTMJ201: Title: Morphology Anatomy and Plant Taxonomy
Credits:04

Course Outcome: "Enable students to proficiently apply morphological and anatomical techniques in plant identification and classification, fostering a deep understanding of plant diversity and evolutionary relationships crucial for careers in biodiversity conservation, taxonomy, and ecological research."

Course Content:

BOTMJ201T: Morphology, Anatomy and Plant Taxonomy
Course contents:

Credits 03

UNIT	Topic	No. of Lectures
1	Vegetative morphology -A general account of root, stem & leaves with different types of modifications; Different types of stipules and modifications along with Phyllotaxy and diversity of leaves.	3
2	Flower -different types of inflorescences; Floral morphology, aestivation with Special reference to adhesion and cohesion of the floral parts, Placentation-types; Floral formula, Floral diagram.	3
3	Fruits& seeds-types and dispersal mechanisms	1
4	Structure and Development of Plant Body: internal organization of plant body: The three tissue systems, types of cells and tissues. Root stem transition. Apical meristems, types of stomata, Types of vascular bundles; Stele and its evolution.	3
5	Vascular Cambium and Wood Structure, function and seasonal activity of cambium; Secondary growth in root and stem, Types of Anomalous secondary growth with special emphasis on <i>Boerhavia</i> and <i>Dracaena</i> . Sapwood and heartwood; Ring and diffuse porous wood; Early and late wood, tyloses; Annual ring; composition of periderm, rhytidome and lenticels.	3
6	Significance of Plant systematics; Functions of Herbarium; Important herbaria and botanical gardens of the world and India; Virtual herbarium; E-flora; Documentation: Flora, Monographs, Journals; Keys: Single access and Multi-access.	2
7	Taxonomic hierarchy, Concept of taxa (family, genus, species); Categories and taxonomic hierarchy; Species concept (taxonomic, biological, evolutionary). Botanical nomenclature, Principles and rules (ICN); Typification, author citation,	3

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	Valid publication, rejection of names, principle of priority and its limitations; Names of hybrids.	
8	Systems of classification , Overview of artificial, natural and phylogenetic classification; Classification system of Bentham and Hooker (up to series). Brief Reference of Angiosperm Phylogeny Group (APG IV) classification.	3
9	Taximetrics : numerical taxonomy and cladistics Characters; OTUs, Cluster analysis; Phenograms, cladograms (definitions and differences).	2
10	Phylogeny of Angiosperms : Terms and concepts (homology and analogy, parallelism and convergence, monophyly, Paraphyly, polyphyly and clades). Origin and evolution of angiosperms. Concept of Basal Angiosperms and Eudicots.	3
11	General descriptions of the given families : Magnoliaceae, Malvaceae, Acanthaceae, Verbenaceae, Scrophulariaceae, Fabaceae, Caesalpinioideae, Asteraceae, Euphorbiaceae, Lamiaceae, Poaceae, Orchidaceae.	4

Suggested Readings:

1. "Morphology of Angiosperms" by P.C. Vashishta and V.B. Rastogi, S. Chand & Company Ltd
2. "Plant Systematics: A Phylogenetic Approach" by Walter S. Judd, Christopher S. Campbell, Elizabeth A. Kellogg, Peter F. Stevens, and Michael J. Donoghue, Publisher: Sinauer Associates

BOTMJ201P: Morphology, Anatomy and Plant Taxonomy (Practical)

Credits 01

1. Study of phyllotaxy and stipules.
2. Study of Inflorescence types- Racemose, Cymose, Special types (Capitulum, Verticillaster, and Hypanthodium)
3. Study of floral morphology with special reference to adhesion and cohesion of the floral parts, placentation types.
4. Study of different fruit types.
5. Study of vegetative and floral characters of the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification):
 - ii) Malvaceae – *Sida* sp. / *Abutilon* sp.
 - iii) Acanthaceae – *Ruellia* sp. / *Barleria* sp.
 - iv) Fabaceae-*Tephrosia* sp. / *Crotalaria* sp.
 - v) Verbenaceae- *Lantana* sp. / *Duranta* sp.
 - vi) Asteraceae-*Vernonia* sp./*Ageratum* sp., *Eclipta* sp./*Tridax* sp.
 - vii) Lamiaceae –*Leucas* sp./*Ocimum* sp.
 - viii) Euphorbiaceae–*Euphorbia* sp./*Jatropha* sp.
 - ix) Poaceae–*Triticum* sp./ *Chrysopogon* sp. Or any local common grass

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- x) Orchidaceae-*Vanda* sp.
- 6. Mounting of a properly dried and pressed specimen of any wild plant with herbarium label (to be submitted in the record book– At least 25 nos.).
- 7. Root: monocot, dicot, secondary growth.
- 8. Stem: monocot, dicot-primary and secondary growth
- 9. Anatomy of Leaf: isobilateral, dorsiventral
- 10. Anomalous secondary growth (Through permanent slides).
- 11. Study of Stomata and its types
- 12. Field visit (two) at least one to study the local flora

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Minor Course

BOTMI2T: Title: Morphology, anatomy and plant taxonomy Credits: 04

Course Outcome: "Enable students to proficiently apply morphological and anatomical techniques in plant identification and classification, fostering a deep understanding of plant diversity and evolutionary relationships crucial for careers in biodiversity conservation, taxonomy, and ecological research."

Course Content:

BOTMI-2: Morphology, anatomy and plant taxonomy Credits 04(FullMarks:75)

BOTMI-2T: Morphology, anatomy and plant taxonomy Credits 03

UNIT	Topic	No. of Lectures
UNIT-1 Morphology And Anatomy	Vegetative morphology -A general account of root, stem & leaves with different types of modifications; Different types of stipules of leaves	15
	Flower -different types of inflorescences; Floral morphology, Placentation-types; Floral formula, Floral diagram.	
	Fruits & seeds-types and dispersal mechanisms	
	Structure and Development of Plant Body: internal organization of plant body: The three tissue systems, types of cells and tissues. Apical meristems, types of stomata, Types of vascular bundles; Stele	
	Vascular Cambium and Wood Structure, function and seasonal activity of cambium; Secondary growth in root and stem, Sapwood and heartwood; Ring and diffuse porous wood; Early and late wood, tyloses; Annual ring;	
UNIT-II TAXONOMY	Significance of Plant systematics; Functions of Herbarium; Important herbaria and botanical gardens of the world and India;	15
	Taxonomic hierarchy, Concept of taxa (family, genus, species); Categories and taxonomic hierarchy; Species concept (taxonomic, biological, evolutionary). Botanical nomenclature, Principles and rules (ICN)	
	Systems of classification, Overview of artificial, natural and phylogenetic classification; Classification system of Bentham and Hooker (up to series)	
	General descriptions of the given families: Magnoliaceae, Malvaceae, Acanthaceae, Verbenaceae, Scrophulariaceae, Fabaceae, Caesalpinioideae, Asteraceae, Euphorbiaceae, Lamiaceae, Poaceae, Orchidaceae.	

Suggested Readings:

1. "Morphology of Angiosperms" by P.C. Vashishta and V.B. Rastogi, S. Chand & Company Ltd
2. "Plant Systematics: A Phylogenetic Approach" by Walter S. Judd, Christopher S.

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Campbell, Elizabeth A. Kellogg, Peter F. Stevens, and Michael J. Donoghue, Publisher:
Sinauer Associates

BOTMI-2P: Morphology, anatomy and plant taxonomy (Practical) Credits01

Course Outline:

1. Study of phyllotaxy and stipules.
2. Study of Inflorescence types- Racemose, Cymose, Special types (Capitulum, Verticellaster, and Hypanthodium)
3. Study of floral morphology and placentation types.
4. Study of different fruit types.
 5. Study of vegetative and floral characters of the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification):
 - 1) Malvaceae – *Sida* sp. / *Abutilon* sp.
 - 2) Fabaceae – *Tephrosia* sp./*Crotalaria* sp
 - 3) Verbenaceae–*Lantana* sp. /*Duranta* sp.
 - 4) Asteraceae-*Vernonia* sp. / *Ageratum* sp., *Eclipta* sp./ *Tridax* sp.
 6. Mounting of a properly dried and pressed specimen of any wild plant with herbarium label (to be submitted in the record book– At least 10 nos.).
 7. Anatomy of Leaf: isobilateral, dorsiventral [SLIDES]
 8. Study of Stomata and its types

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SEC Course

BOTSEC201: Title: Floriculture

Credits: 03

Course Outcome: Develop practical skills in propagation, cultivation, and management of ornamental plants, fostering an understanding of sustainable practices and enhancing readiness for careers in horticulture and related fields."

Course Content:

BOTSEC201P: Floriculture

Credits03

Full Marks: 50

Course Outline:

1. Hands on workout of the following plant propagation techniques

- Cutting
- Grafting
- Layering
- Budding

2. Study of Different Garden Models

- Mughal
- French
- Italian
- English
- Japanese

3. Identification of Various Ornamental plants (at least 20) with Family

4. Identification of Various Ornamental Plant Diseases.

5. Visit to any Nursery and Report submission on it.

6. Project Report- On preparing a small garden (Ornamental)

Suggested Readings:

1. Randhawa, G.S. and Mukhopadhyay, A.1986. Floriculture in India. Allied Publishers.
2. Principles of Horticulture" by C.R. Adams and M.P. Early, Publisher: Butterworth-Heinemann
3. Floriculture: Principles and Species" by John M. Dole and Harold F. Wilkins, Publisher: Pearson

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