SHRI GOVIND GURU UNIVERSITY

Syllabus on the bases of New Education Policy (NEP)

As Proposed by University Grant Commission

For

B.Sc. Semester - III

Major Course (BOTANY)

Paper – I: Gymnosperms, Plant Morphology and Embryology

Paper – II: Genetics, Biostatistics, Plant Tissue Culture, Nursery and Gardening

Paper – III: Practical (Based on Paper – I & II)

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester – III

Major Course – BOTANY

BS23MJ3BO1

Paper – I: Gymnosperms, Plant Morphology and Embryology

UNIT: 1. Gymnosperms

- Introduction & General Characteristics
- Outline Classification of Gymnosperms by Chamberlain
- Systematic Position; Morphology, Anatomy and Reproduction (excluding development) and life cycle of the;
  - *Cycas*
- Systematic Position; Morphology, Anatomy and Reproduction (excluding development) and life cycle of the;
  - *Pinus*
- Ecological and Economical importance of Gymnosperms

UNIT: 2. Plant Morphology

- Basics of Plant Morphology
- Leaf:
  - Parts of leaf; Types of Leaves; Types of Phyllotaxy; Types of Stipules
- Inflorescences:
  - Types of Racemose and Cymose with suitable examples; Specialized types
- Flowers:
  - Definition; bracts; pedicel; symmetry; sexuality; hypogynous; perigynous; epigynous
  - Calyx: function and types
  - Corolla: function; forms and aestivation
  - Perianth
  - Androecium: Parts of Stamen; Attachment
  - Gynoecium: Parts of Carpels; Carpel numbers and function; Placentation; Stigma and Style; Ovule
  - Floral formula and Floral diagram

UNIT: 3. Embryology

- Structure of microsporangium, microsporogenesis and development of male gametophyte.
- Structure of megasporangium, megasporogenesis and development of
- female gametophyte (monosporic, bisporic and tetrasporic- Fritillaria type).
- Structure of Ovule and its types.
- Fertilization: Double fertilization

UNIT:4. Embryology

- Pollination: Definition and significance of self-pollination and cross pollination.
- Endosperm: Types, structure and function.
- Apomixis: Definition, types, Causes and its practical applications.
- Embryology in relation to taxonomy- General account.

Suggested Readings

1. College Botany Vol. I & II Das, Datta, Gangulee and Kar, New Centralbook Agency.
2. Smith, G.M. 1972. Cryptogamic Botany Vol. 1 & 2. Tata McGraw Hill PublishingCo. Ltd. New Delhi.
3. Bhatnagar, S.P. and Moitra, A. 1996. Gymnosperms. New Age International (P) Ltd Publisher, New Delhi, India.
4. Gangulee, H.C., Das, K.S. and Datta, C. College Botany Vol. I, II & III. Publisher Central Educational Enterprises(P) Ltd., Kolkata.
5. Bendre Ashok and Kumar Ashok. A Texbook of Practical Botany vol. I & II. Rastogi Publication Meerut.
6. Simpson, M.G. 2006. Plant Systematics. Elsevier Academic Press, San Diego, CA, U.S.A.
7. Verma, B.K. 2011. Introduction to Taxonomy of Angiosperms. PHI Learning Private Ltd. New Delhi.
8. Mondal, A.K. Advance Plant Taxonomy, New Central Book Agency (P) Ltd.
9. Bhojwani,SS. & Bhatnagar, SP. 2011. Embryology of Angiosperms, Vikas Publication House Pvt. Ltd. NewDelhi. 5th Edition.
10. Johri, B.M. l (1984). Embryology of Angiosperms, Springer-Verlag, Netherlands.
11. Raghavan, V. (2000). Developmental Biology of Flowering plants, Springer, Netherlands.

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester – III

Major Course – BOTANY

BS23MJ3BO2

Paper – II: Genetics, Biostatistics, Plant Tissue Culture, Nursery and Gardening

UNIT: 1. Genetics

- Mendelian Genetics- Laws of inheritance
- Modified Mendelian Ratios (Gene interactions): Complementary Factors; Supplementary Factors, Inhibitory Factors, Epistasis
- Sex Determination in Plants (Types of sex expression in plants & Sex Determination in *Cocconia indica* and *Melandrium album*)
- Cytoplasmic (Extra nucleus) inheritance (Mirabilis jalapa, Male sterility).
- Genetic code and its properties.
- Structural Chromosomal aberrations:
    - Deficiencies/Deletions, Duplication,
    - Inversions, Translocation

UNIT: 2. Biostatistics

- Biometrics: Aims & objective as applicable to biological Science.
- Methods of data collection & graphical representation
- Measures of central tendency: Mean, Median & Mode.
- Standard deviation & Simple linear regression, correlation
- Frequency of distribution (Normal, binomial & Poisson).

UNIT: 3. Plant Tissue Culture

- *Tools and organization of plant tissue culture facilities*:
- pH meter, Laminar Air Flow hood, Autoclave, Electric oven, Shaker- gyrator.
- *Laboratory requirement for Plant Tissue Culture*: General Account of Lab space, Washing & Sterilization, Media & their composition, Media selection & Preparation.
- Technique of Plant Tissue Culture (Nutrient medium, Useful Organs of Plant for Tissue culture, Aseptic transfer, Aeration, Incubation)

- Production of Plantlets from Callus (Organogenesis & Embryogenesis)
- Micropropagation; Cell Suspension Culture & its importance; Somatic embryogenesis.
- Secondary metabolites obtained using plant tissue culture techniques and its extraction method from higher Plants.
- Somatic hybridization.

UNIT: 4. Nursery and Gardening

- Nursery**:** Definition**,** Objectives and scope and Nursery development/ Planning.
- Seed: Structure, Types- Seed dormancy; Causes and methods of breaking dormancy.
- Seed storage and Factors affecting seed viability.
- Gardening: Definition, objective and scope of different types of gardens, Landscaping.
- Gardening operations- soil laying, manuring, watering, management of pests, Gardening tools & equipment.

Suggested Readings

1. Gupta, PK. 2003-04. Genetics, Rastogi Publications, Meerut.
2. Sundara Rajan, S. 2000. Cytogenetics, Anmol Publications Pvt. Ltd., NewDelhi.
3. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
4. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons, U.K. 5th edition.
5. Stewart, C.N. Jr. (2008). Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.
6. Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). Principles of Genetics, John Wiley & sons, India. 8th edition.
7. Klug, W.S., Cummings, M.R., Spencer, C.A. (2009). Concepts of Genetics. Benjamin Cummings, U.S.A. 9th edition.
8. Griffiths, A.J.F., Wessler, S.R., Carroll, S.B., Doebley, J. (2010). Introduction to Genetic Analysis. W. H. Freeman and Co., U.S.A. 10th edition.
9. Bose, TK. & Mukherjee, D, 1972, Gardening in India, Oxford & IBH Publishing Co., NewDelhi.
10. Kumar, N. 1997. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
11. Agrawal, PK. 1993. Hand Book of Seed Technology. McGraw Hill Book Co., NewDelhi.

SHRI GOVIND GURU UNIVERSITY
B.Sc. Semester - III

Major Course - BOTANY

BS23MJ3BO3
Paper-III - Practical
Based on
[Paper – I: Gymnosperms, Plant Morphology and Embryology]
[Paper – II: Genetics, Biostatistics, Plant Tissue Culture, Nursery and Gardening]

1. *Cycas*: Morphology (coralloid roots, leaf)

Mounting: V.S. of leaflet; V.S. microsporophyll

Permanent slides: T.S. rachis; V.S. leaflet; V.S. microsporophyll; L.S. ovule

2. *Pinus*: Mounting of Pollen grain; T.S. of Pinus needle.

Specimens: Male cone, Female cone, Needle

Permanent slides: Ovule, Needle, male cone L.S.

3. Types of Leaves:

simple and compound (Types of Palmately and pinnately compound leaves)

4. Types of Phyllotaxy

5. Types of Stipules: Free lateral, Scaly, Adnate, Interpetiolar, Ochreate, Spinous and Tendrilar

6. Inflorescences: Types of Racemose and Cymose with suitable examples; Specialized types

7. Flowers:

- Symmetry: Actinomorphic, Zygomorphic
- Types of Flowers: hypogynous; perigynous; epigynous
- Types of aestivation: Valvate, Twisted (Contorted), Imbricate, Quincuncial and Vexillary
- Types of Placentation (Permanent Slides/Charts): Marginal, Axile, Parietal, Freecentral, Basal and Superficial

8. Exposition and mounting of Endosperm haustoria from Cucumis/ Cassia/ Guar seed.

9. To perform the experiment on pollen tube germination from pollen of *Catherenthus*/ *Dhatura*.

10. Permeant Slide of microspore mother cell, megasporangium, megaspore mother cell, 8-nucleate embryosac, various types of ovule, pollen- stigma interaction, Dicots and Monocots embryo through P.S.

11. Solve the Genetical problems- *as per theory syllabus*.

12. Statistical Exercises and Examples for the analysis of following parameters:

- Measures of central tendency: Mean, Median & Mode.
- Standard Deviation.
- Correlation.
- Frequency of Distribution (Normal, Binomial & Poisson).

13. Demonstrate the instruments useful in plant tissue culture laboratory.

14. Tools and organization of plant tissue culture facilities:

- pH meter, Laminar Air Flow hood, Autoclave, Electric oven, Shaker- gyrator.

15. Demonstration of various Gardening Tools:

- Shovel, Digging Fork, Watering Can, Hose, Spade, Hand Trowel, Hoe, Scissors, Pruners

SHRI GOVIND GURU UNIVERSITY

Syllabus on the bases of New Education Policy (NEP)

As Proposed by University Grant Commission

For

B.Sc. Semester - III

MDC Course (BOTANY)

BS23MD3BO1

Plant Anatomy and Plant Ecology

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester – III

MDC Course – BOTANY

BS23MD3BO1

[Plant Anatomy and Plant Ecology]

UNIT: 1. Plant Anatomy

- Meristems - Characteristics of Meristems; Classification of Meristem
- Theories of Apical organization- Shoot Apex & Root Apex
- Simple and Complex Tissue system
- Dermal Tissue System
- Epidermal outgrowths (Types of Epidermis, Epidermal Hairs & glands, Monocot and Dicot stomata)

UNIT: 2. Plant Ecology

- Introduction
- Scope and Branches of Ecology
- External and internal characters and Adaptation of
    - Hydrophytes, Xerophytes and Halophytes
- Heterotrophic nutrition in plants.
- Climatic factors: Humidity, Rainfall, Wind Light and Temperature

Suggested Readings

1. Gangulee, H.C., Das, K.S. and Datta, C. College Botany Vol. I, II & III. Publisher Central Educational Enterprises(P) Ltd., Kolkata.
2. Bendre Ashok and Kumar Ashok. A Texbook of Practical Botany vol. I & II. Rastogi Publication Meerut.
3. Mauseth, JD, 1988. Plant Anatomy. The Benjamin/ Cummings Publishers, USA.
4. Eames, AJ and Mac Daniels, LH. 1981. An Introduction to Plant Anatomy, Tata McGraw Hill Publishing co. Ltd., NewDelhi.
5. Kormondy, E.J. 1996. Concept of Ecology. Prentice Hall, U.S.A. 4th edition.
6. Sharma, P.D. 2010. Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester - III

MDC Course - BOTANY

Practical

[Based on Paper: Plant Anatomy and Plant Ecology]

1. Study of simple tissue (parenchyma, collenchyma, sclerenchyma) and complex tissue through P.S.

2. Study of complex tissue and its component from L.S. of plant material.

3. Study of Dermal tissue system through permanent Slides:

(a) Types of epidermis- Uniseriate: Cucurbita/ Sunflower stem T.S.;

Multiseriate: *Nerium*/ *Ficus* leaf T.S. OR Orchid root T.S.

(b) Epidermal outgrowths: Through P.S.

Stellate hairs: *Gossypium*/ *Abutilon* leaf

Branched hairs: *Tectona*/ Ashwaghandha leaf

Stinging hairs: *Mucuna*/ *Urtica* leaf

Peltate hairs: *Fern* rachis (Ramenta)

Peltate glands: *Avicinnia*/ *Ipomea biloba* leaf

Glandular hairs: *Martynia*/ *Jetropa* leaf

Stomata: Monocot, Dicot leaf

4. Study of morphological adaptations of

- Hydrophytes (*Hydrilla, Nymphaea*),
- Xerophytes (*Nerium, Opuntia*)
- Halophytes (*Avicennia*)

5. Heterotrophic nutrition in plant specimens.

6. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain guage

7. Project/Submission

SHRI GOVIND GURU UNIVERSITY

Syllabus on the bases of New Education Policy (NEP)

As Proposed by University Grant Commission

For

B.Sc. Semester - III

Skill Enhancement Course
(BOTANY)

BSC23SE303

Plant Diversity and Conservation

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester – III

Skill Enhancement Course – BOTANY

BSC23SE303

Plant Diversity and Conservation

Unit: 1. Plant diversity

- Plant diversity and its scope- Genetic diversity, Species diversity,
- Plant diversity at the ecosystem level
- Agrobiodiversity and cultivated plant taxa, wild taxa.
- Values and uses of Biodiversity: Ethical and aesthetic values, Precautionary principle, Methodologies for valuation, Uses of plants
- Loss of Biodiversity: Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agrobiodiversity.

Unit: 2. Conservation of Biodiversity

- Conservation of genetic diversity, species diversity and ecosystem diversity
- *In situ* and *ex situ* conservation
- Social approaches to conservation
- Biodiversity awareness programmes
- Sustainable development
- Organizations associated with biodiversity management-Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR;
- Biodiversity legislation and conservations

Suggested Readings

1. 1. Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi.
2. Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.

SHRI GOVIND GURU UNIVERSITY

Syllabus on the bases of New Education Policy (NEP)

As Proposed by University Grant Commission

For

B.Sc. Semester – IV

Major Course (BOTANY)

Paper – I: Plant Taxonomy, Plant Ecology and Economic Botany

Paper – II: Plant Pathology, Fossils and Plant Physiology

Paper – III: Practical (Based on Paper - I &II)

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester – IV

BS23MJ4BO1

Major Course - BOTANY

Paper – I: Plant Taxonomy, Plant Ecology and Economic Botany

UNIT: 1. Plant Taxonomy

- Ranks, categories and taxonomic groups
- Outline classification of Bentham and Hooker's
- Botanical nomenclature: Principles and rules (ICN); Binomial system,
- Importance of Herbaria; Botanical garden of the India
- Study of following angiospermic families:
    - Dicotyledons- Polypetalae – *Malvaceae*
    - Dicotyledons- Gamopetalae- *Solanaceae*
    - Dicotyledons- Apetalae- *Nyctaginaceae*
    - Monocotyledons- *Amaryllidaceae*

UNIT: 2. Plant Ecology

- Introduction
- Scope and Branches of Ecology
- External and internal characters and Adaptation of
    - Hydrophytes, Xerophytes and Halophytes
- Heterotrophic nutrition in plants.
- Climatic factors: Humidity, Rainfall, Wind Light and Temperature

UNIT: 3. Plant Ecology

- Plant community:
    - Characters; Ecotone and Edge effect; Succession: Process and Types
- Ecosystem:
    - Structure; Function and energy flow in ecosystem
    - Components of Fresh water (Pond) and Terrestrial (Grassland) ecosystem
    - Ecological pyramids

UNIT:4. Economic Botany

- General account, methods of cultivation, climate and uses of the following plants:
  - Cereals: Maize and Rice
  - Pulses: Tur and Gram
  - Oil seeds: Ground nut and Castor
  - Fiber yielding: Cotton, Jute and Coir
  - Dyes yielding: Heena, Indigofera, Butea.
- General account of selected regional (Gujarat) Timber & Fire wood plant species:
  - Timber plant species: *Tectona grandis, Dalbergia sisoo, Azadirachta indica, Madhuca indica.*
  - Fire wood plant species: *Holoptelia integrefolia, Zyziphus jujube, Acacia nilotica, Salvadora persica.*

Suggested Readings

1. Verma, B.K. 2011. Introduction to Taxonomy of Angiosperms. PHI Learning Private Ltd. New Delhi.
2. Mondal, A.K. Advance Plant Taxonomy, New Central Book Agency (P) Ltd.
3. Gangulee, H.C., Das, K.S. and Datta, C. College Botany Vol. I, II & III. Publisher Central Educational Enterprises(P) Ltd., Kolkata.
4. Bendre Ashok and Kumar Ashok. A Texbook of Practical Botany vol. I & II. Rastogi Publication Meerut.
5. Kormondy, E.J. 1996. Concept of Ecology. Prentice Hall, U.S.A. 4th edition.
6. Sharma, P.D. 2010. Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.
7. Kochhar, SL. 2011. Economic Botany in the Tropics,4th Edition, MacMillan Publishers India Ltd., NewDelhi.

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester – IV

Major Course – BOTANY

BS23MJ4BO2

Paper – II: Plant Pathology, Fossils and Plant Physiology

UNIT: 1. Plant Pathology

- Introduction, Symptoms and modes of infections in Plants, Control of plant diseases types, mode of action, application of Fungicides- chemotherapy, Immunization and Disease cycle of the following;
    - Tikka Disease of Ground Nut (*Cercospora personata; C.arachidicola*)
    - Green ear Disease of Bajra (*Sclerospora graminicola*)
    - White Rust of Crucifers (*Albugo candida*)

UNIT: 2. Fossils

- Condition and Formation of Fossils
- Types of Fossils
- Geological Time Scale
- **Pteridophytes:**
    - Psilophytales: General characters RHYNIA
    - Lepidodendrales: General characters LEPIDODENDRON, LEPIDOCARPON
    - Calamitales: General characters CALAMITES
- **Gymnosperms:**
    - Cycadofilicales: General characters LYGENOPTERIS & *LYGENOSTOMA LOMAXI* (Seed)
    - Cordaitales: General characters CORDAITES & CORDAINTHUS.

UNIT: 3. Plant Physiology

- Plant-Water relations; Diffusion, Osmosis, Plasmolysis, Imbibition.
- Transpiration: Types, its Significance, Mechanism of stomatal movements,
- Factors affecting rate of Transpiration; Guttation.
- Translocation of organic solutes in Phloem.

- Photosynthesis: Photosynthetic Pigments (Chl a, b, Xanthophyll, Carotene), Photosystem I and II, Electron transport and Mechanism of ATP synthesis, C3 and C4 pathway of carbon fixation.
- Respiration: Glycolysis, TCA cycle, Oxidative Phosphorylation, Electron Transport System

UNIT: 4. Plant Physiology

- Growth: Phases of Growth and Growth Correlations.
- Plant response to light and temperature- Photoperiodism and Vernalization.
- Enzymes- Classification, Structure, Properties, Mechanism of enzyme action and factors affecting rate of enzymatic reactions.
- pH and Buffer solutions and its significance.
- Plant Growth Regulators: Biosynthesis, Physiological role of Auxins, Gibberellins, ABA and Ethylene

Suggested Readings

1. Padey, B. P. 2009. Plant Pathology, S Chand Publishers., NewDelhi.
2. Sharma, P. D. 2004. Plant Pathology, Rastogi Publication, NewDelhi.
3. Mehrotra, RS. 2003. Plant Pathology, Tata McGraw Hill Publishing Co. Ltd., NewDelhi.
4. Sharma, O. P. 1980. Gymnosperms, Pragati Prakashan, Meerut (India)
5. Kumar, A. & Purohit, SS. 1997-98, Plant Physiology, Agro Botanical Publishers (India), Bikaner.
6. Noggle RG. & Fritz, GJ, 1989. Introductory Plant Physiology, 2nd ED. Prentice Hall of India Private Ltd. NewDelhi.
7. Devlin, RM. & Witham, FH, 1997.Plant Physiology,4th Ed., CBS Publishers & Distributers, Delhi.
8. Taiz, L.& Zeiger, E.2010. Plant Phtysiology. Sinauer Associate Inc. USA, 5th Edition
9. Hopkins, WG. & Hunter, NP. 2009. Introduction to Plant Physiology, John Wiley & Sons, USA, 4th Edition.

SHRI GOVIND GURU UNIVERSITY
B.Sc. Semester - IV
Major Course - BOTANY
BS23MJ4BO3 - Paper-III - Practical
Based on
[Paper – I: Plant Taxonomy, Plant Ecology and Economic Botany]
[Paper – II: Plant Pathology, Fossils and Plant Physiology]

1. Study of Plant families:

Malvaceae, Solanaceae, Nyctaginaceae and *Amaryllidaceae* - Classification with reasons, Identifying characters, floral formula and floral diagrams, habit sketch, androecium, gynoecium and T.S. of ovary; 3-4 botanical and common names of examples.

2. Study of morphological adaptations of

- Hydrophytes (*Hydrilla, Nymphaea*),
- Xerophytes (*Nerium, Opuntia*)
- Halophytes (*Avicennia*)

3. Heterotrophic nutrition in plant specimens.

4. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain guage

5. Economic botany: Specimens and / or their products to be demonstrated as per theory syllabus.

6. Study of Plant diseases (pathogens) as per theory syllabus Mounting (W.M.) and Permanent Slide (P.S.) of

(a) Tikka Disease of Ground Nut (*Cercospora personata; C.arachidicola*)

(b) Green ear Disease of Bajra (*Sclerospora graminicola*)

(c) White Rust of Crucifers (*Albugo candida*)

7. Study of following plant Fossils from specimen/ P.S. / chart.

- Pteridophytes: Rhynia stem T.S., Lepidodendron T.S, Cast, Impression, Lepidocarpon V.S. Slide, Calamites stem T.S., Impression.
- Gymnosperms: Cordaites Stem T.S., Cordainthus Cone L.S.

8. To study the rate of Photosynthesis under different wavelength of Light.

9. To study the rate of Photosynthesis under different concentrations of CO_2

10. To Study the various stages of Plasmolysis using Tredescantia/ croton bicolour leaf.

11. To study the phenomenon of Osmosis using Potato Osmoscope & Colocasia petiole.

12. Study of Transpiration rate by Four Leaf Experiment.

SHRI GOVIND GURU UNIVERSITY

Syllabus on the bases of New Education Policy (NEP)

As Proposed by University Grant Commission

For

B.Sc. Semester - IV

Minor Course (BOTANY)

BS23MN4BO1

Plant Ecology and Plant Physiology

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester – IV

Minor Course – BOTANY

BS23MN4BO1

[Plant Ecology and Plant Physiology]

UNIT: 1. Plant Ecology

- Introduction
- Scope and Branches of Ecology
- External and internal characters and Adaptation of
  - Hydrophytes, Xerophytes and Halophytes
- Heterotrophic nutrition in plants.
- Climatic factors: Humidity, Rainfall, Wind Light and Temperature

UNIT: 2. Plant Physiology

- Plant-Water relations; Diffusion, Osmosis, Plasmolysis, Imbibition.
- Transpiration: Types, its Significance, Mechanism of stomatal movements,
- Factors affecting rate of Transpiration; Guttation.
- Translocation of organic solutes in Phloem.
- Photosynthesis: Photosynthetic Pigments (Chl a, b, Xanthophyll, Carotene), Photosystem I and II, Electron transport and Mechanism of ATP synthesis, C3 and C4 pathway of carbon fixation.

Suggested Readings

1. Kormondy, E.J. 1996. Concept of Ecology. Prentice Hall, U.S.A. 4th edition.
2. Sharma, P.D. 2010. Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.
3. College Botany Vol. I & II Das, Datta, Gangulee and Kar, New Centralbook Agency.
4. Bendre Ashok and Kumar Ashok. A Texbook of Practical Botany vol. I & II. Rastogi Publication Meerut.
5. Kumar, A. & Purohit, SS. 1997-98, Plant Physiology, Agro Botanical Publishers (India), Bikaner.
6. Noggle RG. & Fritz, GJ, 1989. Introductory Plant Physiology, 2nd ED. Prentice Hall of India Private Ltd. NewDelhi.
7. Devlin, RM. & Witham, FH, 1997.Plant Physiology,4th Ed., CBS Publishers & Distributers, Delhi.
8. Taiz, L.& Zeiger, E.2010. Plant Phtysiology. Sinauer Associate Inc. USA, 5th Edition

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester - IV

Minor Course - BOTANY

Practical

[Based on Paper: Plant Ecology and Plant Physiology]

1. Study of morphological adaptations of

- Hydrophytes (*Hydrilla, Nymphaea*),
- Xerophytes (*Nerium, Opuntia*)
- Halophytes (*Avicennia*)

2. Heterotrophic nutrition in plant specimens.

3. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain guage

4. To study the rate of Photosynthesis under different concentrations of CO_2

5. To Study the various stages of Plasmolysis using Tredescantia/ croton bicolour leaf.

6. To study the phenomenon of Osmosis using Potato Osmoscope & Colocasia petiole.

7. Study of Transpiration rate by Four Leaf Experiment.

8. Project / Submission

SHRI GOVIND GURU UNIVERSITY

Syllabus on the bases of New Education Policy (NEP)

As Proposed by University Grant Commission

For

B.Sc. Semester - IV

Skill Enhancement Course
(BOTANY)

BSC23SE403

Medicinal Botany

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester – III

Skill Enhancement Course – BOTANY

BSC23SE403

Medicinal Botany

Unit: 1

- History, Scope and Importance of Medicinal Plants.
- Indigenous Medicinal Sciences; Definition and Scope-Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments
- Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine.
- Unani: History, concept: Umoor-e- tabiya.

Unit: 2

- Conservation of endangered and endemic medicinal plants.
- Definition: endemic and endangered medicinal plants
- Red list criteria
- In situ conservation: Biosphere reserves, sacred groves, National Parks
- Ex situ conservation: Botanic Gardens, Ethnomedicinal plant Gardens

Suggested Readings

1. Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
2. Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd ed. Agrobios, India.

SHRI GOVIND GURU UNIVERSITY

Syllabus on the bases of New Education Policy (NEP)

As Proposed by University Grant Commission

For

B.Sc. Semester - IV

Skill Enhancement Course
(BOTANY)

BSC23SE403

Medicinal Botany

SHRI GOVIND GURU UNIVERSITY

B.Sc. Semester – IV

Skill Enhancement Course – BOTANY

BSC23SE403

Medicinal Botany

Unit: 1

- History, Scope and Importance of Medicinal Plants.
- Indigenous Medicinal Sciences; Definition and Scope-Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments
- Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine.
- Unani: History, concept: Umoor-e- tabiya.

Unit: 2

- Conservation of endangered and endemic medicinal plants.
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- Red list criteria
- In situ conservation: Biosphere reserves, sacred groves, National Parks
- Ex situ conservation: Botanic Gardens, Ethnomedicinal plant Gardens

Suggested Readings

1. Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
2. Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd ed. Agrobios, India.