

# **SHRI GOVIND GURU UNIVERSITY**

**Syllabus on the bases of Choice Based Credit System (CBCS)**

**As Proposed by University Grant Commission**

**For**

**Semester - I & II (F.Y.B.Sc.)**

**BOTANY**

**Semester – I**

**Paper No. – I: Biodiversity (Algae, Fungi and Bryophytes), Plant  
Morphology and Plant Ecology**

**Semester – II**

**Paper No. – II: Biodiversity (Pteridophytes and Gymnosperms), Plant  
Taxonomy and Plant Ecology**

**INFORCE FROM JUNE 2016**

# SHRI GOVIND GURU UNIVERSITY

## BOTANY

### Choice Based Credit System (CBCS) Theory Syllabus

Effective from June 2016

(Credits: Theory-4, Practicals-2)

Total Lectures: 48

Semester – I (Paper: 101)

### Paper – I: Biodiversity (Algae, Fungi and Bryophytes), Plant Morphology and Plant Ecology

#### Unit – 1: Algae and Fungi

##### Algae

- Introduction & General Characteristics 1 Lecture
- Classification (Smith G.M.); Thallus Organization; Cell Structure; Reproduction and life cycle of the following; 4 Lecture
  - o *NOSTOC, SPIROGYRA, SARAGASSUM*
- Economic importance of Algae 1 Lecture

##### Fungi

- Introduction & General Characteristics 1 Lecture
- Classification (G.C. Ainsworth); Thallus Organization; Cell Structure; Reproduction and life cycle of the following; 3 Lecture
  - o *MUCOR, PUCCINIA*
- Economic importance of Fungi 1 Lecture
- Symbiotic Association - *LICHENS* 1 Lecture

#### Unit – 2: Bryophytes

- Introduction & General Characteristics 1 Lecture
- Systematic Position; Adaptation to land habit, Thallus (External & Internal) organization; Reproduction (excluding development) and life cycle of the following; 9 Lecture
  - o *RICCIA, FUNARIA*
- Ecological and Economic importance of Bryophytes 2 Lecture

#### Unit – 3: Plant Ecology

- Introduction 1 Lecture
- Scope and Branches of Ecology 1 Lecture
- Climatic factors: Humidity, Rainfall and Wind 2 Lecture
- Light and Temperature:
  - o Variation Optimal and limiting factors; Shelford law of tolerance 4 Lecture
- External and internal characters and Adaptation of
  - o Hydrophytes, Xerophytes and Halophytes 3 Lecture
- Principle Biogeographical Zone; Endemism 1 Lecture

## Unit – 4: Plant Morphology

- Basics of Plant Morphology 1 Lecture
- Leaf: Parts of leaf; Types of Leaves; Types of Phyllotaxy; Types of Stipules 3 Lecture
- Inflorescences: 4 Lecture
  - Types of Racemose and Cymose with suitable examples; Specialized types
- Flowers: 4 Lecture
  - 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

### 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. A Textbook of Botany vol. 1 & 2 S.N. Pandey, P.S. Trivedi and S.P.Mishra., Vikas Publication House Pvt. Ltd.
4. Algae, Fungi, Bryophytes, Pteridophyte by Vasishta., S. Chand Pub., New Delhi.
5. Kormondy, E.J. 1996. Concept of Ecology. Prentice Hall, U.S.A. 4<sup>th</sup> edition.
6. Sharma, P.D. 2010. Ecology and Environment. Rastogi Publications, Meerut, India. 8<sup>th</sup> edition.
7. Simpson, M.G. 2006. Plant Systematics. Elsevier Academic Press, San Diego, CA, U.S.A.
8. Verma, B.K. 2011. Introduction to Taxonomy of Angiosperms. PHI Learning Private Ltd. New Delhi.
9. Mondal, A.K. Advance Plant Taxonomy, New Central Book Agency (P) Ltd.
10. Gangulee, H.C., Das, K.S. and Datta, C. College Botany Vol. I, II & III. Publisher Central Educational Enterprises(P) Ltd., Kolkata.
11. Bendre Ashok and Kumar Ashok. A Texbook of Practical Botany vol. I & II. Rastogi Publication Meerut.

# SHRI GOVIND GURU UNIVERSITY

## BOTANY

### Choice Based Credit System (CBCS) Practical Syllabus

Effective from June 2016

#### Semester – I

#### Practicals (Paper: 102)

Base on Paper – I: [Biodiversity (Algae, Fungi & Bryophytes), Plant Morphology & Plant Ecology]

- (1) Study of Algae
  - (A) *Nostoc*: Mounting and Permanent Slide (P.S.) of Colony
  - (B) *Spirogyra*: Mounting and P.S. of Thallus and Conjugation types
  - (C) *Saragassum*: Thallus Structure; T.S. Passing through Reproductive organs; P.S.: Thallus T.S.; T.S through male and female receptacle
- (2) Study of Fungi
  - (A) *Mucor*: Mounting: Reproductive structure- Sporangia; P.S.: Sporangia and Zygospore
  - (B) *Puccinia*: Herbarium specimens of Black Stem Rust of Wheat and infected Barberry leaves; Section mounts of spores on Wheat and Barberry; P.S.: Pycnidiospores, Aecidiospores, Uredospores, Teleutospores
- (3) Study of Bryophytes
  - (A) *Riccia*: Specimen: Thallus with sporophyte; P.S.: Thallus V.T.S., Thallus with Antheridia and Archegonia
  - (B) *Funaria*: Morphology of thallus; Mounting of Antheridia and Archegonia, Peristome; P.S: Antheridial and Archegonial branch, L.S. Capsule, Protonema
- (4) Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge
- (5) Determination of soil pH and analysis of two soil samples for carbonates, chlorides, nitrates and base deficiency
- (6) Study of morphological adaptations of hydrophytes(*Nymphaea*, *Eichhornia*), Xerophytes(*Nerium*, *Opuntia*) and halophytes(*Avicennia*)
- (7) Plant Morphology
  - Types of Leaves: simple and compound (Types of Palmately and pinnately compound leaves)
  - Types of Phyllotaxy
  - Types of Stipules: Free lateral, Scaly, Adnate, Interpetiolar, Ochreate, Spinous and Tendrilar
  - Inflorescences: Types of Racemose and Cymose with suitable examples; Specialized types
  - Flowers:
    - o Symmetry: Actinomorphic, Zygomorphic
    - o Types of Flowers: hypogynous; perigynous; epigynous
    - o Types of aestivation: Valvate, Twisted(Contorted), Imbricate, Quincuncial and Vexillary
    - o Types of Placentation (Permanent Slides/Charts): Marginal, Axile, Parietal, Free-central, Basal and Superficial

# SHRI GOVIND GURU UNIVERSITY

## BOTANY

### Choice Based Credit System (CBCS) Theory Syllabus

Effective from June 2016

(Credits: Theory-4, Practicals-2)

Total Lectures: 48

Semester – II (Paper: 103)

Paper No. – II: Biodiversity (Pteridophytes and Gymnosperms), Plant Taxonomy and Plant Ecology

#### Unit – 1: Pteridophytes

- Introduction & General Characteristics 2 Lecture
- Systematic Position; Morphology, Anatomy and Reproduction (excluding development) and life cycle of the following; 6 Lecture
  - o *Nephrolepis, Selaginella*
- Ecological and Economical importance of Pteridophytes 2 Lecture
- Heterospory and seed habit 2 Lecture

#### Unit – 2: Gymnosperms

- Introduction & General Characteristics 2 Lecture
- Systematic Position; Morphology, Anatomy and Reproduction(excluding development) and life cycle of the following; 7 Lecture
  - o *Cycas, Ephedra*
- Ecological and Economical importance of Pteridophytes 3 Lecture

#### Unit – 3: Plant Ecology

- Plant community: 4 Lecture
  - o Characters; Ecotone and Edge effect; Succession: Process and Types
- Ecosystem: 3 Lecture
  - o Structure; Function and energy flow in ecosystem
  - o Components of Fresh water(Pond) and Terrestrial(Grassland) ecosystem
  - o Ecological pyramids 2 Lecture

#### Unit – 4: Plant Taxonomy

- Ranks, categories and taxonomic groups 2 Lecture
- Outline classification of Bentham and Hooker's 1 Lecture
- Botanical nomenclature: Principles and rules (ICN); Binomial system, Principle of priority and its limitation. 3 Lecture
- Importance of Herbaria; Botanical garden of the India 2 Lecture
- Study of following angiospermic families 4 Lecture
  - o Malvaceae, Solanaceae, Euphorbiaceae; Liliaceae

# SHRI GOVIND GURU UNIVERSITY

## BOTANY

### Choice Based Credit System (CBCS) Practical Syllabus

Effective from June 2016

Semester – II

Practicals (Paper: 104)

Base on Paper No. – II: Biodiversity (Pteridophytes&Gymnosperms), Plant Taxonomy & Plant Ecology

- (1) *Nephrolepis*: Morphology; Mounting: Ramenta, Hydathode, Sporangia; P.S.: Prothallus with Antheridia and Archegonia; V.S. leaflet passing through sorus
- (2) *Selaginella* – Morphology; Mounting: whole mount of strobilus; P.S.: L.S. Strobilus
- (3) *Cycas*–Morphology(coralloid roots, leaf); Mounting: V. S. of leaflet; V.S. microsporophyll; P.S.: T.S. rachis; V.S. leaflet; V.S. microsporophyll; L.S. ovule
- (4) *Ephedra* - Morphology; Male and Female strobilus; P.S.: Stem T.S.; L.S. Male and Female strobilus; L.S. of Ovule
- (5) Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method.
- (6) Determination of the frequency of various species occurring in a given area.
- (7) Demonstration of biogeographical zone of India.
- (8) 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):  
*Malvaceae, Solanaceae, Euphorbiaceae, Liliaceae*
- (9) Mounting of a properly dried and pressed specimen of any ten plant with herbarium label must be submitted to the department.
- (10) Botanical study tour and report preparation.

### 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. Algae, Fungi, Bryophytes, Pteridophyte by Vasishta., S. Chand Pub., New Delhi.
4. Bhatnagar, S.P. and Moitra, A. 1996. Gymnosperms. New Age International (P) Ltd Publisher, New Delhi, India.
5. Kormondy, E.J. 1996. Concept of Ecology. Prentice Hall, U.S.A. 4<sup>th</sup> edition.
6. Sharma, P.D. 2010. Ecology and Environment. Rastogi Publications, Meerut, India. 8<sup>th</sup> edition.
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. Gangulee, H.C., Das, K.S. and Datta, C. College Botany Vol. I, II & III. Publisher Central Educational Enterprises(P) Ltd., Kolkata.
10. Bendre Ashok and Kumar Ashok. A Textbook of Practical Botany vol. I & II. Rastogi Publication Meerut.