



KARNATAK UNIVERSITY, DHARWAD  
ACADEMIC (S&T) SECTION

ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ  
ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ



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NAAC Accredited  
'A' Grade 2014

website: kud.ac.in

No. KU/Aca(S&T)/JS/MGJ(Gen)/2023-24/59

Date: 04/09/2023

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2023-24ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಪದವಿಗಳಿಗೆ 5 ಮತ್ತು 6ನೇ ಸೆಮೆಸ್ಟರ್  
NEP-2020 ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

- ಉಲ್ಲೇಖ: 1. ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿಗಳು(ವಿಶ್ವವಿದ್ಯಾಲಯ 1) ಉನ್ನತ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಇವರ  
ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 104 ಯುಎನ್ಇ 2023, ದಿ: 20.07.2023.  
2. ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂಖ್ಯೆ: 2 ರಿಂದ 7, ದಿ: 31.08.2023.  
3. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: 04/09/2023

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳನ್ವಯ ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶದ ಮೇರೆಗೆ, 2023-24ನೇ  
ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ, ಎಲ್ಲ B.A./ BPA (Music) /BVA / BTTM / BSW/ B.Sc./B.Sc. Pulp &  
Paper Science/ B.Sc. (H.M)/ BCA/ B.A.S.L.P./ B.Com/ B.Com (CS) / BBA & BA ILRD ಸ್ನಾತಕ ಪದವಿಗಳ 5  
ಮತ್ತು 6ನೇ ಸೆಮೆಸ್ಟರ್‌ಗಳಿಗೆ NEP-2020ರ ಮುಂದುವರೆದ ಭಾಗವಾಗಿ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ  
ಕೋರ್ಸಿನ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ [www.kud.ac.in](http://www.kud.ac.in) ದಲ್ಲಿ ಭಿತ್ತರಿಸಲಾಗಿದೆ. ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ.  
ಅಂತರ್ಜಾಲದಿಂದ ಡೌನ್‌ಲೋಡ್ ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತ ವಿದ್ಯಾರ್ಥಿಗಳ ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ  
ತಂದು ಅದರಂತೆ ಕಾರ್ಯಪ್ರವೃತ್ತರಾಗಲು ಕವಿವಿ ಅಧೀನದ/ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ  
ಸೂಚಿಸಲಾಗಿದೆ.

ಅಡಕ: ಮೇಲಿನಂತೆ

  
ಕುಲಸಚಿವರು.

ಗೆ,  
ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಎಲ್ಲ ಅಧೀನ ಹಾಗೂ ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ  
ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ. (ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ ಹಾಗೂ ಮಿಂಚಂಚಿ ಮೂಲಕ ಬಿತ್ತರಿಸಲಾಗುವುದು)

ಪ್ರತಿ:

1. ಕುಲಪತಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
2. ಕುಲಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
3. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
4. ಅಧೀಕ್ಷಕರು, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ / ಗೌಪ್ಯ / ಜಿ.ಎ.ಡಿ. / ವಿದ್ಯಾಮಂಡಳ (ಪಿ.ಜಿ.ಪಿಎಚ್.ಡಿ) ವಿಭಾಗ, ಸಂಬಂಧಿಸಿದ  
ಕೋರ್ಸುಗಳ ವಿಭಾಗಗಳು ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
5. ನಿರ್ದೇಶಕರು, ಕಾಲೇಜು ಅಭಿವೃದ್ಧಿ / ವಿದ್ಯಾರ್ಥಿ ಕಲ್ಯಾಣ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.



**KARNATAK UNIVERSITY, DHARWAD**

# **B.Sc. in Botany**

**Syllabus With Effect From 2023-24**

**DISCIPLINE SPECIFIC CORE COURSE (DSCC)**

**FOR SEM V & VI,**

**SKILL ENHANCEMENT COURSE (SEC) FOR SEM V SEM**

**AS PER NEP - 2020**

**KARNATAK UNIVERSITY, DHARWAD**

**04 – Year B.Sc. (Hons.) Program**

**SYLLABUS**

**Subject: Botany**

**[Effective from 2023-2024]**

**DISCIPLINE SPECIFIC CORE COURSE (DSCC-9 to 12),  
FOR SEM - V.**

**AS PER NEP- 2020**

## BOTANY AND ANOTHER SUBJECT AS DOUBLE MAJORS IN THIRD YEAR (V SEM) NEP 2020

Sem.	Type of Course	Theory/ Practical	Course Code	Course Title	Instructi onhour/ week	Total hours / sem	Duration of Exam	Marks			Credits
								Formati ve	Summa tive	Total	
V	DSCC-9	Theory	035 BOT 011	Plant Morphology and Taxonomy	04hrs	56	02 hrs	40	60	100	04
	DSCC-10	Practical	035 BOT 012	Plant Morphology and Taxonomy	04 hrs	52	03 hrs	25	25	50	02
	DSCC-11	Theory	035 BOT 013	Genetics and Plant Breeding	04hrs	56	02 hrs	40	60	100	04
	DSCC-12	Practical	035 BOT 014	Genetics and Plant Breeding	04 hrs	52	03 hrs	25	25	50	02
	Other subject										04
	Other subject										04
	Other subject										04
	SEC-3	Practical	035 BOT 061		04hrs	52	03 hrs	25	25	50	02
<b>Total</b>											<b>26</b>

**B.SC.: SEMESTER – V**  
**SUBJECT: BOTANY**

**THE COURSE BOTANY IN V SEMESTER HAS TWO PAPERS (THEORY PAPER- 033 BOT 011 FOR 04 CREDITS AND PRACTICAL PAPER- 033 BOT 012 FOR 02 CREDITS) FOR 06 CREDITS: BOTH THE PAPERS ARE COMPULSORY, DETAILS OF THE COURSES ARE AS**

**TITLE OF THE COURSE:**  
**PLANT MORPHOLOGY AND TAXONOMY (THEORY)**  
**COURSE CODE: 035 BOT 011**  
**THEORY: DISCIPLINE SPECIFIC CORE COURSE (DSCC-9)**

Program Name	<b>B.Sc. in BOTANY</b>	Semester	<b>V</b>
Course Title	<b>PLANT MORPHOLOGY AND TAXONOMY (THEORY)</b>		
Course Code:	<b>035 BOT 011</b>	No. of Credits	<b>04</b>
Contact hours	<b>56 Hours</b>	Duration of Exam	<b>2hours</b>
Formative Assessment Marks	<b>40</b>	Summative Assessment Marks	<b>60</b>

**COURSE OUTCOMES (COS):**

After the successful completion of the course, the student will be able to:

- CO1. Understanding the main features in Angiosperm evolution
- CO2. Ability to identify, classify and describe a plant in scientific terms, thereby, Identification of plants using dichotomous keys. Skill development in identification and classification of flowering plants.
- CO3. Interpret the rules of ICN in botanical nomenclature.
- CO4. Classify Plant Systematic and recognize the importance of herbarium and Virtual Herbarium, Evaluate the Important herbaria and botanical gardens.
- CO5. Recognition of locally available angiosperm families and plants and economically important plants. Appreciation of human activities in conservation of useful plants from the past to the present.

**CONTENTS**

**56 Hrs**

**Unit 1:**

**16 hrs**

**Morphology** of Root, Stem and Leaf. Their modifications for various functions. Inflorescence – types. Structure and variations of flower. Fruits–types. Floral diagram and floral formula.

**Introduction to Taxonomy:** History, objectives, scope and relevance of Taxonomy **Systems of classification:** Artificial, Natural and Phylogenetic; brief account of Linnaeus', Bentham & Hooker's, Engler and Prantl's system and APG IV System (2016).-Merits and demerits of classification.

**Taxonomic literatures:** Floras, Monograph. Revisions, Journals.

**Herbaria and Botanical gardens:** Important herbaria and botanical gardens of the world and India.

Technique of Herbarium Preparation and roles botanical gardens.

**Virtual herbarium;** E-flora; Documentation.

**Unit 2:**

**12 hrs**

**Taxonomic Hierarchy:** Concept of taxa (family, genus, species); Categories and taxonomic hierarchy; Species concepts (biological, morphological, evolutionary). Modes of speciation. Problems with species concepts. Rank less system of phylogenetic systematics

**Botanical Nomenclature:** Principles and rules (ICN); Latest code –brief account, Brief account of Ranks of taxa, Type concept (Typification), Rule of priority, Author citation., valid publication, rejection of names, principle of priority and its limitations; Names of hybrids/cultivated species.

<b>Unit 3:</b>	<b>18 hrs</b>
<p><b>Plant identification:</b> Taxonomic dichotomous keys; intended (yolked) and bracketed keys.( brief account only).</p> <p><b>Plant descriptions:</b> Common Terminologies used for description of vegetative andreproductive parts of the following families.</p> <p><b>Study of the diagnostic features of Angiosperm families:</b> Annonaceae, Brassicaceae, Malvaceae, Rutaceae, Anacardiaceae, Fabaceae (with sub Families), Myrtaceae, Apiaceae, Rubiaceae, Asteraceae, Apocynaceae, Solanaceae, Acanthaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Liliaceae, Arecaceae and Poaceae.</p>	
<b>Unit 4:</b>	<b>10 hrs</b>
<p><b>Biometrics, Numerical Taxonomy; Phenetics and Cladistics:</b> Characters; Variations; OTUs, character weighting and coding; Cluster analysis; Phenograms, cladograms (definitions and differences).</p> <p><b>Origin and evolution of angiosperms;</b> Co-evolution of angiosperms and animals; Methods of illustrating evolutionary relationship (phylogenetic tree, cladogram).</p> <p><b>Plant Taxonomic Evidences:</b> from palynology embryology, cytology, phytochemistry and molecular data. Field inventory.</p>	

**Pedagogy:** Teaching and learning, Seminar, Assignments, etc

Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Test-I (Objective type)	10
Test-II (Objective type)	10
Assignments	10
Seminar	10
<b>Total</b>	<b>40 Marks</b>
<i>Formative Assessment as per guidelines are compulsory</i>	

**TITLE OF THE COURSE: PLANT MORPHOLOGY AND TAXONOMY (PRACTICAL)**  
**COURSE CODE: 035 BOT 012**  
**PRACTICAL: DISCIPLINE SPECIFIC CORE COURSE (DSCC-10)**

Program Name	<b>B.Sc. in BOTANY</b>	Semester	<b>V</b>
Course Title	<b>PLANT MORPHOLOGY AND TAXONOMY (PRACTICAL)</b>		
Course Code:	<b>035 BOT 012</b>	No. of Credits	<b>02</b>
Contact hours	<b>52 Hours</b>	Duration of Exam	<b>3 hours</b>
Formative Assessment Marks	<b>25</b>	Summative Assessment Marks	<b>25</b>

## LIST OF EXPERIMENTS TO BE CONDUCTED

1. Study of root, stem and leaf structure and modifications. Study of inflorescence types. Study of flower and its parts, Study of fruits. Floral diagram and floral formula. 04 hrs
2. Study of families mentioned in theory with at least two examples for each family and make suitable diagrams, describe them in technical terms (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification) and identify up to species using the flora. 24 hrs
3. Identification of species using the flora 06 hrs
4. Identify plants/plant products of economic importance belonging to the families mentioned in the syllabus; with binomial, family and morphology of useful parts. Cotton, Mango, Red gram, Green gram, Horse gram, Black gram, Bengal gram, Indigo, Brinjal, Tomato, Chilly, Tamarind, Asfoetida, Cumin, Coriander, Coffee, Rubber, Tapioca, Ricinus, Coir, Arecanut, Rice, Wheat, Ragi, Sugarcane *Annona muricata* *Catharanthus roseus*, *Rauwolfia serpentina*, *Justicia adhatoda*, *Vitex negundo* and *Leucas aspera* 18 hrs
5. Submission of any 5 economic plant products.

**Submission:** Tour report and Herbarium (Preparation of 10 properly identified herbarium specimens; mounting of a properly dried and pressed specimen of any common plants from your locality with herbarium label).

**Pedagogy:** Teaching and learning, conducting experiments, field visits.

<b>Formative Assessment for Practical</b>	
<b>Assessment Occasion/ type</b>	<b>Marks</b>
Test-I	05
Test-II	05
Field visit(Tour report and Herbarium)	10
Submission ( any 5 economic plant products)	05
<b>Total</b>	<b>25 Marks</b>
<i>Formative Assessment as per guidelines are compulsory</i>	

## GENERAL PATTERN OF THEORY QUESTION PAPER

(60 marks for semester end Examination with 2 hrs duration)

### Part-A

1. Question number 1-06 carries 2 marks each. Answer any 05 questions: 10 marks

### Part-B

2. Question number 07- 11 carries 05 Marks each. Answer any 04 questions: 20 marks

### Part-C

3. Question number 12-15 carries 10 Marks each. Answer any 03 questions : 30 marks

(Minimum 1 question from each unit and 10 marks question may have sub-questions for 7+3 or 6+4 or 5+5 if necessary)

**Total: 60 Marks** Note: Proportionate weightage shall be given to each unit based on number of hours prescribed.

## SCHEME OF PRACTICAL EXAMINATION

(Distribution of marks): 25 marks for the Semester end examination

- |   |                |
|---|----------------|
| 1. Identify, classify and describe the specimen A & B taxonomically   | 6 Marks        |
| 2. Identify the given specimen C with the help of Key using Flora     | 4 Marks        |
| 3. Write the floral diagram and floral formal of the given specimen D | 2 Marks        |
| 4. Identification of Specimen/slides E, F and G                       | 6 Marks        |
| 5. Viva Voce  | 2 Marks        |
| 6. Submission (Practical Record/Journal)                              | 5 Marks        |
|   | Total 25 marks |

### GENERAL INSTRUCTIONS:

- Q1. Give specimen from Dicotyledons (A) and Monocotyledons (B)  
Q2. Give specimen from family they studied (C)  
Q3. Give specimen from family they studied (D)  
Q4. Specimen /Slides/ materials from Root/Stem/ Leaf/ Inflorescence (E), Flower/Fruit (F) and Economic importance (G)  
Q5. Viva  
Q6. Submission (Practical Record/Journal)

**Note: Same Scheme may be used for IA (Formative Assessment) examination**



**REFERENCES**

1	Baker. H.G. 1970. <i>Plant and Civilization</i> , Wadsworth Publishing Company.
2	Colton C.M. 1997. <i>Ethnobotany – Principles and applications</i> . John Wiley and sons –Chichester
3	Cotton, C.M. 1996. <i>Ethnobotany – Principles and Applications</i> . Wiley and Sons
4	Datta S C, <i>Systematic Botany</i> , 4th Ed, Wiley Estern Ltd., New Delhi, 1988.
5	Eames A. J. - <i>Morphology of Angiosperms</i> - Mc Graw Hill, New York.
6	Hall, B.G. (2011). <i>Phylogenetic Trees Made Easy: A How-To Manual</i> . Sinauer Associates, Inc.USA
7	Heywood - <i>Plant taxonomy</i> - Edward Arnold London.
8	Jeffrey C .J. and A. Churchil - <i>An introduction to taxonomy</i> – London.
9	Jeffrey, C. (1982). <i>An Introduction to Plant Taxonomy</i> . Cambridge University Press, Cambridge
10	Judd, W.S., Campbell, C.S., Kellogg, E.A., Stevens, P.F., Donogue, M.J., 2002. <i>PlantSystematics: A Phylogenetic approach</i> , 2nd edition. Sinauer Associates, Inc., USA.
11	Lawrence - <i>Taxonomy of Vascular Plants</i> - Oxford & I B H, New Delhi.
12	Manilal, K.S. and M.S. Muktesh Kumar 1998. <i>A Handbook on Taxonomy Training</i> . DST, NewDelhi.
13	Manilal, K.S. and A.K. Pandey, 1996. <i>Taxonomy and Plant Conservation</i> . C.B.S. Publishers &Distributors, New Delhi.
14	Manilal, K.S. 2003. <i>Van Rheede'sHortusMalabaricus. English Edition</i> , with AnnotationsandModern Botanical Nomenclature. (12 Vols.) University of Kerala, Trivandrum.
15	Naik V.N., <i>Taxonomy of Angiosperms</i> , 1991. Tata Mcgraw-Hill Pub. Co. Ltd., New Delhi.
16	Pandey, S. N, and S.P. Misra (2008)- <i>Taxonomy of Angiosperms</i> - Ane Books India, New Delhi.
17	Radford A B, W C Dickison, J M Massey & C R Bell, <i>Vascular Plant Systematics</i> , 1974,Harper& Row Publishers, New York.
18	Singh G.2012. <i>Plant systematics: Theory and Practice</i> . Oxford and IBH, Pvt. Ltd., New Delhi.
19	Singh V. & Jain - <i>Taxonomy of Angiosperms</i> - Rastogi Publications, Meerut.
20	Sivarajan V. V - <i>Introduction to Principles of taxonomy</i> - Oxford &I B H New Delhi.
21	Any local/state/regional flora published by BSI or any other agency.

**TITLE OF THE COURSE: GENETICS AND PLANT BREEDING (THEORY)**  
**COURSE CODE: 035 BOT 013**  
**THEORY: DISCIPLINE SPECIFIC CORE COURSE (DSCC-11)**

Program Name	<b>B.Sc. in BOTANY</b>	Semester	<b>V</b>
Course Title	<b>GENETICS AND PLANT BREEDING (THEORY)</b>		
Course Code:	<b>035 BOT 013</b>	No. of Credits	<b>04</b>
Contact hours	<b>56 Hours</b>	Duration of Exam	<b>2 hours</b>
Formative Assessment Marks	<b>40</b>	Summative Assessment Marks	<b>60</b>

<b>Course Outcomes (COs):</b>	
<p>After the successful completion of the course, the student will be able to:</p> <p>CO1. Understanding the basics of genetics and plant breeding</p> <p>CO2. Ability to identify, calculate and describe crossing over, allelic generations and frequencies of recombination.</p> <p>CO3. Interpret the results of mating and pollinations.</p> <p>CO4. Classify Plant pollination methods</p> <p>CO5. Recognition of modes of inheritance of traits/ phenotypes and Phenotype-genotype correlation.</p>	
<b>CONTENTS</b>	<b>56 Hours</b>
<b>Unit 1:</b>	<b>16 hrs</b>
<p>Mendelian genetics and its extension Mendelism: History; Principles of inheritance; Chromosome theory of inheritance; Autosomes and sex chromosomes;</p> <p>Probability and pedigree analysis; Incomplete dominance and codominance; Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Recessive and Dominant traits, Penetrance and Expressivity, Numericals; Polygenic inheritance.</p> <p>Extrachromosomal Inheritance Chloroplast mutation: Variegation in Four o'clock plant; Mitochondrial mutations in yeast.</p>	
<b>Unit 2:</b>	<b>16 hrs</b>
<p>Linkage, crossing over and chromosome mapping.</p> <p>Linkage and crossing over-Cytological basis of crossing over; Recombination frequency, two factor and three factor crosses; Interference and coincidence; Numerical based on gene mapping; Sex Linkage.</p> <p>Variation in chromosome number and structure: Gene mutations Types of mutations; Molecular basis of Mutations; Mutagens – physical and chemical (Base analogs, deaminating, alkylating and intercalating agents); Role of Transposons in mutation. DNA repair mechanisms.</p> <p>Fine structure of gene (Population and Evolutionary Genetics, Allele frequencies, Genotype frequencies, Hardy-Weinberg Law, role of natural selection, mutation, genetic drift. Genetic variation and Speciation.</p>	
<b>Unit 3:</b>	<b>12 hrs</b>
<p>Plant Breeding: Introduction and objectives. Breeding systems: modes of reproduction in crop plants. Important achievements and undesirable consequences of plant breeding.</p> <p>Methods of crop improvement</p> <p>Introduction: Centers of origin and domestication of crop plants, plant genetic resources; Acclimatization;</p> <p>Selection methods: For self-pollination, cross pollination and vegetative Propagation in plants;</p> <p>Hybridization: For self, cross and vegetative propagation in plants – Procedure, advantages and limitations.</p>	

<b>Unit 4:</b>	<b>12 hrs</b>
Quantitative inheritance Concept, mechanism, examples of inheritance of Kernel colour in wheat, Monogenic vs polygenic inheritance Inbreeding depression and heterosis. History, genetic basis of inbreeding depression and heterosis; Applications. Crop improvement and breeding Role of mutations; Polyploidy; Distant hybridization and role of biotechnology in crop improvement..	

**Pedagogy:** Teaching and learning, Seminar, Assignments, etc

<b>Formative Assessment for Theory</b>	
<b>Assessment Occasion/type</b>	<b>Marks</b>
Test-I (Objective type)	10
Test-II (Objective type)	10
Assignments	10
Seminar	10
<b>Total</b>	<b>40 Marks</b>
<i>Formative Assessment as per guidelines are compulsory</i>	

**TITLE OF THE COURSE: GENETICS AND PLANT BREEDING (PRACTICAL)****COURSE CODE: 035 BOT 014****PRACTICAL: DISCIPLINE SPECIFIC CORE COURSE (DSCC-12)**

Program Name	<b>B.Sc. in BOTANY</b>	Semester	<b>V</b>
Course Title	<b>GENETICS AND PLANT BREEDING (PRACTICAL)</b>		
Course Code:	<b>035 BOT 014</b>	No. of Credits	<b>02</b>
Contact hours	<b>52 Hours</b>	Duration of Exam	<b>3 hours</b>
Formative Assessment Marks	<b>25</b>	Summative Assessment Marks	<b>25</b>

<b>Practical: Plant breeding:</b>	<b>26 hrs</b>
1. Reproductive of biology, self and cross pollinated plants; Vegetative reproduction	
2. Hybridization: Emasculation, bagging, pollination and production of hybrids and pollen fertility	
3. Origin, distribution and centres of diversity of crop plants: Wheat, Sorghum, Rice, Chilly, Sugarcane, Cotton, Potato, coffee, Sunflower and groundnut	
<b>Practical: Genetics</b>	<b>26 hrs</b>
1. Mendel's laws through seed ratios. Laboratory exercises in probability and chi-square.	
2. Chromosome mapping using point test cross data. Pedigree analysis for dominant and recessive autosomal and sex-linked traits.	
3. Incomplete dominance and gene interaction through seed ratios (9:7, 9:6:1, 13:3, 15:1, 12:3:1 and 9:3:4).	
4. Study of aneuploidy: Down's, Klinefelter's and Turner's syndromes.	
5. Photographs/Permanent Slides showing Translocation Ring, Laggards and Inversion Bridge.	

**Pedagogy:** Teaching and learning and conducting experiments.

<b>Formative Assessment for Practical</b>	
<b>Assessment</b>	<b>Marks</b>
Test-I	10 Marks
Test-II	10 Marks
Plant breeding station visit report	05 Marks
<b>Total</b>	<b>25 Marks</b>
<i>Formative Assessment as per guidelines are compulsory</i>	

## GENERAL PATTERN OF THEORY QUESTION PAPER

(60 marks for semester end Examination with 2 hrs duration)

- Part-A
1. Question number 1-06 carries 2 marks each. Answer any 05 questions: 10 marks
- Part-B
2. Question number 07- 11 carries 05 Marks each. Answer any 04 questions: 20 marks
- Part-C
3. Question number 12-15 carries 10 Marks each. Answer any 03 questions: 30 marks

(Minimum 1 question from each unit and 10 marks question may have sub-questions for 7+3 or 6+4 or 5+5if necessary)

**Total: 60 Marks**

**Note: Proportionate weightage shall be given to each unit based on number of hours prescribed.**

## SCHEME OF PRACTICAL EXAMINATION

(Distribution of marks): 25 marks for the Semester end examination

1. Test the percentage of pollen viability of the given material by hanging drop technique **A** 5 Marks
2. Calculate the recombinant frequency and state the order of gene from the given data **B** 4 Marks
3. Solve the genetic problem **C** 4 Marks
4. Identification of Specimen/slides/ Photographs **D** and **E** 4 Marks
5. Viva Voce 3 Marks
6. Submission (Journal / Record) 5 Marks
- Total 25 marks

## GENERAL INSTRUCTIONS:

- Q1. Material Cassia// Hibiscus/ etc (A)
- Q2. Mapping using one point / two point test cross data (B)
- Q3. Problems on gene interaction (C)
- Q4. Down's, Klinefelter's and Turner's syndromes, Translocation Ring, Laggards and Inversion Bridge (D and E)
- Q5. Viva Voce
- Q6. Submission (Journal/ Record)

**Note: Same Scheme may be used for IA (Formative Assessment) examination**

REFERENCES	
1	Acquaah, G. (2007). Principles of Plant Genetics & Breeding. New Jersey, U.S.: Blackwell Publishing.
2	Singh, B.D. (2005). Plant Breeding: Principles and Methods, 7th edition. New Delhi, Delhi: Kalyani Publishers.
3	Chaudhari, H.K. (1984). Elementary Principles of Plant Breeding, 2nd edition. New Delhi, Delhi: Oxford – IBH.
4	Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). Principles of Genetics, 8th edition. New Delhi, Delhi: John Wiley & sons
5	Griffiths, A.J.F., Wessler, S.R., Carroll, S.B., Doebley, J. (2010). Introduction to Genetic Analysis, 10th edition. New York, NY: W.H. Freeman and Co.
6	Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics, 10th edition. San Francisco, California:

	Benjamin Cummings
7	Raven, F.H., Evert, R. F., Eichhorn, S.E. (1992).Biology of Plants. New York, NY: W.H. Freeman and Co.
8	Welsh, J. R. (1981). Fundamentals of Plant Genetics and Breeding. John Wiley and Sons, New York.
9	Poehlman, J.M. (1987). Breeding Field Crops, 3rd Ed. AVI Publishing Co. Inc., Westport, Connecticut
10	Chopra, V.L. (2000). Plant Breeding: Theory and Practice 2nd Ed. Oxford & IBH, New Delhi.

**B.SC. – V SEMESTER  
SUBJECT: BOTANY  
SKILL ENHANCEMENT COURSE (SEC-3)  
CODE: 035 BOT 061**

Program Name	<b>B.Sc. in BOTANY</b>	Semester	<b>V</b>
Course Title	<b>NURSERY AND GARDENING (PRACTICAL)</b>		
Course Code:	<b>035 BOT 061</b>	No. of Credits	<b>02</b>
Contact hours	<b>52 Hours</b>	Duration of Exam	<b>2 hours</b>
Formative Assessment Marks	<b>25</b>	Summative Assessment Marks	<b>25</b>

**Title of the Paper:  
Nursery and Gardening  
Code: 035 BOT 061**

**Course outcomes (COs):**

After the completion of this course the learner will be able to:

- CO1. Know tools and techniques of nursery
- CO2. Techniques of vegetative propagation
- CO3. Methods to break seed dormancy
- CO4. Components of manures and fertilizers

**NURSERY AND GARDENING**

**(Credits: 2)**

1. Tools used in nursery and gardening techniques
2. Vegetative propagation techniques: Natural propagation methods
3. Vegetative propagation techniques: artificial propagation methods: cuttings, grafting, air layering and ground layering
4. Seed structure and types
5. Methods used to break seed dormancy
6. Types of manures: inorganic and organic
7. Common pests and diseases in nursery plants
8. Visit to commercial nursery

**SCHEME OF PRACTICAL EXAMINATION**

(Distribution of marks): 25 marks for the Semester end examination

- |   |                       |
|---|-----------------------|
| 1. Perform vegetative propagation method in specimen A                                | 5 Marks               |
| 2. Identify and describe the specimen/tools/photographs of specimen B, C, D, E, and E | 10 Marks              |
| 3. Viva voce  | 4 Marks               |
| 4. Journal  | 3 Marks               |
| 5. Field visit report   | 3 Marks               |
|   | <b>Total 25 marks</b> |

### **GENERAL INSTRUCTIONS:**

- Q1 Vegetative propagation techniques from practical 3
- Q2. One from practical 1, practical 2, practical 6 and two from practical 7 (one from pest and one from disease)
- Q3. Viva Voce
- Q4. Journal
- Q5. Field visit report

### **References**

1. Bose T.K. & Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.
2. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.
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5. Agrawal, P.K. 1993, Hand Book of Seed Technology, Dept. of Agriculture and Cooperation, National Seed Corporation Ltd., New Delhi.
6. Janick Jules. 1979. Horticultural Science. (3rd Ed.), W.H. Freeman and Co., San Francisco, USA.
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