

Kuvempu University Bachelor of Science (B.Sc.)

Semester Scheme -SEP

SKILL ENHANCEMENT COURSE FOR UG BOTANY

Govt. of Karnataka (As per G.O. No.: ED 166 UNE 2023, Bengaluru, dated: 08-05-2024)

V – Semester

Title: Herbal Technology

Practical Knowledge/Skill based Course – V (Compulsory Course)

BOT4.1: Botany Practical / Skill based Course

BOTANY - V SEMESTER SKILL ENHANCEMENT COURSE (SEP)

COURSE STRUCTURE

Course No.	Type of course	Theory/ Practical	Credits	Hours/ week	Total hours/ semester	Duration of Exam	Formative assessment mark	Summative assessment marks	Total marks
	SEC	PRACTICAL	02	04	64	03 hours	10	40	50

Course Objectives

- To develop practical skills in the **identification and authentication of medicinal plants** based on morphological and macroscopic characters.
- To train students in **pharmacognostic evaluation techniques** such as powder microscopy and organoleptic analysis.
- To impart knowledge of **propagation and primary processing methods** for medicinal plant conservation and utilization.
- To provide hands-on experience in **herbal drug extraction, formulation, and preparation of traditional products** like decoctions and churna.
- To introduce students to **basic phytochemical screening methods** for identification of bioactive compounds.
- To promote field-based learning through **herbarium preparation, economic study of medicinal plants, and industrial/field visits**.

Course Outcomes

- Students will be able to **identify and document medicinal plants** using standard taxonomic and pharmacognostic methods.
- Students will perform **microscopic, organoleptic, and macroscopic evaluation** of crude drugs for quality assessment.
- Students will demonstrate **skills in propagation, processing, and preservation** of medicinal plant materials.

- Students will prepare **basic herbal formulations and plant extracts** following traditional and simple laboratory techniques.
- Students will conduct **preliminary phytochemical screening** and interpret qualitative results of plant extracts.
- Students will compile **herbarium sheets, field reports, and practical records**, reflecting applied knowledge in herbal technology and phytopharmaceutical practices

PRACTICAL SYLLABUS

1. **Morphological Identification of Medicinal Plants (Field Study)**
Study and identify morphological characters (root, stem, leaf, flower, fruit, seed) of: *Andrographis paniculata*, *Asparagus racemosus*, *Centella asiatica*, and *Ocimum tenuiflorum*
2. **Macroscopic Evaluation of Selected Crude Drugs**
Observation of colour, odour, taste, size, shape and texture of crude drugs such as: *Ocimum tenuiflorum*, *Zingiber officinale* and *Phyllanthus emblica*
3. **Powder Microscopy of Crude Drugs**
Preparation of powder slides and identification of diagnostic characters (starch grains, fibers, vessels, trichomes).
4. **Organolectic Evaluation of Herbal Drugs**
Determination of colour, odour, taste and texture of powdered crude drugs.
5. **Study of Propagation Methods in Medicinal Plants**
Demonstration of propagation techniques (seed sowing, stem cuttings) in *Centella asiatica*, *Andrographis paniculata* and *Curcuma longa*
6. **Demonstration of Primary Processing Methods**
Cleaning, shade drying, grading and packaging of medicinal plant materials.
7. **Preparation of Herbal Formulations (Simple Decoction)**
Preparation of herbal decoction using Tulsi or Ginger and understanding dosage principles.
8. **Extraction of Plant Material by Simple Maceration Method**
Preparation of aqueous or alcoholic extract of *Justicia adhatoda* or *Centella asiatica*
9. **Preliminary Phytochemical Screening of Plant Extract** Qualitative tests for: Alkaloids, Flavonoids, Saponins, Tannins, Steroids, Glycosides
10. **Study of Economic Importance and Uses of Selected Medicinal Plants**
Preparation of herbarium sheets and short notes on uses of: *Catharanthus roseus*, *Saraca asoca*, *Trigonella foenum-graecum*, *Asparagus racemosus*, and *Ocimum tenuiflorum*
11. **Preparation of Herbal Powder / Churna** : Preparation, sieving, mixing and packaging of herbal powder formulation as per traditional methods.
12. **Field visit**

Note: A minimum of 10 experiments should be conducted

Reference Books

1. **Kokate, C.K., Purohit, A.P. & Gokhale, S.B..**
Pharmacognosy. Nirali Prakashan, Pune.
→ Standard book for crude drug evaluation, powder microscopy, phytochemical screening and herbal formulations.
2. **Trease & Evans (Indian Adaptation by K.K. Khandelwal)**
Practical Pharmacognosy Techniques and Experiments. Nirali Prakashan, Pune.
→ Useful for extraction methods, macroscopic and microscopic studies.
3. **Khandelwal, K.R.**
Practical Pharmacognosy: Techniques and Experiments. Nirali Prakashan.
→ Covers phytochemical tests, ash values, extractive values and drug evaluation.
4. **Wallis, T.E. (Indian Reprint Edition)**
Textbook of Pharmacognosy. CBS Publishers, New Delhi.
→ Reference for identification and quality control of crude drugs.
5. **Sharma, O.P. (2012).**
Plant Taxonomy. Tata McGraw-Hill Publishing, New Delhi.
→ Helpful for morphological identification and herbarium preparation.
6. **Pandey, B.P.**
Taxonomy of Angiosperms. S. Chand Publishing, New Delhi.
→ Useful for identification of medicinal plants and botanical description.
7. **Jain, S.K. & Rao, R.R. (1977).**
A Handbook of Field and Herbarium Methods. Today & Tomorrow's Printers and Publishers, New Delhi.
→ Essential for herbarium sheet preparation and field visit documentation.
8. **Pulok K. Mukherjee**
Quality Control of Herbal Drugs. Business Horizons, New Delhi.
→ Useful for drug standardization and phytochemical screening.
9. **Trivedi, P.C.**
Medicinal Plants: Utilization and Conservation. Aavishkar Publishers, Jaipur.
→ Covers economic importance and uses of medicinal plants.
10. **Agarwal, S.S. & Paridhavi, M.**
Herbal Drug Technology. Universities Press (India) Pvt. Ltd., Hyderabad.
→ Covers processing, formulation, extraction, and herbal product development.

Assessment Pattern

Assessment Component	Marks
Summative Assessment (Practical Exam – End Semester)	40 Marks
Formative Assessment (Internal – C1 & C2)	10 Marks
Total	50 Marks

Practical Examination

Duration: 3 Hours

Maximum Marks: 40

Q1. Identification of Medicinal Plant (Morphology) – 5 Marks

Identify the given fresh specimen and describe its morphological characters (Root, Stem, Leaf, Flower, Fruit, Seed):

- *Asparagus racemosus*
OR
- *Andrographis paniculata*
OR
- *Centella asiatica*

Q2. Phytochemical Test – 5 Marks

Perform any **one** of the following preliminary phytochemical tests on the given plant extract and write:

- Procedure
- Observation
- Inference

Tests may include:

Alkaloids / Flavonoids / Saponins / Tannins / Glycosides.

Q3. Powder Microscopy – 10 Marks

Identify the given **two crude powder drugs** under microscope and write their diagnostic characters (any two):

- Starch grains
- Fibres
- Xylem vessels
- Trichomes
- Calcium oxalate crystals

Powders of the following plants can be given

- *Zingiber officinale*
- *Saraca asoca*
- *Trigonella foenum-graecum*
- *Catharanthus roseus*

Q4. Spotters – 10 Marks

Identify **any two** of the following spotters and write:

- Botanical name

- Family
- Part used
- Medicinal value

1. *Zingiber officinale*
2. *Saraca asoca*
3. *Trigonella foenum-graecum*
4. *Catharanthus roseus*

(5 marks each)

Q5. Record Submission – 5 Marks

Certified practical record duly signed by HOD

Q6. Field Visit Report Submission – 3 Marks

Submission of field study report on medicinal plant identification/cultivation visit.

Q7. Viva Voce – 2 Marks

Based on:

- Morphology
- Pharmacognosy
- Phytochemical tests
- Medicinal uses

Mark Distribution Summary

Section	Marks
Morphological Identification	5
Phytochemical Test	5
Powder Microscopy (2 drugs)	10
Spotters (2)	10
Record	5
Field Report	3
Viva	2
Total	40

ASSESSMENT METHOD

Assessment		Marks
C1	Attendance	05
C2	Submission of any two potted medicinal plants to the department/Assignment submission	05
C3	Semester End Practical Examination	40