



MANONMANIAM SUNDARANAR UNIVERISTY,  
TIRUNELVELI-12

## SYLLABUS

### UG - COURSES – AFFILIATED COLLEGES

Course Structure for B. Sc. Botany

(Choice Based Credit System)

(with effect from the academic year 2023-2024 onwards )



Semester-II				
Part	Subject Status	Subject Title	Subject Code	Credit
I	Language I	TAMIL/ MALAYALAM/ HINDI	E1TL21/ E1MY21/ E1HD21	3
II	Language II	ENGLISH	E2EN21	3
III	Core	PLANT DIVERSITY II – FUNGI, BACTERIA, VIRUSES, PLANT PATHOLOGY AND LICHENS	EMBO21	5
III	Core	PLANT DIVERSITY II - FUNGI, BACTERIA, VIRUSES, PATHOLOGY AND LICHENS – PRACTICAL II	EMBOP2	3
III	Elective	ALLIED: ZOOLOGY PAPER – II	EEZO21	3
III	Elective	ALLIED ZOOLOGY PRACTICAL II	EEZOP2	2
IV	SEC - 2	1. MUSHROOM CULTIVATION 2. HERBAL MEDICINE 3. GLOBAL CLIMATE CHANGE	ESBO21/ ESBO22/ ESBO23	2
IV	SEC - 3	BOTANICAL GARDEN AND LANDSCAPING	ESBO24	2



**Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks**

**A. Scheme for internal Assessment:**

Maximum marks for written test: **20 marks**

**3 internal tests**, each of **1 hour** duration shall be conducted every semester.

To the average of the **best two** written examinations must be added the marks scored in. The **assignment** for 5 marks.

The break up for internal assessment shall be:

Written test- 20 marks; Assignment -5 marks Total - 25 marks

**B. Scheme of External Examination**

**3 hrs.** examination at the end of the semester

A – Part : 1 mark question two - from each unit

B – Part : 5 marks question one - from each unit

C – Part : 8 marks question one - from each unit

➤ **Conversion of Marks into Grade Points and Letter Grades**

S.No	Marks	Letter Grade	Grade point (GP)	Performance
1	90-100	O	10	Outstanding
2	80-89	A+	9	Excellent
3	70-79	A	8	Very Good
4	60-69	B+	7	Good
5	50-59	B	6	Above Average
6	40-49	C	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

➤ **Cumulative Grade Point Average (CGPA)**

$$CGPA = \frac{\Sigma (GP \times C)}{\Sigma C}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

➤ **Classification**

- First Class with Distinction : CGPA  $\geq 7.5^*$
- First Class : CGPA  $\geq 6.0$
- Second Class : CGPA  $\geq 5.0$  and  $< 6.0$
- Third Class : CGPA  $< 5.0$



## Part – I TAMIL

### Learning Objectives:

- முதலாமாண்டுப் பட்ட வகுப்பு மாணவர்களுக்குத் தமிழ் மொழி இலக்கியங்களை அறிமுகம் செய்தல்
- தமிழ் இலக்கியப் போக்குகளையும், இலக்கணங்களையும் மாணவர் அறியுமாறு செய்து அவர்களின் படைப்பாற்றலைத் தூண்டுதல்
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்

### அலகு 1:

#### தமிழ் இலக்கிய வரலாறு அறிமுகம்.

1. சிற்றிலக்கியம்; குறவஞ்சி, கலம்பகம், உலா, பரணி, பள்ளு பிள்ளைத்தமிழ், தூது, அந்தாதி
2. தனிப்பாடல் அறிமுகம்
3. இக்கால இலக்கியம் :- கவிதை, சிறுகதை நாடகம், உரைநடை, திராவிட இயக்கம் வளர்த்த தமிழ்.

### அழகு 2

#### சிற்றிலக்கியமும், தனிப்பாடலும்

#### சிற்றிலக்கியம்:

1. கலிங்கத்து பரணி-விருந்தினருக்கு வறியவரும் நெருங்கியுண்ண முதல் கேட்பாரைக் காண்மின் காண்மின் வரை (5 பாடல்கள்)
2. திருக்குற்றாலக் குறவஞ்சி - வானரங்கள் கனிகொடுத்து
3. முக்கூடற் பள்ளு - ஆற்று வெள்ளம் நாளை வரத்
4. அபிராமி அந்தாதி - கலையாத கல்வியும் குறையாத வயதும் (பதினாறு செல்வங்கள்)
5. திருவரங்கக் கலம்பகம் - மறம் பேசவந்த தூது செல்லரித்த ஓலை சொல்லுமோ (பிள்ளைப் பெருமாள் ஐயங்கார்)
6. தமிழ்விடு தூது -முதல் பதுக் கண்ணிகள்

#### தனிப்பாடல்;

1. வான்குருவி யின்கூடு - ஓளவையார்
2. ஆமணக்குக்கும் யானைக்கும் சிலேடை - முதிருக்கும் கொம்பசைக்கும் மூரிதண்டேந்தி - காளமேகப் புலவர்
3. இம்பர் வான் எல்லை இராமனையே பாடி - வீரராகவர்
4. நாராய் நாராய் - சத்தி முத்தப் புலவர்

### அலகு 3 இக்கால இலக்கியம் 1

1. பாரதியார் பாரத சமுதாயம் வாழ்கவே
2. பாரதிதாசன் - சிறுத்தையே வெளியில் வா
3. நாமக்கல் கவிஞர் - கத்தியின்றி
4. தமிழ் ஒளி - மீன்கள்
5. ஈரோடு தமிழன்பன் - எட்டாவது சீர் (வணக்கம் வள்ளுவ - தொகுப்பு)

#### சிறுகதைகள்:

1. புதுமைப்பித்தன் - கடிதம்
2. ஜெயகாந்தன் - வாய்ச் சொற்கள் (மாலை மயக்கம் - தொகுப்பு )
3. ஆர். சூடாமணி - அந்நியர்கள்
4. உரைநடை:
5. மு.வ. கடிதங்கள் - தம்பிக்கு நூலில் முதல் இரண்டு கடிதங்கள்

### அலகு - 4 இக்கால இலக்கியம் - 2

1. தந்தை பெரியார் - திருக்குறள் மாநாட்டு உரை



2. பேரறிஞர் அண்ணா - இரண்டாம் உலகத் தமிழ் மாநாட்டு உரை
3. கலைஞர் மு கருணாநிதி - தொல்காப்பிய பூங்கா - எழுத்து - நூற்பா கட்டுரை

#### நாடகம்/திரைத்தமிழ்:

1. வேலைக்காரி - திரைப்படம்
2. ராஜா ராணி - சாக்ரடீஸ் - ஓரங்க நாடகம்

#### இதழியல் தமிழ்:

##### முரசொலி கடிதம்

1. செம்மொழி வரலாற்றில் சில செப்பேடுகள்

##### அலகு 5 மொழி பயிற்சி

##### சொல் வேறுபாடு/பிழை தவிர்த்தல்

- வாசிப்பது - வாசிப்பவர்
- சுவர் - சுவரில்
- வயிறு - வயிற்றில்
- கோயில் - கோவில்
- கருப்பு - கறுப்பு
- இயக்குநர் - இயக்குனர்
- சில்லறை - சில்லரை
- முறித்தல் - முறிதல்
- மனம் - மனசு - மனது
- அருகில் - அருகாமையில்
- அக்கரை - அக்கறை
- மங்கலம் - மங்களம்

##### பயிற்சி:

- பிழையான சொற்களை ஒரு பத்தியில் கொடுத்து அந்தப் பிழையான சொற்களைச் சரியாகச் எழுதச் செய்தல்
- சிறிய பத்தி ஒன்றை ஆங்கிலத்தில் கொடுத்து அதனைத் தமிழில் மொழிபெயர்க்க வைத்தால்.

##### Text Books

##### Reference Books

1. மு. வரதராசன், தமிழ் இளகிய வரலாறு, சாகித்ய அக்காதெமி, புதுடெல்லி.
2. மது.ச. விமலானந்தன், தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
3. தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
4. தமிழ் இலக்கிய வரலாறு - முனைவர். சிற்பி பாலசுப்ரமணியம், நீல. பத்மநாபன்
5. தமிழ் இலக்கிய வரலாறு - டாக்டர் எ.கா. பெருமாள்
6. தமிழ் இலக்கிய வரலாறு - முனைவர். ப. ச. ஏசுதாசன்
7. தமிழ் இலக்கிய வரலாறு - ஸ்ரீ குமார்
8. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு - பாக்கியமேரி
9. தமிழ் பயிற்றும் முறை, பேராசிரியர் ந. சுப்புரெட்டியார் - மணிவாசகர் - பதிப்பகம், சிதம்பரம்

##### Web Sources:

- <https://www.chennaiibrary.com/>
- <https://www.sirukathaigal.com/>
- <https://www.tamilvirtualuniversity.org/>
- <https://www.noolulagam.com/>
- <https://www.katuraitamilblogspot.com/>



## **PART I MALAYALAM**

### **Course Objectives**

- To give compressive view of communication and its scope and importance in official communication and business communication

### **Unit I:**

This unit introduces basic communication skills in Malayalam. Salutation, Discourse markers, formal and informal communication strategies are also introduced.

### **Unit II:**

This unit introduces word processing and Editing text Auto correct- spell check & grammar check, undo& redo Text formatting Changing case, drop caps, coloring & highlighting text, adding special characters, bullets & numbering.

### **Unit III**

This unit introduces the document formation compositional and typographical ways. Advanced page layout in word Borders, box, shading, page fills & back ground Module and Table & columns Creating tables Inserting tables from the menu & tool bar, drawing tables Manipulating tables Selecting tables elements, inserting & deleting columns & rows, adjusting table properties, are introduced . This unit introduces the Printing word documents Using print preview.

Practical knowledge in different fonts and Unicode

### **Unit IV**

This Unit Introduces blog writing, technical writing, content editing, Proof reading, new making (Writing for career)

### **Unit V**

This unit introduces Malayalam for Competitive Exams. Reading comprehension, reasoning, inferential comprehension, analogical creations( Competitive Malayalam)

### **Unit VI**

Malayalam for language Specific Exams for writing UPSC, PSC Exams

### **Recommended Text:**

1. Bharanabhasha: The State language Institute Business Communication for Success: Publisher: University of Minnesota Libraries Publishing



## PART I HINDI - Kahani, Ekanki aur Vyakran

### Course Objectives

The Main Objectives of this course are these courses are to

- Introduction to Hindi fiction
- Teaching of social values through stories and skits
- Practical application of grammar

### Unit I

#### Hindi Katha-Sahitya: Parichay

- 1 Kahani ke Tatva
2. Hindi ke Pramukh kahanikaro ka Parichay
3. Ekanki ke Tattva
4. Hindi ke Pramukh Ekankikaro ka Parichay

### Unit II

#### Hindi Kahaniya

- 1 Premchand – Bade Ghar ki Beti
- 2 Malathi Joshi – Vo Tera Ghar Yah Mera Ghar
- 3 Pita - Gyanranjan

### Unit III

#### Hindi Ekanki

- 1 Lakshmi ka Swagat – Upendranath Ashk
- 2 Vibhajan – Vishnu Prabhakar
- 3 Maa Baap – Sri Vishnu

### Unit IV

#### Vyakaran

- 1 Kriya Visheshan
- 2 Sambandh Bodhak
- 3 Samuchay Bodhak
- 4 Vismayadi Bodhak aadi shabdo ka prayog

### Unit V

#### Pratiyogi Pariksha par aadharit Nimnalikhit Vishayo se sambandhit Prashikshan Karya

- 1 Tamil Bhasha: Mahakavi Bharatiyar
- 2 Sanket Vikas dwara Lekhan kala aur Kahani Lekhan ka Vikas
- 3 Gadyansh dekhkar sahi Shirshak chunna
- 4 Pathit Vyakaran par aadharit Vakya rachna
- 5 Vibhinna Pratiyogi parikshao ke bare mein suchna pradan dena

#### Reference Books

- 1 Aath Ekanki Natak – Ed. Dr. Ramkumar Verma
- 2 Das Ekanki

#### Related Online Contents (MOOCs, SWAYAM, NPTEL, YouTube, Websites, etc.)

1. Lokpriya Kahaniya: <https://www.hindwi.org/sangrahaalay/100-best-stories-inhindii>
2. Vo Tera Ghar Ye Mera Ghar : [http://gadyakosh.org/gk/%E0%A4%B5%E0%A5%8B\\_%E0%A4%A4%E0%A5%87%E0%A4%B0%E0%A4%BE\\_%E0%A4%98%E0%A4%B0/\\_%E0%A4%AF%E0%A5%87\\_%E0%A4%AE%E0%A5%87%E0%A4%B0\\_%E0%A4%BE\\_%E0%A4%98%E0%A4%B0/\\_%E0%A4%AE%E0%A4%BE%E0%A4%B2%E0%A4%A4%E0%A5%80\\_%E0%A4%9C%E0%A5%8B%E0%A4%B6%E0%A5%80](http://gadyakosh.org/gk/%E0%A4%B5%E0%A5%8B_%E0%A4%A4%E0%A5%87%E0%A4%B0%E0%A4%BE_%E0%A4%98%E0%A4%B0/_%E0%A4%AF%E0%A5%87_%E0%A4%AE%E0%A5%87%E0%A4%B0_%E0%A4%BE_%E0%A4%98%E0%A4%B0/_%E0%A4%AE%E0%A4%BE%E0%A4%B2%E0%A4%A4%E0%A5%80_%E0%A4%9C%E0%A5%8B%E0%A4%B6%E0%A5%80)
3. <https://hindistory.net/>



## **PART II ENGLISH**

### **Learning Objectives**

- LO1 To make students realize the importance of resilience
- LO2 To enable them to become good decision makers
- LO3 To enable them to imbibe problem-solving skills
- LO4 To enable them to use tenses appropriately
- LO5 To help them use English effectively at the work place.

### **Unit I**

#### **RESILIENCE**

##### **Poem**

- 1.1 Don't Quit – Edgar A. Guest
- 1.2 Still Here – Langston Hughes

##### **Short Story**

- 1.3 Engine Trouble – R.K. Narayan
- 1.4 Rip Van Winkle – Washington Irving

### **Unit II**

#### **DECISION MAKING**

##### **Short Story**

- 2.1 The Scribe – Kristin Hunter
- 2.2 The Lady or the Tiger - Frank Stockton

##### **Poem**

- 2.3 The Road not Taken – Robert Frost
- 2.4 Snake – D. H Lawrence

### **Unit III**

#### **PROBLEM SOLVING**

##### **Prose life Story**

- 3.1 How I taught My Grandmother to Read – Sudha Murthy  
Autobiography
- 3.3 How frog Went to Heaven – A Tale of Angolo
- 3.4 Wings of Fire (Chapters 1,2,3) by A.P.J Abdul Kalam

### **Unit IV**

#### **Tenses**

- 4.1 Present
- 4.2 Past
- 4.3 Future
- 4.4 Concord

### **Unit V**

#### **English in the Workplace**

- 5.1 E-mail – Invitation, Enquiry, Seeking Clarification
- 5.2 Circular
- 5.3 Memo
- 5.4 Minutes of the Meeting

#### **Text Books (Latest Editions)**

#### **References Books**



1. Martin Hewings. Advanced English Grammar. Cambridge University Press, 2000
2. SP Bakshi, Richa Sharma. Descriptive English. Arihant Publications (India) Ltd., 2019.
3. Sheena Cameron, Louise Dempsey. The Reading Book: A Complete Guide to Teaching Reading. S & L. Publishing, 2019.
4. Barbara Sherman. Skimming and Scanning Techniques, Liberty University Press, 2014.
5. Phil Chambers. Brilliant Speed Reading: Whatever you need to read, however. Pearson, 2013.
6. Communication Skills : Practical Approach Ed. Shaikh Moula Ramendra Kumar. Stories of Resilience, Blue Rose Publications, 2020.

### Web Sources

- 1 Langston Hughes. Still Here  
<https://poetryace.com/im-still-here>
- 2 R. K. Narayan. Engine Trouble  
<http://www.sbioaschooltrichy.org/work/Work/images/new/8e.pdf>
- 3 Washington Irving. Rip Van Winkle  
<https://www.gutenberg.org/files/60976/60976-h/60976-h.htm>
- 4 Frank Stockton. The Lady or the Tiger <https://www.gutenberg.org/ebook>

## PLANT DIVERSITY – II: FUNGI, BACTERIA, VIRUSES, PLANT PATHOLOGY AND LICHENS

### Learning Objectives

- To describe the common characteristics of fungi as being heterotrophic, unicellular/multicellular.
- To understand the biology of fungi and to discuss the importance of fungi in various ecological roles
- To understand lichen structure, function, identification, and ecology; Comprehend the events of symbiosis and lichenization and to demonstrate the use of lichens as bioindicator species.
- To identify the main groups of plant pathogens, their symptoms.
- To understand the various types of plant diseases.

### UNIT I FUNGI

Classification of fungi - (Alexopoulos and Mims, 1979), criteria for classification, Characteristic features, thallus organization, mode of nutrition, structure, reproduction and life-history of classes, each with one suitable example: Zygomycotina (*Pilobolus*, *Mucor*, *Rhizopus*), Ascomycotina (*Aspergillus*, *Saccharomyces*, *Peziza*), Basidiomycotina (*Agaricus*, *Pleurotus*, *Puccinia*) and Deuteromycotina (*Cercospora*, *Alternaria*). (Examples may be changed according to the availability of the specimens). Importance of mycorrhizal association.





**UNIT II****ECONOMIC IMPORTANCE OF FUNGI:**

Cultivation of mushroom – *Pleurotus* (food). Fungi in agriculture application (biofertilizers): Mycotoxins (biopesticides), Production of industrially important products from fungi- alcohol (ethanol), organic acids (citric acid), enzymes (protease). Vitamins (Vitamin B-complex and Vitamin B-12), applications of fungi in pharmaceutical products (Penicillin). Importance of VAM fungi. Harmful effects of Fungi. Agriculture (Biofertilizers); Mycotoxins

**UNIT III**

**BACTERIA, VIRUS:** Classification (Bergey's, 1994), structure and reproduction of bacteria, Mycoplasma, Virology -Viruses general characters, structure and reproduction.

**UNIT IV**

**PLANT PATHOLOGY:** General symptoms of plant diseases; Geographical distribution of diseases; Etiology; Host-Pathogen relationships; Disease cycle and environmental relation; prevention and control of the following plant diseases. General characters of Bacteria and Viruses.

**Bacterial diseases** – Citrus canker and Bacterial wilt of Banana

**Viral diseases** – Tobacco Mosaic and Vein clearing of Papaya

**Fungal diseases** – Blast disease in rice and Tikka disease

**UNIT V**

**LICHEN:** Classification (Hale, 1969). Habitat, nature of association, Structure, Nature of Mycobionts and Phycobionts, Study of growth forms of lichens (crustose, foliose and fruticose), types, distribution, thallus organization, reproduction and ecological significance of lichens with special reference to *Usnea*.

**Economic importance of Lichens:** food, fodder and nutrition, flavor, tanning and dyeing, cosmetics and perfumes, Brewing and distillation, minerals, Natural products, medicine (Ayurvedic, Siddha), pharmaceutical products, biodegradation agent, air pollution and biomonitoring, soil formation, nitrogen fixation, Harmful aspects, poison from lichens,

**Recommended Texts**

1. Pandey, B.P. 1997. College Botany. Vol. I Fungi & Pathology.
2. Mehrotra, R.S and Aneja, K.R. 2003. An introduction to mycology. New age International (P) Ltd, Publishers, New Delhi.
3. Poonam Singh and Ashok Pandey. 2009. Biotechnology for agro-Industrial residues utilization. Springer.
4. Satyanarayana T and Johri B.N. 2005. Microbial diversity, Current Perspectives and Potential Applications, IK International.
5. Nair, L.N. 2007. Topics in Mycology and Pathology, New Central Book agency, Kolkata.
6. Sharma, P.D. 2011. Plant Pathology, Rastogi Publication, Meerut, India.
7. Mahendra Rai. 2009. Advances in Fungal Biotechnology. I.K. International



Publishing House, New Delhi.

### Reference Books

1. Alexopoulos, C.J., Mims, C.W., Blackwell, M. 1996. Introductory Mycology. 4th edition. John Wiley & Sons (Asia) Singapore.
2. Webster, J and Weber, R. 2007. Introduction to Fungi. 3rd edition. Cambridge University Press, Cambridge.
3. Sharma, O.P. 2011. Fungi and allied microbes The McGraw –Hill companies, New Delhi.
4. Burnett, J.H. 1971. The fundamentals of Mycology. ELBS Publication, London.
5. Bessey, E.A. 1979. Morphology and Taxonomy of fungi, Vikas publishing House Pvt. Ltd, New Delhi.
6. Dharani Dhar Awasthi. 2000. A Handbook of Lichens Vedams eBooks (P) Ltd. New Delhi.
7. Pelzer, M.J., Chan, E.C.S and Krieg, N.R. 1983. Microbiology , Tata MaGraw Hill Publishing House, New Delhi.
8. Pandey, P.B. 2014. College Botany- 1: Including Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. Chand Publishing, New Delhi.
9. Mishra, A. and Agarwal, R.P. 1978. Lichens – A Preliminary Text. Oxford and IBH.
10. Pandey, B.P. 2005. College Botany I: Including Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S Chand & Company

### Web Resources

1. <https://www.amazon.in/Fungi-Sarah-C-Watkinson-ebook/dp/B0199YFDFF>
2. <http://www.freebookcentre.net/biology-books-download/A-text-book-of-mycology-and-plant-pathology.html>
3. <http://www.freebookcentre.net/Biology/Mycology-Books.html>
4. <https://www.kobo.com/us/en/ebook/introduction-to-fungi>
5. <http://www.freebookcentre.net/biology-books-download/Introductory-Mycology.html>
6. [http://www.freebookcentre.net/biology-books-download/Fungi-\(PDF-15P\).html](http://www.freebookcentre.net/biology-books-download/Fungi-(PDF-15P).html)

## PLANT DIVERSITY II FUNGI, BACTERIA, VIRUSES, PATHOLOGY AND LICHENS - PRACTICAL-II

### Learning Objectives

- To enable students to identify microscopic and macroscopic fungi.
- To prepare microslides of fungi and lichens.
- To know the presence of pathogen inside the plant tissues through microscopic sections.
- To identify the bryophytes based on the morphology, and microslides.
- To know the economic importance of the microbes studied.

### EXPERIMENTS

1. Microscopic observation of vegetative and reproductive structures of types



prescribed in the syllabus through temporary preparations and permanent slides.

2. Identifying the micro slides relevant to the syllabus.
3. Herbarium specimens of bacterial diseases/photograph.
4. Protocol for mushroom cultivation.
5. Inoculation techniques for fungal culture (Demonstration only).
6. Study of economically important products obtained from fungi: Fungal biofertilizers, biopesticides, biofungicide (Trichoderma), edible mushroom/Yeast, organic acids (citric acid) enzymes (protease), antibiotics and vitamins.
7. Mycorrhiza: ecto-mycorrhiza and endo-mycorrhiza (Photographs)
8. Visit to fungal biotechnology laboratories.
9. Ultra structure of bacteria.
10. Structure of bacteriophage.
11. Micro-preparation of *Usnea* to study vegetative and reproductive structures.
12. Identifying the micro slides relevant to the syllabus.
13. Study of thallus and reproductive structures (apothecium) through permanent slides.
14. Economic importance of Lichens - Dye and perfume.

#### **Recommended Texts:**

1. Chmielewski, J.G and Kravesky, D. 2013. General Botany laboratory Manual. Author House, Bloomington, USA.
2. Das, S and Saha, R. 2020. Microbiology Practical Manual. CBS Publishers and Distributors (P) Ltd., New Delhi, India.
3. Webster, J and Weber, R. 2007. Introduction to Fungi, 3rd Ed. Cambridge University Press, Cambridge.
4. Nair, L.N. 2007. Topics in Mycology and Pathology, New Central Book agency, Kolkata.
5. Nair, L.N. 2007. Topics in Mycology and Pathology, New Central Book agency, Kolkata.

#### **Reference Books:**

1. Alexopoulos, J and Mims, W. 1985. Introductory Mycology, Wiley Eastern Limited New Delhi.
2. Bendre, M. Ashok and Ashok Kumar, A. 2020. Text Book of Practical Botany 1 (10th ed). Rastogi Publications, Meerut.
3. Singh, R and U.C. Singh 2020. Modern mushroom cultivation, 3d Edition Agrobios (India), Jodhpur.
4. Poonam Singh and Ashok Pandey. 2009. Biotechnology for agro-Industrial residues utilization. Springer.
5. Satyanarayana T and Johri B.N. 2005. Microbial diversity, Current Perspectives and Potential Applications, IK International.

#### **Web resources:**

1. <https://www.amazon.in/Practical-Manual-Fungi-Fungicides/dp/B0025AEFP4>
2. [https://books.google.co.in/books/about/Practical\\_Mycology.html?id=5ycJAQAAMAAJ&redir\\_esc=y](https://books.google.co.in/books/about/Practical_Mycology.html?id=5ycJAQAAMAAJ&redir_esc=y)



3. <https://www.flipkart.com/colour-handbook-practical-plantpathology/p/itmefsn6dyhfh9b>
4. [https://books.google.co.in/books/about/Practical\\_Botany.html?id=T5narQEACAAJ&redir\\_esc=y](https://books.google.co.in/books/about/Practical_Botany.html?id=T5narQEACAAJ&redir_esc=y)
5. <https://www.kobo.com/us/en/ebook/introduction-to-fungi>

## Allied Zoology II

### Learning Objectives

- To enable students to learn basic concepts relating to aspects of respiratory, circulatory, excretory nervous and sensory physiology.
- To enable students to comprehend the processes involved during development
- To enable students to learn basic concepts of immunity and the working of immune organs and familiarize them with the recommended vaccination schedule
- To enable students to comprehend the basic concepts of human genetics and patterns of inheritance
- To enable students to learn about aspects of animal behaviour such as foraging, courtship, nest construction, parental care and learning

### UNIT I

Respiration- Respiratory pigments and transport of gases. Mechanism of blood clotting. Types of excretory products–Ornithine cycle. Structure of neuron–Conduction of nerve impulse, Mechanism of vision and hearing.

### UNIT II

Fertilization, Cleavage, Gastrulation and Organogenesis of Frog; Placentation in mammals

### UNIT III

Immunity Innate and Acquired - Active and Passive; Antigens and Antibodies; Immunological organs–responses in humans; Vaccination schedule

### UNIT IV

**Human Genetics:** Human Chromosomes – Sex Determination in Humans; Patterns of Inheritance: Autosomal Dominant, Autosomal Recessive, X-linked, Y-linked, Multiple Allelic and Polygenic; Genetic Counseling

### UNIT V

**Animal Behaviour:** Foraging, Courtship Behaviour, Shelter and Nest Construction, Parental Care, Learning Behaviour

### Text Books (Latest Editions)

1. Verma P.S. & Agarwal - Developmental Biology, Chordata embryology S. Chand & Co.



**References Books** (Latest editions, and the style as given below must be strictly adhered to)

1. Owen, J. A., Punt, J. & Stranford, S. A. - Kuby Immunology. New York: W.H. Freeman & Company
2. Klug, W. S., Cummings, M. R. & Spencer, C - Concepts of Genetics. (12th ed.). New Jersey: Pearson Education
3. Mathur, R.- Animal Behaviour. Meerut: Rastogi.
4. Verma P. S. & Agarwal Developmental Biology, Chordata embryology S.Chand & Co.

**LAB ON ALLIED ZOOLOGY-II****Learning Objectives**

- To understand the vital physiological functions of our body like respiration and circulation.
- To identify and compare the embryological developmental stages in frog
- To understand the different immune system and its components of our body and gain knowledge about immunization schedule.
- To compare the basic concept of genetic inheritance
- To analyse the different pattern of behaviour and its physiology

**UNIT I**

1. Examination and analysis of Ammonia. Urea and Uric acid
2. Estimation of haemoglobin using haemometer

**UNIT II****Observation of models, charts and diagrams**

Human heart, haemoglobin, neuron, eye, Snellan chart for vision test and ear

**UNIT III****SPOTTERS- Slides and Specimen**

Frog: egg, blastula, gastrula- yolk plug stage; any two placenta

**UNIT IV**

**CHARTS-** Human karyotype, Haemophilia, Colour Blindness, Hypertrichosis, Down's syndrome, Turner's syndrome, Klinefelters's syndrome;  
Examination of blood group- Demonstration

**UNIT V**

Immunization schedule by WHO

**Text Books** (Latest Editions)

1. Verma P.S. & Agarwal - Developmental Biology, Chordata embryology S. Chand & Co.
2. Widmaier, E.P., Raff, H. and Strang, K.T. 2008. Vander's Human Physiology, XI Edition., McGraw Hill., 770 PP
3. Abhijit Dutta, 2009. Experimental biology: A Laboratory Science, Narosa,



New Delhi.

- ROITT, M, PETER J. DELVES, SEAMUS J. MARTIN AND DENNIS R. BURTON, 2017. ESSENTIAL IMMUNOLOGY, 13TH EDITION, WILEY-BLACKWELL PUBLISHING, USA, 576 PP.

**References Books** (Latest editions, and the style as given below must be strictly adhered to)

- Owen, J. A., Punt, J. & Stranford, S. A. - Kuby Immunology. New York: W.H. Freeman & Company.
- Klug, W. S., Cummings, M. R. & Spencer, C - Concepts of Genetics. (12th ed.). New Jersey: Pearson Education
- Mathur, R.- Animal Behaviour. Meerut: Rastogi.
- Verma P.S. & Agarwal – Developmental Biology, Chordata embryology S.Chand & Co.

## **HERBAL MEDICINE**

### **Learning Objectives**

- To understand the nuances of medicinal plants and their phytoconstituents of commercial value
- To design and develop medicinal garden.
- To apply the knowledge to cultivate medical plants.
- To know the pharmacological importance of medicinal plants.
- To enlist phytochemicals and secondary metabolites of market and commercial value.

### **UNIT I**

Importance and Relevance of Herbal drugs in Indian System of Medicine, Pharmacognosy – Aim and scope.

### **UNIT II**

Medicinal gardening – Gardens in the Hills and plains; House gardens; plants for gardening – Poisonous plants – Types of plant poison; action of poisons; treatment for poisons, some poisonous plants; their toxicity and action.

### **UNIT III**

Adulteration of crude drugs and its detection – methods of adulteration; types of adulteration. Medicinal plants of export values; rejuvenating herbs; Medicinal uses of Non-flowering plants.

### **UNIT IV**

Botanical description and active principles of Root drugs; Rhizomes woods and bark



drugs (Two examples for each plant organs).

## UNIT V

Botanical description and active principles of leaves; Flowers; Fruits seed and entire plants as drugs. Taxonomic study of some selected herbals (Two examples for each plant organs).

### Recommended Texts

1. Somasundaram, S. 1997. Medicinal botany (Maruthuvar Thavaraviyal) – (Tamil Medium Book).
2. Wallis, T.E. 1967. Text Books of Pharmacognosy. J. & A. Churchill Ltd., London, 3. Jains, S.K.. 1996. Medicinal Plants. Deep Publications, New Delhi.
3. Srivastava, A.K. 2006, Medicinal Plants, International Book Distributors, Dehradun.
4. Agarwal,O.P. 1985, Vol. II, Chemistry of organic – natural products. S Chand & Company, New Delhi.
5. Gamble, J.S. and Fisher, 1921, CEC I, II, III Flora of the Presidency, Madras Volumes.
6. Mathew K.M., 1988, Flora of the Tamilnadu and Carnatic.

### Reference Books

1. Nair, N.C and Henry, A.N. 1983, Flora of Tamil Nadu, India, Botanical Survey of India.
2. Chopra, R.N., Nagar S.L., and Chopra, I.C. 1956, Glossary of Indian Medicinal Plants.
3. Chopra, R.N., Chopra, I.C., Handa, K.L., and Kapur L.D., 1994, Indigenous drugs of India.
4. Chopra, R.N., Badhuvar R.L and Gosh, G. 1965. Poisonous plants in India.
5. Miller, L and Miller, B. 2017. Ayurveda & Aromatherapy: The Earth Essential Guide to Ancient Wisdom and Modern Healing. Motilal Banarsidass, Fourth edition.
6. Patri, F and Silano, V. 2002. Plants in cosmetics: Plants and plant preparations used as ingredients for cosmetic products - Volume 1. ISBN 978-92-871-8474-0, pp 218.

### Web Resources

1. <https://www.barnesandnoble.com/b/free-ebooks/nook-books/alternative-medicine-natural-healing/herbal-medicine/ /N-ry0Z8qaZ11iu>
2. <https://www.springer.com/gp/book/9783540791157>
3. <https://www.gpatonline.com/gpat/book-reference-pharmacognosy>
4. [https://www.researchgate.net/publication/334670695\\_Book\\_review\\_Herbal\\_Drug\\_Technology](https://www.researchgate.net/publication/334670695_Book_review_Herbal_Drug_Technology)



5. <http://www.eurekaselect.com/node/173492/herbal-medicine-back-to-the-future>

## **BOTANICAL GARDEN AND LANDSCAPING**

### **Learning Objectives**

- To know about the fundamental concepts of gardening and landscaping.
- To provide an overview of various gardening styles and its scope in recreation and bio-aesthetic planning.
- To illustrate the significance of garden adornments and propagation structures.
- To inculcate entrepreneurial skills in students for creative landscaping design using CAD software.
- To create the design outdoor and indoor gardens and inculcate entrepreneurial skills for landscaping.

### **UNIT I**

Principles of gardening, garden components, adornments, lawn making, methods of designing rockery, water garden, etc. Special types of gardens, their walk-paths, bridges, constructed features. Greenhouse. Special types of gardens, trees, their design, values in landscaping, propagation, planting shrubs and herbaceous perennials. Importance, design values, propagation, plating, climbers and creepers, palms, ferns, grasses and cacti succulents.

### **UNIT II**

**Flower arrangement:** importance, production experiments and cultural operations, constraints, postharvest practices. Bioaesthetic planning, definition, need, round country planning, urban planning and planting avenues, schools, villages, beautifying railway stations, dam sites, hydroelectric stations, colonies, river banks, planting material for play grounds.

### **UNIT III**

Vertical gardens, roof gardens. Culture of bonsai, art of making bonsai. Parks and public gardens. Landscape designs, Styles of garden, formal, informal and free style gardens, types of gardens, Urban landscaping, Landscaping for specific situations, institutions, industries, residents, hospitals, roadsides, traffic islands, damsites, IT parks, corporate.

### **UNIT IV**

Establishment and maintenance, special types of gardens, Bio-aesthetic planning, ecotourism, theme parks, indoor gardening, therapeutic gardening, non-plant components, water scaping, xeriscaping, hardscaping.





**UNIT V**

Computer Aided Designing (CAD) for outdoor and indoorscaping Exposure to CAD (Computer Aided Designing).

**Recommended Texts**

1. Acquaah, J. 2009. Horticulture – principles and practices, 4th edition, PHI learning Pvt. Ltd.
2. Rao Manibhushan K. 1991. Textbook of horticulture. MaC Millan India Ltd.
3. Gangulee H. C. and Kar A. K. 2004. College Botany Vol II, New Central Book Agency
4. Sharma V. K. 1999. Encyclopaedia of Practical Horticulture, Vol I –IV, Deep And Deep Publ. Pvt. Ltd.
5. Singh, J. 2018. Fundamentals of Horticulture. Kalyani Publishers.

**Reference Books**

1. Berry, F. and Kress, J. 1991. Heliconia: An Identification Guide . Smithsonian Books.
2. Butts, E. and Stensson, K. 2012. Sheridan Nurseries: One hundred years of People, Plans, and Plants. Dundurn Group Ltd.
3. Russell, T. 2012. Nature Guide: Trees: The world in your hands (Nature Guides).
4. Acquaah, J. 2009. Horticulture – principles and practices, 4th edition, PHI learning Pvt. Ltd.
5. Edment Senn Andrews. 1994. Fundamentals of Horticulture. Tata. McGraw Hill Publishing Co., Ltd., Delhi.

**Web resources**

1. [https://www.amazon.in/Gardening-LandscapeDesignandBotanicalGarden/s?rh=n%3A1318122031%2Cp\\_27%3Aand+Botanical+Garden](https://www.amazon.in/Gardening-LandscapeDesignandBotanicalGarden/s?rh=n%3A1318122031%2Cp_27%3Aand+Botanical+Garden)
2. <https://www.overdrive.com/subjects/gardening>
3. <https://www.scribd.com/book/530538456/Opportunities-in-Landscape-Architecture-Botanical-Gardens-and-Arboreta-Careers>
4. <https://www.scribd.com/book/305542619/Botanic-Gardens>
5. <https://www.overdrive.com/subjects/gardening>

