



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 2024-2025 onwards )



Semester-II				
Part	Subject Status	Subject Title	Subject Code	Credit
I	LANGUAGE	TAMIL/MALAYALAM/HINDI	F1TL21/ F1MY21/ F1HD21	3
II	ENGLISH	ENGLISH	F2EN21	3
III	CORE	PLANT DIVERSITY II – FUNGI, BACTERIA, VIRUSES, PLANT PATHOLOGY AND LICHENS	FCBO21	5
III	CORE	PLANT DIVERSITY II - FUNGI, BACTERIA, VIRUSES, PATHOLOGY AND LICHENS – PRACTICAL II	FCBOP2	3
III	ELECTIVE	ALLIED: ZOOLOGY PAPER – II	FEZO21	3
		ALLIED PRACTICAL	FEZOP2	2
IV	SEC 2	MUSHROOM CULTIVATION	FSBO21	1
IV	SEC 3	BOTANICAL GARDEN AND LANDSCAPING	FSBO24	1
IV		NAAN MUDHALVAN		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

### பொதுத்தமிழ் 2

#### தமிழ் இலக்கிய வரலாறு 2

**அலகு 1: தமிழ் இலக்கிய, இலக்கண வரலாறு அறிமுகம்.**

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

**அலகு 2 சிற்றிலக்கியமும், தனிப்பாடலும்**

**சிற்றிலக்கியம்:**

1. கலிங்கத்து பரணி-விருந்தினரும் வரியவரு நெருங்கி யுண்ணரும் - முதல் - கேட்பாரைக் காண்மின் காண்மின் - வரை
2. திருக்குற்றாலக் குறவஞ்சி - வானரங்கள் கனிகொடுத்து
3. முக்கூடற் பள்ளு - ஆற்று வெள்ளம் நாளை வரத்
4. அபிராமி அந்தாதி - கலையாத கல்வியும் குறையாத வயதும் (பதினாறு செல்வங்கள்)
5. திருவரங்கக் கலம்பம் - மறம் - பிள்ளைப் பெருமாள் ஐயங்கார்-பேசவந்த தூத செல்லரித்த ஓலை சொல்லுமோ
6. தமிழ்விடு தூது முதல் பத்து கண்ணிகள்

**தனிப்பாடல்**

1. வான்குருவி யின்கூடு - ஒளவையார்
2. ஆமணக்குக்கும் யானைக்கும் சிலேடை: முதிருக்கும் கொம்பசைக்கும் மூரித்தண்டே-காளமேகப் புலவர்
3. இம்பார் வான் எல்லை இராமனையே பாடி - வீரராகவர்
4. நாராய் நாராய் 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 (அந்தி நிலா பார்க்க வா)
5. ஈரோடு தமிழன்பன் - எட்டாவது சீர் (வணக்கம் வள்ளுவ)

**சிறுகதைகள்**

1. புதுமைப்பித்தன் - கடிதம்
2. ஜெயகாந்தன் - வாய்ச் சொற்கள் (மாலை மயக்கம் தொகுப்பு)
3. ஆர். சூடாமணி - அந்நியர்கள்

**உரைநடை :**

1. 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-முதல் நூற்பா கட்டுரை

**நாடகம் /திரைத்தமிழ்:**

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

**இதழியல் தமிழ்:****முரசொலி கடிதம்**

1. செம்மொழி வரலாற்றில் சில செப்பேடுகள்

**அலகு 5 மொழிப் பயிற்சி**

சொல் வேறுபாடு / பிழை தவிர்த்தல்

வாசிப்பது - வாசிப்பாளர்

சுவர் - சுவரில்

வயிறு - வயிற்றல்

கோயில் - கோவில்

கரறுப்பு - கருப்பு

இயக்குநர் - இயக்குனர்

சில்லறை - சில்லரை

முறித்தல் - முரித்தல்

மனம் - மனசு - மனது

அருகில் - அருகாமையில்

அக்கரை - அக்கறை

மங்கலம் - மங்களம்

**பயிற்சி:**

1. பிழையான சொற்களை ஒரு பத்தியில் கொடுத்து அந்தந்தப் பிழையான சொற்களைச் சரியாக எழுதச் செய்தல்
2. சிறிய பத்தி ஒன்றை ஆங்கிலத்தில் கொடுத்து அதனைத் தமிழில் மொழிபெயர்க்க வைத்தல்

**Text Books:**

1. பிழையான சொற்களைச் சரியாக எழுதச் செய்தல்
2. சிறிய பத்தி ஒன்றை ஆங்கிலத்தில் கொடுத்து அதனைத் தமிழில் மொழிபெயர்க்க வைத்தல்

**Reference Books:**

- மு. வரதராசன், தமிழ் இலக்கிய வரலாறு, சாகித்ய அக்காதமி, புதுடெல்லி
- மது. ச. விமலானந்தன், தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
- தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
- தமிழ் இளகிய வரலாறு - முனைவர் சிற்பி பாலசுப்ரமணியன், முனைவர்.சொ. சேதுபதி
- புதி யதமிழ் இலக்கிய வரலாறு - முனைவர் சிற்பி பாலசுப்ரமணியன், நீல. பத்மநாபன்

**Web Sources:**

- [இணைய தமிழ் நூலகம் - சென்னை நூலகம் - Online Tamil Library - ChennaiLibrary.com](http://இணைய தமிழ் நூலகம் - சென்னை நூலகம் - Online Tamil Library - ChennaiLibrary.com)
- [முகப்பு - சிறுகதைகள் \(sirukathaigal.com\)](http://முகப்பு - சிறுகதைகள் (sirukathaigal.com))
- [www.tamilvirtualuniversity.org](http://www.tamilvirtualuniversity.org)
- [Buy tamil books online 10% to 50% discount, Tamil Novels, Tamil Audio Books online - Buy tamil books online - Established 2010 \(noolulagam.com\)](http://Buy tamil books online 10% to 50% discount, Tamil Novels, Tamil Audio Books online - Buy tamil books online - Established 2010 (noolulagam.com))
- [www.katuraitamilblogspot.com](http://www.katuraitamilblogspot.com)



# MALAYALAM

## PAPER- II Office Communication Malayalam

### Learning Objectives

- To give compressive view of communication and its scope and importance in official communication and business communication
- To recall the official writing styles
- To understand different kinds of letter drafting
- To Generalize office keeping and data management
- To differentiate the structural and content variations both official and non-official communication
- To compare the different style of letters based on domains
- To Conceptualize the different trends in computer network and social media

### UNITS I

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

Language-oral and written-importance of languages-formal and informal – communication style in written communication-principles of written communication Text-messages-Email-letter drafting- different types of letter drafting personal letters- -Business letters Official letters—letter to the editor memorandums- Bio data-Reports-press conference-business proposal

### 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

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 III

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



## UNIT IV

Official language- Malayalam

Detailed study-

1. Malayalam nammude mathru bhasha.- Bharana bhasha prasnangal- M.V.Thomas,State Institute of languages.
2. Bharanam janakeeya bhashayil- Bharana bhasha prasnangal M.V.Thomas-State Institute of languages
3. Deseeyodgrathanam pradesika bhashakaliloode -Bharana bhasha prasnangal M.V.Thomas,State Institute of languages
4. Bhasha samraajyam srishtikkum--- Bhashayum bharanabhashayum Dr.Ezhumattoor Raja raja Varmma ,State Institute of languages
5. Swathanthryathinte Kodyadayalam- Bhashayum bharanabhashayum Dr.Ezhumattoor Raja raja Varmma, State Institute of languages
6. Bharanaghatana vyavasthakal- Bhashayum bharanabhashayum- Dr.Ezhumattoor Rajaraja Varmma, State Institute of languages
7. Malayala dinaghoshavum Bharanabhashavaraghoshavum Bhashayum bharanabhashayum-Dr.Ezhumattoor Rajaraja Varmma, State Institute of languages

## UNIT V

This unit introduces Malayalam for Competitive Exams. Reading comprehension, reasoning , inferential comprehension, analogical creations( Competitive Malayalam) Malayalam for language Specific Exams for writing UPSC, PSC exams

### Reading List (Print and Online)

1. Bharana bhasha prasnangal- M.V.Thomas-State Institute of languages
2. Business Communication for Success: Publisher: University of Minnesota Libraries Publishing
3. Vanijyaparamaya kathidapadukal,G.R.Pilla .State Institute of languages
4. Bhashayum bharanabhashayum-Dr.Ezhumattoor Rajaraja Varmma,



# HINDI

## Kahani, Ekanki aur Vyakaran

### Course Objectives

The Main Objectives of this course are to:

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

### Unit I

#### Hindi Katha-Sahitya: Parichay

- Kahani ke Tatva
- Hindi ke Pramukh kahanikaro ka Parichay
- Ekanki ke Tattva
- Hindi ke Pramukh Ekankikaro ka Parichay

### Unit II

#### Hindi Kahaniya

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

### Unit III

#### Hindi Ekanki

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

### Unit IV

#### Vyakaran

- Kriya Visheshan
- Sambandh Bodhak
- Samuchay Bodhak
- Vismayadi Bodhak aadi shabdo ka prayog

### Unit V

Pratiyogi Pariksha par aadharit Nimnalikhit Vishayo se sambandhit Prashikshan Karya

- Tamil Bhasha: Mahakavi Bharatiyar
- Sanket Vikas dwara Lekhan kala aur Kahani Lekhan ka Vikas
- Gadyansh dekhkar sahi Shirshak chunna
- Pathit Vyakaran par aadharit Vakya rachna
- 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-storiesin-hindii>
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%00%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%00%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**

### **GENERAL ENGLISH - II**

#### **Learning Objectives**

- To make students realize the importance of resilience
- To enable them to become good decision makers
- To enable them to imbibe problem-solving skills
- To enable them to use tenses appropriately
- 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/ebooks/396>

## **PLANT DIVERSITY II FUNGI, BACTERIA, VIRUSES, PLANT PATHOLOGY AND LICHENS**

**Learning Objectives**

- To describe the general 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 learn the structure and reproduction in Bacteria and viruses
- 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 various types of plant diseases.

**UNIT I**

**FUNGI:** Characteristic features of Fungi, Classification of fungi (Alexopoulos and Mims, 1979), thallus organization, mode of nutrition, structure, reproduction and life-history of Zygomycotina - Mucor, Ascomycotina - Peziza, Basidiomycotina - Puccinia and Deuteromycotina - Cercospora. .



**UNIT II**

**ECONOMIC IMPORTANCE OF FUNGI:** Fungi as food; Fungi in agriculture application – bio-fertilizers; Mycotoxins - biopesticides; Production of industrially important products from fungi -- ethanol, organic acids - citric acid, Applications of fungi in pharmaceuticals -Penicillin. Importance of VAM fungi. Harmful effects of Fungi (any five)

**UNIT III**

**BACTERIA, VIRUS:** Classification- outline (Bergey, 1994), Ultra structure and reproduction -vegetative and sexual in bacteria., Viruses: general characters, structure and reproduction of bacteriophage.

**UNIT IV**

**PLANT PATHOLOGY:** General symptoms of plant diseases; Disease cycle. Prevention and control of the following plant diseases: Bacterial diseases - Citrus canker and Bacterial wilt of Banana Viral diseases-Tobacco Mosaic and Vein clearing of Ladies finger. Fungal diseases - Blast disease in rice and Tikka disease of Groundnut.

**UNIT V**

**LICHEN:** Classification (Hale, 1969). Habitat, nature of association, Study of growth forms of lichens (crustose, foliose and fruticose), . Structure, distribution and reproduction of Usnea. Economic importance of Lichens.-Food, Medicine, Dye, Ecological importance

**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/B0199YFDPE>
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-\(PDF15P\).html](http://www.freebookcentre.net/biology-books-download/Fungi-(PDF15P).html)

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

### Learning Objectives

- To enable students to identify microscopic and macroscopic fungi.
- To know about the economic uses of fungi
- To know the ultra structure of bacteria and virus through photomicrographs
- To identify the lichens based on the morphology, and microslides.
- To identify the symptoms of plant diseases caused by microbes

### PRACTICALS

1. Micro preparation of vegetative and reproductive structures of fungi prescribed in the syllabus.
2. Study of economically important products obtained from fungi: Fungal biofertilizers, biopesticides,, edible mushroom/Yeast, organic acids (citric acid), and antibiotics (Penicillin)
3. Mycorrhiza: Ecto-mycorrhiza and endo-mycorrhiza (Photographs)
4. Grams staining procedure for identification of bacteria.
5. Micro photograph for ultra structure of Bacteria and Bacteriophage
6. Vegetative and reproductive structure of Usnea- Micro-preparation



7. Visit to agricultural Farms..

### Recommended Texts:

1. Chmielewski, J.G and Krayesky,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, 3<sup>rd</sup> 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 (10<sup>th</sup> 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-plant-pathology/p/itmefsn6dyhfs9b>
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

### Course 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 Counselling

### **UNIT V**

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

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

1. Verma P.S. & Agarwal – (1997), Developmental Biology, Chordata embryology S. Chand & Co.
2. Michael D. Breed and Janice Moore, (2012), Animal Behaviour, Academic Press, USA,

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

1. Owen, J. A., Punt, J. & Stranford, S. A. (2018), Kuby Immunology, New York: W.H. Freeman & Company
2. Klug, W. S., Cummings, M. R. & Spencer, C (2016), Concepts of Genetics. (12th ed.). New Jersey: Pearson Education
3. Mathur, R. (2014), Animal Behaviour. Meerut: Rastogi.



4. David McFarland, (1985), Animal Behaviour, Longman Scientific & Technical, UK.
5. Harjindra Singh, (1990), A Text Book of Animal Behaviour, Anomol Publication

## **ALLIED ZOOLOGY LAB COURSE - 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, Snellen chart for vision test and ear, Human karyotype, Haemophilia, Colour Blindness, Hypertrichosis, Down's syndrome, Turner's syndrome, Klinefelters's syndrome;

### **UNIT III**

**SPOTTERS-** Slides and Specimen Frog: egg, Cleavage, blastula, gastrula- yolk plug stage; any two placenta

### **UNIT IV**

1. Examination of blood group- Demonstration
2. Immunization schedule by WHO

### **UNIT V**

Record / Observation Note (SUBMISSION IS MANDATORY)

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

1. Verma P.S. & Agarwal (2004), 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.
4. Roitt, M, Peter J. Delves, Seamus J. Martin And Dennis R. Burton, (2017), Essential Immunology, 13th Edition, Wiley-Blackwell Publishing, Usa,

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

1. Owen, J. A., Punt, J. & Stranford, S. A. (2018), Kuby Immunology, New York: W.H. Freeman & Company
2. Klug, W. S., Cummings, M. R. & Spencer, C (2016), Concepts of Genetics. (12th ed.). New Jersey: Pearson Education
3. Mathur, R. (2014), Animal Behaviour. Meerut: Rastogi.

## MUSHROOM CULTIVATION

### Course Objectives

- To learn about morphology and importance of mushrooms
- To understand the structure and life cycle of mushrooms
- To know about methods involved in growth and harvesting of mushrooms
- To recognize the techniques of mushroom cultivation.
- To study about the diseases of mushrooms and post harvest technology

### UNIT I

Introduction: Morphology, Types of Mushroom, identification of edible and poisonous mushroom, Nutritive values.

### UNIT II

Structure and Life cycle of *Pleurotus spp* and *Agaricus spp*.

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### UNIT III

Spawn production, growth media, spawn running and harvesting of mushrooms and marketing.

### UNIT IV

Mushroom cultivation methods: Bag method, Bed method. Prospects and scope of Mushroom cultivation in small scale Industry.

### UNIT V

Diseases -, Insect pests, nematodes, mites, viruses, fungal competitors. Post harvest technology



### Recommended Texts

1. Handbook of Mushroom Cultivation. 1999. TNAU publication.
2. Marimuthu, T., Krishnamoorthy, A.S., Sivaprakasam, K. and Jayarajan. R. 1991. Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
3. Swaminathan, M. 1990. Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
4. Sing. 2005. Modern Mushroom Cultivation, International Book Distributors, Dehradun.
5. Verma, 2013. Mushroom: edible and medicinal: cultivation conservation, strain improvement with their marketing. Daya Publishing House.

### Reference Books

1. Handbook of Mushroom Cultivation. 1999. TNAU publication.
2. Marimuthu, T., Krishnamoorthy, A.S., Sivaprakasam, K. and Jayarajan. R. 1991. Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
3. Swaminathan, M. 1990. Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
4. Nita Bahl. 2002. Handbook on Mushroom 4th edition Vijayprimlani for oxford & IBH publishing co., Pvt., Ltd., New Delhi. Dr.C. Sebastian Rajesekaran Reader in Botany Bishop Heber College, Trichy – 17.
5. Suman. 2005. Mushroom Cultivation Processing and Uses, M/s. IBD Publishers and Distributors, New Delhi.

### Web Resources

1. <https://www.amazon.in/Mushroom-Cultivation-India-B-C/dp/817035479X>
2. <http://nrcmushroom.org/book-cultivation-merged.pdf>
3. [http://agricoop.nic.in/sites/default/files/ICAR\\_8.pdf](http://agricoop.nic.in/sites/default/files/ICAR_8.pdf)
4. <http://www.agrimoon.com/mushroom-culture-horticulture-icar-pdf-book/>
5. [https://books.google.co.in/books/about/Mushroom\\_Cultivation\\_in\\_India.html?id=6AJx99OGTKEC&redir\\_esc=y](https://books.google.co.in/books/about/Mushroom_Cultivation_in_India.html?id=6AJx99OGTKEC&redir_esc=y)



# **BOTANICAL GARDEN AND LANDSCAPING**

## **Learning Objectives**

- To know about the fundamental concepts of gardening and its importance
- To provide an overview of various components of a garden
- To illustrate the significance of garden adornments like rockery
- To provide an insight into indoor gardening
- To create entrepreneurial skills for landscaping.

## **UNIT I**

Types of gardening – Formal and Informal garden, Ornamental garden, Importance of garden making. Principles of designing a garden.

## **UNIT II**

Garden components – Green house, Lawn, Planting trees, shrubs, climbers and creepers. Flower beds and borders

## **UNIT III**

Ornamental hedges, Edges, Pergola, Rockery and water garden.

## **UNIT IV**

Topiary, indoor gardening, Bonsai -preparation of soil and its composition, manuring, watering and maintenance,

## **UNIT V**

Basic principles of landscape design – components of landscape design – plant materials and structural materials. Vertical gardens. Landscaping of residential and public areas.

## **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. Acquaaah, 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-Landscape-Design-and-Botanical-Garden/s?rh=n%3A1318122031%2Cp\\_27%3Aand+Botanical+Garden](https://www.amazon.in/Gardening-Landscape-Design-and-Botanical-Garden/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>

