



MANONMANIAM SUNDARANAR UNIVERISTY,
TIRUNELVELI-12

SYLLABUS

UG - COURSES – AFFILIATED COLLEGES

Course Structure for B. Sc. Zoology
(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		3
II	ENGLISH	ENGLISH		3
III	CORE	CHORDATA		5
III	CORE	LAB ON CHORDATA		3
III	ELECTIVE	ALLIED BOTANY II		3
		LAB ON ALLIED BOTANY II		2
IV	SEC 2	BIO COMPOSTING FOR ENTREPRENEURSHIP		1
IV	SEC 3	ANIMAL BEHAVIOUR		1
IV	NAAN MUDHALVAN	LANGUAGE PROFICIENCY FOR EMPLOYABILITY- OVERVIEW OF ENGLISH COMMUNICATION*- CAMBRIDGE (HANDLED BY ENGLISH)		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-பேசுவந்த 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
- [முகப்பு - சிறுகதைகள் \(sirukathaigal.com\)](http://முகப்பு - சிறுகதைகள் (sirukathaigal.com))
- 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



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 Kodiyadayalam- 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
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>

CHORDATA

Course Objectives

- To understand the structures and distinct features of Phylum Chordata.
- To understand and able to distinguish the characteristic features of each subphylum and class.
- To understand the economic importance of vertebrates.
- To know about the adaptations of vertebrates.
- To understand the evolutionary position of different groups of vertebrates.

UNIT I

General Characters and Classification of Phylum Chordata: Origin of Chordata, Differences between non-chordates and chordates, General characters of chordates and prochordates, Affinities and Systematic position of Hemichordata (Balanoglossus), Urochordata (Ascidia), Cephalochordata (Amphioxus).

UNIT II

Characteristics of subphylum Vertebrata, Classification of Vertebrata upto Class level, Agnatha - Petromyzon - Ammocoetus larva. Pisces - Type study : Scoliodon sorrakowah. General characters and classification of Pisces, Origin of fishes,



Affinities of Dipnoi - Types of scales and fins - Accessory respiratory organs - Parental care - Migration - Economic importance.

UNIT III

Amphibia: General characters and classification - Origin of Amphibia - Type study : Rana hexadactyla - Adaptive features of Anura, Urodela and Apoda - Neoteny in Urodela - Parental care in Amphibia.

UNIT IV

Reptilia: General characters and classification - Type study: Calotes versicolor - Origin of reptiles, Extinct reptiles. Snakes of India – Identification of Poisonous and non-poisonous snakes - Poison apparatus and biting mechanism of poisonous snakes and first aid. Skull in reptiles as basis of classification

UNIT V

Aves and Mammalia: Aves: General characters and classification – Type study: Columba livia - Origin of birds, Flight adaptations, Migration. Mammalia: General characters and classification - Type study: Rabbit - Adaptive radiation in mammals - Egg laying mammals, Marsupials, Flying mammals, Aquatic mammals, Dentition in mammals.

Text Books (Latest Editions)

1. Ayyar, E.K. and T.N. Ananthkrishnan, (1992), Manual of Zoology Vol. II (Chordata), S. Viswanathan (Printers and Publishers) Pvt Ltd., Madras.
2. Jordan, E.K. and P.S. Verma, (1995), Chordate Zoology and Elements of Animal Physiology, 10th edition, S. Chand & Co Ltd., Ram Nagar, New Delhi,
3. Nigam, H.C., (1983), Zoology of Chordates, Vishal Publications, Jalandhar - 144008,
4. Ganguly, Sinha., Bharati Goswami and Adhikari, (2004), Biology of animals Vol.II - New central book Agency (p) Ltd.
5. Kotpal. R.L. A, (2009), Modern text book of Zoology Vertebrates- Rastogi publications.

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

1. Darlington P.J. (2017), Zoogeography: The Geographical Distribution of Animals, R.E. Krieger Pub. Co.
2. Hall B.K. and Hallgrímsson B. (2008). Strickberger's Evolution. IV Edition. Jones and Bartlett Publishers Inc.
3. Hickman, C.P. Jr., F.M. Hickman and L.S. Roberts, (1984), Integrated Principles of Zoology, 7th Edition, Times Merror/Mosby College Publication.



St. Louis.

4. Newman, H.H., (1981), The Phylum Chordata, Satish Book Enterprise, Agra – 282 003
5. Parker and Haswell, (1964), Text Book of Zoology, Vol II (Chordata), A.Z.T,B.S. Publishers and Distributors, New Delhi - 110 051
6. Pough H. (2009) Vertebrate life, VIII Edition, Pearson International.
7. Waterman, Allyn J. et al., (1971), Chordate Structure and Function, Mac Millan &Co., New York
8. Young, J. Z. (2004). The Life of Vertebrates. III Edition. Oxford university press.

Web Resources

1. <http://tolweb.org/Chordata/2499>
2. <https://www.nhm.ac.uk/>
3. <https://bit.ly/3Av1Ejg>
4. <https://bit.ly/3kqTfYz>
5. <https://biologyeducare.com/aves/>
6. <https://www.vedantu.com/biology/mammalia>

LAB ON CORE COURSE II - CHORDATA

Learning Objectives

- To understand the structures and distinct features of Phylum Chordata.
- To understand and able to distinguish the characteristic features of each subphylum and class.
- To understand and compare the structure of various internal organs in different classes of vertebrates.
- To know about the classification, adaptations and affinities of chordate animals.

UNIT I

Dissections: Fish: External features, Digestive system (Sardine or any other fish)
Frog: External features, Digestive system (Demo), Arterial System (Demo/Virtual)

UNIT II

Mounting: Fish: Placoid and Ctenoid scales, Frog: Hyoid apparatus and Brain (Demonstration).

UNIT III

Osteology: Frog/ mammal: Skull and lower jaw, Vertebral column, Pectoral girdle, Pelvic girdle, Fore limb, Hind limb, Chelonia: Anapsid skull. Pigeon: skull, lower jaw and synsacrum.



UNIT IV**Specimen and Slides:**

1. Hemichordata: Balanoglossus, Tornaria larva
2. Protochordata: Amphioxus, Amphioxus
3. Cyclostomata: Petromyzon, Ammocoetus larva
4. Pisces: Shark, Pristis, Torpedo, Anabus, Cybium, Hippocampus, Exocoetus, Echieneis, Labeo, Catla, Clarius, Anguilla, Protopterus,
5. Amphibia: Ichthyophis, Amblystoma, Hyla, Rachophous, Bufo, Rana, Axolotal larva
6. Reptilia: Draco, Chamaeleon, Vipera russelli, Naja, Bungarus, Enhydrina, Typhlops, Trionyx, Crocodilus, Chelon.
7. Aves: Archaeopteryx, Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo,
8. Collection and study of different types of feathers: Quill, Contour, Filoplume, Down
9. Mammalia: Ornithorhynchus, Pteropus, Manis, Loris, Hedgehog

UNIT V

Record / Observation Note (SUBMISSION IS MANDATORY)

Text Books (Latest Editions)

1. Ekambaranatha Iyyar and T. N. Ananthakrishnan, 1995 A manual of Zoology Vol.I (Part 1, 2) S. Viswanathan, Chennai
2. Ganguly, Sinha and Adhikari , 2011 . Biology of Animals: Volume I, New Central Book Agency; 3rd revised edition. 1008 pp.
3. Sinha, Chatterjee and Chattopadhyay, 2014. Advanced Practical Zoology, Books & Allied Ltd; 3rd Revised edition, 1 07 0 pp.
4. Lal ,S. S, 2016 . Practical Zoology Invertebrate, Rastogi Publications.
5. Verma, P. S. 2010. A Manual of Practical Zoology: Invertebrates, S Chand, New Delhi

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

1. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
2. Barnes, R.D. (1982). Invertebrate Zoology, V Edition. Holt Saunders International Edition.
3. Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition, E.L.B.S. and Nelson
4. Boradale, L.A. and Potts, E.A. (1961). Invertebrates: A Manual for the use of Students. Asia Publishing Home.
5. Lal, S.S. (2005), A text Book of Practical Zoology: Invertebrate, Rastogi, Meerut



Web Resources

1. https://www.youtube.com/watch?v=b04hc_kOY10
2. <https://bit.ly/3CzTEy8>
3. <http://tolweb.org/Chordata/2499>
4. <https://www.nhm.ac.uk/>
5. <https://bit.ly/3Av1Ejg>

ALLIED BOTANY-II

Learning Objectives

- To be familiar with the basic concepts of morphology of plant parts
- To Learn the vegetative and floral characters of angiosperm families
- To Understand the internal structure of vegetative plant parts
- To become familiar with the concepts of embryology of flowering plants
- To learn about the physiological processes that underlie plant metabolism.

UNIT I

MORPHOLOGY OF FLOWERING PLANTS: Structure of root, stem and leaf. Leaf types- simple and compound. Phyllotaxy. Inflorescence - Racemose, Cymose and Special types. Terminology with reference to flower description.

UNIT II

TAXONOMY: Study of the vegetative and floral characters and economic importance of the following families: Rutaceae, Caesalpiniaceae, Asclepiadaceae, Euphorbiaceae and Poaceae

UNIT III

ANATOMY Tissue and tissue systems: Simple and complex tissues. Anatomy of monocot and dicot root, stem and leaf.

UNIT IV

EMBRYOLOGY Structure of mature anther and ovule - Types of ovules, structure of embryo sac, pollination -double fertilization.

UNIT V

PLANT PHYSIOLOGY Absorption of water- Mechanism .Photosynthesis -Light reaction, dark reaction (Calvin cycle). Respiration - Glycolysis - Krebs cycle - electron transport system.

Recommended Texts

1. Sharma, O.P. 2017. Plant Taxonomy. (II Edition).The McGraw Hill Companies.



2. Bhojwani, S.S. Bhatnagar, S.P and Dantu, P.K. 2015. The Embryology of Angiosperms (6th revised and enlarged edition). Vikas Publishing House, New Delhi.
3. Maheshwari, P. 1963. Recent Advances in Embryology of Angiosperms. Intl. Soc. Plant Morphologists, New Delhi.
4. Salisbury, F. B.C.W. Ross.1991. Plant Physiology. Wassworth Pub. Co. Belmont.
5. Ting, I.P. 1982. Plant Physiology. Addison Wesley Pb. Philippines.

Reference books

1. Lawrence.G.H.M. 1985. An Introduction to Plant Taxonomy, Central Book Depot, Allahabad.
2. Bhojwani, S.S and Bhatnagar, S.P. 2000. The Embryology of Angiosperms (4th revised and enlarged edition). Vikas Publishing House, New Delhi.
3. Pandey, B.P. 2012. Plant Anatomy. S Chand Publishing.
4. Jain, VK. 2006. Fundamentals of Plant Physiology, S. Chand and Company Ltd.
5. Rajni Gupta. 2012. Plant Taxonomy: Past, Present and Future. Vedams (P) Ltd. New Delhi.
5. Jain, V.K. 2006. Fundamentals of Plant Physiology, S.Chand and Company Ltd., New Delhi.
6. Verma, S.K. 2006. A Textbook of Plant Physiology, S.K.Chand & Co., New Delhi.

Web Resources

1. https://books.google.co.in/books/about/Plant_Taxonomy.html?id=0bYs8F0Mb9gC&redir_esc=y
2. https://books.google.co.in/books/about/PLANT_TAXONOMY_2E.html?id=Roi0lwSXFuUC&redir_esc=y
3. <https://archive.org/EXPERIMENTS/plantanatomy031773mbp>
4. <https://www.amazon.in/Embryology-Angiosperms-6th-S-P-Bhatnagar-ebook/dp/B00UN5KPQG>
5. <https://www.crcpress.com/Plant-Physiology/Stewart-Globig/p/book/9781926692692>

ALLIED BOTANY PRACTICALS

Learning Objectives

- To enhance information on the arrangement of leaves on stem and identification of inflorescence types
- To learn the skill of floral dissection
- To be familiar with the physiological experiments related to photosynthesis and respiration



- To develop the skill for micro preparation of vegetative plant parts
- To learn about the structure of anther and ovule

PRACTICALS

1. Phyllotaxy types – Alternate, Opposite and Whorled
2. Inflorescence types- Racemose and Cymose
3. Dissect out and draw the floral parts of the plants belonging to the families prescribed in the syllabus.
4. Demonstration experiments:
 - a) Ganong's Light screen
 - b) Fermentation – Kuhn's experiment
5. To make suitable micro preparations of vegetative plant parts prescribed in the syllabus.
6. Permanent microslides / photographs for Observation of anther and ovule.

Recommended Texts

1. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd, New Delhi.
2. Sharma, O.P. 2012. Pteridophyta, Tata McGraw-Hills Ltd, New Delhi.
3. Subramaniam, N.S. 1996. Laboratory Manual of Plant Taxonomy. Vikas Publishing House Pvt. Ltd., New Delhi.
4. Benjamin, A. Pierce. 2012. Genetics- A conceptual Approach. W.H. Freeman and Company, New York, England.
5. Noggle G.R and G.J. Fritz. 2002. Introductory Plant Physiology. Prentice Hall of India, New Delhi.

Reference Books

1. Strickberger, M.W. 2005. Genetics (III Ed). Prentice Hall, New Delhi, India.
2. Nancy Serediak and M. Huynh. 2011. Algae identification lab Guide. Accompanying manual to algae identification field guide, Ottawa Agriculture and Agri food Canada publisher.
3. Mohammed Gufran Khan, Shite Gatew and Bedilu Bekele. 2012. Practical manual for Bryophytes and Pteridophytes. Lambert Academic Publishing.
4. Aler Gingauz. 2001. Medicinal Chemistry. Oxford University Press & Wiley Publications.
5. Steward, F.C. 2012. Plant Physiology Academic Press, US

Web sources

1. <https://www.amazon.in/Practical-Manual-Pteridophyta-Rajan-Sundara/dp/8126106883>
2. <https://www.google.co.in/books/edition/Gymnosperms/3YrT5E3Erm8C?hl=en&gbpv=1&dq=gymnosperms&printsec=frontcover>
3. <https://www.amazon.in/Computational-Phytochemistry-Satyajit-Dey-Sarker-ebook/dp/B07CV96NZJ>
4. <https://medlineplus.gov/genetocs/understanding/basics/cell/>
5. <https://apan.net/meetings/apan45/files/17/17-01-01-01.pdf>
6. http://www.cuteri.eu/microbiologia/manuale_microbiologia_pratica.pdf
7. <https://www.amazon.in/Manual-Practical-Bryophyta-Suresh-Kumar/dp/B0072GNFX4>



BIOCOMPOSTING FOR ENTREPRENEURSHIP

Learning Objectives:

- To highlight the importance of Biocomposting for entrepreneurship in waste management.
- To enable students to set up Biocompost units and bins for waste reduction.
- Course outcomes:
- The students will gain knowledge about the process of Biocomposting.
- Students will be able to demonstrate Biocomposting techniques for various end applications like solid waste management, industrial waste recycling using sugarcane bagasse, etc.
- To learn about the economic cost of establishing small Biocompost units as a cottage industry.

Unit – I

Biocomposting – Definition, types and ecological importance.

Unit – II

Types of Biocomposting technology – Field pits/ground heaps/ tank/large-scale/batch and continuous methods.

Unit – III

Preparation of Biocompost pit and bed using different amendments.

Unit – IV

Applications of Biocompost in soil fertility maintenance, promotion of plant growth, value added products, waste reduction, etc.

Unit – V

Economics of establishment of a small biocompost unit – project report proposal for Self Help Group (Income and employment generation).

Practical

1. Preparation procedures for Biocompost pit.
2. Selection of Biocompost material, separation of Compostable and Non-compostable materials.
3. Packing and marketing of Biocompost.
4. Field visit to Biocomposting unit.

References

1. Bikas R. Pati & Santi M. Mandal (2016). Recent trends in composting technology.
2. Van der Wurff, A.W.G., Fuchs, J.G., Raviv, M., Termorshuizen, A.J. (Editors) 2016. Handbook for Composting and Compost Use in Organic Horticulture. BioGreenhouse COST Action FA 1105, www.biogreenhouse.org.



ANIMAL BEHAVIOUR

Learning Objectives:

- To learn the origin and development of animal behaviour and to understand the influence of genetics, environment on animal behaviours.
- To understand the biological properties of animal behavior, with an evolutionary and ecological emphasis.
- To Compare innate and learned behavior and differentiate between various mating system.
- To impart the knowledge about visual and auditory communication; courtship, mate choice, and mating systems; social behavior and social systems; and animal personality.
- To discuss how movement and migration behaviors are a result of natural selection.

Unit I

Genetics and Behaviour: Genetic material, Genes and chromosomes, Genetic variation, Single and Polygenic inheritance of behaviour, Heritability of behaviour, Natural selection and behaviour, Frequency distribution of phenotypes, Darwinian fitness, Evolution of adaptive strategies.

Unit II

Evolution and Social Behaviour: Sexual selection, Altruism, and social organisation, Animal perception, Neural control of behaviour, Visual adaptations to unfavourable environments.

Unit III

Animal and the Environment: Coordination and Orientation, Homeostasis and Behaviour, Physiology and Behaviour in changing environments, Animal Learning, Conditioning and Learning, Cognitive aspects of learning.

Unit IV

Understanding Complex Behaviour: Instinct and learning, Displacement activities, Decision making behaviour in Animals, Complex behaviour of honey bees, Mechanism of Decision making. The mentality of Animals: Languages and mental representation, non-verbal communication in humans, mental images, Intelligence, tool use and culture.

Unit V

Chronobiology : Organization of circadian system in multicellular animals; Concept of central and peripheral clock system; Photoreception and photo- transduction; The physiological clock and measurement of day length; The relevance of biological clocks for human welfare - Clock function (dysfunction).



Text Books

1. David McFarland, (1985), Animal Behaviour, Longman Scientific & Technical, UK.
2. Harjindra Singh,(1990), A Text Book of Animal Behaviour, Anomol Publication.
3. Hoshang S.Gundevia and Hare Goving Singh, (1996), Animal Behaviour, S.Chand & Co.
4. Shukla, J. P (2010), Fundamentals of Animal Behaviour, Atlantic.
5. Vinod Kumar, (2002), Biological Rhythms. Narosa Publishing House, Delhi.

Suggested Readings

1. Michael D. Breed and Janice Moore, (2012), Animal Behaviour, Academic Press, USA.
2. Aubrey Manning and Martin Stamp Dawkins, (2012), An Introduction to Animal Behaviour, 6th Edition, Cambridge University Press, UK.
3. Davis E.Davis, (1970), Integral Animal Behaviour, Mac Millan Company, London,
4. Jay, C. Dunlap, Jennifer, J. Loros, Patricia J. De Coursey (ed). (2004), Chronobiology Biological time Keeping, Sinauer Associates Inc, Publishers, Sunderland, MA.

Web Resources

1. <https://www.ncbs.res.in/content/animal-behaviour>
2. <https://bit.ly/3i6wUxR>
3. <https://www.behaviour.univie.ac.at/>
4. <https://www.ru.nl/bsi/>

