



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 2021-2022 onwards)



Semester-IV				
Part	Subject Status	Subject Title	Subject Code	Credit
I	Language	TAMIL/MALAYALAM/HINDI	C1TL41/ C1MY41/ C1HD41	4
II	Language	ENGLISH	C2EN41	4
III	Core	PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY	CMBO41	4
III	Major Practical III	PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY - Practical	CMBOP4	2
III	Allied – II Paper II	DEVELOPMENTAL ZOOLOGY, ANIMAL PHYSIOLOGY, ECOLOGY & EVOLUTION	CAZO21	3
III	Allied Practical II	DEVELOPMENTAL ZOOLOGY, ANIMAL PHYSIOLOGY, ECOLOGY & EVOLUTION - PRACTICAL	CAZOP2	2
III	Skill Based	PRESERVATION OF FRUITS AND VEGETABLES	CSBO42	4
IV	Non-Major Elective	PUBLIC HEALTH AND HYGIENE/ ARIMUGA TAMIL	CNZO41/ CNTL41	2
IV	Common	COMPUTERS FOR DIGITAL ERA	CCDE41	2
V	Extension Activities	NCC/NSS/YRC/YWF	C5EA41	1



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



பொதுத்தமிழ்

பாடத்திட்டத்தின் நோக்கங்கள் (Course Objectives) சங்க இலக்கியத்தின் சிறப்புகளை உணர வைத்தல்		
எதிர்பார்க்கும் படிப்பின் முடிவுகள் (Expected Course Outcomes)		
CO1	மாணவர் பண்டைத் தமிழரின் பண்பாட்டினை அறிந்து கொள்வர்	K ₁ ,K ₄ ,K ₆
CO2	வாழ்வியலுக்கான பொருள் இலக்கணத்தைக் கற்றுக் கொள்வர்	K ₂ ,K ₅
CO3	இலக்கியங்கள் வாயிலாக வாழ்வியல் அறங்களைப் புரிந்து கொள்வர்.	K ₁ ,K ₃ ,K ₅
CO4.	வரலாற்றுப் பின்புலங்களை மையமாகக் கொண்டு நாடகங்கள் படைக்கும் உந்துதலைப் பெறுவர்.	K ₂ ,K ₆
CO5	சங்க இலக்கியங்களின் வரலாற்றையும், தனிச்சிறப்புகளையும் அறிந்து கொள்வர்.	K ₂ ,K ₅
K1 – நினைவில் கொள்ளுதல் (Remember) K2 – புரிந்து கொள்ளுதல் (understand) K3 – விண்ணப்பித்தல்(Apply) K4 – பகுத்தாய்தல் (Analyze) K5 – மதிப்பீடு		

அலகு:1 - செய்யுள்

நற்றிணை முதல் பட்டினப்பாலை வரை
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்., திருநெல்வேலி-1
தொலைபேசி எண்: 0462 2323990

அலகு:2 - இலக்கணம்

1. பொருள் இலக்கணம்
2. ஒரெழுத்து ஒருமொழிகள்
3. மரபுச் சொற்கள்
4. பிறமொழிச் சொற்களை நீக்கி எழுதுதல்

அலகு:3 - உரைநடை

வாழ்வியல் அறம் - தொகுப்பாசிரியர் - முனைவர் ச.பொ.சீனிவாசன்
நெஸ்லிங் புக்ஸ் பப்ளிஷிங் அன்ட் டிஸ்ட்ரிபிட்டர்ஸ் (பி) லிட்., சென்னை -50
தொலைபேசி எண் : 044-26251968, 26258410, 48601884

அலகு:4 - நாடகம்

ஆதி அத்தி - ஆசிரியர் - பெ.தூரன் - பதிப்பாசிரியர் - முனைவர் சொ.சேதுபதி
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்., சென்னை -50
தொலைபேசி எண் : 044-26251968, 26258410, 48601884



அலகு:5 - இலக்கிய வரலாறு

1. எட்டுத்தொகை நூல்கள்
2. பத்துப்பாட்டு நூல்கள்
3. சங்க இலக்கியங்களின் சிறப்பியல்புகள்

மேற் பார்வை நூல்கள்

இலக்கணம் : புறப்பொருள் வெண்பாமாலை

இலக்கிய வரலாறு : ஆசிரியர் முனைவர் சி. பாலசுப்பிரமணியன்.

பாவை பப்ளிகேஷன்ஸ் 142இ ஜானி ஜான் கான் சாலை இராயப்பேட்டை

சென்னை - 14 தொலைபேசி எண் : 28482441

முனைவர் பெ. சுயம்பு

பாரதி பதிப்பகம் 113இ இராஜீவ் தெரு திசையன்விளை -57

தொலைபேசி எண் :04637 - 272096

மாணவர்களைக் களஆய்விற்கு அழைத்துச் செல்லலாம்

Mapping with Programme Outcomes

CO ₅	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	M	S	M	M	M
CO3	S	M	S	S	M
CO4	S	M	M	S	S
CO5	M	S	S	M	M

S- மிகையான (Strong) M- நடுநிலையான (Medium) L- குறைவான (Low)



MALAYALAM

UNIT – 1

മാധ്യമമോഷ

മാധ്യമം - നിർവ്വചനം - ചരിത്രം - സാങ്കേതികവിദ്യ - വിവിധതരം മാധ്യമങ്ങളെ - സമൂഹം - സംസ്കാരം - സ്വാധീനം

FOR DETAILED STUDY

1. ഡോ. ടി. അനിതകുമാരി - മാധ്യമമോഷ ഇന്റ

UNIT – 2

അച്ഛിദ്രമാധ്യമം

അച്ഛിദ്രിയുടെ ചരിത്രം - കരളേതീലയെ ആദ്യകാല പ്ലവർത്തനങ്ങളെ - പർമാസികകളുടെ ആദ്യകാലം - പുതിയ കാലത്തേ അച്ഛിദ്ര രീതികളെ - ലിപി പരിഷ്കരണം - ഡിടിപി - തനതു ലിപികളെ

FOR DETAILED STUDY

2. ഡോ. എസ്.എസ്. ശ്രീകുമാർ - മലയാള ലിപി പരിഷ്കരണം വരുത്തിയ വിനകളെ

UNIT – 3

ഭൃശ്ശരവ്യാധിമാധ്യമം

റഡിയോ - ടെലിവിഷൻ - മട്ടുടിമീഡിയ - സിനിമ - പൊതു സ്വഭാവം - ഗുണഭോഷവശങ്ങളെ

FOR DETAILED STUDY

3. ടെലിവിഷൻ പഠനങ്ങളെ - സി. എസ്. വെങ്കടേശ്വരൻ ലഖേനം - ജനകീയതയും റിയാലിറ്റിഷോകളും

UNIT – 4

സംബന്ധമാധ്യമം

ഇന്റർനെറ്റ് - ചരിത്രം - മലയാളത്തിലേ ബ്ലോഗുകളെ - സംബന്ധ സാന്നിദ്ധ്യം - സോഷ്യൽ മീഡിയ - സ്മാർട്ട് ഫോൺ ഉപയോഗം - ഗുണഭോഷവശങ്ങളെ

FOR DETAILED STUDY

4. ഡോ. അച്ഛിദ്ര ശങ്കർ എസ്. നായർ - സംബന്ധ മലയാളം



UNIT – 5

പരസ്യകല

പരസ്യം - നിർവ്വചനം - സംസ്കാരം - സ്വാധീനം- വിവിധതരം പരസ്യങ്ങളുടെ - ആശയബോധനം

FOR DETAILED STUDY

5. പ്ലായോഗികപരിചയം നേടുന്നതിനാവശ്യമായ പരവർത്തനങ്ങളെ നടത്തുക. പരസ്യം നിർമ്മിക്കുന്നതിനുള്ള വിഷയം നൽകുക.

REFERENCE BOOKS

പന്തലോകം - ഒരു സംഘം ലേഖകർ - കരള ഭാഷാ ഇൻസ്റ്റിറ്റ്യൂട്ട്
 ആ ലോകം മുതൽ ഇ-ലോകം വരെ - ഡോ. ജെ. വി. വിളനിലം
 മാധ്യമങ്ങളും മലയാളസാഹിത്യവും - കരള ഭാഷാ ഇൻസ്റ്റിറ്റ്യൂട്ട്
 പന്തലോകം - കരള പരസ്യ അക്കാദമി
 മലയാളഭാഷയും ആഗോളവൽക്കരണവും - ഡോ. കെ. എസ്. പ്ലക്കാശ്, ഡോ. എസ്. എ. ഷാനവാസ് (പ്രകാശനവിഭാഗം, കരള സർവ്വകലാശാല)
 ഭാഷയും മാധ്യമവും - വി. കെ. നാരായണൻ
 മാധ്യമഭാഷാ മാറ്റങ്ങളുടെ - കെ. കെ. ശ്രീരാജ്
 ടലിവിഷൻ പഠനങ്ങളുടെ - സി. എസ്. വെങ്കിടശ്വരൻ
 മാധ്യമങ്ങളും മലയാളസാഹിത്യവും - എം. വി. തോമസ്
 ഇൻറർനെറ്റ്യും ഇൻഫർമേഷൻ വിപ്ലവവും - കെ. രവീന്ദ്രൻ, ഡോ. കെ. ഇബ്രാഹിം
 ഇൻഫർമേഷൻ സയൻസ് - ഒരാമുഖം - ഡോ. ജി. ദേവരാജൻ
 മലയാള സബ്ബർ സാഹിത്യം - ഡോ. മനോജ് ജെ. പാലക്കുടി
 സബ്ബർ മലയാളം - സുനീത ടി. വി. (എഡി.)
 മാറുന്ന ലോകം മാറുന്ന മാധ്യമലോകം - എൻ. പി. രാജനേദ്രൻ
 Progress in Information Technology - Dr. G. Devarajan
 The Mass Media and You - Desmond D' Abreo
 Advertising - Dr. C. N. Santakki



HINDI

Objectives:

1. To acquire knowledge regarding fundamental concepts in Hindi grammar.
2. To acquire the ability to master translation skills
3. To develop writing skills for official documentation – Letter, Banking terminologies

Course Outcomes:

C.O. No.	Upon the completion of this course, students will be able to	PSOs Addressed	Cognitive Level
CO 1	Understand the writing skills of novelist - Premchand	F,G	K1,K4
CO 2	Understand the basics of navras, vrith and alankars	B,D	K1,K2
CO 3	Understand the history of Hini Literature – modern and medieval	A,C	K3,K5
CO 4	Apply and analyse administrative Hindi	A,C	K5
CO 5	Writing skills - Essay	B,C,D	K4,K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

UNIT I

NOVEL

1. Nirmala

UNIT II

POETICS

KavyaPradeep

1. Ras - Navras
2. Chand – Rola, Doha, Soratta
3. Alankar – Anupras, Upama, Roopak

UNIT III

HISTORY OF HINDI LITERATURE

1. Reethikal – Visheshatha, Pramukh Kavi – Bihari Lal



2. Adhunik Kaal – Chaya Vaad – Pramukh Kavi
3. Gadya Sahithya – Bharadendu, Prem Chand

UNIT IV

ADMINISTRATIVE HINDI

UNIT V

ESSAY WRITING

(General Topics – Paryavaran Aur Pradooshan, Bhoomandalikaran Aur Hindi, Varthaman Yug Aur Technique, Nari Ki Desha Aur Disha, Desh Vikas Mein Yuva Peedi Ka Yogdaan)

Text book:

1. Nirmala – Premchand – Published by Gyan Bharathi Prakashan, Dariabad, Allahabad
2. Kavya Pradeep – Ram Bhaori Shukla – Published by Lok Bharathi Prakashan, Pehli Manzil, Darbari Building, Mahatma Gandhi Maarg, Allahabad
3. Hindi Sahithy ka Saral Ithihas – Viswanath Tripathi – Published by Orient Publication Private Limited, Himayath Nagar, Hyderabad

Books for Reference:

1. Hindi Vathayan – Dr. K M Chandra Mohan – Published by Viswavidyalay Prakashan, Varanasi
2. Essay Writing – General Topics

Mapping with POs

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1	S	S	S	S	S	S	S	M
CO 2	S	S	M	S	M	S	S	S
CO 3	S	S	S	S	S	S	M	S
CO 4	S	S	S	S	S	S	S	S
CO 5	S	S	M	S	S	S	L	S
CO 6	S	S	S	S	M	M	S	S

S – Strong, M – Medium, L – Low



ENGLISH

PROGRAMME OUTCOMES – PO

At the end of the course students will be able to

PO1: Imbibe moral, ethical, and cultural values through various forms of literature.

PO 2: Enable the learner to communicate effectively and appropriately in real life situation.

PO3: Able to think, speak, and write independently using grammatical forms and Vocabulary.

PO4: Improve their writing and reading fluency skills through extensive reading.

PO5: Develop their pronunciation by studying the sounds of language.

PROGRAMME SPECIFIC OUTCOME: PSO

At the end of the course students will be able to:

PSO1: Provide the students with an ability to build and enrich their communication skills.

PSO2: Critically analyse and appreciate poetry, prose, fiction and play.

PSO3: Enhance sufficient practice in Vocabulary, Grammar, Comprehension.

PSO4: Study the Phonetic symbols for correct pronunciation.

PSO5: Spot language errors and correct them.

GENERAL ENGLISH -- PROSE, POETRY, DRAMA, GRAMMAR, LANGUAGE STUDY & ORAL COMMUNICATION SKILLS

UNIT I - PROSE

1. Give us a Role Model – A.P.J. Abdul Kalam.
2. The Best Investment I have ever made – A.J. Cronin
3. Seven Good Habits – Robin Sharma
4. How much Land does a Man Need - Leo Tolstoy

UNIT II – POETRY

1. 1. Anxiety – A.K. Ramanujam
2. Incident on the French Camp – Robert Browning.
3. Stopping by the woods – Robert Frost
4. Still I raise – Maya Angelo

UNIT III - DRAMA - Select scenes from William Shakespeare

1. Antony and Cleopatra – Death Scene of Cleopatra – Act V, Scene II
2. Macbeth – Sleep Walking Scene – Act V, Scene I
3. King Lear – Heath, before a Hovel – Act III, Scene IV.



UNIT IV – GRAMMAR

1. Transformation of Sentences
2. Synthesis of Sentences
3. Spot the Error

UNIT V – LANGUAGE STUDY AND ORAL COMMUNICATION

1. Phonetics – Vowel sounds
2. Dialogue Writing
3. One word Substitution
4. Report writing.

COURSE OUTCOMES: At the end of the course students will be able to

Course Outcomes		Cognitive level
CO1	Use English accurately across the curriculum	K1, K2, K3
CO2	Attained enhanced vocabulary and improved language skills	K2, K3, K4
CO3	Analyse and interpret prescribed text	K2, K4
CO4	Conceptualize the Shakespearean drama in the prescribed text	K2, K4
CO5	Gain proficiency in LSRW skills	K1, K2, K3, K4, K6

K1- Remember, K2- Understand, K3- Apply ,K4- Analyse , K5- Evaluate,K6- Create

MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES

CO/ PO	PO1	PO2	PO3	PO4	PO5	POS1	POS2	POS3	POS4	POS5
CO1	S	M	S	S	S	S	M	S	M	S
CO2	M	S	M	M	M	M	M	M	S	M
CO3	M	S	M	S	M	S	M	§	M	S
CO4	S	M	S	M	M	S	S	M	S	M
CO5	M	M	M	S	M	S	S	M	S	M

S – Strongly correlated, M – Moderately Correlated, w- weakly correlated, No Correlation - 0

E- LINKS

1. [https:// www.msuniversity.ac.in](https://www.msuniversity.ac.in)
2. <https://www.bdu.ac.in>
3. <https://www.scribd.com>
4. <https://www.goodreads.com>
5. <https://casenglishdepartment.wordpress.com>
6. <https://www.poetryfoundation.org>
7. <https://www.britannica.com>
8. <https://englishgrammar.org>



PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY

Objectives:

- To understand the structural organization and developmental study of Pteridophytes and Gymnosperms.
- To learn about evolutionary trends, students aware of the Preservation of Plant life of the Geological Period.

UNIT – I

Pteridophytes: General characteristics and Classification of Pteridophytes (Sporne 1966), *Psilotum* and *Lycopodium*: Distribution, Systematic Position, Structure, Reproduction and Life History (Need not study the development of gametophyte, sex organ and sporophyte).

UNIT – II

Selaginella, Adiantum: Occurrence, Systematic Position, Structure, Reproduction and Life Cycle (Need not study the development of gametophytes, Sex organ and Sporophyte) Stellar Evolution in Pteridophytes.

UNIT – III

Gymnosperms: General characteristics and Classification of Gymnosperms (David Bierhorst 1971), **Pinus:** Distribution, Systematic Position, Structure, Reproduction and Lifecycle.

UNIT – IV

Gnetum: Occurrence, Systematic Position, Structure, Reproduction and Life Cycle of Gnetum.(Need not study the Development of Sex Organs and Sporophyte). Economic Importance of Gymnosperms.

UNIT – V

Paleobotany: Geological Time Scale, Methods of Fossilization; Brief Study of Rhynia, Lepidodendron and Lyginopteris.

PRACTICALS

To make suitable micro preparations of the following.

Stem T.S - *Lycopodium*, *Selaginella* and *Adiantum* rachis

T.S: *Pinus* stem and needle, *Gnetum* stem and leaf

To observe and identify specimens and Microslides.

Psilotum: Habit, Stem - T.S and Synangium, *Lycopodium* cone L.S.

Selaginella: Rhizophore T.S.



Adiantum: Habit.

Pinus: L.S and Specimen - Male and Female cone

Gnetum: L.S and Specimen - Male, Female cone and ovule

Paleobotany: Stem T.S – *Rhynia*, *Lepidodendron* and *Lyginopteris*

To maintain a record notebook for external evaluation.

REFERENCES

1. Chamberlain, C.J. 2000. Gymnosperms. CBS Publishers and Distributors, New Delhi.
2. Chester A. Arnold. 2017. An Introduction to Paleobotany. Mc Graw Hill Co. Ltd. New Delhi.
3. Pandey, S.N-1995. A text Book of PeridophytaVikas Publishing House, Ghaisibad.
4. Parihar, N.S. 1967. An Introduction to EmbryophytaVol.II- Pteridophyta Central Book Depot. Allahabad.
5. Rashid, A1976. An Introduction to PteridophytaVikas Publishing House Ghaisibad.
6. Shukla, A.C. and Misra, P. 1982. Essentials of Paleobotany, Vikas Publishing House Pvt.LtdGhaisibad.
7. Sing, V, Pande, P.C. and Jain, D.K. 2002. A text Book of Botany – Vol: 4. Pteridophyta, Gymnosperms and Paleobotany. Rastogi Publications. Shivaji Road Meerut-230002.
8. Smith, G.M 1955. Cryptogamic Botany Vol: III Mc Graw Hill Co Ltd. New Delhi.
9. Vashista P.C. 1971. Botany for Degree Students Gymnosperms. Chand and Co New Delhi.
10. Vashista. P.C.1971. Botany for Degree student - Pteridophytes. Chand and Co New Delhi.

<https://www.youtube.com/watch?v=L5Qn9lhI1y0>

<https://www.youtube.com/watch?v=4k9xIMgECVE>

<https://www.youtube.com/watch?v=tc-dllsGZT4>

<https://www.youtube.com/watch?v=mZFhtV2wYYA>

<https://www.youtube.com/watch?v=MxRINmAbAPs>

<https://www.youtube.com/watch?v=zDUCacewuAg>

<https://www.youtube.com/watch?v=QtlcbDWLEDo>

<https://www.youtube.com/watch?v=tumujWmtFj8>



PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY

CO. NO	Description	PO Addressed	PSO Addressed	CL
CO. 1	To explain the classification, distribution, structure, diversity inhabits, habitats , reproduction and life cycle and organization of Pteridophytes. (<i>Psilotum</i> and <i>Lycopodium</i>)	PO1, PO2	PSO1, PSO2, PSO3	K, C
CO. 2	To impart an insight into the Occurrence, Systematic Position, Structure, Reproduction and Life Cycle of gametophytes.	PO2, PO3	PSO3, PSO4	K, C
CO. 3	To argue about the General characteristics and Classification of Gymnosperms	PO1, PO2	PSO1, PSO2, PSO3	An, Ap
CO. 4	To outline the anatomical variations in Gnetum.	PO3, PO4	PSO4, PSO5, PSO6	K
CO. 5	To infer the significance of Paleobotany and its applications.	PO5	PSO6, PSO7	Ap, E

K: Knowledge; C: Comprehension; Ap: Application; An: Analysis; S: Synthesis; E: Evaluation

Mapping

PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY												
CO/PO/PSO	PO					PSO						
	1	2	3	4	5	1	2	3	4	5	6	7
1	3	3	3	3	2	2	3	3	3	3	2	2
2	3	3	2	2	2	2	3	3	3	3	3	2
3	3	3	2	2	2	1	3	3	3	3	3	2
4	3	3	2	1	2	1	3	3	3	3	3	2
5	2	3	3	3	2	2	2	3	3	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)



PRESERVATION OF FRUITS AND VEGETABLES

Objectives:

- Inspire regarding the principles of preservation of fruits and vegetables.
- Know the nutritive values, importance and factors affecting storage.
- Understand, methods of preservation of fruits and vegetables and preservation recipes.

UNIT – I

Nutritive values of fruits and vegetables; factors affecting storage; spoilage - microbial, enzymatic and insects.

UNIT – II

Hours Importance and Methods of Preservation - Refrigeration, Freezing, Canning, Drying and Dehydration, Preservatives – Natural and Chemical.

UNIT – III

Methods of preparation of Fruit Juice- Orange, Squashes- grape and Pine apple; Jam - Tomato and Mixed Fruit, Jellies - Guava.

UNIT – IV

Preparation of Chutney- Mango, Sauce –Tomato, Pickles- Amla, Mango and Garlic, Ketchup- Tomato. Drying of fruits: Papaya, Grapes and Fig.

UNIT – V

Canning of Mango, Cherry, Cucumber, Carrot, Bean and Mushrooms.

REFERENCES:

1. Alex.V and Ramani.2009. Food Chemistry, MPJ Publishers, Chennai.
2. Cruess W.V.1948. Commercial Fruits and Vegetables Products, McGraw Hill Book Company Inc, New York.
3. Girdhari Lal, G.S. Siddappa and G.L.Tandon, 1986, Preservation of Fruits and Vegetables, Indian Council of Agricultural Research, New Delhi.
4. Kumar, N.1997. Introduction to Horticulture, Rajalakshmi Publication, Nagercoil.
5. Kumaresan, V. 2009.Horticulture, Saras Publication, Nagercoil.
6. Usha Rani, C.K. and R. Mary Christi. 2010. Preservation of Fruits and Vegetables, Sheen Grafix, Nagercoil.

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<https://www.youtube.com/watch?v=sE6ABn7qbmY>

https://www.youtube.com/watch?v=Q_MZkOCdUzc

<https://www.youtube.com/watch?v=f141C9Kw3jo>

https://www.youtube.com/watch?v=XKvo9_Jdjt4



PRESERVATION OF FRUITS AND VEGETABLES

CO. NO	Description	PO Addressed	PSO Addressed	CL
CO. 1	Acquire basic knowledge about the nutritive values of fruits and vegetables	PO1, PO2	PSO1, PSO2	K
CO. 2	Familiarize with the basic skills in the methods of Preservation.	PO2, PO3	PSO3, PSO4, PSO5	Ap
CO. 3	Understand the Methods of preparation of Fruit Juice.	PO3, PO4	PSO5, PSO7	C
CO. 4	Understand the Preparation of Chutney, Ketchup and Drying of fruits.	PO3, PO4, PO5	PSO5, PSO6	K, C
CO. 5	To know about the canning methods.	PO5	PSO6, PSO7	K

K: Knowledge; C: Comprehension; Ap: Application; An: Analysis; S: Synthesis; E: Evaluation

Mapping

PRESERVATION OF FRUITS AND VEGETABLES												
CO/PO/PSO	PO					PSO						
	1	2	3	4	5	1	2	3	4	5	6	7
1	3	3	3	3	2	2	3	3	2	2	2	2
2	3	3	3	3	2	2	3	3	2	2	2	2
3	3	3	3	3	2	1	3	3	2	1	2	1
4	3	3	3	3	2	1	3	3	2	1	2	1
5	2	3	3	3	2	2	2	3	3	3	2	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION

OBJECTIVES:

- To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.
- To study the interaction and the interdependence among environmental factors and living organisms.
- To understand the functional significance of various organs and organ systems of animals.
- To discern the evolutionary significance of the animals, origin of species, effects of mutation.

COURSE OUTCOMES (COs)

On successful completion of the course the student will be able to

CO1: recognize the basic concept of developmental stages of the animals

CO2: understand the interaction of abiotic and biotic factors in the ecosystem and its components



CO3: apply the knowledge of vital physiological functions of our body

CO4: evaluate the evolutionary concepts on origin of life.

UNIT I

DEVELOPMENTAL ZOOLOGY

Early development in Man: Structure of sperm and ovum; Fertilization – Cleavage, Morula, Blastocyst, Implantation and Gastrulation – Fate map. Placenta in mammals – types and functions. Test tube babies – Twins – Amniocentesis. Nuclear Transplantation in *Acetabularia*.

UNIT II

ECOLOGY

Abiotic factors: Biological effects of Temperature and Light; **Biotic factors:** Symbiosis, Commensalism, Mutualism, Parasitism, Prey- Predator Relationship; **Adaptations:** Desert adaptations; **Community:** Ecosystem – Structure and dynamics of a pond.

UNIT III

ANIMAL PHYSIOLOGY

Nutrition: Food constituents – Carbohydrates, Proteins and Fats. **Digestion:** Role of enzymes in carbohydrate, protein and fat digestion. **Absorption:** Absorption of digested food. **Metabolism:** Carbohydrate metabolism: Glycogenesis, Glycogenolysis, Glycolysis. **Respiration:** Transport and exchange of Oxygen and Carbon-di-oxide. Haemoglobin.

UNIT IV

Excretion: Structure of Nephron – Urine formation – Dialysis; **Nervous Co-ordination:** Structure and types of neurons – Nerve impulse, conduction of nerve impulse through neuron and synapse; **Reproduction:** Structure of human testis and ovary, Graafian follicle, Menstrual cycle and its hormonal control.

UNIT V

EVOLUTION

Theories of Evolution: Darwinism, Mutation theory of De Vries. Adaptive radiation in birds. Mimicry and Colouration.

Books for reference (Use latest Editions)

Developmental Zoology

1. Arora, M.P. Embryology. Himalaya Publishing House, Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai- 400 004.



- Arumugom, N. Developmental Biology, Saras Publication, 114/35G,A.R.P camp Road, Nagercoil.

Ecology:

- Agrawal. A.k. Ecology and environmental biology, student edition agrobios (india), behind nasrani cinema. Chopasani road. Jodhpur-342 002
- Odum, E.P. Fundamentals of Ecology International Student Edition W.B. Saunders Company, Philadelphia, London.

Animal Physiology:

- Agarwal, R.A., A.K. Srivastava and Kaushal Kumar. Animal Physiology and Biochemistry (3rd Edition). S. Chand & Company Limited, 7361 Ram Nagar, New Delhi-110 055.
- Arora,M.P Animal Physiology (6th Edition). Himalaya Publishing House, Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai 400 004.

Evolution:

- Arora, M.P. Evolutionary Biology. Himalaya Publishing House, Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai 400 004.
- Tomar, B.S. and S.P. Singh. Evolutionary Biology. Rastogi Publications, Gangotri, Shivaji Road, Meerut-250 002.
- Organic Evolution Arumugam, N. Saras Publication, 114/35G,A.R.P camp Road, Nagercoil,

COs at Cognitive level and mapping with POs and PSOs

SEMESTER II/IV PART III ALLIED COURSE: 2.1 DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION																
CO	COGNITIVE LEVEL	PO							PSO							
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	8
CO1	K2- Understand	3	3	3	3	2	1	1	3	3	3	3	3	3	2	1
CO2	K3- Apply	3	3	3	2	1	3	1	3	3	3	3	2	3	3	1
CO3	K4- Analyse	3	3	3	3	3	3	1	3	3	3	2	3	2	3	2
CO4	K5- Evaluate	3	2	3	2	3	2	1	3	3	3	2	3	2	3	1

Strongly Correlated (3), Moderately Correlated (2), Weakly Correlated (1), No Correlation (0)



PRACTICAL II

DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION.

1. Mounting and observation of live sperms of a vertebrate.
2. Estimation of dissolved oxygen in two water sample and discuss the result
3. Qualitative test for glucose, protein and lipid.
4. Effect of temperature on the opercular movement of fish; Calculation of Q_{10} .
5. Museum specimens, slides, models and charts:

Developmental Zoology: Human sperm, Human ovum, Cleavage, Diffuse Placenta, Zonary Placenta, Discoidal placenta, Cotyledonary Placenta (any two).

Ecology: Identification of any two planktons- either Fresh water (or) marine samples. Echineis and Shark, Hermit crab and Sea anemone, Sacculina, Secchi disc.

Animal Physiology: Intestinal villi, Nephron, Heart of mammal.

Evolution: Ancon sheep.

PUBLIC HEALTH AND HYGIENE

LEARNING OBJECTIVES (LOs)

The objectives of the course are enabling the student to

- understand the physical, mental and social health.
- know the safer disposal of various wastes.
- create awareness about first aid and accidents.
- improve the awareness about healthy and hygienic practices.
- instruct the health standard and status and schemes.

COURSE OUTCOMES (COs)

On successful completion of the course the student will be able to

CO1: relate the concepts, definition and principles of health and hygiene in our daily life.

CO2: illustrates the hygienic uses of water and make use of standard housing recommendations.

CO3: identify the safety disposal of excreta and practice it.

CO4: classify the diseases as communicable and parasitic diseases.

CO5: assesses the safety procedures for health and hygiene.

CO6: propose solution for the health related problems/issues in the light of eradication schemes of government and the involvement of NGOs.



UNIT I

DEFINITION AND BASICS

Physical, Mental, Social and Positive health – Quality of life Index. Nutrition and Health – Food hygiene – Food toxicants. Population explosion in India – Birth control measures.

UNIT II

ENVIRONMENT AND HEALTH

Water – Sources of water – Uses of water. Water borne diseases – Cholera – Ascariasis. Standards of Housing – Ventilation.

UNIT III

EXCRETA DISPOSAL & FIRST AID

Importance – Methods of excreta disposal. Sanitary health measures during fares and festivals. First aid with reference to accident.

UNIT IV

COMMUNICABLE DISEASE

Viral diseases: AIDS, Rabies. Bacterial diseases: Tuberculosis, Typhoid. Protozoan diseases: Amoebiasis. Helminth diseases: Filariasis.

UNIT V

HEALTH SITUATION IN INDIA

Health problems – Primary health care in India – PHC – National Programmes – National AIDS control – National Malaria Eradication Programme – National Tuberculosis Control Programme.

Books for Reference

1. Anderson R.Cliford. Your Guide to Health.
2. Basu, S.C. Preventive and Social Medicine.
3. Goel, S.O.L. Public Health Administration.
4. Harold Shoryock and Hubert O. Swartout. You and Your Health illustrated Dealing with Diseases.
5. Park, K. & Park. S. Text Book of Preventive and Social Medicine. Banarsidas Bhanot Publishers,1167 Prem Nager, Jabalpur – 482001.
6. Ramarao, V. First Aid in accidents. Sri Krishna brothers, Thambu Chetty Street, Chennai.
7. Sanitarions Hand Book. Theory and Administrative Practice. Pearles Publications, New



COs at Cognitive level and Orleans, USA. mapping with POs and PSOs

CO	COGNITIVE LEVEL	PO							PSO							
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	8
CO1	K-1 Remember	2	3	2	2	2	3	1	3	3	3	2	-	3	2	2
CO2	K-2 Understand	3	3	2	-	3	3	2	3	3	2	3	-	3	3	2
CO3	K-3 Apply	2	3	2	2	3	3	2	3	3	3	3	2	3	2	3
CO4	K-4 Analyse	2	2	2	2	3	3	3	3	3	3	3	2	2	2	3
CO5	K-5 Evaluate	2	2	2	3	3	2	2	3	2	2	3	2	-	3	3
CO6	K-6 Create	-	2	1	3	2	3	3	2	2	3	1	2	3	3	3

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

அறிமுகத்தமிழ்

அலகு- 1 : செய்யுள் பகுதி

1. கடவுள் வாழ்த்து
2. கல்வி:
3. அறம்
4. ஆத்திசூடி
5. ஓடி விளையாடு பாப்பா
6. பசுவும் கன்றும் பாடல்

குறிப்பு:- மனப்பாடப்பகுதி

1. கடவுள் வாழ்த்து
2. கல்வி
3. அறம்
4. ஆத்திசூடி

அலகு-2: கதை வாசித்து கதை சொல்லல்

1. பணிமிருந்தும் பட்டினி
2. அறிவால் வெல்லுவேன்

அலகு-3 : பொதுக்கட்டுரை

1. ஒன்றுபட்டால் உண்டு வாழ்வு
2. வாய்மையே வெல்லும்

அலகு -4 : சொற்பொருள் அறிதல்

அலகு- 5: மொழித்திறன் பயிற்சி



COMPUTERS FOR DIGITAL ERA

Objectives:

1. To create the awareness about the digital India among the student community.
2. To make the student to understand the role of computer in the day to day living.
3. To create the awareness about the e-learning and security issues.

Unit I

FUNDAMENTALS OF COMPUTERS

The role of computers in the modern society – Types of Computers and their specifications – Server – Desk Top Computers - Lap Top – Tablet – Smart Phones - Block diagram of Digital Computer –Working Principle of Computer, I/O Devices – Central Processing Unit – Types of Memory - Display – Port – UPS – Setting up and Maintenance of Computer.

Unit II

TYPES OF SOFTWARE AND OFFICE AUTOMATION

Types of Software with examples – System Software – Application Software – Utility Software - Operating System – Basics on Windows – Introduction to Android –Application Software - Free Open source software – Database and its applications – Office Automation Software – applications of Microsoft Word – Microsoft Power Point – Microsoft Excel.

Unit III

INTERNET AND MOBILE APPLICATIONS

Introduction to computer networks – LAN – WAN – MAN – Wired and wireless network – Wi Fi Networks - Network Devices – Modem – Switch – Router – Broad Band – Leased Lines- Internet – WWW – URL- Browser – e-mail – SMS – MMS - Client Server Computing - Cloud – Public and Private cloud – Mobile Applications.

Unit IV

E – GOVERNANCE IN INDIA

E-Governance initiative by the Government – Digital India Platform – Agencies enabling Digital India - Electronic Payment and Receipt – Digital Locker – e-district service – electronic signature service – Digital AIIMS – India BPO Scheme – Integrated Nutrient Management – GIS – Mobile Seva App Store- GARV- Grameen Vidyutikaran



Unit V**E – LEARNING AND MOOC**

E – Learning – Digital Library – E- Journals – Introduction to MOOC – Edex – Course era etc - SWAYAM – NPTEL – Cyber Security – Virus – Malware – Network Security - Hacking – Big Data – Data Analytics – Social Networks – Social Media Analytics- Introduction to IT Act.

➤ **10 Hours Practical Sessions are to be allotted for Computer & Mobile Applications**

Suggested List of Exercises:

1. Setting up of computers – Connecting I/O device, UPS, CPU, Printers, Mouse, Key Boards, Pen Drives, etc. (Mandatory)
2. Minor fault findings.
3. Preparing a word Document and saving, copying files, deleting files, renaming files, etc. (Mandatory)
4. Preparing slides – Animation – Slide Transition – Back Ground Changing – Word Art , etc. (Mandatory)
5. Preparing Mark Sheet with Excel - Calculating First Class, second class, etc. (Mandatory)
6. Browsing – Searching for documents – e-mail id creation - Useful mobile apps – downloading. (Mandatory)
7. Data/Wi-Fi Connectivity and Exchanging of Data.
8. Electronic Payment – Online Application Processing
9. Browsing for NPTEL/ SWAYAM Courses
10. Browsing the useful e-learning sites

Learning Outcomes:

At the end of the course the students will be able to:

1. apply the computing technology in their day to day life
2. create awareness regarding digital India initiatives to their surroundings
3. identify the areas where he can extend the digital computing for their benefits.

Text Book:

1. E- Materials of Manonmaniam Sundaranar University on “Computer for Digital Era”, <http://msuniv.ac.in>



References:

1. Andrew S. Tanenbaum, Computer Networks, 4th Edition, Eastern Economy Edition, PHI Private Ltd, New Delhi, 2003.
2. Gautam Shroff, Enterprise Cloud Computing, Technology, Architecture, Applications, Cambridge University Press, First Edition, 2010.
3. Reza B'Far, Mobile Computing Principles, Cambridge University Press, First Edition, 2005.
4. Charles P Pfleeger, Shari Lawrence Pfleeger, Security in Computing, I Edition, Pearson Education, 2003.
5. <https://swayam.gov.in>
6. <http://www.digitalindia.gov.in/content/social-media-analytics>

Scheme of Examination	
Internal – 25 Marks	External – 75 Marks
Internal Break Up - 15 for Continuous Assessment Test (CAT) + 5 for Assignment + 5 for Seminar. 3 CATs (Two tests on Theory and one on Practical)are to be conducted	

