A.V.V.M. SRI PUSHPAM COLLEGE (AUTONOMOUS), POONDI

Programme: B. Sc.
Department: Botany

Syllabus Revision 2017-2018

S.No.	Components	Number of courses having changes
1.	Part - I	04
2.	Part - II	03
3.	Part - III	17
4.	Part - IV	-
	TOTAL	24

Total Number of Courses : 43

Total Number of Courses having changes : 24

Percentage of Revision : 55.8%

Note:

The content of the syllabus which has been revised is highlighted.

B.Sc., BOTANY (2017 – 2018)

S. No.	SEM	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks for Pass			Hours Week	Credits
					CIA	E.E	Total	CIA	E.E	Total		
1.	I	Part-I	17U1BOT1/H1	Tamil-I/ Hindi-I	25	75	100	10	30	40	6	3
2.		Part – II	17U1BOE1	English-I	25	75	100	10	30	40	6	3
3.		Core I	17U1BOC1	Algae, Fungi and Bryophytes	25	75	100	10	30	40	7	5
4.		Core PL	17U1BOCP1	Practical – I	40	60	100	16	24	40	3	5
5.		Allied	17U1BOZOA1	Allied Zoology – I	25	75	100	10	30	40	5	4
		Allied (NS)	17U2BOZOAPL	Allied Zoology Practical (NS)	-	-	-	-	-	-	3	-
6.		ES	17U1BOES	Environmental Studies	-	100	100	-	40	40	-	1
7.	II	Part-I	17U2BOT2/H2	Tamil-II/Hindi-II	25	75	100	10	30	40	6	3
8.		Part - II	17U2BOE2	English-II	25	75	100	10	30	40	6	3
9.		Core I	17U2BOC2	Fundamentals of Industrial Microbiology	25	75	100	10	30	40	7	5
10.		Core PL	17U2BOCP2	Practical - II	40	60	100	16	24	40	2	5
11.		Allied	17U2BOZOA2	Allied Zoology – II	25	75	100	10	30	40	5	4
12.		Allied PL	17U2BOZOAPL	Allied Zoology Practical (NS)	40	60	100	16	24	40	3	2
13.		SBE	17U1BOS1	Culture of Microorganisms	25	75	100	10	30	40	1	1
14.		VBE	17U2BOVBE	Value based Education	25	75	100	10	30	40	-	-
15.	III	Part-I	17U3BOT3/H3	Tamil-III/ Hindi-III	25	75	100	10	30	40	6	3
16.		Part – II	17U3BOE3	English-III	25	75	100	10	30	40	6	3
17.		Core I	17U3BOC3	Anatomy and Embryology	25	75	100	10	30	40	8	5
18.		Core PL	17U3BOCP3	Practical - III	40	60	100	16	24	40	2	5
19.		Allied	17U3BOCHA3	Allied Chemistry – I	25	75	100	10	30	40	5	4
		Allied PL (NS)	17U4BOCHAPL	Allied Chemistry Practical (NS)	-	-	-	-	-	-	3	-
20.		GS	17U3BOGS	Gender Studies	-	100	100	-	40	40	-	-

S. No.	SEM	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks for Pass			Hours Week	Credits
					CIA	E.E	Total	CIA	E.E	Total		
21.	IV	Part-I	17U4BOT4/H4	Tamil-IV/ Hindi-IV	25	75	100	10	30	40	6	3
22.		Part – II	17U4BOE4	English-IV	25	75	100	10	30	40	6	3
23.		Core I	17U4BOC4	Pteridophytes and Gymnosperms	25	75	100	10	30	40	7	5
24.		Core PL	17U4BOCP4	Practical - IV	40	60	100	16	24	40	2	5
25.		Allied	17U4BOCHA2	Allied Chemistry – II	25	75	100	10	30	40	5	4
26.		Allied PL	17U4BOCHAPL	Allied Chemistry Practical (NS)	40	60	100	16	24	40	3	2
27.		SBE	17U4BOS2	Compost Preparation	25	75	100	10	30	40	1	1
28.	V	Core I	17U5BOC5	Taxonomy and Economic Botany	25	75	100	10	30	40	5	5
29.		Core II	17U5BOC6	Cytogenetics and Molecular Biology	25	75	100	10	30	40	5	5
30.		Core III	17U5BOC7	Fundamentals of Bioinformatics	25	75	100	10	30	40	5	4
31.		Core PL	17U5BOCP5	Practical V	40	60	100	16	24	40	4	4
32.		Major Elective- I	17U5BOEL1A 17U5BOEL1B	Biofertilizer Biological control	25	75	100	10	30	40	4	4
33.		Major Elective II	17U5BOEL2A 17U5BOEL2B	Applied Microbiology Laboratory Techniques	25	75	100	10	30	40	4	3
34.		NME	17U5BONME	Herbal Technology	25	75	100	10	30	40	2	1
35.		SSD	17U5BOSSD	Soft Skill Development	-	-	100	-	40	40	1	-
36.	VI	Core I	17U6BOC8	Plant Physiology	25	75	100	10	30	40	6	5
37.		Core II	17U6BOC9	Environmental Botany and Biostatistics	25	75	100	10	30	40	5	5
38.		Core III	17U6BOC10	Forest Botany & Wood Science	25	75	100	10	30	40	5	4
39.		Core PL	17U6BOCP6	Practical - VI	40	60	100	16	24	40	4	4
40.		Major Elective-III	17U6BOEL3A 17U6BOEL3B	Biotechnology Environmental Biotechnology	25	75	100	10	30	40	4	4
41.		Major Elective-IV	17U6BOEL4A 17U6BOEL4B	Plant Tissue Culture Preservation of Fruits and Vegetables	25	75	100	10	30	40	4	3
42.		GK	17U6BOGK	General Knowledge	-	100	100	-	40	40	1	-
43.		CN	17U6BOCN	Comprehensive Test	-	100	100	-	40	40	1	1
				Extension Activity	-	-	-	-	-	-	-	1
				Total			**4300**				**180**	**140**

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
I	**17U1_T1**	**இக்கால இலக்கியம்** **(செய்யுள் , உரைநடை, சிறுகதை, புதினம், நாடகம்)**	**6**	**3**

கூறு: 1 செய்யுள் **நேரம்: 18**

1. இராமலிங்க அடிகளார் - திருவருட்பா - இறைத் திருக்காட்சி —1—10
2. பாரதியார் - தேசியகீதம் : பாரத தேசம் — எங்கள் நாடு,
3. பாரதிதாசன் - புதிய உலகம்: உலக ஒற்றுமை —பேரிகை, தளைஅறு, மானுட சக்தி
4. பட்டுக்கோட்டை கல்யாண சுந்தரம் -காடு வெளையட்டும் பெண்ணே ,
5. நாமக்கல் கவிஞர் - என்றுமுளதென்றமிழ் ,
6. கவிமணி : ஒற்றுமையே ,உயர்வு நிலை—நாட்டுக்குழைப்போம்

கூறு: 2 உரைநடை **நேரம்: 18**

1. கேட்டிவி - இராகபாவம் (1 முதல் 15 வரை)
2. கேட்டிவி - பயணங்கள் தொடரும்

கூறு: 3 சிறுகதை **நேரம்: 18**

1. கேட்டிவி - குரல் கொடுக்கும் வானம்பாடி (1 முதல் 10 வரை)
2. கேட்டிவி - மனோரஞ்சிதம் முழுவதும்

கூறு: 4 புதினம் **நேரம்: 18**

கு.வெ. பாலசுப்பிரமணியன் - காளவாய்

கூறு: 5 நாடகம் , இலக்கிய வரலாறு **நேரம்: 18**

1. கலைவாணன் — கு.சா.கிருஷ்ணமூர்த்தி(NCBH வெளியீடு)
2. சிறுகதை, புதினம், நாடகம், கவிதை, உரைநடை

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
II	**17U2_T2**	**இடைக்கால இலக்கியம் – பயன்முறைத் தமிழ் –இலக்கண வரலாறு**	**6**	**3**

கூறு: I **நேரம்: 18**

1. திருஞானசம்பந்தர் - தேவாரம் - கோளறு திருப்பதிகம்
2. திருநாவுக்கரசர் -தேவாரம் -தனித்திருக் குறுந்தொகை - மாசில்வீணையும் - 1—10 பதிகம்
3. சுந்தரர் -தேவாரம் - திருநொடித்தான்மலைப் பதிகம் —தானெனை முன்படைத்தான்
4. மாணிக்கவாசகர் - திருவாசகம் - திருப்பொன்னூசல்

கூறு: 2 **நேரம்: 18**

1. குலசேகராழ்வார்: திருவித்துவக்கோட்டம்மான் : 1—10 பாடல்கள்
2. நம்மாழ்வார் - திருவாய் மொழி -இரண்டாம்பத்து —1—10 பாடல்கள்
3. ஆண்டாள் - நாச்சியார் திருமொழி —வாரணமாயிரம் 1—10 பாடல்கள்
4. திருமங்கையாழ்வார் - சிறிய திருமொழி —1—10 பாடல்கள்

கூறு: 3 **நேரம்: 18**

1. திருமூலர் - திருமந்திரம் - அட்டாங்க யோகம் —1—10 பாடல்கள்
2. குமரகுருபரர் - மீனாட்சியம்மை பிள்ளைத் தமிழ்: வருகைபருவம்
3. திரிகூடராசப்பக் கவிராயர் - குற்றாலக் குறவஞ்சி - நாட்டு வளம்
4. வீரமாமுனிவர் - திருக்காவலூர்க் கலம்பகம் — முதல் 5 பாடல்கள்
5. குணங்குடி மஸ்தான் சாகிபு - ஆனந்தக் களிப்பு —முழுதும்

கூறு: 4 பயன்முறைத் தமிழ் **நேரம்: 18**

வாக்கிய அமைப்பு - புணர்ச்சி வகைகள் - வலிமிகும், வலி மிகா இடங்கள் - எழுத்துப்பிழை நீக்கம் லகர, ளகர, ழகர வேறுபாடுகள் - சொற்களைப் பிரித்துப் பொருள் காணும் முறை - நிறுத்தற் குறியீடுகள் - சரியான தமிழ் வடிவம் அறிதல்.

சொல்லியல் - சொல் வகை - இலக்கண வகை - இலக்கிய வகை - பெயர்ச்சொல் - இடுகுறி - காரணம் - அறுபொருட் பெயர் (பொருள், இடம், காலம், சினை, குணம், தொழில்) - வினைச்சொல் - இடைச் சொல் - உரிச்சொல் - முற்று - எச்சம் - விகுதிகள் - இடைநிலை - தன்வினை - பிறவினை - தெரிநிலை வினை - குறிப்பு வினை-வழுவமைதி.

கூறு: 5 இலக்கண வரலாறு **நேரம்: 18**

இலக்கண வரலாறு - தமிழ்த் துறை வெளியீடு.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
III	**17U3_T3**	**காப்பியங்கள், கட்டுரைகள், இலக்கிய வரலாறு**	**6**	**3**

கூறு: 1 காப்பியங்கள் 1 **நேரம்: 18**

1. சிலப்பதிகாரம் - புகார்க் காண்டம்—மனையறம்படுத்த காதை
2. மணிமேகலை - ஆதிரை பிச்சையிட்ட காதை
3. சீவக சிந்தாமணி - மண்மகள் இலம்பகம்
4. கம்பராமாயணம் - மிதிலைக் காட்சிப் படலம்

கூறு: 2 காப்பியங்கள் 2 **நேரம்: 18**

1. பெரிய புராணம் -மெய்ப்பொருள் நாயனார் புராணம் —முழுதும்
2. அரிசந்திரபுராணம் —மயான காண்டம்
3. தேம்பாவணி - திருமணப் படலம்—1—10 பாடல்கள்
4. சீறாப்புராணம் -நபி அவதாரப் படலம் —1—10 பாடல்கள்

கூறு: 3 கட்டுரைத் தொகுப்பு **நேரம்: 18**

கட்டுரைத் தொகுப்பு - தமிழ்த்துறை வெளியீடு

கூறு: 4 பொதுக்கட்டுரை, மொழிபெயர்ப்புப் பயிற்சி **நேரம்: 18**

பயிற்சிக் கட்டுரைகளும் கடிதங்களும் -பாவை வெளியீடு

கட்டுரைப் பயிற்சி - 10 மதிப்பெண்

மொழிபெயர்ப்புப் பயிற்சி - 5 மதிப்பெண்

கலைச்சொல்லாக்கம்

கூறு: 5 **நேரம்: 18**

அ. இலக்கிய வரலாறு

பக்தி இலக்கியங்கள் - காப்பிய இலக்கியங்கள் - சிற்றிலக்கியங்கள்

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
IV	**17U4_T4**	**சங்க இலக்கியம் – அற இலக்கியம் – செம்மொழி – இலக்கிய வரலாறு**	**6**	**3**

கூறு: 1 **நேரம்: 18**

குறுந்தொகை

1. குறிஞ்சி - (பா.எ.:3) 2. முல்லை - (பா.எ.94)
3. மருதம் - (பா.எ.45) 4. நெய்தல் - (பா.எ.:49)
5. பாலை - (பா.எ.:41)

நற்றிணை

1. குறிஞ்சி - (பா.எ. 32) 2. முல்லை - (பா.எ. 81) 3. மருதம் - (பா.எ. 210)
4. நெய்தல் - (பா.எ. 226) 5. பாலை - (பா.எ.229)

கலித்தொகை

1. பாலை - (பா.எ. 6) 2. குறிஞ்சி - (பா.எ. 38)

அகநானூறு

1. குறிஞ்சி : - (பா.எ. 68) 2. மருதம் - (பா.எ. 86)

கூறு: 2 **நேரம்: 18**

ஐங்குறுநூறு

குறிஞ்சி - தோழிக்கு உரைத்த பத்து: பாடல் எண்கள் —111—120

புறநானூறு

பாடல் எண்கள் 8,17,20,95,141,159,184,186,188,206

பதிற்றுப்பத்து

ஏழாம் பத்து —பாடல் எண். 1

பரிபாடல்

எட்டாம் பாடல் : செவ்வேள்

கூறு: 3 **நேரம்: 18**

நெடுநல்வாடை முழுவதும்

திருக்குறள் : வான்சிறப்பு, பெருமை, காதற் சிறப்புரைத்தல்

கூறு: 4 **நேரம்: 18**

செம்மொழி வரலாறு

மொழி - விளக்கம் - மொழிக்குடும்பங்கள் - உலகச் செம்மொழிகள் - இந்தியச் செம்மொழிகள் - செம்மொழித் தகுதிகள் - வரையறைகள் - வாழும் தமிழ்ச்செம்மொழி - தொன்மை - தமிழின் சிறப்புகள் - தமிழ்ச் செம்மொழி நூல்கள்.

கூறு: 5 **நேரம்: 18**

அ. இலக்கிய வரலாறு

சங்க இலக்கியங்கள், பதினெண்கீழ்க்கணக்கு நூல்கள்

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
I	**17U1--E1**	**PART — II PROSE, POETRY AND COMMUNICATION SKILLS**	**6**	**3**

Objective

- To initiate the Students to understand English through Prose, Poetry and Basic Communicative Grammar.

Unit — I

Shakespeare - Shall I compare thee to a Summer's Day?

John Milton – On His Blindness.

William Wordsworth – The Solitary Reaper

P.B.Shelley – Song to the Men of England.

Robert Frost – The Road not Taken

Nissim Ezekiel - Night of the Scorpion

Unit — II

1) The Running Rivulets of Man,
2) Parliament is Marking Time,
3) The Lady in Silver Coat,
4) Mr. Applebaum at Play.

Unit — III

1) The Feigning Brawl of an Imposter,
2) Thy Life Is My Lesson,
3) Solve The Gamble,
4) The Stoic Penalty.

Unit — IV

1) Nobility In Reasoning,
2) Malu the Frivolous Freak,
3) Bharath! Gird Up Your Loins!
4) Honesty is the Cream Of Chastity

Unit — V

Parts of Speech, Nouns, Pronouns, Conjunctions, Adjectives, Articles, Verbs, Adverbs, Interjection – sentence.

References Book:

A Melodious Harmony – Sri.KTV, Rajendra Publishing House, Poondi, 2017.

Flying Colours – Prof. K.Natarajan, New Century Book House (P) LTD., 2017.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
II	**17U2--E2**	**PART — II EXTENSIVE READERS AND COMMUNICATIVE SKILLS**	**6**	**3**

Objective

- To impart language and communicative skills through short stories, one act plays and communicative grammar

Unit — I

Shakespeare – The Seven Stages of Man

Long Fellow – A Psalm of Life

Nissim Ezakiel - Enterprise

William Wordsworth – The world is too much with us

Unit — II

Anton Chekov – The Proposal

J.B.Priestly - Mother's Day

Unit - III

William Faulkner - A Rose for Emily

P. Lankesh - Bread

Katherine Mansfield - The Doll's House

Unit — IV

Tense, Question Tag, Dialogue Writing, Paragraph Writing, Adjectives, Adverb

Unit — V

Voices, Degrees of Comparison, Direct and Indirect

Book Prescribed:

Unit I , II, III , Voices of vision in English (Vol. I & II), Board of Editors, Pavai Printers (P) Ltd., Chennai, 2016.

Unit IV & V – Communicative grammar by the Department of English, Poondi, 2017.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
III	**17U3--E3**	**PART - II** **SHAKESPEARE, EXTENSIVE READERS AND COMMUNICATIVE SKILLS**	**6**	**3**

Objective

- To introduce the language of the world renowned dramatist and novelist to enhance the vocabulary and communicative skills of the learners.

Unit — I

Funeral Oration – Julius Caesar

Trial for a Pound of Flesh – The Merchant of Venice

Unit — II

He Kills Sleep – Macbeth

The gulling scene of malvalio – Twelfth Night

Unit — III

Romeo and Juliet

In Love is a "Midsummer Madness" – Tempest

Unit — IV

R.L. Stevenson – Treasure Island

Unit — V

Note making, Hints Developing, Expansion of Ideas and Proverbs, Clauses and sentence, Structure simple, Compound and Complex.

Book Prescribed:

Unit – I, II & III: Selected scenes from Shakespeare, Prof.K.Natarajan, Pavai Printers (p) Ltd., 2017.

Unit IV: Treasure Island Abridged by E.F. Dodd

Unit V: Communicative Grammar by Department of English, Poondi, 2017.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
I	**17U1BOCP1**	**Algae, Fungi and Bryophytes**	**3**	**5**

Objectives:

- To know the vegetative and reproductive structures of various types of algae, fungi and bryophytes.

Algae

A study of the vegetative and reproductive structures of the following genera *Spirulina, Volvox, Caulerpa, Ectocarpus* and *Polysiphonia*.

Fungi and Lichens

A study of the vegetative and reproductive structures of the following genera, *Albugo*, Yeast, *Aspergillus, Peziza, Puccinia, Polyporus* and *Lichens (3)*

Bryophytes:

A study of the vegetative and reproductive structures of the following genera: *Riccia, Anthoceros* and *Funaria.*

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
II	**17U2BOC2**	**Fundamentals of Industrial Microbiology**	**7**	**5**

Objectives:

- To understand the various concepts of Industrial Microbiology.
- To study the classification, characteristics and structure of industrially important microbes used in industries.
- To study the isolation, identification and production of microbes used in industries.
- To study the various methods of culture preservation and an mutant selection

Unit I

Characteristics and ultrastructure of Bacteria, Mycoplasma and Viruses. Classification of bacteria (Bergey's manual - of determinative bacteriology). IX Ed

Unit II

Procedure for isolation, purification, identification and inoculum production of Bacteria and fungi – Methods of sterilization and preparation of media (PDA,NA)– Methods of staining of Bactria and Fungi .

Unit III

Culture preservation and stability – Preservation of microbes: serial subculture - Preservation by overlaying culture with mineral oil, lyophilisation (freeze drying) cryopreservation.

Unit IV

Methods for selection of mutants – direct selection method for resistant mutants, Penicillin selection technique, Replica plating technique, other technique – lethality and its use in mutant selection. Industrial application of microbes (Fundamental aspects).

Unit V

History scope and development of industrial microbiology.of experiments of Louis Pasteur – discovery of microbes, production of strain –screening techniques.

Books for Reference

- P.D.Sharma (1998) - Microbiology, Rastogi & Company, Meerut.
- P.D.Sharma (1987) - The Fungi, Rastogi & Company, Meerut.
- A.H.Patel (1994) - Industrial Microbiology, McMillan, India.
- F.G.Mott and Foster, J.W.(1988)- Microbial Physiology, John Wiley Sons.
- Powar and Dognivala (2004)- General Microbiology Vol-II 2nd Edition
- RC Dubey and DK Maheswari (1999)-Text Book of Microbiology 1st Edition

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
II	**17U2BOCP2**	**Fundamentals of Industrial Microbiology**	**2**	**5**

Objectives:

- To know the various aspects like preparation of media.
- To know the methods of autoclaving and sterilization of glassware.
- To know the isolation and maintenance of different microbial groups

Fundamentals of Microbiology

- Preparation of media, autoclaving and sterilization of glassware.
- Maintenance of culture room
- Pure culture technique (spread plate, pour plate and streak plate).
- Isolation and maintenance of microbes of different groups
- Bacteria and fungi Isolation from soil and water
- Gram's staining Isolation of fungi from soil and water
- Standard plate count
- Cell counting using Haemocytometer
- Isolation of *Rhizobium* from root nodules.
- Isolation of BGA

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
III	**17U3BOC3**	**Anatomy and Embryology**	**8**	**5**

Objectives:

- To study the tissues, their classification and functions.
- To study the meristems, their classification and distribution
- To study the various aspects in roots and stems of dicots and monocot embryo
- To study the structure of anther and ovule
- To study the mechanism of endosperm formation & their development in dicots & monocots.

Unit I

Anatomy - Tissues: Classification, meristems: General account – classification and distribution of meristematic tissues. Various concepts and apical organization of shoot and root.

Unit II

Permanent tissues **-** Structure and functions of parenchyma, collenchyma, sclerenchyma, xylem and phloem – Tissues systems: Epidermal, Ground and Vascular – Primary structure of normal dicot and monocot stem, leaf and root.

Unit III

Normal secondary growth of dicot stem and roots – annual rings, heart wood and sap wood – periderm formation – lenticels – wound healing. Anomalous secondary thickening in stems of dicots (*Achyranthes* and *Boerhaavia*) and secondary growth in monocot stems (*Dracaena*).

Unit IV

Structure of microsporangium – wall layers (Tapetum) – microsporogenesis and microspores. Development of male gametophytes; Types of ovules. Structure and development of megasporangia and megasporogenesis – development of female gametophyte (Polygonum type). Endothelium Process of double fertilization and triple fusion.

Unit V

Endosperm formation - nuclear, cellular and helobial types Ruminate Endosperm (haustoria not included). Development of dicot (Capsella type) and monocot embryo (Luzula type), polyembryony and apomixis.

Books for Reference

- Anatomy: A text book of Plant Anatomy – E.John Jothi Prakash, Emkay Pub., Delhi.
- Embryology: Developmental Botany –Annie Regland, Saras Publications.
- Gangulee Das & Kar (1992)– College Botany, Vol. II, New Central Agency, Calcutta.
- Pandey, B.P. – Plant Anatomy, S.Chand & Co., New Delhi.
- Bhojwani and Bhatnagar – Embryology of Angiosperms. Vikas Publishing House (P) Ltd, New Delhi.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
V	17U5BOC5	Taxonomy and Economic Botany	5	4

Objectives

- To study the different types of classification.
- To learn herbarium techniques
- To learn in detail about characters and economic importance of various families.
- To understand the concept of evolution and learn the various theories.

Unit I

Morphology of flowering plants: Root, Stem and Leaf – types and modifications; Inflorescence – Cymose, Racemose and Special types; Flower – Calyx, Corolla, Androecium and Gynoecium; Fruit – Types; Floral formula.

Unit II

Classification; Outline of Natural System - Bentham and Hooker; Phylogenetic System - Engler and Prantl. Herbarium techniques; Nomenclature; Principles of priority and its limitations. Types and typification.

Unit III

A detailed study of the vegetative and flowering characters and economic importance of the following families: Annonaceae, Capparidaceae, Rutaceae, Fabaceae, Caesalpiniaceae, Mimosaceae, Cucurbitaceae, Apiaceae, Asteraceae, Apocynaceae and Asclepiadaceae,

Unit IV

A detailed study of the vegetative and flowering characters and economic importance of Scrophulariaceae, Acanthaceae, Verbenaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae Orchidaceae, Liliaceae, Cannaceae and Poaceae

Unit V

Economic Botany – Economic importance of fiber yielding plants; sugar yielding plants; Non- Timber forest products (NTFPS)- Gums, Resins.

Books for Reference:

- Rao, K.N. and Krishnamoorthy (1984) – Angiosperms, Viswanathan & Col.
- Sharma, O.P.(2009) – Plant Taxonomy, Tata McGraw Hill Company.
- Gurucharansingh – Plant Systematics, Oxford SH.
- Ramasamy, S., Lakshminarayana, N. and Venkateswaralu, V., Taxonomy of systematic Botany, New Central Book, Depot, Calcutta.
- Gangulee Das & Kar – College Botany, Vol. III, Central Book Agency, Calcutta.
- Gangulee, Das and Dutta – College Botany, Vol. I, New Central Book Depot, Calcutta.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
V	**17U5BOC6**	**Cytogenetics and Molecular Biology**	**5**	**5**

Objectives

- Understand the modern concept of cell structure, component and function.
- Know about latest concept of prokaryotic & eukaryotic DNA structure & expression.
- To study the basis of Mendelian Genetics.
- To study the various factors for various mechanisms of sex determination in plants.
- Apply the knowledge gained from plant molecular biology in agriculture.
- Make venture in plant genomic research

Unit I

Nucleus – Nucleolus. Morphology and Structure of Eukaryotic chromosomes. Special types of chromosomes – Lamp brush chromosome and polytene chromosome – Cell cycle and stages - Mitosis & Meosis.

Unit II

History of Gregor John Mendel – Mendelian laws of Heredity (Law of segregation and law of independent assortment). Deviations from Mendelian ratios. Simple interaction– complementary factor – Supplementary factor. Sex linked inheritance (human); Sex determination in plants.

Unit III

DNA: structure and types, DNA as a genetic material. Transformation and Transduction Replication - semi conservative. Structure of RNA and its types.

Unit IV

Translation - Genetic code, protein synthesis, Gene regulation – lac operon, post translational modifications.

Unit V

Structure of Prokaryotic and eukaryotic cells – Ultra structure and function of plasma membrane, Plastids, Mitochondria, Ribosomes, Golgibody, Microbodies – Peroxisomes and Glyoxysomes.

Books for Reference:

- Gupta, R.K.,(2015) A text book of Cytology, Genetics and Evolution. Rastogl Publications.
- Sharma, N.S., (2005). Molecular Cell Biology. International Book Distributors, Dehradun.
- Sinha and Sinha.(1980) Cytogenetics, Plant breeding and Evolution. Vikas Publishing House.
- Verma, P.S. and Agarwal, V.K., (1986). Cell Biology and Molecular Biology (Cytology) S.Chand and Company, New Delhi.
- Grierson, D. and Convey, S.N., (1989). Plant Molecular Biology, Blackie Publishers.
- Power, C.B., (1984). Cell Biology, Himalaya Publishing Col. Mumbai.
- De Roberts and De Roberts, (1998). Cell and Molecular Biology. K.M.Verghese and Company.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
V	**17U5BOCP5**	**Core – Practical – V (Taxonomy, Cytogenetics and Molecular Biology)**	**4**	**4**

Objectives

- To identify the families of locally available plants.
- To study the various cell organelles using slides and electron micrographs
- To study the floral biology of some important crops
- To know the various aspects of Mendelian genetics and molecular biology
- Mandatory – Botanical tour / Submission of Herbarium of 20 sheets and Tour report
- To study the Economic importance of plants and submission of charts

I. Taxonomy

Study of the following families with emphasis on identification

Dicot -Polypetalae: Gamopetalae: Manochlamydeae:

Monocotyledon:

Annonaceae	Asteraceae	Amaranthaceae	Arecaceae
Capparidaceae	Apocynaceae	Euphorbiaceae	Poaceae
Rutaceae	Asclepiadaceae		
Fabaceae	Scrophulariaceae		
Caesalpiniaceae	Acanthaceae		
Mimosaceae	Varbenaceae		
Cucurbitaceae	Lamiaceae		
Apiaceae			

B- Study the economic important of plants and submission of charts.

C-Submission of Herbarium

II. Molecular Biology

1. Cell division: Mitosis and Meiosis – Squash technique in Onion root tips and Tradeschantia / Rheo flower bud respectively.
2. Photographs: Ultra structure of cell organelles.
3. Structure and types of chromosomes, DNA and RNA.

III. Cytogentics:

1. Simple problems on Monohybrid and dihybrid, ratios, interaction of gene factors inheritance (Charts).

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
V	**17U5BOEL1A**	**Major Elective–I Biofertilizer**	**4**	**4**

Objectives

- To know the basic aspects of Biofertilizers
- To study the symbiotic association of various microbes
- To study in detail about various types of biofertilizers
- To know about production & mass multiplication of various microbes used as fertilizers.

Unit I

General account about the microbes used as biofertilizer – *Rhizobium* – taxonomy, physiology, host – *Rhizobium* interaction – isolation - identification, mass multiplication, carrier based inoculants - Actinorhizhal symbiosis - Frankia.

Unit II

Azospirillum – rhizosphere competence and host plant specificity, taxonomy and physiology, isolation and mass multiplication – carrier based inoculant, associative effect of different microorgnaisms.

*Azotobacte*r – classification, characteristics, ecology, physiology – crop response to *Azotobacter* inoculum, maintenance and mass multiplication.

Unit III

Cyanobacteria (blue green algae), *Azolla* and *Anabaena azollae* association, nitrogen fixation, factors affecting growth, blue green algae and *Azolla* in rice cultivation.

Unit IV

Phosphate Solubilizing Microorganisms- Phosphobacterium, fungi, VA Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, colonization of VAM – isolation and inoculum production of VAM.

Unit V

Production and identification of different nitrogen fixing microbes. Assessment of nitrogen fixing ability of different strains under controlled and field conditions, culture production (fermentor) Quality control.

Books for Reference:

- N.S.Subba Rao (2013)– Biofertilizers in Agriculture and Forestry.
- Norris, J.R., Read, D.J. and Verma, A.K., - Methods in Microbiolog, Vol. XXIV.
- Whitton and Carr (1982)– Biology of Cyanobacteria
- Sprent and Sprent – Nitrogen fixation

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
V	**17U5BOEL2A**	**Major Elective – II Applied Microbiology**	**4**	**3**

Objectives

- To understand the fundamental of fermentation process.
- To know the microbial based industries
- To gain knowledge about Industrial fermentations and products

Unit I

Introduction – general information on microbe based industries – Substrate for industrial fermentation.

Unit II

Food and Dairy Industries: Single Cell Protein (SCP) advantages – Microbes as source of SCP (Algae, Fungi, Bacteria) – Mass production of SCP (Spirulina, Bacterial SCP) – Yogurt and Cheese production.

Unit III

Pharmaceutical and related industries -Antibiotics – Sources and types – production of Penicillin and Streptomycin; Recombinant drugs and vaccines – insulin and Hep B Vaccine; advantages of vaccine, Vitamins – Vitamins B_{12}.

Unit IV

Alcohol and organic acid industries-Industrial production of Alcohol (Ethanol). Organic acids: Citric acid and Acetic acid production – Vinegar production. Lactic acid production , Glutamic acid.

Unit V

Microbial Enzymes – Amylase, Protease, Microbes used for aminoacid production – production of Hormones. Commercial production of L- Glutamic acids and Application of enzymes.

Books for Reference:

- Adams, M.R. and Moss, M.O., (1995). Food Microbiology Tata McGraw Hill.
- Agarwal, (2006). Industrial Microbiology: Fundamentals and Application. M/S. IBP Publishers and Distributes, New Delhi.
- Crueger, F. and Anneliese Cruger, (2000). Biotechnology: Industrial Microbiology, Panima Publications.
- Dubey, R.C. and Maheswari, D.K., (2003). A text book of Microbiology. S.Chand and Campus, New Delhi.
- Kumaresan, V., (2001). Biotechnology Saras Publications, Nagarcoil.
- Purohit, (2005). Microbiology Fundamentals and Applications. 6th Ed., International Book Distributors, Dehradun.
- Ratledge and Kristenson, (2001). Basic Biotechnology. Oxford University Press.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
VI	**17U6BOC8**	**Plant Physiology**	**6**	**5**

Objectives

- To study in detail about diffusion, osmosis and water potential.
- To study the various aspects of enzymes
- To learn about the light and dark reactions of photosynthesis
- To learn in detail about respiration and growth mechanisms.

Unit I

Diffusion, Osmosis, water potential, osmotic potential – plant cell as an osmotic system – plasmolysis – imbibitions. Absorption of water – mechanism – active and passive absorption. Absorption of mineral salts: mechanism – ion exchange – passive and active absorption, carrier concept.

Unit II

Enzymes classification – new system – structure of enzymes – cofactors – mode of action – Induced fit theory – mechanism of enzyme action – Michaelis – Menton equation – Properties of enzymes – Factors affecting enzymes action – Enzyme inhibition (allosteric) and regulation Nitrogen metabolism: sources of nitrogen – molecular, inorganic and organic.

Unit III

Absorption and utilization of light energy. Two pigment system – PS I and PS II Mechanism of photosynthesis – light reaction – photolysis of water – Electron transport (Z – Scheme) – cyclic and non-cyclic-photophosphorylation. Dark reaction – Calvin cycle (C_3 pathway). Hatch-Slack pathway (C_4 dicarboxylic acid pathway – NAD – Malate dependent) CAM pathway. Photorespiration.

Unit IV

Respiration Mechanism – glycolysis (EMP pathway) – Anaerobic respiration – Alcoholic fermentation – Lactic acid fermentation. Kreb's cycle (TCA – Cycle). Electron Transport system and mechanism of oxidative phosphorylation - Pentose phosphate pathway and its significance. Differences between oxidative and photophosphorylation. Factors affecting respiration – Internal and External (Electron transport systems) ETS.

Unit V

Growth – Growth hormones – Auxins, gibberellins and cytokinins – discovery, bioassay – chemical nature and physiological effects; Physiological effects of Ethylene & florigen – Phytochrome. Vernalization - mechanism.

Books for Reference:

- Jain, V.K., (1974)- Fundamental of Plant Physiology, S. Chand & Co. New Delhi
- Pandey, S.N. and Sinha, B.K.- Plant Physiology, Vikas Publishing Co.
- Noggle and Fritz - Introduction to Plant Physiology, Prantice Hall of India.
- Salisbury and Ross - Plant Physiology
- Goodwin and Mercer - Plant Biochemistry
- Malik, C.P. - Plant Physiology, Oxford IBH.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
VI	**17U6BOC9**	**Environmental Botany and Bio-statistics**	**5**	**5**

Objectives

- To study the various aspects of Ecology.
- To know about ecological pyramids, food chain and food webs
- To know in detail about various types of vegetation
- To study the biodiversity and pollution
- To study the importance of statistics in biology

Unit I

Approaches to the study of ecology – Autecology – Synecology – Population, Community – units of vegetation. Ecosystem concept, components - abiotic, biotic.

Unit II

Food chain, food web ecological pyramids and energy flow in pond ecosystem. productivity in aquatic ecosystem. Factors in ecological pyramids influencing vegetation-climatic, edaphic and biotic factors.

Unit III

Ecological succession of hydrosere - xerosere. Ecological classification - Hydrophytes – xerophytes – mesophyte - Halophytes and Epiphytes. Morphological and Anatomical adaptations of hydrophytes and xerophytes.

Unit IV

Applied ecology – Atmospheric pollution – Land pollution – water pollution and control method - Botanical provinces of India.

Unit V

Importance of statistics in biology – Population – census and sampling methods – presentation of data (Graphic and diagrammatic) – frequency distribution, mean, median and mode; Standard deviation.

Books for Reference:

- Sharma, P.D. – (1992)- Ecology and Environment, Rastogi Publications, Meerut, UP.
- David, N. Sen. (1978)- Concept in Indian Ecology, Shoban Lalin Chand &Co., M 5, Industrial Area, Jalankhar City 144 004, India.
- Sakal and Rohif, - Introduction to Bio-statistics, Freeman-Sanfrancisco.
- Idaikkandan, N.M. - Agricultural Statistics, Pergamon Press, Oxford.
- Khan and Khanum - Fundamentals of Biostatistics, International Book Dept.
- Ramakrishnan, P., (2001) - Biostatistics, Saras Publications.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
VI	**17U6BOC10**	**Forest Botany and Wood Science**	**5**	**4**

Objectives:

- To know the scope of studying forestry.
- To learn the significance of agroforestry and social forestry.
- To know the value of Silviculture.
- To know the importance of resources to environment.

Unit I

History of forests – General introduction to forests. Different types of forests – tropical, temperate, evergreen, semi-evergreen and deciduous (with few examples).

Unit II

Agroforestry – definition, need and scope. Agroforestry systems under different agro-ecological zones. Social / Urban forestry - scope and necessity, people's participation.

Unit III

Forest environment – Major biotic and abiotic components. Nutrient cycling (in brief). Silviculture - concept and scope of study. Ethnobotany and its significance.

Unit IV

Wood science – kinds of wood – Hard wood and Soft wood, heart wood and sap wood, Physical properties of wood. Chemical constituents wood - Cellulose, Hemicellulose and Lignin.

Unit V

Forest resources and utilization. Direct benefits from forests – fuelwood, timber, food, shelter and paper. Indirect benefits - soil improvement, reduction of atmospheric pollution and control of climate.

Books for Reference:

- Champion HG and Seth SK, 1968. A revised survey of forest types of India. Govt. of India, New Delhi.
- Dwiyedi AP, 1992. Agroforestry principles and practices. Oxford and IBH publications, New Delhi.
- Mehta T, 1981. A handbook of forest utilization. Periodical Expert Book Agency, New Delhi.
- Grebner D, Bettinger P, Siry J 2003. Introduction to forestry and natural resources (1st edition). Academic press, USA.
- Manikandan K and Prabhu S, 2013. Indian Forestry: A break-though approach to forest service – 6th edition. Jain Brothers, New Delhi.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
I	17U1BOZOA1/ 17U1CHZOA1	ALLIED ZOOLOGY – 1	5	4

Objectives:

1. To acquire a basic knowledge of animal diversity and organization.
2. To study the general aspects of Invertebrates and Parasites.
3. To study the general aspects of Chordata animals and their anatomy
4. To learn the general principles.

Unit I **Hrs15**

1. Phylum Protozoa : Detailed study of Plasmodium - Protozoan Parasites of Man
2. Phylum Coelenterata: Obelia – External characters only.
3. Phylum Platyhelminthes: *Taenia solium* - Organisation and Life history.

Unit II **Hrs15**

1. Phylum Arthropoda: External characters of Prawn.
2. Phylum Mollusca: Fresh water Mussel – external characters only.
3. Phylum Echinodermata: Detailed study of Sea star.

Unit III **Hrs15**

General characters and outline classification of Chordata – Detailed study of Rat.

Unit IV **Hrs15**

Cell biology: Structure and functions of Eukaryotic cells,
Plasma membrane – Fluid Mosaic model, Mitochondria- Molecular structure, Kreb's cycle.
Genetics: Mendelian Principles – Monohybrid and Dihybrid.
Evolution: Lamarckism and Darwinism only.

Unit V **Hrs15**

Embryology: Types of vertebrate eggs and patterns of cleavage
Ecology: Food chain, Food web and Energy flow.

References

1. Ekambaranatha Iyer, M and Anatha Krishnan, T.N – Outlines of Zoology
2. Nair, N.C., Leelavathy, L. Soundara Pandian, N., Murugan, T and Arumugam, N. 2009. A Text book of Vertebrates. Saras Publications. Nagerkoil.
3. Rastogi, V.B. 1984. Invertebrate Zoology. Kedar Nath Ram Nath Publications, Meerut.
4. P.S.Verma and V.K.Agarwal(1996) – Cytology and Genetics.
5. P.S.Verma and V.K.Agarwal(1996) Animal Physiology and Ecology
6. Balinsky, B.J. (1981) An introduction to embryology, CBS College Publishing.
7. Arumugam. N. Evolution, Saras Publications, Nagerkoil.

Semester	Subject Code	Title of the Paper	Hours of	No.

			Teaching / Week	of Credits
II	**17U2BOZOA2/ 17U2CHZOA2**	**ALLIED ZOOLOGY –II**	**5**	**4**

Objectives:

1. To acquire basic knowledge about the beneficial role of animals.
2. To study the various types cultures.

Unit-I **Hrs15**

Vermiculture and composting – types of earthworm – rearing technology; Types of Vermicomposting: Small scale and Large scale method – economic importances.

Unit-II **Hrs15**

Sericulture –Types of silkworm; Biology and Life cycle of silkworm (*Bombyx mori*), Mori culture – economic importance of silkworm.

Unit- III **Hrs15**

Apiculture – Species of Honeybee – Types of bee hive – nutritive and medicinal value of honey and Bee wax.

Unit-IV **Hrs15**

Aquaculture – Scope of Aquculture – construction of a pond – Freshwater cultivable fishes – Water quality management -fish feed – Fish preservation - Economic importance of fishes.

Unit-V **Hrs15**

Poultry farming – Types of poultry – Poultry nutrition – diseases and their prevention – Economics of poultry production.

References

1. Agarwal, W.C. – Economic Zoology
2. Pradip V. Jabde – Applied Zoology.
3. T.V.R.Pillai, (1988) Aquaculure: Principles and practices. Fishing News Books.

Semester	Subject code	Title of the paper	Hours of Teaching / Week	No. of Credits
III	**17U3BOCHA1**	**Allied chemistry – I**	**5**	**4**

UNIT I Fundamental concepts

Bonding – nature of bonds – ionic, covalent, coordinate and hydrogen bonds - Cleavage of covalent bonds– homolytic and heterolytic fission– electrophiles, nucleophiles and free radicals. Types of organic reactions – substitution, addition, elimination, rearrangement – definition and examples. Hybridisation – states of hybridization of carbon in methane, ethane, ethylene, acetylene.

UNIT II Fuel gases, Plant nutrients and Fertilizers

Fuel gases – natural gas, water gas, semi water gas, carburetted water gas, producer gas, LPG and oil gas – composition, manufacture (elementary idea) and uses. Plant nutrients – major nutrients – role of nitrogen, phosphorus and potassium in plant life, micro nutrients. Fertilizers – definition, urea, ammonium sulphate, superphosphate of lime, triple superphosphate and potassium nitrate – preparation and uses.

UNIT III Industrial Organic Chemistry

Pesticides – DDT, BHC – preparation and uses. Refrigerant – freon 12 – preparation, properties and uses. Polymers – definition, classification – natural and synthetic, homo and copolymers, natural polymers – cotton, silk and wool, preparation and applications of the synthetic polymers – polythene, PVC, teflon and nylon. Synthetic dyes – classification, preparation and uses of methyl orange and indigo, food colours.

UNIT IV Colloidal State and Chromatography

Colloidal system – definition, types -Emulsions– definition, types – o/w and w/o emulsions – tests for identification, properties and applications. Gels – definition, classification, preparation and properties – syneresis, imbibition and thixotropy. Electrophoresis – applications. Chromatography–column and paper chromatography – experimental procedures only.

UNIT V Pharmaceutical chemistry

Antiseptic & disinfectants – phenolic compounds – Dettol, phenyle & Lysol – Definition – differences – medicinal uses and side effects. Anaesthetics – general anaesthetics and local anaesthetics – Definition, examples, uses and side effects.

Analgesics – narcotic– morphine & pethidine, non-norcotic – salicylic acid & its derivatives– medicinal uses and side effects. Organic pharmaceutical aids – Preservatives, antioxidants, colouring, flavouring and sweetening agents – Definition, examples and uses.

Text Books:

- Text Book of Ancillary Chemistry, **V.Veeraiyan** et al,revised edition, 1997.
- Allied Chemistry, **R. Gopalan** and **S. Sundaram,** , S. Chand & Sons, 2nd edition, 1993.

Reference Books:

- Text Book of Organic Chemistry**, P.L. Soni** and **H.M.Chawla**, S.Chand & Sons, 29th edition, 2014 (Unit III).
- Principles of Inorganic Chemsitry, **B.R. Puri, L.R. Sharma** and **K.C. Kalia** Vishal
- Publishing Co, Reprint 2016 (Unit I & II).
- Principles of Physical Chemistry, **B.R.Puri, L.R. Sharma,** Vishal
- Publishing Company, Jalandhar, 44th edition 2009. (Unit IV)
- A text book of pharmaceutical chemistry, **Jayashree Ghosh**, S.Chand and Company Ltd., New Delhi, 1st edition, 2004. (Unit V)
- Pharmaceutical Chemistry, **S. Lakshmi**, S.Chand & Company Ltd., New Delhi, 3rd edition, 2004. (Unit V)

Semester	Subject code	Title of the paper	Hours of Teaching / Week	No. of Credits
IV	**17U4BOACH2**	**Allied chemistry-II**	**5**	**4**

UNIT I Acids, Bases and Catalysis

Acids and bases – Arrhenius and Lewis theories of acids and bases, pH scale, buffer solutions – definition – examples of acidic and basic buffer solutions, importance of pH and buffer in living systems. Hardness of water – types and determination of hardness by EDTA titration. Catalysis – types of catalysis, characteristics of catalysts, promoters and catalytic poison, biocatalysts – enzyme catalysis, industrial applications of catalysts.

UNIT II Carbohydrates, Vitamins and Cosmetics

Carbohydrates – classification, glucose and fructose – sources, manufacturing method, reactions of glucose, derivatives of starch and cellulose – applications. Vitamins –classification, sources and deficiency diseases of vitamins A, D, E, K, C, B_1, B_2, B_5, B_6, and B_{12}.

UNIT III Amino acids, Proteins and Nucleic acids

α-Amino acids–essential and non essential amino acids, α-amino acid-preparation by Gabriel-phthalimide reaction and Strecker's method, isoelectric point, zwitter ion formation, action of heat, ninhydrin test. Peptides–definition only, proteins–classification, characteristics and biological functions, elementary treatment of primary and secondary structure. Nucleic acids– DNA & RNA– composition and structure (elementary treatment), differences between DNA & RNA.

UNIT IV Biochemsitry

Metabolism–anabolism and catabolism. Digestion and absorption of carbohydrates, glycolysis, TCA cycle, glycogenesis, glyconeogenesis, maintenance of blood sugar level. Digestion and absorption of proteins, urea biosynthesis. Digestion and absorption of lipids - β-oxidation of fatty acids.

UNIT V Food Chemistry

Food additives – sweetners, preservatives, emulsifying and stabilizing agents, flavouring agents, antioxidants and colouring agents. Food adulteration – definition and types of adulterations – adulterants in soft drinks, milk and milk products, edible oils and fats. Packaging hazards – prevention and control. Simple tests for common adulterants in coffee powder, tea leaves, cane sugar, honey, turmeric, common salt, dhals, and ice creams.

Text Books

- Text Book of Organic Chemistry, **P.L. Soni and H.M. Chawla**, S. Chand & Sons, 27th edition, 1997.
- Principles of Physical Chemistry, **B.R.Puri, L.R. Sharma,** Vishal Publishing Company, Jalandhar, 44th edition 2009. (Unit IV)

Reference Books:

- Elements of Physical Chemistry, **B.R. Puri, L.R. Sharma, M.S. Pathania,** Vishal Publishing Co. 43rd edition, 2008-09. (Unit-I)
- TextBook of Biochemistry, **O.P. Agarwal and G.R. Agarwal,** Goel Publishing House, 7th edition, 1993. (Unit III & IV)
- Chemistry for Changing Times, **John W.Hill,** St. edition, subject Publishing House, 1986 (Unit II)
- Food Science, **B.Srilakshmi**, New Age International (P) Ltd., Publishers, 3rd edition ,2003 (Unit V).
- Food Additives – Characteristics, Detection and Estimation, **S.N. Mahindru** Tata McGraw Hill Publishing Company Limited. (Unit V).

Semester	Subject Code	**Title of the Paper**	Hours of Teaching /Week	No. of Credits
III & IV	**17U4BOCHAPL**	**Allied chemistry practical (NS)**	**3+3**	**2**

C. Volumetric Analysis

1. Estimation of HCl (or H_2SO_4) by NaOH using a standard oxalic acid solution.
2. Estimation of NaOH by H_2SO_4 (or HCl) using a standard Na_2CO_3 solution
3. Estimation of oxalic acid by $KmnO_4$ using a standard Mohr's salt solution
4. Estimation of Ferrous sulphate by $KmnO_4$ using a standard oxalic acid solution.
5. Estimation of Mohr's salt by $KmnO_4$ using a standard oxalic acid solution.
6. Estimation of KMnO4 by thio using a standard $K_2Cr_2O_7$ solution.
7. Estimation of $K_2Cr_2O_7$ by thio using a standard $CuSO_4$ solution
8. Estimation of $CuSO_4$ by thio using a standard $K_2Cr_2O_7$ solution

9. Organic qualitative analysis

Systematic analysis of an organic compound, Preliminary tests, detection of element present, Aromatic or aliphatic, Saturated or unsaturated, nature of the functional group and exhibiting confirmatory tests for given organic compounds.

The following substance are prescribed:

Benzoic Acid, Cinnamic acid, Phenol, Cresol, Aniline, Toludine, Urea, Benzaldehyde, Glucose

Reference:

Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, Sultan Chand & sons, New Delhi, (1997)