

Sadakathullah Appa College

(Autonomous)

(Reaccredited by NAAC at an 'A' Grade and ISO 9001:2015 Certified Institution)

Rahmath Nagar, Tirunelveli – 627 011, Tamil Nadu.

PG DEPARTMENT OF MICROBIOLOGY



CBCS SYLLABUS

For

B.Sc. Microbiology

**(Applicable for students admitted in June 2019 and onwards)
(As per the Resolutions of the Academic Council Meetings
held on 03-03-2018, 17-10-2018 and 02-03-2019).**

SADAKATHULLAH APPA COLLEGE(AUTONOMOUS)
(REACCREDITED BY NAAC WITH 'A' GRADE AND ISO 9001:2008
CERTIFIED INSTITUTION)
RAHMATH NAGAR, TIRUNELVELI – 627 011.

DEPARTMENT OF MICROBIOLOGY
SYLLABUS (CBCS)

B.Sc. (MICROBIOLOGY) (2018-2021)
For those who join the course from 2019 – June onwards.

1. Objectives of the Course

The objective of the course is to create awareness in the field of microbiology and cultivate scientific approach and research aptitude among the students in various subjects of microbiology and emerging extensions of research activities. The course involves the study of microorganisms with particular emphasis on the biology of bacteria, viruses, fungi and protozoan parasites. Group projects are included in the course so that the candidates know about the flavor of research methodology in science.

2. Eligibility for Admission

B.Sc. Microbiology is a 3-year full-time undergraduate course in Microbiology. Eligibility for the course is 10+2 or an equivalent examination in a science stream from a recognized board with a minimum aggregate of 55% of marks.

Knowledge

The candidate

- has substantial knowledge in biology.
- has advanced knowledge in relevant fields of microbiology
- familiar with contemporary research within various fields of microbiology.

Skills

The candidate

- has the background and experience required to model and analyse experimental methods in microbiology
- is able to apply advanced theoretical and/or experimental methods
- can combine and use knowledge from several disciplines.
- can critically and independently assess and evaluate research methods and results.
- has the ability to develop and renew scientific competence.

General competence

The candidate

- understands the role of microorganisms in environment and has the background to consider environmental problems.
- knows the historical development of microbiology, its possibilities and limitations, and understands the value of lifelong learning.
- is able to gather, assess, and make use of new information.
- has the ability to successfully carry out advanced tasks and projects, both independently and in collaboration with others, and also across disciplines.

CONTENTS

Sl. No.	Course Title	Subject Code	Page No.
1	B.Sc. Microbiology Course Structure	–	1
2	இக்காலத் தமிழ்	18ULTA11	7
3	Applied Grammar and Translation – I	18ULAR11	9
4	Prose, Poetry and Grammar-I	18ULEN11	10
5	English for Communication	18ULEC11	11
6	Introduction to microbial World	18UCMB11	12
7	Microbial Diversity	18UCMB12	13
8	Aquatic Microbiology	18UAMB11	14
9	Techniques in Microbiology & Microbial Diversity	18UCMB1P1	15
10	Techniques in Aquatic Microbiology	18UAMB1P1	16
11	Environmental Studies	18UENS11	17
12	சமயத் தமிழ்	18ULTA21	19
13	Applied Grammar and Translation – II	18ULAR21	21
14	Prose, Poetry and Grammar – II	18ULEN21	22
15	Microbial Physiology and Metabolism	18UCMB21	23
16	Environmental Microbiology	18UCMB22	24
17	Basic Biotechnology	18UAMB21	25
18	Techniques in Microbial Physiology & Environmental Microbiology	18UCMB2P1	26
19	Techniques in Biotechnology	18UAMB2P1	27
20	Value Education - I OR	18USVE2A	28
21	Value Education - II	18USVE2B	29
22	பயன்பாட்டுத் தமிழ்	18ULTA31	30
23	Applied Grammar and Translation – III	18ULAR31	31
24	One-Act Plays and Writing Skill	18ULEN31	32
25	Microbial Biochemistry	18UCMB31	34
26	Medical Lab Technology	18UEMB3A	35
27	Bioinformatics	18UEMB3B	36
28	Bioinstrumentation	18UAMB31	37

Sl. No.	Course Title	Subject Code	Page No.
29	Techniques in Microbial Biochemistry Soil and Agricultural Microbiology and Medical Microbiology	18UCMB3P1	38
30	Techniques in Bioinstrumentation	18UAMB3P1	38
31	Vermiculture and Mushroom	18UNMB31	39
32	சங்கத் தமிழ்	18ULTA41	40
33	<i>Classical Prose</i>	18ULAR41	42
34	A Practical Course in Spoken English	18ULEN41	43
35	Cell & Molecular Biology	18UCMB41	44
36	Microbial Nanotechnology	18UEMB4A	45
37	Plant Science	18UEMB4B	46
38	Pharmaceutical Microbiology	18UAMB41	47
39	Techniques in cell and Molecular Biology	18UCMB4P1	48
40	Techniques in Pharmaceutical Microbiology	18UAMB4P1	49
41	Aquaculture & Apiculture	18UNMB41	50
42	Immunology	18UCMB51	51
43	Microbial Genetics	18UCMB52	52
44	Food Microbiology	18UCMB53	53
45	Genetic Engineering	18UEMB5A	54
46	Dairy Microbiology	18UEMB5B	55
47	Techniques in Immunology,	18UCMB5P1	56
48	Techniques in Microbial Genetics and Food Microbiology	18UCMB5P2	56
49	Food Processing & Quality Control	18USMB51	57
50	Medical Microbiology	18UCMB61	58
51	Industrial Microbiology	18UCMB62	59
52	Project	18UCMB63	60
53	Agricultural Microbiology	18UEMB6A	61
54	Biostatistics	18UEMB6B	62
55	Techniques in Medical Microbiology	18UCMB6P1	63
56	Techniques in Industrial Microbiology	18UCMB6P2	63
57	Basic Dietetics	18USMB61	64
58	Personality Development	18USPD62	65
59	Scheme of Examinations	-	66

B.Sc. MICROBIOLOGY (2018 – 2021)
(Applicable for students admitted in June 2019 and onwards)
DISTRIBUTION OF CREDITS, NO. OF PAPERS & MARKS

Part	Course	Semester	Hours	Credits	Papers	Marks
I	Tamil / Arabic	I to IV	24	16	4	400
II	English	I to IV	24	16	5	400
III	Discipline Specific Core (DSC) + Project + Practicals	I to VI	78	62	20	1800
	Discipline Specific Elective (DSE)	III to VI	16	16	4	400
	Allied Theory + Practicals	I to IV	24	16	8	600
IV	Non-major Elective (NME)	III & IV	4	4	2	200
	Skill Enhancement Course (SEC)	V & VI	4	4	2	200
	Skill Based Common (SBC)	VI	2	2	1	100
	Ability Enhancement Compulsory Course (AECC) Environmental Studies (EVS)	I	2	2	1	100
	Value Education (VE)	II	2	2	1	100
V	Extension Activities	I to IV+	--	1+1*	1	100
	MOOC\$	I – V	-	2#		
TOTAL			180	141+1*+2#	49	4400

SEMESTER WISE DISTRIBUTION OF HOURS

Part	I	II	III				IV				Total
SEM	T/A	ENG	DSC	PRO/ FW	DSE	AL	NME	SEC	SBC	EVS/VE	
I	6	6	10	-	-	6	-	-	-	2	30
II	6	6	10	-	-	6	-	-	-	2	30
III	6	6	6	-	4	6	2	-	-	-	30
IV	6	6	6	-	4	6	2	-	-	-	30
V	-	-	24	-	4	-	-	2	-	-	30
VI	-	-	16	6	4	-	-	2	2	-	30
Total	24	24	72	6	16	24	4	4	2	4	180

+ Activities and evaluation are to be performed during Semesters I to IV and results to be declared at the end of the Semester IV along with those for other courses in the Mark Statement.

* Extra credit for Sadakath Outreach Programme (SOP)

\$ As per the guidelines of the UGC all the UG and the PG students shall enrol for one Massive Open Online Course offered through SWAYAM, NPTEL, etc.

Two extra credits will be given on completion of the course.

B.Sc. Microbiology (2018-2021) Course Structure
(With Medical Lab Technology & Biotechnology Allied)
(Applicable for students admitted in June 2019 and onwards)
TITLE OF THE PAPERS, CREDITS & MARKS

I SEMESTER								
P	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
I	TA 1	இக்காலத் தமிழ்	18ULTA11	6	4	25	75	100
	AR 1	Applied Grammar and Translation – I	18ULAR11					
II	EN 1	Prose, Poetry and Grammar-I	18ULEN11	4	2	25	75	100/2
		English for Communication	18ULEC11	2	2	25	75	100/2
III	DSC 1	Introduction to Microbial World	18UCMB11	4	4	25	75	100
	DSC 2	Microbial Diversity	18UCMB12	4	4	25	75	100
	AI-1	Aquatic Microbiology	18UAMB11	4	3	25	75	100
	DSCP-1	Core Microbiology Practicals - I	18UCMB1P1	2	1	40	60	100/2
	AI-P-1	Techniques in Aquatic Microbiology	18UAMB1P1	2	1	40	60	100/2
	IV	EVS	Environmental Studies	2	2	25	75	100
TOTAL				30	23			700

II SEMESTER								
P	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
I	TA 2	சமயத் தமிழ்	18ULTA21	6	4	25	75	100
	AR 2	Applied Grammar and Translation – II	18ULAR21					
II	EN 2	Prose, Poetry and Grammar – II	18ULEN21	6	4	25	75	100
III	DSC 3	Microbial Physiology and Metabolism	18UCMB21	4	4	25	75	100
	DSC 4	Environmental Microbiology	18UCMB22	4	4	25	75	100
	AI-2	Basic Biotechnology	18UAMB21	4	3	25	75	100
	DSCP-2	Core Microbiology Practicals-II	18UCMB2P1	2	1	40	60	100/2
	AI P-2	Techniques in Biotechnology	18UAMB2P1	2	1	40	60	100/2
IV	VE	Value Education-I	18USVE2A	2	2	25	75	100
		Value Education-II	18USVE2B					
TOTAL				30	23			700

III SEMESTER								
P	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
I	TA 3	பயன்பாட்டுத் தமிழ்	18ULTA31	6	4	25	75	100
	AR 3	Applied Grammar and Translation – III	18ULAR31					
II	EN 3	One-Act Plays and Writing Skill	18ULEN31	6	4	25	75	100
III	DSC 5	Microbial Biochemistry	18UCMB31	4	4	25	75	100
	DSE-IA	Medical Lab Technology	18UEMB3A	4	4	25	75	100
	DSE-IB	Bioinformatics	18UEMB3B					
	A-II-1	Bioinstrumentation	18UAMB31	4	3	25	75	100
	DSCP-3	Core Microbiology Practicals-III	18UCMB3P1	2	1	40	60	100/2
	AII-P1	Techniques in Bioinstrumentation	18UAMB3P1	2	1	40	60	100/2
IV	NME-I	Vermiculture and Mushroom	18UNMB31	2	2	25	75	100
TOTAL				30	23			700

IV SEMESTER

P	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
I	TA 4	சங்கத் தமிழ்	18ULTA41	6	4	25	75	100
	AR 4	Classical Prose	18ULAR41					
II	EN 4	A Practical Course in Spoken English	18ULEN41	6	4	25	75	100
III	DSC 6	Cell & Molecular Biology	18UCMB41	4	4	25	75	100
	DSE-2A	Microbial Nanotechnology	18UEMB4A	4	4	25	75	100
	DSE-2B	Plant Science	18UEMB4B					
	AII-2	Pharmaceutical Microbiology	18UAMB41	4	3	25	75	100
	DSCP-4	Core Microbiology Practicals-IV	18UCMB4P1	2	1	40	60	100/2
	AII-P2	Techniques in Pharmaceutical Microbiology	18UAMB4P1	2	1	40	60	100/2
IV	NME-2	Aquaculture & Apiculture	18UNMB41	2	2	25	75	100
V	EX	Extension Activities (Choose from the list)	---	--	1	--	100	100
		SOP	18UEXSOP		1*			
TOTAL				30	24+ 1*			800

V SEMESTER

P	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
III	DSC 7	Immunology	18UCMB51	6	4	25	75	100
	DSC 8	Microbial Genetics	18UCMB52	5	4	25	75	100
	DSC 9	Food Microbiology	18UCMB53	5	4	25	75	100
	DSE-3A	Genetic Engineering	18UEMB5A	4	4	25	75	100
	DSE-3B	Dairy Microbiology	18UEMB5B					
	DSCP-5	Core Microbiology Practicals-V	18UCMB5P1	4	2	40	60	100
	DSCP-6	Core Microbiology Practicals-VI	18UCMB5P2	4	2	40	60	100
IV	SEC-1	Food Processing & Quality Control	18USMB51	2	2	25	75	100
TOTAL				30	22			700

VI SEMESTER

P	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
III	DSC 10	Medical Microbiology	18UCMB61	4	4	25	75	100
	DSC 11	Industrial Microbiology	18UCMB62	4	4	25	75	100
	DSC 12	Project	18UCMB63	6	6	-	-	100
	DSE-4A	Agricultural Microbiology	18UEMB6A	4	4	25	75	100
	DSE-4B	Biostatistics	18UEMB6B					
	DSCP-7	Core Microbiology Practicals-VII	18UCMB6P1	4	2	40	60	100
	DSCP-8	Core Microbiology Practicals-VIII	18UCMB6P2	4	2	40	60	100
	SEC-2	Basic Dietetics	18USMB61	2	2	25	75	100
	SBC	Personality Development	18USPD62	2	2	25	75	100
TOTAL				30	26			800
I-V Sem		Massive Open Online Course \$		-	2#			

B.Sc. Microbiology (2018-2021) Course Structure (CBCS)

(Applicable for students admitted in June 2019 and onwards)

PART I AND PART II SUBJECTS

TITLE OF THE PAPERS, CREDITS & MARKS

GROUP II COURSES (TWO YEAR LANGUAGE COURSES) (, B.A. Arabic, B.A. Tamil, B.A. English, B.A. History, B.Sc. Mathematics, B.Sc. Physics, B.Sc. Chemistry, B.Sc. Zoology, B.Sc. Microbiology and B.Sc. Nutrition and Dietetics)							
SEM	Title of the paper	S.CODE	H/W	C	I	E	T
PART I – TAMIL							
I	இக்காலத் தமிழ்	18ULTA11	6	4	25	75	100
II	சமயத் தமிழ்	18ULTA21	6	4	25	75	100
III	பயன்பாட்டுத் தமிழ்	18ULTA31	6	4	25	75	100
IV	சங்கத் தமிழ்	18ULTA41	6	4	25	75	100
TOTAL			24	16			400
PART I – ARABIC							
I	Applied Grammar and Translation – I	18ULAR11	6	4	25	75	100
II	Applied Grammar and Translation – II	18ULAR21	6	4	25	75	100
III	Applied Grammar and Translation – III	18ULAR31	6	4	25	75	100
IV	<i>Classical Prose</i>	18ULAR41	6	4	25	75	100
TOTAL			24	16			400
PART II – ENGLISH							
I	Prose, Poetry and Grammar-I	18ULEN11	4	2	25	75	100/2
	English for Communication	18ULEC11	2	2	25	75	100/2
II	Prose, Poetry and Grammar-II	18ULEN21	6	4	25	75	100
III	One – Act Plays and Writing Skill	18ULEN31	6	4	25	75	100
IV	A Practical Course in Spoken English	18ULEN41	6	4	25	75	100
TOTAL			24	16			400

PART III

Part III DSC, DSE and Project								
SEM	P	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
I	DSC1	Introduction to microbial World	18UCMB11	4	4	25	75	100
	DSC2	Microbial Diversity	18UCMB12	4	4	25	75	100
	CP 1	Core Microbiology Practicals-I	18UCMB1P1	2	1	20	30	50
II	DSC3	Microbial Physiology and Metabolism	18UCMB21	4	4	25	75	100
	DSC4	Environmental Microbiology	18UCMB22	4	4	25	75	100
	CP 2	Core Microbiology Practicals-II	18UCMB2P1	2	1	20	30	50
III	DSC5	Microbial Biochemistry	18UCMB31	4	4	25	75	100
	CP 3	Core Microbiology Practicals-III	18UCMB3P1	2	1	20	30	50
	DSE-I	Medical Lab Technology	18UEMB3A	4	4	25	75	100
		Bioinformatics	18UEMB3B					
IV	DSC6	Cell & Molecular Biology	18UCMB41	4	4	25	75	100
	CP 4	Core Microbiology Practicals-IV	18UCMB4P1	2	1	20	30	50
	DSE-II	Microbial Nanotechnology	18UEMB4A	4	4	25	75	100
		Plant Sceince	18UEMB4B					
V	DSC7	Immunology	18UCMB51	6	4	25	75	100
	DSC8	Microbial Genetics	18UCMB52	5	4	25	75	100
	DSC9	Food Microbiology	18UCMB53	5	4	25	75	100
	CP 5	Core Microbiology Practicals-V	18UCMB5P1	4	2	40	60	100
	CP 6	Core Microbiology Practicals-VI	18UCMB5P2	4	2	40	60	100
	DSE-III	Agricultural Microbiology	18UEMB6A	4	4	25	75	100
		Biostatistics	18UEMB6B					
VI	DSC10	Medical microbiology	18UCMB61	4	4	25	75	100
	DSC11	Industrial Microbiology	18UCMB62	4	4	25	75	100
	DSC12	Project	18UCMB63	6	6	25	75	100
	CP 7	Core Microbiology Practicals-VII	18UCMB6P1	4	2	40	60	100
	CP 8	Core Microbiology Practicals-VIII	18UCMB6P2	4	2	40	60	100
	DSE-IV	Agricultural Microbiology	18UEMB6A	4	4	25	75	100
		Biostatistics	18UEMB6B					
TOTAL				94	78			2200

PART III – ALLIED

SEM	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
I	AI-1	Aquatic Microbiology	18UAMB11	4	3	25	75	100
	AI-P1	Techniques in Aquatic Microbiology	18UAMB1P1	2	1	20	30	50
II	AI-2	Basic Biotechnology	18UAMB21	4	3	25	75	100
	AI-P2	Techniques in Biotechnology	18UAMB2P1	2	1	20	30	50
III	AII-1	Bioinstrumentation	18UAMB31	4	3	25	75	100
	AII-P1	Techniques in Bioinstrumentation	18UAMB3P1	2	1	20	30	50
IV	AII-2	Pharmaceutical Microbiology	18UAMB41	4	3	25	75	100
	AII-P2	Techniques in Pharmaceutical Microbiology	18UAMB4P1	2	1	20	30	50
TOTAL				24	16			600

PART IV – NON-MAJOR COURSE (FOR OTHER MAJOR STUDENTS)

SEM	Sub	Title of the paper	S.CODE	H/W	C	MARKS		
						I	E	T
III	NME-I	Vermiculture and Mushroom	18UNMB31	2	2	25	75	100
IV	NME-II	Aquaculture & Apiculture	18UNMB41	2	2	25	75	100
TOTAL				4	4			200
Part IV – SEC/SBC								
V	SEC-I	Food Processing & Quality Control	18USMB51	2	2	25	75	100
VI	SEC-II	Basic Dietetics	18USMB61	2	2	25	75	100
VI	SBC	Personality Development	18USPD62	2	2	25	75	100
TOTAL				6	6			300
Part IV – EVS & Value Education								
I	EVS	Environmental Studies	18UENS11	2	2	25	75	100
II	VE	Value Education I	18USVE2A	2	2	25	75	100
		Value Education II	18USVE2B					
TOTAL				4	4			200

PART – V – Extension Activities

SEM	Extension Activities (Choose anyone)	S.CODE	H/W	C	MARKS		
					I	E	T
I to IV	NCC	18UEXNCC		1			100
	NSS	18UEXNSS					
	Physical Education	18UEXPHE					
	Red Ribbon Club	18UEXRRC					
	Youth Red Cross	18UEXYRC					
	Youth Welfare	18UEXYWL					
	Yoga	18UEXYOG					
III to IV	Sadakath Outreach Programme (SOP)	18UEXSOP		1*			
Total			-	1+1*			100

முதல் பருவம்			
PART - 1 TAMIL			
TA - 1	இக்காலத்தமிழ்		18ULTA11
Hrs/Week: 6	Hrs/Sem: 90	Hrs/Unit: 18	Credits:4

நோக்கம்

1. தமிழ்ப்படைப்பிலக்கியங்களான புதுக்கவிதைகள், சிறுகதைகள் ஆகியவற்றை முதல் வைத்தல்
2. சமூகம் பற்றிய சிந்தனைகளைப் படைப்பிலக்கியங்கள் மூலம் ஏற்படுத்துதல்.

அலகு - 1 தமிழ்க்கவிதைகள்

- | | |
|--------------------------------------|------------------------------|
| 1. பரம்பொருள் வாழ்த்து | - மகாகவி பாரதியார் |
| 2. தமிழின் இனிமை | - பாவேந்தர் பாரதிதாசன் |
| 3. கொக்கு | - ந.பிச்சமூர்த்தி |
| 4. நான் | - தருமு சிவராம் (பிரமிள்) |
| 5. முக்காலம் | - சி.மணி |
| 6. தோழர் மோசிகேரனார் | - ஞானக்கூத்தன் |
| 7. நகுலன் கவிதைகள் | - நகுலன் |
| 8. எதிர்வரும் யாவரும் | - கல்யாண்ஜி |
| 9. ஆயிரம் திருநாமம் பாடி | - கவிக்கோ அப்துல் ரகுமான் |
| 10. மரங்களைப் பாடுவேன் | - வைரமுத்து |
| 11. இளைய தோழனுக்கு | - மு.மேத்தா |
| 12. செய்யுள் | - கலாப்ரியா |
| 13. பெயர் தெரியாப்பறவை | - தேன்மொழிதாஸ் |
| 14. நிசப்த்தத்தில் குளிரும் வார்த்தை | - அனார் |
| 15. முதல்துளி | - பாலைவன லாந்தர் |
| 16. இந்தக்காலம் | - மனுஷ்யபுத்திரன் |
| 17. பூவின் பதில் | - நாகூர் ருமி |
| 18. அறிவுமதி கவிதைகள் | - அறிவுமதி |
| 19. வேர் பிடித்த மரம் | - க.அம்சப்ரியா |
| 20. நட்சத்திரக் கிழவி | - ப.சுடலைமணி |
| 21. கீதாஞ்சலி | - மகாகவி இரவீந்தரநாத் தாகூர் |
| 22. ஜென் கவிதைகள் | - பாவேஷா |

அலகு - 2 சிறுகதை இன்பம்

- | | |
|-------------------------|----------------------------|
| 1. விடியுமா? | - கு.பா.ராஜகோபாலன் |
| 2. காலனும் கிழவியும் | - புதுமைப்பித்தன் |
| 3. கதவு | - கி.ராஜநாராயணன் |
| 4. காலத்தின் ஆவர்த்தனம் | - தோப்பில் முஹம்மது மீரான் |
| 5. சொர்க்கக் கன்னிகை | - கருணா மணாளன் |
| 6. செடிகளுக்கு | - வண்ணதாசன் |
| 7. கனவில் உதிர்ந்த பூ | - நாரும்பூநாதன் |
| 8. சங்காத்தி | - தீன் |
| 9. ராஜமீன் | - கீரனூர் ஜாகீர்ராஜா |

அலகு - 3 கட்டுரைக் கனிகள்

1. தமிழில் ஹைக்கூ கவிதைகள்
2. கவிக்கோ அப்துல் ரகுமானின் கவிதைகள்
3. நாட்டுப்புற இலக்கியங்கள்
5. இணையத்தில் தமிழ்
6. தமிழ்ச் சிறுகதை இலக்கியம்
7. இயற்கையைக் கொண்டாடும் ஜென் கவிதைகள்

அலகு - 4 இலக்கியவரலாறு

1. தமிழ்ப் புதுக்கவிதை தோற்றமும் வளர்ச்சியும்
2. தமிழ்ச் சிறுகதை தோற்றமும் வளர்ச்சியும்
3. தற்காலச் சிறுகதையாசிரியர்கள் ஓர் அறிமுகம்
4. புதுக்கவிதைகள் எழுதப்பயிற்சி தந்து மாணவர் கவிதைத் தொகுப்பை வெளியிடல்.

அலகு - 5 எழுத்து இலக்கணம் & எழுத்து வகைகள் அறிமுகம்

1. முதலெழுத்துகள், சார்பெழுத்துகள், சுட்டெழுத்துக்கள், வினாவெழுத்துகள்
2. மொழி முதல் எழுத்துகள், மொழி இறுதி எழுத்துகள், வல்லினம் மிகுமிடங்கள், வல்லினம் மிகாவிடங்கள்.
3. நாளிதழ்களில் இடம்பெறும் செய்திகளில் பிழைகளைக் கண்டறிந்து எழுதப்பயிற்சி

பாடநூல்

“இன்பத்தமிழ்”

சதக்கத்துல்லாஹ் அப்பா கல்லூரித் தமிழ்த்துறை வெளியீடு
ரஹ்மத்நகர், திருநெல்வேலி & 627 011.

பார்வை நூல்கள் மற்றும் வழிகாட்டு இணையதளங்கள்

1. வல்லிக்கண்ணன்
புதுக்கவிதை தோற்றமும் வளர்ச்சியும்
2. ந.சுப்புரெட்டியார்
புதுக்கவிதை போக்கும் நோக்கம்
3. பேராசிரியர் சு.பாலசந்திரன்
புதுக்கவிதை & ஒரு புதுப்பார்வை
4. எஸ். ராமகிருஷ்ணன்
கதாவிலாசம்
விகடன் பிரசுரம்
757, அண்ணாசாலை
சென்னை & 600 002.

இணையதளங்கள்

1. www.tamilvu.org
2. www.azhiyasudargal.blogspot.in
3. www.neelamegam.blogspot.in
4. www.jeyamohan.in
5. www.sramakrishnan.com

SEMESTER - I			
AR-1	APPLIED GRAMMAR AND TRANSLATION-I		18ULAR11
Hrs/ Week: 6	Hrs/ Sem: 90	Hrs/ Unit: 18	Credits: 4

Objectives: To enable the students to learn Alphabets, Pronunciation, Basic Grammar, Reading, Writing of Arabic Language

Unit I: Lessons 1 to 4 (Textbook – 1)

من الدرس الأول إلى الدرس الرابع

Unit II: Lessons 5 to 8 (Textbook – 1)

من الدرس الخامس إلى الدرس الثامن

Unit III: Grammar Portions (Textbook – 2)

- 1) Words and the types of words (أجزاء الكلام)
- 2) Nominal Sentence (الجملة الاسمية)
- 3) Adjective and Noun-qualified (الصفة والموصوف)
- 4) Subject and Predicate
- 5) Masculine and Feminine (المذكر والمؤنث)
- 6) Interrogatives (أدوات الاستفهام)
- 7) Singular, Dual and Feminine (المفرد والتثنية والجمع)
- 8) Possessiveness (المضاف والمضاف إليه)
- 9) Detached Pronouns (الضمائر المنفصلة)
- 10) Prepositions (حروف الجر)
- 11) Demonstrative pronouns (أسماء الإشارة)
- 12) Relative pronouns (الأسماء الموصولة)

Unit IV: Lessons 9 to 12 (Textbook – 1)

من الدرس التاسع إلى الدرس الثاني عشر

Unit V: Lessons 13 to 16 (Textbook – 1)

من الدرس الثالث عشر إلى الدرس السادس عشر

TEXTBOOKS

1. Duroosul Lughatil Arabiya Part – I Lessons 1 to 16 only by Dr. V. Abdur Rahim. Available at: Islamic foundation Trust, 78 Perambur High Road, Perambur, Chennai- 600 012.
2. Arabic for Beginners (selected topics only) by Dr. Syed Ali (Former HOD of Arabic, The New College, Royappettach, (Chennai) (International Edition 2001) (UBS Publishers & Distributors Ltd) 5, Ansari Road New Delhi -110 002.

I SEMESTER			
Part – II English			
EN I A	Prose, Poetry and Grammar - I		18ULEN11
Hrs/ Week: 4	Hrs/ Sem: 60	Hrs/ Unit: 12	Credits:2

Objectives:

1. To answer comprehensive questions on passages of moderate level of difficulty.
2. To write a critical appreciation of the prescribed poems.
3. To write grammatically.

UNIT I PROSE

- | | |
|--|-----------------------|
| 1. Education Provides a Solid Foundation | - A.P. J. Abdul Kalam |
| 2. Love Story | - Maneka Gandhi |

UNIT II PROSE

- | | |
|----------------------------------|--------------------|
| 3. Speech on Indian Independence | - Jawaharlal Nehru |
| 4. Film-Making | - Satyajit Ray |

UNIT III POETRY

- | | |
|--------------------------------|------------------|
| 1. In the Bazaars of Hyderabad | - Sarojini Naidu |
| 2. Middle Age | - Kamala Das |

UNIT IV GRAMMAR

1. Parts of Speech: Verb
2. Tenses

UNIT V COMMUNICATION SKILLS

1. Unseen Passages
2. Letter Writing: Personal and Business Letters
3. Curriculum Vitae (CV)

TEXTBOOK:

Kulat L. Ambadas, Dr. Joshi, Sandeep. et. al. (ed). Blooming Buds. Hyderabad: Orient BlackSwan, 2017.

I SEMESTER			
EN I B	ENGLISH FOR COMMUNICATION		18ULEC11
Hrs/ Week: 2	Hrs/ Sem: 30	Hrs/ Unit: 6	Credits:2

Objectives:

- To teach students basic Grammatical categories.
- To teach students the four skills viz. Listening, Speaking, Reading and Writing and to impart language skills through tasks.
- To inculcate in students the skills necessary for social and academic circumstances.

UNIT I

Parts of Speech (Pages 5 to 17)

UNIT II

Listening and Speaking (Pages 22 to 34) and (56 to 59)

UNIT III

Reading (Pages 35 to 45)

UNIT IV

Writing - I

Punctuation and Kinds of Sentences (Pages 46 to 55)

UNIT V

Writing - II

Filling in Forms & Wrap-up (Pages 60 to 78)

TEXTBOOK:

Board of Editors, *Content and Language Integrated Learning to Enhance Communication Skills. Semester I Module 1*. Chennai: Tamil Nadu State Council for Higher Education, 2017.

I SEMESTER		
DSC-1	INTRODUCTION TO MICROBIAL WORLD	18UCMB11
Hrs/Week:4	Hrs/Sem: 4 X 15= 60	Credits:4

UNIT – I History and Scope of Microbiology(10 hours)

Contribution by pioneers-Spontaneous generation – Antony Van Leeuwenhoek, Louis Pasteur, Robert Koch, Edward Jenner, Alexander Fleming, Winogradsky – Recent contributions – Haeckel's three kingdom concept, Whittaker's five kingdom concept.

UNIT – II Structure of Prokaryotic cell and Eukaryotic cell(14 hours)

Structure and functions of Capsule, Flagella, Fimbriae or Pili; The cell wall- chemical composition, characteristics and functions of cell wall, Plasma membrane (Fluid mosaic model), mesosomes, Ribosomes, Cytoplasm, Nucleoids, Nucleus, Cytoplasmic inclusions, Spores and Cysts. Difference between the prokaryotic and eukaryotic organisms.

UNIT – III Microscopy (12 hours)

Principles and applications of simple, compound, bright field, dark field, phase contrast, fluorescent and electron microscopy.

UNIT –IV Sterilization and Disinfection (12 hours)

Sterilization: Instruments, Principles and methods – Physical (moist heat, dry heat, filtration, pasteurization, tyndallization, radiations) and Chemical (alcohols, aldehydes, phenols, halogens, metallic salts, gases, quaternary ammonium compounds and hypochlorite's).

UNIT – V Culture techniques (12 hours)

Isolation, Purification (Spread, Pour, Streak) and Preservation of microorganisms, Types of growth media- purpose- General, Selective & differential- Nutrient, MacConkey agar, Enrichment – blood agar, transport media.

REFERENCE BOOKS:

- 1) Prescott L.M., Harley J.P., and Klein D.A. 2008, Microbiology (7th edition) McGraw- Hill Inc, New York.
- 2) Tortora G.J., Funke B.R., and Case C.L. 2001, Microbiology – An Introduction (7th edition) Pearson.
- 3) Dubey R.C., and Maheswari, S. 2003, A Textbook of Microbiology, S. Chand & Co, New Delhi.
- 4) Pelczar Jr., M.J. Chan E.C.S., and Kreig N.R. 1993, Microbiology-McGraw- Hill Inc, New York.
- 5) Roger Y. Stanier, John L. Ingraham, Mark L. Wheelis, R. Painter, 1992, General microbiology (5th edition) Macmillan, London

I SEMESTER		
DSC-2	MICROBIAL DIVERSITY	18UCHMB12
Hrs/Week:4	Hrs/Sem: 4 X 15= 60	Credits:4

UNIT – I Major Characteristics of Microorganism (12 hours)

Morphological, Chemical, Cultural, Metabolic, Antigenic, Genetic, Pathogenicity - Ecological characteristics - Microbial Classification - Nomenclature and Identification-Taxonomic Groups-Goals of Classification-General Methods of classifying bacteria.

UNIT – II Bacteria and other special groups (15 hours)

Archaeobacteria, Methanogens, Sulphur bacteria Halophiles, Barophiles, Gliding bacteria, Sheathed bacteria. Cultural and Biochemical characters of aerobic gram positive - (cocci – *Streptococcus sp*, rod – *Bacillus sp*) – gram negative (Cocci – *Neisseria sp*, rod – *Pseudomonas sp*). Anaerobic gram positive (Cocci- *Pepto streptococcus sp*, rod – *Clostridium sp*), Gram negative (cocci – *Veillonella sp*, rod – *Bacteriodes sp*). Facultative – *Escherichia coli*, *Spirochetes*.

UNIT – III Virology (10 hours)

Virus – Introduction, structure, classification based on morphology and genetic material, plant virus (TMV), Animal virus (Adenovirus), bacteriophage (T4 series).

UNIT –IV Mycology (10 hours)

Fungi – General introduction, Morphology, Alexopoulous classification and their general features - reproduction – filamentous fungi (Actinomycetes), molds (*Aspergillus*), macroscopic fungi (mushroom-*Agaricus bisporus*) – unicellular fungi (Yeast-*Saccharomyces cerevisiae*)

UNIT – V Phycology (13 hours)

Algae - General characteristics, algal diversity, morphology, classification – blue green algae (*Nostoc*) – Red algae (*Gracilaria*) - Protozoa – General introduction –morphology, classification - Sarcodina (*Entamoeba histolytica*) –Mastigophora (*Euglena gracilis*)

REFERENCE BOOKS:

1. Stanier, Y. Roger, John L. Ingrahm, Mark L. Wheelis and Page R. Painter, 2003. General Microbiology V Ed. MacMillan Press Ltd. New Jersey.
2. R.C. Dubey, 2004 Textbook of Microbiology S. Chand and Company Ltd.,
3. Graham S Wilson and Arnold Ashley Miles, 1975, Topley and Wilson's Principles of Bacteriology, Virology and Immunity (6th edition) Edward Arnold Ltd, London.
4. Pelczar Jr., M.J. Chan E.C.S., and Kreig N.R. 1993, Microbiology McGraw- Hill Inc, New York.

I SEMESTER			
Allied I	AQUATIC MICROBIOLOGY		18UAMB11
Hrs/Week:4	Hrs/Sem: 4 X 15= 60	Hrs/Unit: 12	Credits:3

Unit I: Freshwater Ecosystem (12 hours)

Introduction- Microorganisms of the freshwater habitat-Lentic Habitat – Structure-Biota of Lentic habitat, Lotic Habitat- Structure-Biota of Lotic Habitat

Unit II: Marine Ecosystem(12 hours)

Physical and chemical characteristics of marine ecosystem-Structure of the sea-Upwelling-Downwelling-Biota of the sea, General characteristics-Functions of marine flora, Estuarine Ecosystem-Biota of Estuarine—Mangrove Ecosystem-Biota of mangroves.

Unit III: Microbes and Hydrosphere (12 hours)

Microbiology of Water- Bacteriological analysis of water- Methods of studying marine microorganisms- Collection, enumeration, isolation and identification based on morphological, physiological and biochemical characteristics- Preservation of marine microbes (Halophilic, Psychrophilic, Hydrothermal vents, Barophilic) Microbial nutrition- Influence of environmental factors on microbial growth and activity.

Unit IV: Role of microbes in water pollution (12 hours)

Water pollution –Total plate count Coliforms – Concept- indicator organism-MPN estimation–Membrane filtration technique-Tests for Enteric bacteria- Isolation and identification of faecal coliforms. Eutrophication- Biofilm formation- Water borne diseases- Purification of water- Recycling of water.

Unit V: Applications of Aquatic microorganisms (12 hours)

Probiotic bacteria and their importance in aquaculture- Aquatic Microbes of Biotechnological importance- Primary and secondary metabolites- Bioactive compounds from marine microbes.

REFERENCE BOOKS:

1. Mitchel, R., Dong gu, Ji, 2010, Environmental Microbiology. Wiley- John Black well Publishers, New York.
2. Vijaya Ramesh, K. 2004, Environmental Microbiology. MJP Publishers, Chennai.
3. C.B. Munn (2003) Marine Microbiology: Ecology and applications.

I SEMESTER		
DSCP – 1	CORE MICROBIOLOGY PRACTICALS-I	18UCMB1P1
Hrs/Week:2	Hrs/Sem: 2 X 15= 30	Credits: 1

TECHNIQUES IN MICROBIOLOGY & MICROBIAL DIVERSITY

1. Safety guidelines.
2. Instruments used in Microbiology (Autoclave, Laminar air flow, Incubator, Hot-air oven).
3. Hay mount to show different types of microbes.
4. Hanging drop technique.
5. Simple staining.
6. Negative Staining.
7. Gram's staining.
8. Spore Staining.
9. Capsule staining.
10. Lactophenol cotton blue staining-Fungi.
11. Wet mount preparation of yeast- curd.
12. Sterilization techniques and preparation of different types of media.
13. Serial dilution technique.
14. Plating techniques – Pour plate, Spread plate, Streak plate.
15. Enumeration of bacteria in water and soil samples.

REFERENCE BOOKS:

1. Laboratory Manual in General Microbiology – Kannan 1996.
2. A laboratory Manual Microbiology – Cappuccino J.G, and Sherman. N, 1996.

I SEMESTER		
AI-P-1	CORE MICROBIOLOGY PRACTICALS-I	18UAMB1P1
Hrs/Week:2	Hrs/Sem: 2 X 15= 30	Credits: 1

TECHNIQUES IN AQUATIC MICROBIOLOGY

1. Isolation of microorganism (bacteria, fungi) from fresh water.
2. Isolation of microorganism (bacteria, fungi) from marine water.
3. Isolation and identification of fecal coliforms.
4. Isolation and identification of Halophilic bacteria.
5. MPN Technique.
6. Isolation and identification of water borne pathogen from water sample.
7. Isolation of Yeast /Mould from water sample.

REFERENCE BOOKS

1. Cappuccino. J.G. and Sherman. N. 1996, Microbiology – A Laboratory Manual. Benjamin Cummins. New York.
2. Kannan. N. 1996, Laboratory Manual in General Microbiology. Palani Paramount Publication, Palani.
3. Jayaraman, J. 1985, Laboratory Manual in Biochemistry. Wiley Eastern Ltd., New Delhi.
4. Palanivelu. P. 2018, Analytical Biochemistry and Separation Techniques – A Laboratory Manual.

I SEMESTER			
EVS	ENVIRONMENTAL STUDIES		18UENS11
Hrs/ Week: 2	Hrs/ Sem: 30	Hrs/ UNIT: 6	Credits:2

Objectives:

1. To teach the students the availability of various natural resources and its significance.
2. To create an awareness to the students about the biodiversity and its conservation strategies.

UNIT - I: Nature of Environmental Studies

Goals, Objectives and guiding principles of environmental studies. Towards sustainable development - Environmental segments- Atmosphere, Hydrosphere, Lithosphere, Biosphere – definition. Pollution episodes – Hiroshima – Nagasaki, - Bhopal gas Tragedy, Fukushima. Stone leprosy in Taj Mahal

UNIT - II: Natural Resources

Renewable and Non-Renewable resources - classification.

- Forest resources: Use and over - exploitation, Afforestation and deforestation.
- Water resources: Use and over - utilization and conservation of surface and ground water - Rainwater harvesting.
- Marine Resources: Fisheries and Coral reefs.
- Mineral resources: Use and exploitation - environmental impacts of extracting and using mineral resources.
- Food resources: Effects of modern agriculture fertilizers - pesticide problem.
- Energy resources: Growing energy needs - use of alternate energy source - Solar cells & windmills.
- Land resources: Land degradation

UNIT - III: Ecosystem

- Concept of Eco-systems - Tropic level, food chains, food web and Ecological pyramids, Living conditions on other planets (Brief account).
Types, structure & Functions of the following:
 - a) Aquatic ecosystem
 - b) Grassland ecosystem
 - c) Forest ecosystem
 - d) Desert ecosystem

UNIT - IV: Biodiversity & Its Conservation

Introduction - Definition: Ecosystem diversity, Species diversity and Genetic diversity. Hot spots of biodiversity - Western Ghats, Eastern Himalayas and Gulf of Mannar. Threats to biodiversity - Habitat Loss, Poaching of wildlife and Man - wildlife conflicts.

Conservation of biodiversity: *In-situ* and *Ex-situ*.

UNIT - V: Environmental Pollution

Sources, effects, prevention and control measures of the following.

- a) Air pollution: Composition of clean air, Global warming, Ozone layer depletion.
- b) Water Pollution: Fresh water and Marine water.
- c) Noise Pollution
- d) Soil pollution

Bio degradable and Non Bio degradable wastes; Environmental Acts

- Air (prevention & Control of Pollution) Act.
- Environmental Protection Act
- Water (Prevention & Control of pollution) Act
- Environmental movements - Green peace and Chipco movement.
- Role of Central & State pollution Control Boards.

REFERENCE BOOKS:

1. Basic of Environmental Science. Vijayalakhmi, Murugesan and Sukumaran - Manonmaniam Sundaranar University publications.
2. Environmental Studies. John de Brito, Victor, Narayanan and Patric Raja - published by St. Xavier's College, Palayamkottai, 2008.
3. Environmental Science and Biotechnology. A.G. Murugesan and C. Raja Kumar - MJP Publishers.
4. Fundamental of Environmental pollution - Krishnan Kannan - Chand & Company Ltd., New Delhi, 1997.
5. Environmental Studies. S. Muthiah, Ramalakshmi publications, Tirunelveli.
6. Environmental Studies. V.M. Selvaraj, Bavani Publications, Tirunelveli.

இரண்டாம் பருவம்			
PART - 1 TAMIL			
TA- 2	சமயத்தமிழ்		18ULTA21
Hrs/Week: 6	Hrs/Sem: 90	Hrs/Unit: 18	Credits:4

நோக்கம்

1. பலசமயக் கருத்துக்களை ஒப்பிட்டுச் சமயநல்லிணக்கத்தோடு வாழ்வழிகாட்டுதல்
2. தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையத் தேர்வுக்கு மாணவர்களை ஆயத்தப்படுத்துதல்.

அலகு - 1தமிழ்ச் செய்யுள் (துறை வெளியீடு)

1. அ. திருநாவுக்கரசர்
 - சைவம்
 - மாசில் வீணையும்...
 - நாமார்க்கும் குடியல்லோம்...
 - அப்பன் நீ அம்மை நீ
- ஆ. திருஞானசம்பந்தர்
 - தோடுடைய செவியன்...
 - வேயுறு தோளிபங்கன்
 - மருந்தவை மந்திரம்...
 - பித்தா பிறைகுடி...
- இ. சுந்தரமூர்த்தி நாயனார்
 - பால் நினைந்தாட்டும்....
2. திருவாசகம் & மாணிக்கவாசகர்
 - ஆதியும் அந்தமும் இல்லா...
3. திருவெம்பாவை
 - ஒன்றே குலமும் ஒருவனே தேவனும்
4. திருமந்திரம் & திருமூலர்
 - வைணவம்
 - வையம் தகளியா...
 - அன்பேதகளியா...
 - திருக்கண்டேன்..
5. அ. பொய்கையாழ்வார்
 - மார்கழித் திங்கள்...
- ஆ. பூதத்தாழ்வார்
 - சமணம்
 - மக்கட் செல்வம்
- இ. பேயாழ்வார்
 - பௌத்தம்
 - மு.ரா.பெருமாள்
6. திருப்பாவை & ஆண்டாள்
 - கிறித்தவம்
 - கண்ணதாசன்
7. வளையாபதி
 - இஸ்லாம்
 - உமறுப்புலவர்
8. புத்தபிரான்
 - சதாவதானிசெய்குத்தம்பிபாவலர்
 - (குறிப்பிட்டபாடல்கள்)
9. இயேசு காவியம் (மலைப் பொழிவு)
 - பாசக்கயிற்றுவலை
- முதல் நான்கு பாடல்கள்
 - தக்கலை பீர்முகம்மது அப்பா
10. அல்லாஹ்
 - இறையருட் கவிமணி
11. நபிகள்நாயக மான்மிய மஞ்சரி
 - கா. அப்துல்கபூர்
12. குணங்குடி மஸ்தான் பாடல்கள்
 - நீதிஇலக்கியம்
 - ஒழுக்கமுடைமை
13. ஞானப்புகழ்ச்சி
 - கல்விகரையில்
14. அலகிலா அருளம்
 - கல்விகரையில்
15. திருக்குறள்
 - கல்விகரையில்
13. நாலடியார்
 - கல்விகரையில்

வாடிவாசல்

அலகு - 2 புதினம்

- சி.சு.செல்லப்பா,

காலச்சுவடு பதிப்பகம், நாகர்கோவில்

அலகு - 3 உரைநடை (தமிழ்த்துறை வெளியீடு)

போட்டித் தேர்வுகளுக்குக் கட்டுரை எழுதும் பயிற்சி

1. தமிழ் இலக்கியத்தில் சமயநல்லிணக்கச் சிந்தனைகள்
2. நபிகள்நாயகம் (ஸல்) அன்பின் தாயகம்
3. சதக்கத்துல்லாஹ் அப்பா அவர்களின் வாழ்வும் பணியும்
4. தமிழ் இலக்கியங்களில் மனிதநேயச் சிந்தனைகள்
5. தமிழ் இலக்கியத்தில் மதுஒழிப்புச் சிந்தனைகள்
6. சூஃபியச் சித்தாந்தமும் சித்தர்களும்

அலகு - 4

(போட்டித் தேர்வுத் தயாரிப்பு)

இலக்கியவரலாறு

1. சைவம், வைணவம், கிறித்தவம், இசுலாம் வளர்த்த தமிழ்
2. புகழ் பெற்றதமிழ் நூல்கள், நூலாசிரியர்கள்

அலகு - 5

தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையம் நடத்தும் போட்டித் தேர்வுக்குரிய

பொதுத் தமிழ் இலக்கணப்பகுதி & ஓர் அறிமுகம்

1. வேர்ச் சொல்லைக் கண்டறிதல்
2. பெயரெச்சம், வினையெச்சம், முற்றெச்சம் பற்றி அறிதல்
3. வினைத்தொகை, பண்புத்தொகை பற்றி அறிதல்
4. வினைமுற்று, வினையாலணையும் பெயர் கண்டறிதல்
5. இரட்டைக்கிளவி, அடுக்குத் தொடர் அறிதல்
6. வேற்றுமைத் தொகையைக் கண்டறிதல்

பாடநூல்

நற்றமிழ், சதக்கத்துல்லாஹ் அப்பா கல்லூரித் தமிழ்த்துறை வெளியீடு

வழிகாட்டு இணையதளங்கள்

1. www.noolulagam.com
2. www.tamilauthors.com
3. www.tnpsc.gov.in
4. www.tnpscexams.in
5. www.tamilvu.org

SEMESTER - II			
AR-2	APPLIED GRAMMAR ANDTRANSLATION-II		18ULAR21
Hrs/ Week: 6	Hrs/ Sem: 90	Hrs/ Unit: 18	Credits: 4

Objectives: To make the students to develop the skill of basic Arabic Grammar and Translation skills from Arabic to English vice-versa.

Unit I: Lessons 1 to 3 (Textbook – 1)

من الدرس الأول إلى الدرس الثالث

Unit II: Lessons 4 to 6 (Textbook – 1)

من الدرس الرابع إلى الدرس السادس

Unit III: Grammar Portions (Textbook – 2)

- 1) Inna and Its sisters (إن وأخواتها)
- 2) Elative (اسم التفضيل)
- 3) Perfect Tense (الفعل الماضي) 4) Imperfect Tense (الفعل المضارع)
- 5) Doer and Object (الفاعل والمفعول)
- 6) Kaana and Its sisters (كان وأخواتها)
- 7) Classification of Verb into Sound and weak verb (تقسيم الفعل إلى صحيح ومعتل)
- 8) Transitive and Intransitive verb (الفعل اللازم والمتعدي)
- 9) Verbal Noun (المصدر)

Unit IV: Lessons 7 to 9 (Textbook – 1)

من الدرس السابع إلى الدرس التاسع

Unit V: Lessons 10 to 12 (Textbook – 1)

من الدرس العاشر إلى الدرس الثاني عشر

TEXTBOOKS

1. DuroosulLughatil Arabiya Part – II Lessons 1 to 12only by Dr.V.Abdur Rahim.Available at: Islamic foundation Trust, 78 Perambur High Road,Perambur, Chennai- 600 012.
2. Arabic Tutor Part-I,II&III, By: Moulana Ebrahim Muhammad Karachi-Darullshaat.

II SEMESTER			
EN2	PART II ENGLISH Prose, Poetry and Grammar - II		18ULEN21
Hrs/ Week: 6	Hrs/ Sem: 90	Hrs/ Unit: 18	Credits: 4

Objectives:

1. To answer comprehensive questions on a passage of moderate level of difficulty.
2. To write a critical appreciation of the prescribed poems and write sentences in English grammatically.

UNIT I PROSE

- | | |
|--------------|--------------------|
| 1. Appro JRD | - Sudha Murthy |
| 2. Packing | - Jerome K. Jerome |

UNIT II PROSE

- | | |
|----------------------------------|-------------------|
| 3. How I Became a Public Speaker | - G. B. Shaw |
| 4. Values in Life | - Rudyard Kipling |

UNIT III POETRY

- | | |
|------------------------|------------------|
| 1. Money-Madness | - D. H. Lawrence |
| 2. No Men are Foreign | - James Kirkup |
| 3. On Another's Sorrow | - William Blake |

UNIT IV GRAMMAR

1. Subject-Verb Agreement
2. Verbs: Forms of 'to be', 'have', 'do'; modal auxiliaries

UNIT V COMMUNICATION SKILLS

1. Story Building
2. e-Communication: Fax; e-mail
3. Notices, Agendas and Minutes

TEXTBOOK:

Kulat L Ambadas, Dr. Joshi, Sandeep. et. al. (ed). *Blooming Buds*. Hyderabad: Orient BlackSwan, 2017.

II SEMESTER			
DSC-3	MICROBIAL PHYSIOLOGY AND METABOLISM	18UCMB21	
Hrs/ Week: 4	Hrs/Sem: 4 X 15= 60	Hrs/Unit: 12	Credits: 4

UNIT- I Microbial Nutrition (12 hours)

The common nutrient requirements- Growth Factors-Nutritional types of Microorganisms (Definitions and examples) - Autotrophs, Chemotrophs, Heterotrophs, Photoautotrophs, Photoorganotrophs, Chemo-lithotrophs (ammonia, nitrate sulphur, hydrogen, iron oxidizing bacteria), Chemo-organotrophs; effects of oxygen on growth, Classification on the basis of oxygen, pH, temperature requirement and tolerance.

UNIT- II Uptake of Nutrients by cell (12 hours)

Thermodynamics- Principle, First, Second and Third Laws of Thermodynamics.- Membrane transport system- Passive transport, Active transport, Facilitated diffusion, Group translocation and Iron transport,

UNIT III Growth of microorganisms (12 hours)

Growth Curve, Synchronous and Asynchronous growth, Factors influencing the growth of Microorganisms – Temperature, pH, Osmotic pressure, Moisture and Radiations

UNIT IV Microbial Metabolism (12 hours)

Basic concepts of metabolism - anabolism and catabolism. Anabolism - Glycogenesis and Gluconeogenesis. Catabolism: Carbohydrates - Glycolysis, TCA cycle, Pentose phosphate pathway, Entner - Doudoroff pathway. Electron transport system and oxidative and substrate level phosphorylation. Fermentation pathways – definition, Ethanol fermentation, homo and heterolactate fermentation – propionate fermentation.

UNIT V Photosynthetic bacteria (12 hours)

Oxygenic phototrophic bacteria, Anoxygenic phototrophic bacteria, Photosynthesis-Mechanism in green bacteria and cyanobacteria-Photosystem I&II- Pigments (Chlorophyll and bacteriorhodopsin). Photophosphorylation

REFERENCE BOOKS:

1. Lansing M.Prescott, John P. Harley and Donald A, Klein. 2007, Microbiology (7th edition). McGraw –Hill Company, Newyork
2. Dubey R.C., and Maheswari, S. 2003, A Textbook of Microbiology, S. Chand & Co, New Delhi.
3. Pelczar Jr., M.J. Chan E.C.S., and Kreig N.R. 1993, Microbiology- McGraw- Hill Inc, New York

II SEMESTER		
DSC-4	ENVIRONMENTAL MICROBIOLOGY	18UCMB22
Hrs/ Week: 4	Hrs/Sem: 4 X 15= 60	Credits: 4

UNIT –I Microbes in extreme environment (10 hours)

Environment induced genetic and physiological adaptations in microbes; Characteristic features of thermophiles, psychrophiles, methanogens, methylotrophs, acidophiles, alkalophiles, halophiles and their survival strategies.

UNIT – II Biogeochemical cycling (14 hours)

Carbon cycle- Sources of carbon- Mineralization of carbon- Decomposition and carbon dioxide evolution. Nitrogen cycle-Sources of Nitrogen, Steps in Nitrogen cycle, Mineralization, Immobilization, Ammonification, Nitrification, Denitrification. Sulfur Cycle-Sources, Mineralization of sulphur, Sulphur Assimilation, Reduction of sulphur, oxidation of sulphur. Phosphorus cycle- Sources, Solubilization of inorganic phosphorus, Immobilization. Iron cycle.

UNIT –III Biodegradation (12 hours)

Definition- Microbial degradation of lignocellulosic substances, keratin and chitin-microbial deterioration of paper, textile, wood, paint and metal corrosion.

UNIT –IV Bioremediation (10 hours)

Microbial degradation of pesticides; hydrocarbons; cleanup of sites polluted with oil spills, heavy metals and chlorinated solvents; biological treatment of effluents of sugar, pulp and paper industry.

UNIT –V Techniques in environmental microbiology (14 hours)

Introduction - Methods for determination of numbers, biomass and activities of microbes in soil, water, air and on plant surfaces and dead organic materials.

Microbes in waste disposal: Microbes in solid waste and sewage treatment systems. Disinfection of potable water supplies; Bacterial indicators of water safety; Microbial assessment of water quality; Standards test for tolerable levels of fecal contamination

REFERENCE BOOKS:

1. Vijaya Ramesh, K. 2004, Environmental Microbiology. MJP Publishers Chennai.
2. Dubey R.C., and Maheswari, S. 2003, A Textbook of Microbiology, S. Chand & Co, New Delhi.
3. Pelczar Jr., M.J. Chan E.C.S., and Kreig N.R. 1993, Microbiology- McGraw- Hill Inc, New York

II SEMESTER			
AI-2	BASIC BIOTECHNOLOGY		18UAMB21
Hrs/ Week: 4	Hrs/Sem: 4 X 15= 60	Hrs/Unit: 12	Credits: 4

UNIT I Introduction to Biotechnology (12 hours)

Biotechnology – definition - History, scope and importance of Biotechnology, Nucleic acid–Nucleosides, Nucleotides - Structure of Nucleotides – DNA- Composition and structure - DNA double helix – other types of DNA - structure - Size of the DNA molecule - Units of length - Denaturation of the DNA strands.

UNIT II Ribonucleic Acid (12 hours)

RNA- Structure of RNA – Types of RNA (Structure and functions) - Messenger RNA - Transfer RNA - Ribosomal RNA -other types of RNA. Proteins- Amino acids- types and classification of Amino acid. Purification and Separation of Nucleic Acids and Proteins– Gel Electrophoresis – AGE, SDS PAGE.

UNIT III Tissue culture (12 hours)

Plant Tissue culture - Micropropagation, Embryogenesis and Animal tissue culture – Different cell lines, Monolayer culture.

UNIT IV Applications of biotechnology in Medical and Pharmaceutical (12 hours)

Gene therapy- Ex vivo, In vivo gene therapy, DNA in infectious and genetic disease diagnosis –Methods of DNA assay – Nucleic acid hybridization, DNA Probes, the DNA chip – microarray of gene probes Tuberculosis, AIDS. Sickle cell anemia, Cancer, Diabetes. Recombinant Vaccine – Definition and Production, Monoclonal antibodies- Definition, Production and Application

UNIT V Applications of biotechnology in agricultural and environment (12 hours)

Growth- promoting bacteria in plants, biocontrol of Phytopathogens, Bio-fertilizer (*Rhizobium*)–Production, Applications, Phosphate Solubilizing bacteria. Environmental pollution- Definition, Sources of pollution, pollution monitoring and methods, biotechnological methods for management of pollution, Sewage and wastewater treatment.

REFERENCE BOOKS

1. Dubey, R. C. A - Textbook of Biotechnology (4thEdition) S. Chand & Company Limited, New Delhi.
2. Gupta, P.K. Elements of Biotechnology. Rastogi Publications, Meerut.
3. Jogdand, S.N. Gene Biotechnology (5thEdition) Himalaya Publishing House, Mumbai.
4. Sathyanarayanan U, Biotechnology, Books and Allied (P) Ltd

II SEMESTER		
DSCP – 2	CORE MICROBIOLOGY PRACTICALS-II	18UCMB2P1
Hrs/ Week: 2	Hrs/Sem: 2 X 15= 30	Credits: 1

TECHNIQUES IN MICROBIAL PHYSIOLOGY&ENVIRONMENTAL MICROBIOLOGY

1. Bacterial growth curve.
2. Biochemical test for identification of bacteria:
 - a. Indole test
 - b. Methyl red
 - c. Voges Proskeauer test
 - d. Citrate utilization
 - e. TSI agar test
 - f. Urease
 - g. Catalase
 - h. Oxidase
3. Carbohydrate fermentation tests:
 - a. Glucose
 - b. Lactose
4. Production of extra cellular enzymes:
 - a. Starch hydrolysis
 - b. Casein hydrolysis
 - c. Gelatin hydrolysis
 - d. Lipid hydrolysis
5. Cultural characteristics of microorganisms.
6. Isolation of bacteria from water.
7. Isolation of fungi from water.
8. Microbial assessment from phyllosphere (bacteria and fungi).
9. Evaluation of total Coliforms-MPN method.
10. Bacterial indicators for water quality.

REFERENCE BOOKS:

1. Kannan N. 1996, Laboratory Manual in General Microbiology – Palani Paramount Publ., Palani.
2. Cappuccino J.G, and Sherman N. 1996, A laboratory Manual Microbiology – Benjamin CUMMINS. New York.

II SEMESTER		
AI-P-2	TECHNIQUES IN BIOTECHNOLOGY	18UAMB2P1
Hrs/ Week: 2	Hrs/Sem: 2 X 15= 30	Credits: 1

TECHNIQUES IN BIOTECHNOLOGY

1. Isolation of genomic DNA from *E. coli*.
2. Isolation of Plasmid DNA.
3. Protein separation by SDS – PAGE.
4. Estimation of genomic DNA.
5. Estimation of RNA.
6. Immobilization of an enzyme or Cell.
7. Plant Tissue culture – Micro propagation (Demonstration).
8. Animal cell Culture – Monolayer Culture (Demonstration).

REFERENCE BOOKS:

1. J.G. Cappuccino and N. Sherman. 1996, Microbiology – A Laboratory Manual Benjamin Cummins. New York.
2. N. Kannan 1996, Laboratory manual in general microbiology. Palani Paramount Publ., Palani

II SEMESTER			
VE1	VALUE EDUCATION – I		18USVE2A
Hrs/ Week: 2	Hrs/ Sem: 30	Hrs/ Unit: 6	Credits: 2

Objectives:

1. To inculcate moral values in the minds of students.
2. To teach ethical practices to be adopted by students in their life.
3. To make students honest and upright in their life.

UNIT I

Islam – Meaning – Importance – A complete Religion – The religion accepted by God – Five Pillars of Islam – Kalima – Prayers – Fasting – Zakat – Haj.

Iman – Monotheism – Angels – Books – Prophets – Dooms Day – Life after death – Heaven and Hell.

UNIT II

Quran – The Book of Allah – Wahi – Revelation to Prophet Muhammad(sal) – Compilation – Perseverance – Structure – Content – Purpose – Source of Islamic Law– Sura Fathiha, Kafirun, Iqlas, Falakh and Nas.

UNIT III

Hadith – Siha Sitha – Buhari – Muslim – Tirmithi – Abu Dawood – Nasai – Ibn Maja – Collection of Hadith – Meaning of 40 Hadith.

UNIT IV

Life History of Prophet Muhammad (sal) – Aiamul Jahiliya – Prophet's Childhood and Marriage – Prophethood – Life at Mecca – Life at Medinah – Farewell Address – Seal of Prophethood.

UNIT V

Good character – Etiquettes – Halal and Haram – Duties towards Allah – Duties towards fellow beings – Masnoon Duas.

REFERENCE BOOKS:

1. V.A. Moahmed Ashrof – Islamic Dimensions – Reflection and Review on Quranic Themes.
2. The Presidency of Islamic Researchers – Revised & Edited – The Holy Quran.
3. M. Manzoor Nomani – Islamic Faith & Practice.
4. Abdul Hasan Ali Nadvi – Muhammad Rasulullah.
5. K. Ali – A Study of Islamic History.
6. Abdul Rahuman Abdullah – Islamic Dress code for Women.
7. Dr. Munir Ahamed Mughal – Code for Believers.
8. Abdul Malik Mujahid – Gems and Jewels.

II SEMESTER			
VE2	VALUE EDUCATION – II		18USVE2B
Hrs/ Week: 2	Hrs/ Sem: 30	Hrs/ Unit: 6	Credits: 2

UNIT I

Individual Morality – Objective of Moral life – Living in accordance with the code of Morality – the goodness of Morality – Morality and *Thirukural* – The need for faith.

UNIT II

Adherence to higher code of Morality – Fear of God – Good Moral Values – Duty to Parents – Teacher, respecting elders – Moral Etiquettes – Right-minded Principle – High Principles for Proper conduct.

UNIT III

Inculcating good attitudes – Open mindedness – Morale – analysing the pros and cons of good and bad – Service to others – Mind Power, tolerance, respecting others, showing love to others, patience – tranquility – Modesty, kindness and forgiveness.

UNIT IV

Quotations and moral Stories expressing Good characters of Great personalities – Life History of Great people: Mahatma Gandhi, Abraham Lincoln, Dr. A.P.J. Abdul Kalam.

UNIT V

Truth, the importance of uprightness, integrity, friendship – Health awareness on Alcohol and drug abuse – inculcating reading habit – reading good books – Hygiene – Dowry – Corruption.

TEXTBOOK:

Publication of Sadakathullah Appa College.

மூன்றாம் பருவம் PART - 1 TAMIL			
TA - 3	பயன்பாட்டுத்தமிழ்		18ULTA31
Hrs/Week: 6	Hrs/Sem: 90	Hrs/Unit: 18	Credits:4

நோக்கம்

1. தமிழின் காப்பியஇலக்கிய வளத்தை மாணவர்களுக்கு உணர்த்துதல்.
2. இந்திய ஆட்சிப் பணித்தேர்வுக்கு மாணவர்களை ஆயத்தப்படுத்துதல்.
3. செய்தி வெளிப்பாட்டு உத்திகளைத் கற்றுத் தந்து மாணவர்களை ஊடகவியலாளர்களாக உருவாக்க முயலுதல்

அலகு - 1தமிழ்ச் செய்யுள்திரட்டு (துறை வெளியீடு)

1. சிலப்பதிகாரம் - காட்சிக்காதை
2. மணிமேகலை - ஆபுத்திரன் திறம் அறிவித்த காதை
3. பெரியபுராணம் - கண்ணப்பநாயனார் புராணம்
4. கம்பராமாயணம் - வாலிவதைப்படலம்
5. இரட்சண்ய யாத்திரிகம் - தீயமகன் திருந்திய கதை
6. சீறாப்புராணம் - மானுக்குப் பிணைநின்றபடலம்

அலகு - 2

“ஐ.ஏ.எஸ். தேர்வும் அணுகுமுறையும்” வெ.இறையன்பு இ.ஆ.ப, நியூ செஞ்சரி புக் ஹவுஸ், அம்பத்தூர், சென்னை-8

அலகு - 3ஊடகப்படைப்பாக்கம்

- வானொலிக்கு உரைச்சித்திரம் தொலைக்காட்சி நிகழ்ச்சித் தயாரிப்புக்கு எழுதுதல்
- தொலைக்காட்சிச் செய்தியறிக்கை தயாரித்தல்.
- தமிழ் நாளிதழ்களுக்குச் சிறப்புக் கட்டுரைகள், வாசகர் கடிதங்கள் எழுதுதல் &இலக்கியப்படைப்பாளருடன் நேர்காணல்-தொலைக்காட்சி விவாதம்
- நேர்முக வருணனை
- சமூகஊடகங்களின் தாக்கம்

அலகு - 4 தமிழ் இலக்கியவரலாறு

- ஐம்பெரும் காப்பியங்கள்
- ஐஞ்சிறு காப்பியங்கள்
- சிற்றிலக்கியங்கள் (உலா, தூது, பிள்ளைத்தமிழ், பரணி)

அலகு - 5 இலக்கணம்

(தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையத்தின் பொதுத்தமிழ்

பிழைத் திருத்தம், சந்திப்பிழைகள், ஒருமை&பன்மை பிழைகள், மரபுப் பிழைகள்

- வழுவச் சொற்களை நீக்குதல், பிறமொழிச் சொற்களை நீக்குதல், வேர்சொல்லைச் தேர்வு செய்தல்.

பாடநூல்

இருந்தமிழ், சதக்கத்துல்லாஹ்அப்பா கல்லூரித் தமிழ்த்துறை வெளியீடு

பார்வை நூல்கள்

- | | |
|--------------------------------------|--|
| தமிழ் இலக்கியவரலாறு | க.பஞ்சாங்கம், அன்னம் அகரம் வெளியீடு, கும்பகோணம். |
| இதழியல் நுணுக்கங்கள் | -செண்பகா பதிப்பகம், சென்னை-17 |
| வானொலிநிகழ்ச்சிக் கலை | -சிந்துமலர் வெளியீடு, சென்னை |
| சீறாப்புராணம் மூலமும் பொழிப்புரையும் | -ஹாஜி எம்.முகமது யூசுப், இரண்டாம் பாகம் |
| மக்கள்ஊடகத் தொடர்பியல் | -மீடியா பப்ளிகேஷன்ஸ், மதுரை |
| தொலைக்காட்சி நிகழ்ச்சிக் கலை | -வள்ளுவன் வெளியீட்டகம், சென்னை. |

SEMESTER III			
AR-3	APPLIED GRAMMAR AND TRANSLATION-III		18ULAR31
Hrs/ Week: 6	Hrs/Sem: 90	Hrs/ Unit: 18	Credits: 4

Objectives: To enable the students to understand simple Arabic sentences and construct Arabic sentences simple by their own

Unit I:Lessons 13 to 16 (Textbook – 1)

من الدرس الثالث عشر إلى الدرس السادس عشر

Unit II:Lessons 17 to 19 (Textbook – 1)

من الدرس السابع عشر إلى الدرس التاسع عشر

Unit III:Grammar Portions (Textbook – 2)

- 1) Imperative and Prohibition (الأمر والنهي)
- 2) Original letters which are not enhanced (الفعل المجرد)
- 3.Original letters which are enhanced (مزيد فيه)
- 4) Subjunctive mood (الحروف الناصبة)
- 5) Jussive Mood (الحروف الجازمة)
- 6) Negative particles (ما و لا وما ولا النافيتان)
- 7) Number 1 to 10,000(العدد من الواحد إلى عشرة آلاف)

Unit IV:Lessons 20 to 22 (Textbook – 1)

من الدرس العشرون إلى الدرس الثاني والعشرون

Unit V:Lessons 23 to 25 (Textbook – 1)

من الدرس الثالث والعشرون إلى الدرس الخامس والعشرون

TEXTBOOKS

- 1) Duroosul Lughatil Arabiya Part – II Lessons 13 to 25 only by Dr. V.Abdur Rahim.

Available at: Islamic foundation Trust, 78 Perambur High Road, Perambur, Chennai- 600 012.

- 2) Arabic Tutor Part-I, II & III, By: Moulana Ebrahim Muhammad Karachi- Darul Ishaat

III SEMESTER			
EN 3	Part - II - English ONE-ACT PLAYS AND WRITING SKILL		18ULEN31
Hrs/ Week: 6	Hrs/ Sem: 90	Hrs/ Unit: 18	Credits: 4

Objectives:

1. To expose the conversational patterns to students and enable them to make use of the patterns in a given practical situation.
2. To write sentences in English grammatically.

UNIT I – ONE-ACT PLAYS

1. The Bishop's Candlesticks - Norman McKinnell
2. The Proposal - Anton Chekov
3. The Hour of Truth - Percival Wilde

UNIT II – ONE-ACT PLAYS

4. Aladdin and His Magic Lamp - Y. Sayed Mohammed
5. Tippu Sultan - Y. Sayed Mohammed
6. Evergreen Merchant of Venice - Y. Sayed Mohammed

UNIT III – WRITING SKILL

1. **Messages** (Pages 1-9 of *Written English for You* to be taught and the tasks given to be accomplished in the *Record of Writing*)
 - i) What is a message?
 - ii) When do we write messages?
 - iii) Why do we write messages?
 - iv) How do we write messages?
2. **Letters – 1** (Pages 10-20 *Written English for You* to be taught and the tasks given in pages 17 and 19 should be accomplished in the *Record of Writing*)
 - i) Letters for Ordering Supply of Goods
 - ii) Letters of Complaint
 - iii) Letters of Enquiry
3. **Letters – 2** (Pages 36-42 of *Written English for You* to be taught and the tasks given in the pages 38 and 44 should be accomplished in the *Record of Writing*)
 - i) Letters to inform your plan of visit
 - ii) Letters of Request
 - iii) Letters of Asking for Advice

UNIT IV – WRITING SKILL

4. **Essays** (Pages 66-79 to be taught and only the tasks 1-3 from pages 79 and 80 should be accomplished in the *Record of Writing*)
 - i) What is an Essay?
 - ii) Types of Essays.
 - iii) The structure of an Essay.
 - iv) Introductory paragraph.
 - v) Supporting paragraph.
 - vi) What can be the length of an Essay?
 - vii) Why am I writing this Essay?
 - viii) Who am I writing for?
 - ix) How to begin an Essay?
 - x) How to organize an Essay?
 - xi) What to avoid in writing an Essay?
5. **Narrating** (Pages 109-116 of *Written English for You* to be taught only the tasks 1 and 2 from pages 115 to 116 to be accomplished in the *Record of Writing*)
 - i) Describing events in a chronological order.

- ii) Narrating events from different points of view
- iii) Narrating events from different view point in time

UNIT V – WRITING SKILL

6. **Reporting** (Pages 127-136 be taught. The tasks given in pages 129- 134 and 136-137 must be accomplished in the *Record of Writing*)
 - i) News Reports
 - ii) Reporting events or Developments.
 - iii) Reporting Interviews and Press Conferences
 - iv) Reports of Meetings.
7. **Summarizing** (Pages 164-172 of *Written English for You* be taught and the tasks 1-3 in pages 172-178 to be accomplished in the *Record of Writing*)
 - i) What is a Summary?
 - ii) How to write a Summary?
 - iii) How long should a Summary be?
 - iv) Should the Summary be in a Paragraph?
 - v) Analysis of the process of Summarizing.

NOTE: Questions for Units III, IV and V should be framed from the tasks given in the prescribed textbook ***Written English for You.***

TEXTBOOKS

1. Compiled by a Board of Editors. *Plays for Pleasure*. Chennai: Paavai Publications, 2009.
2. Sayed Mohammed. Y, ed. *Three One-Act Plays*. Tirunelveli: Muhammed Taahaa Publications, 2011.
3. Radhakrishna Pillai. G, ed. *Written English for you*. Chennai: Emerald Publishers, 1990 (rpt. 2008).

III SEMESTER		
DSC -5	MICROBIAL BIOCHEMISTRY	18UCMB31
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 4

UNIT I Bioenergetics (10 hours)

Structure of atom – chemical bonds – Principles of bioenergetics. Laws of thermodynamics – Structure and functions of energy rich phosphate - ATP, PEP and creatine phosphate – Role of pH and buffers in biological systems.

UNIT II Carbohydrates (14 hours)

Introduction, Classification- monosaccharide-Structure, stereoisomers, structural isomers, mutarotation, and chemical reactions. Oligosaccharides-Dissaccharides-structure and importance of sucrose, lactose and maltose. Polysaccharides-structure and importance of homopolysaccharides and heteropolysaccharides.

UNIT III Proteins (14 hours)

Definition, classification and functions – structural levels of organization. Amino acids - Classification, Essential & Non-essential amino acids, structure and properties- solubility, ampholyte, Zwitterions isoelectric pH. Peptide bonds – Concepts of biological peptide bond formation, types.

UNIT IV Lipids (12 hours)

Classification - simple compounds. Chemistry of fatty acids, unsaturated and saturated fatty acids, triglycerides, saponification alkyl ether phospho glycerides, sterols, cholesterol, prostaglandins, glyco lipids. Function of lipids. Beta oxidation of fatty acids.

UNIT V Enzymes and Vitamins (10 hours)

Classification, occurrence, deficiency symptoms and biochemical functions of fat soluble and water-soluble vitamins. Enzymes – Definition, classification with example, active site, lock & key model, induced fit hypothesis. Enzyme Units – kinetics- factors affecting enzyme activity.

REFERENCE BOOKS:

1. Fundamentals of Biochemistry- J.L. Jain. S. Chand publication:2004.
2. Biochemistry -Agarwal. Global publications; 1999.
3. Textbook of Biochemistry-Edward Staunton West, Wilbert. R.Todd,Howard S. Mason, John T. Van Bruggen
4. Principles of Biochemistry- David. L. Nelson, Michael M. Cox, Lehninger
5. Fundamentals of Biochemistry –Donald Voet, Judith. G. Voet, Charlotte W.Pratt
6. Biochemistry- U. Sathyanarayana, Chakrapani; Edition 2 ;2007 Books and allied (P) Ltd.,

III SEMESTER		
DSE IA	MEDICAL LAB TECHNOLOGY	18UEMB3A
Hrs/ Week: 4	Hrs / Sem: 4x 15 = 60	Credits: 4

UNIT I Organization of the clinical laboratory (8 hours)

Role of Medical lab Technician- Safety regulation-first aid-clinical lab records-Units of measurement –laboratory calculations- Quality Control of lab findings.

UNIT II Blood(13 hours)

Composition, Function and separation of plasma proteins. Methods of collection of blood – Anticoagulants and its role. Haematology- Estimation of haemoglobin (cymethhaemoglobin method), RBC Count, WBC Count by using Haemocytometer. Differential count, Reticulocyte- Estimation of ESR, Platelet count.

UNIT III Blood clotting mechanism (10 hours)

Bleeding time-Clotting time determination-Blood grouping, Major and Minor cross matching – Rhesus typing, Coombs test.

UNIT IV Clinical Pathology (15 hours)

Urine analysis- Physical, Chemical and Microscopic examination of urine- Stool analysis- Physical, Chemical and microscopic examination of stool- Semen analysis- Physical, Chemical and microscopic examination of semen- Routine biochemical tests- Glucose, Protein, Urea, and Bilirubin.

UNIT V Agglutination tests (12 hours)

C reactive protein (CRP) test- RA test-Serodiagnosis of Streptococcal infections- WIDAL-Screening Tests – HBs Ag, HIV(ELISA and Western Blot Test), Malarial Parasite.

REFERENCE BOOKS:

1. Clinical Diagnosis by Laboratory Examination John A Kokmer.
2. Textbook of Pathology Vol. I & II – N.C. Dey
3. Clinical Laboratory Diagnosis – Levinson S A, Mac Fate R.D.
4. Clinical Lab. Methods & Diagnosis Vol. I & II – Alex C, S. L. Garelt.
5. Clinical Lab. Methods – John D Bengner, Philip G. Achermann, Gelsaon Toro.
6. Medical Laboratory Technology (Volume I, II & III) Procedure Manual for Routine Diagnostic Tests – Mukherjee Kanai L, Swarajit Ghosh. McGraw Hill Education.

III SEMESTER		
DSE IB	BIOINFORMATICS	18UEMB3B
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 4

UNIT-I: Introduction to computers (10 hours)

Bioinformatics -Definition, History; Computer - History and development of computers; generations of computers; (I, II, III, IV and V), classifications of computers; analog computers, digital computers, mainframe computers, miniframe computers, microcomputers, fundamentals of logical concepts. Digital Computers: Basic principle of operation of digital computers, structure of digital computers; arithmetic Unit, central Unit, memory Unit, Input Unit and output Unit; Internet - basics, connection, web browsing and URL.

UNIT-II: Data bases (12 hours)

Introduction – Types- Nucleic acid sequence data bases (NCBI, EMBL and DDBJ), Protein sequence data base-SWISS-PROT, and Structural databases – PDB. Organism specific databases.

UNIT-III: Sequence Alignments (12 hours)

Introduction – Types - Local and Global Alignment, Pairwise & Multiple sequence alignment. BLAST Analysis, Phylogenetics - CLUSTAL, PHYLIP & UPGMAS. Gene finding and gene scan.

UNIT-IV: Protein structure and prediction(14 hours)

Aminoacids-physical properties, types, Proteins- Primary structure, Secondary structure, Ramachandran plot, Tertiary structure, Quaternary structure. Prosite, Pfam, CATH and SCOP. Molecular visualization - Protein conformation and visualization tool (RASMOL).

UNIT-V: Drug discovery (12 hours)

Role of bioinformatics in drug discovery- Structure based drug design, ligand-based drug design, Insilico drug design, ADMET properties. Docking and prediction of drug quality. Microarray, Bioinformatics companies.

REFERENCE BOOKS:

1. Programming in ANSIC, E. Balagurusamy, 1991. Tata McGraw Hill.
2. Introduction to bioinformatics, 2001. AH wood, T.K. Parry smith DJ, Pearson education Asia.
3. C & Unix programming; A conceptual perspective, 1995. Kulti, Tata McGraw Hill.
4. Developing bioinformatics in computer skill, Gibas C, Jambeek P.S, oreilly, 2001.

III SEMESTER		
AII-1	BIOINSTRUMENTATION	18UEMB3B
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 3

UNIT I: Buffers (10 hours)

Preparation of buffers - Standard buffers - pH meter - pH- titration curve - Techniques of pH measurement.

UNIT II: Basic Instrumentation in microbiology (12 hours)

Autoclave- Hot air oven- Laminar air flow- Incubator- Spectroscopic Techniques- Beer-Lambert's Law- Principle, mechanism of colorimeter, Spectrophotometer.

UNIT III: Centrifugation Techniques (13 hours)

Introduction - Centrifugal force and Principles of sedimentation-Types of centrifugation – Uses of Centrifugation- Differential centrifugation-Density gradient centrifugation

UNIT IV: Chromatography Techniques (13 hours)

Introduction- Principles of separation- Paper Chromatography, Thin layer chromatography-HPLC-GLC.

UNIT V: Radioisotope techniques (12 hours)

Introduction- Types of radioactive decay-Half-life, Measurement of radioactivity- Biological Applications of radioisotope technique

REFERENCE BOOKS:

1. Bajpai PK (2010). Biological Instrumentation and Methodology. S. Chand&Co.Ltd., New Delhi
2. Palanivelu P (2004) Analytical Biochemistry and Separation Techniques. Third edition, MKU Co-op. Press Ltd., Madurai.
3. Veerakumari L (2015). Bioinstrumentation, MJP Publishers, Chennai.
4. John G Webster (2007). Bioinstrumentation, Wiley Publication, United States.

III SEMESTER		
DSCP 3	CORE MICROBIOLOGY PRACTICALS-III	18UCMB3P1
Hrs/ Week: 2	Hrs / Sem: 2 x 15 = 30	Credits: 1

TECHNIQUES IN MICROBIAL BIOCHEMISTRY

- 1) Preparation of standard and buffer solutions.
- 2) Estimation of Sugar by Anthrone method.
- 3) Estimation of proteins by Lowry's method.
- 4) Estimation of Ascorbic acid.
- 5) Estimation of reducing sugar by Benedict's method.
- 6) Determination of saponification value of fats.
- 7) Determination of Acid Value of fats.
- 8) Separation of Amino acid by Thin Layer Chromatography.
- 9) Separation of Amino acids by paper chromatography.

REFERENCE BOOKS:

1. J.G. Cappuccino and N. Sherman, 1996, Microbiology – A laboratory manual Benjamin Cummins, New York.
2. P. Palanivelu, 2004, Analytical Biochemistry and Separation Techniques. Third edition, MKU Co-op. Press Ltd., Madurai.
3. J. Jayaraman, 1985, Laboratory Manual in Biochemistry. Wiley Eastern Ltd., New Delhi.

III SEMESTER		
A-II-P-3	TECHNIQUES IN BIOINSTRUMENTATION	18UAMB3P1
Hrs/ Week: 2	Hrs / Sem: 2 x 15 = 30	Credits: 1

TECHNIQUES IN BIOINSTRUMENTATION

- 1) Preparation of Buffer and determination of pH using pH meter.
- 2) Verification of Beer-Lambert's Law using Spectrophotometer
- 3) Analysis of Silver Nanoparticles using Spectrophotometer
- 4) Separation of compounds from Plant Extract using Paper chromatography
- 5) Separation of compounds from Plant Extract using Thin layer chromatography
- 6) High performance liquid chromatography (Demonstration)
- 7) Separation of Protein using SDS-PAGE (Demonstration)

REFERENCE BOOKS

1. Cappuccino. J.G., and Sherman. N. (1996). Microbiology – A Laboratory Manual. Benjamin Cummins. New York.
2. Kannan. N. (1996). Laboratory Manual in General Microbiology. Palani Paramount Publication, Palani.
3. Guansekar. P. (1996). Laboratory Manual in Microbiology. New Age International Ltd., Publishers, New Delhi.
4. Sundararaj, T. (2005), Microbiology – Laboratory Manual. (1st Edition). Publn. Sundararaj, T, Chennai.
5. Jayaraman, J. (1985). Laboratory Manual in Biochemistry. Wiley Eastern Ltd., New Delhi.

IV SEMESTER		
NME 1	VERMI CULTURE AND MUSHROOM TECHNOLOGY	18UNMB31
Hrs/ Week: 2	Hrs / Sem: 2 x 15 = 30	Credits: 2

UNIT I Vermitechnology (6 hours)

Definition, Introduction and Scope- Importance of vermitechnology. Habitat of Earthworm- Soil, Chemical and biological changes brought by earthworm in soil.

UNIT II Vermiculture techniques (7 hours)

Steps involved in vermiculture-site selection for vermiculture, species selection, vermibed, inoculation of earthworms, feeding, suitable condition, Harvesting, vermiculture process-Factors influencing the culture of earthworms.

UNIT III Methods of Vermicomposting (5 hours)

Batch system, Continuous flow system, Pit method, Heap method, Bin or tray method. Vermiwash- Preparation, composition of verminwash, Applications of vermiwash. Role of vermicompost in crop production

UNIT IV Introduction to mushroom (6 hours)

Morphology – habitat- Importance of mushrooms – as food (Oyster mushroom) and medicines (Ganoderma).

UNIT V Mushroom cultivation (6 hours)

Mushroom cultivation – Spawn preparation and mushroom bed preparation- Applications – bioconversion of organic wastes into protein rich mushrooms.

REFERENCE BOOKS

1. Arumugam. N 2017, Vermitechnology, Saras Publication, Kanyakumari
2. Edwards, C.A. and Bohlen, P.J. 1996, Ecology of earthworms-3rd Edition, Chapman and hall.
3. Jsmail, S.A. 1970, Vermicology. The biology of earthworms. Orient Longman, London.
4. Lee, K.E. 1985, Earthworms - Their ecology and relationship with soil and land use, Academic Press, Sydney.
5. Ranganathan L.S. 2006, Vermibiotechnology from soil health to human health. Agrobios India.
6. Gupta P.K. 2008, Vermicomposting for sustainable agriculture. Agrobios. India.
7. Philip G. Miles, Shu-Ting Chang, 1997, Mushroom biology, World scientific, Singapore.
8. Kaul, T.N. 1999, Introduction to mushroom science, Oxford & IBH Co., Pvt. Ltd., New Delhi.
9. Bahl, N.1988, Handbook on mushrooms. Oxford & IBH Co., Pvt. Ltd., New Delhi.

நான்காம் பருவம்			
PART - I - TAMIL			
TA - 4	சங்கத்தமிழ்		18ULTA41
Hrs/Week: 6	Hrs/Sem: 90	Hrs/Unit: 18	Credits: 4

நோக்கம்

1. சங்க இலக்கியம் குறித்த புரிதலை மாணவர்களுக்கு ஏற்படுத்துதல்.
2. இணையத்தில் தமிழின் இடத்தினை உணர்த்துதல்.
3. மாணவர்களை இணையத்தைப் பயன்படுத்த அறிவுறுத்துதல்.

அலகு - 1

தமிழ்ச் செய்யுள் (துறை வெளியீடு)

நற்றிணை (பாடல் எண்கள் 68-95), குறுந்தொகை (பாடல் எண்கள் 2, 23), ஐங்குநாறு (பாடல் எண்கள் 23, 49), பதிற்றுப்பத்து (பாடல் எண் 69), பரிபாடல் (செவ்வேள்-திருப்பரங்குன்றத்தின் அமைப்பும் சிறப்பும்-பாடல் எண்கள் 1 முதல் 20 வரை), கலித்தொகை (பாடல் எண் 10), அகநானூறு (பாடல் எண் 44), புறநானூறு (பாடல் எண் 187) மற்றும் பத்துப்பாட்டில் குறிஞ்சிப்பாட்டு முதல் 98 வரிகள்.

அலகு-2

நம்பிக்கைத் தமிழ் - கல்லூரித் தமிழ்த்துறை வெளியீடு,

அலகு - 3

இணையமும் தமிழும்

- தமிழ் இலக்கியப் பதிவுகளும் இணையமும்
- இணையத்தில் படைப்பை வெளியிடும் முறைகள்
- தமிழ் விக்கிபீடியா -அறிமுகம்
- வலைப்பூக்களை உருவாக்க மாணவர்களுக்குப் பயிற்சிதரல்
- தமிழ் மின் நூலகம்
- மின் நூல்களும் வாசகத்தன்மையும்
- புகழ்பெற்ற தமிழ் இலக்கியத் தளங்கள் குறித்த அறிமுகம்.

அலகு - 4

இலக்கியவரலாறு

- சங்க இலக்கியம் ஓர் அறிமுகம்
- எட்டுத்தொகை, பத்துப்பாட்டு
- சங்க இலக்கியத் திணைக் கோட்பாடும் சங்ககால மக்கள் வாழ்வியலும்

அலகு - 5

இலக்கணம்

- தமிழர் வாழ்வில் அகமும் புறமும்
- ஐவகை நிலங்களின் முதல், கரு, உரிப் பொருட்கள்
- அறத்தொடு நின்றல்
- களவு, கற்பு விளக்கம்
- புறத்திணைகள்

பார்வை நூல்கள்

தமிழ்க் கணினிஇணையப்பயன்பாடுகள் - முனைவர் துரை.மணிகண்டன்
 த.வானதி
 கமலினிபதிப்பகம்
 கச்சமங்கலம் அஞ்சல்,
 தோகூர் வழி,
 தஞ்சாவூர் மாவட்டம்

இணையத் தமிழ்

- தமிழ்த்துறை வெளியீடு
 சதக்கத்துல்லாஹ் அப்பா கல்லூரி
 திருநெல்வேலி.

வழிகாட்டு இணையதளங்கள்

1. www.selliyal.com
2. www.tamilvu.org
3. www.tamilcanadian.com
4. www.bbc.com
5. www.tamilinayam.com

	SEMESTER - IV		
AR-4	CLASSICAL PROSE		18ULAR41
Hrs/ Week: 6	Hrs/ Sem: 90	Hrs/ Unit: 18	Credits:4

Objectives: To impart the moral values in the students and build their personality to make them better citizens to serve the society.

Unit I: Verses from 1 to 12 from (Sura – al – Hujraat) (Textbook – 1)

من الآية "يا أيها الذين آمنوا لا تقدموا" إلى الآية "يا أيها الذين آمنوا اجتنبوا"

Unit II: Verses from 10 to 18 from (Sura – al – Hujraat) & verses from Surah Lqman from (12 to 19) (Textbook – 1)

من الآية "يا أيها الناس إنا خلقناكم" إلى الآية "إن الله يعلم غيب السموات"

من الآية "ولقد آتينا لقمان الحكمة" إلى الآية "واقصد في مشيك"

Unit III: Collection and compilation of Quran and Hadeeth,

History of Imam Abu Hanifa, Malik, Asshafi, Ahmad, Bukhari,

Muslim, Abu Dawood, At-Tirmidi, An-Nasaee and Ibn-Majah

(Textbook – 1)

Unit IV: Hadeeth 1 to 10 (Textbook – 2)

من الحديث "لا تأكلوا بالشمال" - إلى الحديث "خيركم من تعلم القرآن"

Unit V: Hadeeth 11 to 20 (Textbook – 2)

من الحديث "لا تمنعوا نساءكم" - إلى الحديث "حق المسلم على المسلم خمس"

TEXTBOOK

1. Tafseer Suratul Hujuraath and from Suraah Luqman (verses from 12-19) A study material prepared by Dept. of Arabic, Sadakathullah Appa College, Rahmath Nagar, Tirunelveli – 627 011.
2. Hadeeth: Ahadeeth Sahlah, Available at: Islamic foundation Trust, 78, Perambur High Road, Perambur, Chennai – 600012.

IV SEMESTER			
EN4	Part - II - English A PRACTICAL COURSE IN SPOKEN ENGLISH		18ULEN41
Hrs/ Week: 6	Hrs/ Sem: 90	Hrs/ Unit: 18	Credits: 4

Objectives:

1. To express one's needs orally in a fluent, simple and direct style.
2. To pronounce words intelligibly
3. To use the right intonation pattern in speech.

UNIT I

Interactive Expressions and Pronunciation Practice: Consonants
(Chapters 1 – 3 of *A Course in Spoken English*)

UNIT II

Introducing oneself / others, patterns for greeting, requesting, expressing and responding to thanks and etc., & Pronunciation Practice: Vowels (Chapters 4 – 8 of *A Course in Spoken English*)

UNIT III

Developing descriptive competency, narrative competency, arguing competency, comparing competency and pronunciation practice: Diphthongs (Chapters 9 – 13 of *A Course in Spoken English*)

UNIT IV

Practicing continuous speech, group discussion and pronunciation practice: Word Accent and Intonation
(Chapters 14 – 19 of *A Course in Spoken English*)

UNIT V LISTENING PRACTICE

Students will listen to audio and video materials for 10 – 12 hours.

Textbook, Workbook, Record Note:

1. Nihamathullah. A. et al. *A Course in Spoken English*. Tirunelveli: MSU, 2005. (rpt.2010).
2. Board of Editors, Department of English, Sadakathullah Appa College, *A Workbook for A Course in Spoken English*, 2011.
3. Spoken English Practice Record.

Evaluation Scheme:

I Internal Oral Test : 15 Marks	}	The best two of the three CIA test marks will be added up
II Internal Oral Test: 15 Marks		
III Internal Oral Test : 15 Marks		

Distribution of Marks

The best two of the three CIA test marks	: 30 Marks
Loud Reading	: 5 Marks
Listening Test	: 5 Marks
Internal Marks	: <u>40 Marks</u>
External Oral Test	: 50 Marks
Record Note	: 05 Marks
Workbook	: 05 Marks
External Marks	: <u>60 Marks</u>

IV SEMESTER		
DSC-6	CELL BIOLOGY AND MOLECULAR BIOLOGY	18UCMB41
Hrs/ Week: 4	Hrs/Sem: 4x15=60	Credits: 4

UNIT I: Cell – Unit of Life (12 hours)

Evolution of cell- Cell as a Unit of living organism, evolution and structure of prokaryotic and Eukaryotic cell. Structure of Cell Wall: Prokaryotic and Eukaryotic cell wall, Cell organelles; Endoplasmic Reticulum, Golgi complex, Lysosomes, Vacuoles, Peroxisomes, Ribosomes, Mitochondria, Chloroplast, Nucleus, Extracellular matrix.

UNIT II: Nucleus (10 hours)

Nuclear envelope, Nuclear pore complex and Nuclear lamina, Nucleolus –Chromosomes- Ultra structure and Giant chromosomes.

UNIT III: Cell cycle and Cell division (14 hours)

Mitosis and Meiosis-Cell death: Eukaryotic cell cycle and its regulation, Development of cancer- Causes, Types, Diagnosis and Therapy. Programmed cell death

UNIT IV: r-DNA technology (12 hours)

History and Fundamentals of r-DNA technology- Tools for rDNA technology- Gene cloning vectors- Plants- Animals. *In vitro* construction of rDNA molecules-isolation of passenger DNA from bacteria and isolation of vector DNA- Cutting of DNA molecules-Transformation of rDNA into target host.

UNIT V: Gene transfer mechanisms (12 hours)

Bacterial transformation, transduction; generalized transduction, specialized transduction, abortive transduction, conjugation; effective contact and pilli in conjugation.

REFERENCE BOOKS:

- 1) Cell Biology - Veer Bala Rastogi, Rastogi Publications.
- 2) Pawar C.B. 1983, Cell Biology. Himalaya Publishers.
- 3) Gerald Karp, Cell biology, McGraw Hill Book company, New York
- 4) Maloy S.R. Cronan Jr. J.S. Freidfelder D. 1994. Microbial Genetics. Jones and Bartlett Publishers.
- 5) Lewin B. 2007. Genes XII, Jones & Bartlett Publishers, Inc.
- 6) Willey J. Sherwood L. &Woolverton C. 2007. Prescott/Harley/Klein's Microbiology, McGraw Hill.

IV SEMESTER		
DSE 2A	MICROBIAL NANOTECHNOLOGY	18UEMB4A
Hrs/ Week: 4	Hrs/Sem: 4x15=60	Credits: 4

Unit I: Basics of Nanotechnology (10 hours)

Introduction- Nanotechnology, Nanoparticles, Important Contributions of Nanotechnology.

Unit II: Nanofabrication methods (12 hours)

Overview of Nano Fabrication Methods- Top-down and bottom-up approaches, Lithography, Deposition.

Unit III: Characterization Tools (11 hours)

UV spectrophotometer, Optical microscopy, Scanning Electron Microscope, AFM.

Unit IV: Nanoparticle preparation methods (13 hours)

Nanoparticles preparation using Microorganism (Bacteria, Fungi and Algae (Intracellular & Extracellular))- Silver Nanoparticles, Gold Nanoparticles.

Unit V: Application of Nanoparticles (14 hours)

Drug delivery, Cancer Cell Imaging, Detection of food borne pathogen and water borne pathogen using fluorescent Nanoparticles (Silica).

REFERENCE BOOKS:

1. Claudio Nicolini, 2009, Nanobiotechnology & Nanobiosciences Pan Stanford Publishing Pte. Ltd.
2. C.M. Niemeyer and C.A. Mirkin, 2004, Nanobiotechnology, Concepts, Applications and perspectives, WILEY-VCH, Verlag GmbH & Co,
3. S. David Goodsell, 2004, Bio-nanotechnology, Lessons from Nature, Wiley-Liss, Inc,

IV SEMESTER		
DSE 2B	PLANT SCIENCE	18UEMB4B
Hrs/ Week: 4	Hrs/Sem: 4x15=60	Credits: 4

UNIT-I Classification of plants (10 hours)

Basics of classification- Species, Genus, Family, Nomenclature-Binomial system. Systems of classification-Artificial, Natural and phylogenetic system-Biosystematics-Aims, methods in this study-Binomial nomenclature – ICBN-Herbarium.

UNIT-II Plant Tissues (10 hours)

Meristematic & permanent tissues. Primary structure of dicot stem, monocot stem and dicot root. Normal secondary thickening in dicot stem.

UNIT-III Characteristics of plant families (14 hours)

General characters and economic importance of the following families- Fabaceae (*Clitoria ternatea*), Rubiaceae (*Ixora coccinea*), Solanaceae (*Datura metel*), Euphorbiaceae (*Ricinus communis*)

UNIT-IV Transport system in plants (14 hours)

Diffusion, Osmosis, DPD and Imbibition, Absorption of water-active and passive, Photosynthesis-Light and Dark reaction. Growth hormones-auxins, gibberellins & cytokinins-their applications.

UNIT-V Drugs from plants (12 hours)

Drugs from roots (*Catharanthus*), Drugs from bark (*Cinchona*), Drugs from leaves (*Aloe*), Drugs from flower (*Eugenia*). Drugs from seeds (*Coriander*), Carminatives and Gastro intestinal regulators (*Ginger*), Antitussives (*Vasaka*), Antiseptic (*Curcuma*), Brain tonic (*Brahmi*).

REFERENCE BOOKS:

- 1) Textbook of biology botany – Dr. K. Ajithadoss, First edition.
- 2) Plant physiology - Prof. Annie Ragland, K. Rajakumar, M. Jayakumar, K. Rajarathinam, Saras publication, Kanyakumari
- 3) Plant Anatomy –B.P. Pandey, S. Chand & 1st edition.
- 4) Plant physiology – V. Verma, Emkay Publication, Delhi 6th revised edition.
- 5) Concepts of Cell Biology – Verma & Agarwal V.K.S. Chand & Co, Rain Nagar, New Delhi.

IV SEMESTER		
AII-2	PHARMACEUTICAL MICROBIOLOGY	18UAMB41
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 3

UNIT I: Basis of Pharmaceutical Microbiology (10 hours)

History of Pharmaceutical Microbiology-Microbiological Assay of Pharmaceutical products: Introduction- Importance and Usefulness – Principle – Methodologies – Cylinder-plate method- Turbidimetric Assay method

UNIT II: Microbiological Assays (12 hours)

Types of Microbiological Assay- Analytical Methods for Microbial Assays- HPLC- RPC-IPC- Pharmaceutical Microbial assay for Antibiotic

UNIT III: Sterility Testing of Pharmaceutical Products (13 hours)

Introduction- Tests- Membrane filtration- Direct Inoculation (Nutrient broth, cooked meat medium, Sabouraud medium)- Pyrogen testing- Antiseptics- Disinfectants- their standardization.

UNIT IV: Vaccine production (11 hours)

Production of Vaccine - BCG and Typhoid- Production of Toxoid- Tetanus and Diphtheria. Production of Insulin, interferon- Preparation of Antisera and their standardization.

UNIT V: Antibiotics (14 hours)

Mechanism of action of Antibiotics- Inhibition of cell wall synthesis- nucleic acid and protein synthesis. Bacterial resistant to antibiotics- Mode of action of non-antibiotic antimicrobial agents- Mode of action of bacterial killing by quinolinones.

REFERENCE BOOKS:

1. Hugo W. B and Russell A.D. 1998. Pharamcetical Microbiology. Sixth Edition, The Black well Science Ltd., UK
2. Reed. G. 1982. Prescott and Dunn's Industrial Microbiology. Macmillian Publishers, UK.
3. Prahlad Singh Mehra, 2011. A Textbook Pharamcetical Microbiology, I.K. International Publishing House, New Delhi.
4. Tim Sandle, 2015, Pharamcetical Microbiology. Essentials for Quality assurance and Quality control. Woodhead Publishing, Sawston, Cambridge.

IV SEMESTER		
DSCP 4	CORE MICROBIOLOGY PRACTICALS-IV	18UCMB4P1
Hrs/ Week: 2	Hrs / Sem: 2 x 15 = 30	Credits: 1

TECHNIQUES IN CELL AND MOLECULAR BIOLOGY

- 1) Permanent Slide Preparation (Demonstration).
- 2) Mitosis in onion root tip.
- 3) Karyotyping.
- 4) Genomic DNA isolation by CTAB method.
- 5) Agarose Gel Electrophoresis.
- 6) Restriction digestion of DNA.
- 7) Ligation of DNA.
- 8) Conjugation (Demonstration).
- 9) Transformation (Demonstration).

REFERENCE BOOKS

1. Cappuccino. J.G., and Sherman. N. 1996, Microbiology – A Laboratory Manual. Benjamin Cummins. New York.
2. Jayaraman, J. 1985, Laboratory Manual in Biochemistry. Wiley Eastern Ltd., New Delhi.
3. Palanivelu. P. 2018, Analytical Biochemistry and Separation Techniques – A Laboratory Manual

IV SEMESTER		
A-P-4	TECHNIQUES INPHARMACEUTICAL MICROBIOLOGY	18UAMB4P1
Hrs/ Week: 2	Hrs / Sem: 2 x 15 = 30	Credits: 1

TECHNIQUES INPHARMACEUTICAL MICROBIOLOGY

1. Preparation and standardization of:
 - a. Sodium hydroxide
 - b. Sulphuric acid
 - c. Sodium thiosulfate
 - d. Potassium permanganate
2. Assay of the following compounds along with Standardization of Titrant:
 - a. Ammonium chloride by acid base titration
 - b. Ferrous sulphate by Cerimetry
 - c. Copper sulphate by Iodometry
 - d. Hydrogen peroxide by Permanganometry
 - e. Sodium Chloride by precipitation titration
3. Determination of solubility of drug at room temperature.
4. Sterility testing of pharmaceuticals.
5. Microbiological assay of antibiotics by cup plate method and other methods.
6. Determination of MIC.

REFERENCE BOOKS

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2. A.I. Vogel, Textbook of Quantitative Inorganic analysis
3. P. GunduRao, Inorganic Pharmaceutical Chemistry
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry
5. John H. Kennedy, Analytical chemistry principles.
6. P. GunduRao, Inorganic Pharmaceutical Chemistry, 3rd Edition
7. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.

IV SEMESTER		
NME -2	AQUACULTURE AND APICULTURE	18UNMB41
Hrs/ Week: 2	Hrs / Sem: 3 x 15 = 30	Credits: 2

UNIT I: Basics of Aquaculture (4 hours)

Definition, Scope of aquaculture-Aquaculture in India- Fresh water, Coastal and marine aquaculture- Culturable organisms and their qualities.

UNIT II: Fish culture (5 hours)

Types of cultures- Extensive, Semi-intensive and Intensive culture, Monoculture, Polyculture. Integrated fish farming- Paddy cum fish culture, Sewage fed fish culture.

UNIT III: Fish feed and Diseases (6 hours)

Fish feed- Definition, Classification of feed- Live feed, artificial feed. Composition of fish feed. Fish feed formulation- Principles, Preparation of artificial feed. Feeding Schedule, Feeding methods. Fish Diseases- Bacterial diseases (Erythroderma, Gill rot, Enteritis), Fungal Diseases (Gill rot, Saprolegniasis), Protozoan diseases (White spot disease, Whirling disease).

UNIT IV: Apiculture (7 hours)

Introduction, Scope, History of Apiculture. Advantages of Bee Keeping. Choice of bee in Apiculture- Desirable traits for bee keeping, Good Choice, Best Choice and Poor choice. Bee Keeping methods- Wall hive, Pot hive, Bamboo hive, Modern Beekeeping. Appliances of Apiaries, Honey Extraction

UNIT V: Preservation and storage of Honey (8 hours)

Honey- Properties, Chemical composition, Nutritional value of Honey, Medicinal value. Honey Processing, Bottling and Packing, Storage of Honey.

REFERENCE BOOKS:

1. Arumugam N. 2016, Aquaculture, Saras Publication, Kanyakumari
2. Arumugam N. 2014, Apiculture, Saras Publication, Kanyakumari
3. Jhingran, V.G. 1982, Fish and Fisheries in India, Hindustan Publishing Corporation, New Delhi.
4. Aennan, J.F, R.O. Smiteman and G. 1983, Principles and practices of Pond Aquaculture, Oregon State University, U.S.A.
5. Cherian R. and Ramanathan K.R. 1992 – Bee keeping in India,
6. Mishra R.C., 1985 – Honeybees and their Management in India, ICAR.
7. Singh S.1982-Bee keeping – ICAR 4. Sharma, P. and Singh L. 1987 – Handbook of bee keeping, Chandigar
8. Rare S. 1998, Introduction to Bee keeping, Vikas publishing house.

V SEMESTER		
DSC7	IMMUNOLOGY	18UCMB51
Hrs/ Week: 6	Hrs / Sem: 6 x 15 = 90	Credits: 4

UNIT I Basics of Immunology (13 hours)

Introduction- History of Immunology – Immunity – Types of immunity – Innate and Acquired. Infection- types- sources- transmission.

UNIT II Immune system (16 hours)

Structure and Function of Primary lymphoid organ- Thymus - Bursa of Fabricius- Structure and Function of Secondary lymphoid organs- Lymph nodes, Spleen, Mucosa associated lymphoid organs. Cells of the immune system – Lymphocytes- T and B cells, Null cells, Phagocytic cell.

UNIT III Antigens (15 hours)

Types, properties, haptens – adjuvants – Immunoglobulins - Structure, Types and Properties and Functions. Monoclonal Antibody- Production and Application-Vaccines – types - Live, killed, recombinant DNA and edible – toxoids antitoxins, Immunization Schedule.

UNIT IV Antigen – antibody reactions (15 hours)

Introduction – *in vitro* methods; ELISA, Immuno turbidometry. Agglutination – Precipitation, Complement fixation, Immunodiffusion - Immuno fluorescence, RIA, *in vivo* methods

UNIT V Hypersensitivity reactions (16 hours)

Introduction – antibody mediated hypersensitivity reactions, Type I anaphylaxis, Type II – Antibody dependent cell cytotoxicity, Type III – immune complex reactions – cell mediated immune responses – Type IV – Hypersensitivity reactions. Organ Transplantation.

REFERENCE BOOKS:

1. van M. Roit. 1994. Essential Immunology – Blackwell Scientific Publications, Oxford.
2. Donal M. Weir, John, Stewart, 1993. Immunology VII edition. ELBS, London.
3. Richard M. Hyde 1995. Immunology III edition. National Medical series, Williams and Wilkins. Harvard Publishing company.
4. Kuby, 1993. Immunology II edition. W.H. Frumen and Company, New York

V SEMESTER		
DSC 8	MICROBIAL GENETICS	18UCMB52
Hrs/ Week: 5	Hrs / Sem: 5 x 15 = 75	Credits: 4

UNIT I Introduction to Microbial Genetics (13 hours)

Introduction and History of Microbial genetics, DNA - experimental evidence as genetic material, DNA Structure, different forms of DNA, RNA-evidence to prove RNA as genetic material- Structure and types of RNA.

UNIT II Central dogma of life I (16 hours)

DNA replication –Types, Mechanism- Enzyme involved in DNA Replication. Transcription in prokaryotes - RNA polymerase, promoter, Steps in transcription- promoter, enhancer and silencer.

UNIT III Central dogma of life II (16 hours)

Translation- tRNA, steps in translation, post translational modification. General characters of a genetic code. DNA repair mechanism. Replication of Virus - DNA virus (Pox) replication and RNA virus (HIV) replication.

UNIT IV Bacterial plasmids (15 hours)

Structure, types and properties of plasmids- Plasmid replication. Transposons and IS elements- structure, types and properties- Regulation of gene expression- negative, positive, repressive operon: lac and trp operon.

UNIT V Mutation (15 hours)

Introduction- types-spontaneous and induced-base pair changes-deletion-insertion-transversions, mutagens (physical, chemical and biological).

REFERENCE BOOKS:

- 1) Maloy SR, Cronan Jr. J.S, Freifelder D. 1994. Microbial Genetics. Jones and Bartlett Publishers.
- 2) Lewin B. 2007. Genes IX, Jones & Bartlett Publishers, Inc.
- 3) Willey J. Sherwood L. &Woolverton C. 2007. Prescott/Harley/Klein's Microbiology, McGraw Hill.

V SEMESTER		
DSC 9	FOOD MICROBIOLOGY	18UCMB53
Hrs/ Week: 5	Hrs / Sem: 5 x 15 = 75	Credits: 4

UNIT I Basics of Food Microbiology (12 hours)

Introduction - Importance of food Microbiology – Types of microorganisms in food – Factors influencing microbial growth in foods (extrinsic and intrinsic).

UNIT II Contamination of Food (16 hours)

Sources of Contamination of food from Plant and Animal, sewage, soil, water, air. Handling and Processing of food.

UNIT III Food Preservation (15 hours)

Contamination, spoilage and preservation of different kinds of foods– vegetable and fruits – meat and meat products – fish and other sea foods, poultry, sugar and sugar products.

UNIT IV Food Poisoning (15 hours)

Food borne infections (a) Bacterial: *Staphylococcal*, *Brucella*, *Bacillus*, *Clostridium*, *Escherichia*, *Salmonella* (b) Fungal: Mycotoxins, (c) Viral: Hepatitis, (d) Algal toxins.

UNIT V Principles and methods of Food preservation (17 hours)

Principles of food preservation – methods of preservation. a. Physical (irradiation, drying, heat processing, canning, chilling and freezing, high pressure and modification of atmosphere) b. Chemical. Food Sanitation: Good manufacturing practices – Hazard analysis, Critical control points, Personal hygiene.

REFERENCE BOOKS:

1. Banwart, G.J.1989. Basic Food Microbiology, Chapman & Hall New York.
2. Board, R.C.1983. A Modern Introduction to Food Microbiology, Blackwell Scientific Publications, Oxford.
3. Robinson, R.K.1990. Dairy Microbiology, Elsevier Applied Science, London.
4. Adams, M.R. and Moss, M.O.1995. Food Microbiology, The Royal Society of Chemistry, Cambridge.
5. Frazier, W.C. and Westhoff, D.C.1988. Food Microbiology, TATA McGraw Hill Publishing company ltd., New Delhi.

V SEMESTER		
DSE3A	GENETIC ENGINEERING	18UEMB5A
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 4

UNIT I Basics of Genetic Engineering (10 hours)

Cloning- Introduction, steps in cloning- enzymology of cloning - construction of rDNA –Gene transfer methods - screening of chimeric DNA.

UNIT II Cloning Vectors (12 hours)

Cloning vectors for rDNA(plasmids, phages, cosmids, viruses, transposons)- Binary and shuttle vectors.

UNIT III Expression Vectors (13 hours)

Expression vectors for high level cloned genes (*E.coli*, yeast, insect cell, mammalian cell)-Expression cassettes- DNA libraries- Genomic, cDNA.

UNIT IV Blotting techniques (13 hours)

Southern blot, Western blot, Northern blot - PCR and its modification- RFLP, RAPD – DNA finger printing.

UNIT V Applications of genetic engineering (13 hours)

Transgenic plants - Development of crops for disease resistance (Bt cotton), herbicide tolerance- Transgenic animals (sheep), Transgenic fish (Tilapia), Medicine (insulin), Environment - role of superbug in biodegradation and industries (ethanol).

REFERENCE BOOKS:

1. Glick, B.R. and Pasternak, J.J (1998). Molecular Biotechnology – Principles and Applications of Recombinant DNA. ASM Press, Washington D.C.
2. Lewin, B. (2000). Genes VII. Oxford University Press, Oxford.
3. Brown, T.A. (1999). Gene Cloning (3rd Edition). Chapman and Hall Publications. USA.
4. Sathyanarayana. U. (2008). Biotechnology. Books and Allied (P) Ltd. Kolkata.
5. Rastogi S.C. (2007). Biotechnology Principles and applications. Narosa Publishing House Pvt. Ltd. New Delhi.
6. HD Kumar (2009). Modern concepts of Biotechnology. Vikas Publishing House Pvt. Ltd. Noida.
7. Dubay R.C. (2001). A Textbook of Biotechnology 1st Edition. S. Chand & Company Ltd., New Delhi.
8. E.J. Gardener *et al.*, (1991). Principles of Genetics. (8th Ed.) John Wiley & sons, New York.
9. Mohan P. Arora (2005). Biotechnology. Himalaya Publishing House. Mumbai.
10. Dr. Prakash S Lohar (2012). Textbook of Biotechnology. MJP Publishers, Chennai.
11. Jogdhand S.N., Gene Biotechnology (2007) Himalaya Publishing House Pvt. Ltd. Mumbai.

V SEMESTER		
DSE3B	DAIRY MICROBIOLOGY	18UEMB5B
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 4

UNIT I Introduction to Dairy (10 hours)

Introduction –Milk- Composition, nutritive types, benefits. Types of milk, Scope of dairy industry, Commercial grades of milk.

UNIT II Contamination, Spoilage and preservation (13 hours)

Normal Flora, Sources of microorganisms in milk - Classification of microbes (Morphology, Biochemical Characteristics, Pathogenicity), Contamination, spoilage and preservation of milk.

UNIT III Dairy products (14 hours)

Fermented milk - Flavoured milk –Curd-Butter milk, Cheese, Milk cream, Yoghurt - Lactic starter culture.

UNIT IV Milk-borne diseases (12 hours)

Bacterial diseases – Brucellosis, Q fever, Mastitis and viral diseases - Foot and Mouth disease - Control measures.

UNIT V Quality Assessment of Milk (12 hours)

Introduction - Physical, Chemical and Microbiological -TVC, DMC, SPC, MBRT, Rezaurin, Clotting Boiling Test, Phosphatase test - Preservation of milk, Pasteurization, Dehydration. Budget for cattle farming (Self learning).

TEXTBOOKS:

1. Adams, M.R. and Moss, M.O.1995. Food Microbiology, The Royal Society of Chemistry, Cambridge.
2. Frazier, W.C. and Westhoff, D.C.1988. Food Microbiology, TATA McGraw Hill Publishing company ltd., New Delhi.
3. Jay, J.M.1987. Modern Food Microbiology. CBS Publishers and distributors, New Delhi
4. Atlas, R.M. 1989. Microbiology, A Fundamentals and Applications, Macmillan Publishing company.

REFERENCE BOOKS:

1. Banwart, G.J.1989. Basic Food Microbiology, Chapman & Hall New York.
2. Board, R.C.1983. A Modern Introduction to Food Microbiology, Blackwell Scientific Publications, Oxford.
3. Robinson, R.K.1990. Dairy Microbiology, Elsevier Applied Science, London.
4. Hobbs, B.C. and Roberts, D.1993. Food Poisoning and Food Hygiene, Edward

V SEMESTER		
DSCP-5	CORE MICROBIOLOGY PRACTICALS-V	18UCMB5P1
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 4

TECHNIQUES IN IMMUNOLOGY

1. Blood grouping.
2. Red Blood Cell Count.
3. White Blood Cell Count.
4. Differential Count.
5. VDRL Test.
6. RA agglutination test.
7. CRP agglutination test.
8. WIDAL agglutination test.
9. Antigen – Antibody reaction – Ouchterlony technique- Double diffusion.
10. Antistreptolysin 'O'

REFERENCE BOOKS:

1. J.G. Cappuccino and N. Sherman. 1996 Microbiology – A laboratory manual Benjamin CUMMINS. New York.
2. An Introduction to practical biochemistry. David T Plummer.1998.Tata McGraw-Hill Education.

V SEMESTER		
DSCP6	CORE MICROBIOLOGY PRACTICALS-VI	18UCMB5P2
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 4

TECHNIQUES IN MICROBIAL GENETICS & FOOD MICROBIOLOGY

1. Induced mutagenesis (UV & NTG).
2. Isolation of antibiotic resistant mutants by gradient plate technique.
3. UV induced auxotrophic mutants production and isolation of mutants by replica plating technique.
4. Wet mount preparation of spoiled bread, tomato, grapes, potato.
5. Enumeration of bacteria from meat
6. Enumeration of bacteria from vegetables.
7. Enumeration of bacteria from fruits.
8. Determination of quality of milk-Methylene Blue Reduction Test (MBRT).
9. Resazurin test of milk.
10. Phosphatase Test.
11. Enumeration of bacteria from spoiled vegetables.

V SEMESTER		
SEC -I	FOOD PROCESSING AND QUALITY CONTROL	18USMB51
Hrs/ Week: 2	Hrs / Sem: 2 x 15 = 30	Credits: 2

UNIT I Basics of food processing (5 hours)

Introduction- Post Harvest Technology - Introduction, Definition, Primary and secondary processing- Importance.

UNIT II Processing Technology of Milk and Milk products(8 hours)

Processing of Milk And Milk Products: Milk- Definition, Composition, Method of manufacture, Use - Butter- Definition, Composition, Method of manufacture, Uses- Ice cream- Definition, Composition, Method of manufacture, Uses- Cheese- Definition, Composition, Method of manufacture, Uses- Condensed milk- Definition, Composition, Method of manufacture, Uses- Dried Milk- Definition, Composition, Method of manufacture, Uses- Yoghurt- Definition, Composition, Method of manufacture, Uses.

UNIT III Processing Technology of Meat and Poultry (6 hours)

Meat- methods of slaughter, Antimortem inspection - Post mortem changes in meat - Tenderizing of meat - Grading of Meat - Processing of meat; Poultry - Classification, Processing- Processing Technology of Fish - Types of sea foods - Fish processing.

UNIT IV Food Quality (5 hours)

Importance and Functions of quality control. Methods of quality assessment of food materials-fruits, vegetables, cereals, dairy products, meat, poultry, egg and processed food products.

UNIT V Sanitation and hygiene (6 hours)

GMP, GLP, Statistical quality control. Food laws and standard, PFA, AGMARK. Sampling and specification of raw materials and finished products, Concept of Codex Alimentarius/USFDA/ISO 9000 series, rules and regulations for waste disposals- Food adulteration and food safety.

REFERENCE BOOKS:

1. Kent, J.A. Riegels Handbook of Industrial Chemistry, 7th edition. Van Nostrand Reinhold Company, New York. 2003.
2. Dubey, R.C. A Textbook of Biotechnology. S. Chand & Company Limited, New Delhi. 2000.
3. Prescott and Proctor B.E. Food Technology. MC Graw hill Book Co. New York 1997.
4. Potter, N. N, Hotchkiss, J.H. Food Science. CBS Publishers, New Delhi. 2000.

VI SEMESTER		
DSC 10	MEDICAL MICROBIOLOGY	18UCMB61
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 4

UNIT I Basics of Medical Microbiology (16 hours)

Introduction- Importance of Medical Microbiology, Normal flora of human body, Epidemic and Endemic diseases, Koch Postulates.

UNIT II Medical Bacteriology (18 hours)

Introduction - Epidemiology, pathogenesis, laboratory diagnosis, prevention and treatment of the following bacteria-pyogenic infection (*Streptococcus pyogenes*), *E.coli*, *Shigella* (Shigellosis), *Salmonella* (Typhoid), *Vibrio cholerae* (Cholera), *Mycobacterium tuberculosis* (Tuberculosis), *Clostridium tetani* (Tetanus), *Neisseria gonorrhoeae* (gonorrhea).

UNIT III Medical Virology (19 hours)

Introduction- Epidemiology, Pathogenesis, Laboratory diagnosis, Prevention and treatment of the following virus - Hepatitis virus – A and B, Influenza Virus, HIV, Rabies Virus-Polio virus- Dengue- Swine flu.

UNIT IV Medical Mycology (19 hours)

Introduction- Epidemiology, pathogenesis, laboratory diagnosis, prevention and treatment of the following fungal infections— Superficial (*Tinea nigra*), subcutaneous and systemic mycoses (Candidiasis), Opportunistic mycoses, Dermatophytosis.

UNIT V Parasitology (18 hours)

Introduction- Epidemiology, Pathogenesis, Laboratory diagnosis, Prevention and treatment of the following parasitic infections-Amoebiasis, Giardia and Malaria

REFERENCE BOOKS

- 1) Anathanarayanan, R., and Panicker, J. (2000). Textbook of microbiology. Orient Longmans, India
- 2) Rajan, S. (2007). Medical microbiology. MJP publisher, Chennai.
- 3) Prescott L.M., Harley J.P., and Klein D.A. (2008). Microbiology (7th edition) McGraw- Hill Inc, New York.
- 4) Pelczar Jr., M.J. Chan E.C.S., and Kreig N.R. (1993). Microbiology- McGraw- Hill Inc, New York
- 5) Dubey R.C., and Maheswari, S. (2003). A Textbook of Microbiology,
- 6) Kanai L. Mukherjee, Medical Laboratory Technology- A Procedure
- 7) Manual for routine diagnosis tests - Tata McGraw- Hill Publishing Company Ltd, New Delhi. Vol I –III.

VI SEMESTER		
DSC 11	INDUSTRIAL MICROBIOLOGY	18UCMB62
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 4

UNIT I Basics of Industrial Microbiology (12 hours)

Historical development of Industrial Microbiology, Screening and selection of Industrially important microorganisms, Improvement of Industrially important microbial strains

UNIT II Fermentation (15 hours)

Design of a fermenter, types of fermenters and basic functions. Fermentation media formulation, types of fermentation - Batch, Continuous and Fed batch.

UNIT III Downstream processing (16 hours)

Downstream processing and purification of products (intracellular and extra cellular), Cell immobilizations -Introduction and its applications.

UNIT IV Microbial products of pharmaceutical value (16 hours)

Raw materials, Organism and Industrial processes involved in the production of Penicillin, Streptomycin, Vitamin B12 and rabies vaccine, Amylase, Protease.

UNIT V Microbial products of Industrial value (16 hours)

Raw materials, Organism and Industrial processes involved in the production of ethanol, vinegar, protease, wine making, brewing, acetone – butanol. Citric acid.

REFERENCE BOOKS:

1. Demain A.L. Solomon, N.A.1986. Manual of Industrial Microbiology and Biotechnology, ASM Press
2. Reed. G. 1982. Prescott and Dunn's Industrial Microbiology. Macmillian Publishers.
3. Prave, P. Faust, V, Sitting, W., Sukatsch, DA. 1987. Fundamentals of Biotechnology, ASM Press.
4. Malik V.S. Sridhar, P.1992. Industrial Biotechnology. Oxford & IBH.
5. Venkataraman, L.V.1983. A Monograph on Spirulina platensis. CFTRI, Mysore.

VI SEMESTER		
DSC 12	PROJECT	18UCMB63
Hrs/ Week: 6	Hrs / Sem: 6 x 15 = 90	Credits: 6

RESEARCH PROJECT

RESEARCH PROJECT

To plan and design statistically, retrieve relevant literature, organize and process the data, photograph relevant observations, evaluate by statistical programme, present the project in any State/ Regional / National conference/ Seminar during the second year of the course and submit during the final semester examinations. The work has to be conducted in the Department / Collaborative organization / Institute under the guidance of the Project Supervisor. Inter- disciplinary collaborations from External Departments / Institutions can also be organized for essential areas of the Project if necessary. The method of valuation of the project report submitted by the candidate is outlined under the course project and *viva-voce*.

The project report should be submitted to the Head of the Course Department "One week prior" to the commencement of the practical examination in the Sixth Semester. Each student has to submit 3 copies of his / her project report for evaluation.

PRESENTATION OF SCIENTIFIC FINDINGS

Each student will have to present their scientific findings of individual work (or) collaborative work in any State / Regional / National International Seminar or Symposia. Alternatively, they can attend any workshops conducted by the State / National Organizations of Scientific Recognition. Abstracts / Papers presented along with certificates will have to be produced during examination. Scientific papers published in Journals / Proceedings during his / her undergraduate Programme will be given special weightage.

GENERAL VIVA - VOCE

The examiners shall conduct a General *Viva-Voce* pertaining to the core course papers as an overall component.

VI SEMESTER		
DSE4A	AGRICULTURAL MICROBIOLOGY	18UEMB6A
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 4

UNIT I Basics of Agricultural Microbiology (15 hours)

Relationship between soil and Microbes -Physical and Chemical characteristics of soil- Major groups of microorganism in soil (Bacteria, Actinomycetes, Fungi, Algae, Protozoa and Viruses)- Soil types and their microflora- Quantification of soil Microflora-Role of Microbes in soil fertility

UNIT II Microbial interactions (15 hours)

Positive interaction within microbes- Commensalism, Synergism, Mutualism- Negative interaction within microbes- Competition, Amensalism, Parasitism and Predation. Plant -Microbe interaction- Mycorrhiza, VAM

UNIT III Biofertilizers (15 hours)

Definition – microbes used as biofertilizers – advantages of biofertilizers. Biopesticides: Definition – microbes used as biopesticides – advantages of biopesticides.

UNIT IV Nitrogen Fixation (15 hours)

Biological Nitrogen fixation- Symbiotic association (*Rhizobium*), Asymbiotic association (*Azotobacter*). Phosphate solubilizing Microorganisms, Siderophores.

UNIT V Plant diseases (15 hours)

Symptoms, Etiology, Life cycle and Control measures - Bacterial (Soft rot of vegetables, Blight of paddy, Citrus canker), fungal (Red rot of sugarcane, Stem rust of wheat, Tikka leaf disease of groundnut, Late blight of potato) and viral (TMV, CMV, Banana bunchy top virus).

REFERENCE BOOKS

1. Shiva Aithal, C. (2010). Modern approaches in Soil, Agricultural and Environmental Microbiology. Himalaya Publishers, New Delhi.
2. Atlas, R.M., and Bartha, M. (2003). Microbial Ecology –Fundamentals and applications. Benjamin – Cummings, Mento Park, California.
3. Martin Alexander (1983). Introduction to Soil Microbiology, Wiley eastern Ltd., New Delhi.
4. Subba Rao, N.S. (1997). Biofertilizers in Agriculture and Forestry III Ed, Oxford and IBH Publishing Co, Pvt. Ltd, New Delhi.
5. Subba Rao, N.S. (1995). Soil Microorganisms and Plant growth. Ed, Oxford and IBH Publishing Co, Pvt. Ltd, New Delhi.
6. Wheeler, B.E. (1976). An introduction to Plant disease. ELBS and John Wiley and sons, Ltd.
7. Rangaswamy, g., and Bagyaraj, D.J. (1996). Agricultural Microbiology. Prentice-Hall of India Pvt. Ltd., New Delhi.
8. Dubey R.C. (2001). A Textbook of Biotechnology. S Chand & Co. New Delhi.
9. Gupta, S.K. (2014). Approaches and trends in plant disease management. Scientific publishers. Jodhpur, India.

VI SEMESTER		
DSE4B	BIostatISTICS	18UEMB6B
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 4

UNIT I Basics of Biostatistics (15 hours)

Biostatistics - Definition - Statistical methods - Basic principles. Variables - Measurements, Functions, Limitations and Uses of statistics.

UNIT II Data Collection (15 hours)

Collection of data primary and secondary - Types and Methods of data collection procedures - merits and demerits. Classification - Tabulation and Presentation of data - sampling methods.

UNIT III Measures of central tendency (15 hours)

Mean, Median, Mode, Geometric mean - merits & demerits. Measures of dispersion - Range, Standard deviation, Mean deviation, Quartile deviation - merits and demerits, Co-efficient of variations.

UNIT IV Correlation (15 hours)

Types and Methods of Correlation, Regression, simple regression equation, fitting prediction, similarities and dissimilarities of correlation and regression.

UNIT V Statistical inference (15 hours)

Hypothesis - Simple hypothesis - Student 't' test - Chi square test.

REFERENCE BOOKS

1. Biostatistics, Danniel, W.W., 1987. New York, John Wiley Sons.
2. An introduction to Biostatistics, 3rd edition, Sundarrao, P.S.S and Richards, J. Christian Medical College, Vellore
3. Statistical Analysis of epidemiological data, Selvin, S., 1991. New York University Press.
4. Statistics for Biology, Boston, Bishop, O.N. Houghton, Mifflin.
5. The Principles of scientific research, Freedman, P. New York, Pergamon Press.
6. Statistics for Biologists, Campbell, R.C., 1998. Cambridge University Press.
7. Statistics for medicine, Colton, T., 1974. Little Brow, Boston

VI SEMESTER		
DSCP 7	CORE MICROBIOLOGY PRACTICALS-VII	18UCMB6P1
Hrs/ Week: 4	Hrs / Sem: 4 x 15 = 60	Credits: 2

TECHNIQUES IN MEDICAL MICROBIOLOGY

1. Enumeration of Bacteria in Urine sample
2. Isolation and identification of UTI causing pathogen from urine
3. Isolation and identification of pathogen from wound.
4. Enumeration of bacteria in throat swab.
5. Isolation and identification of pathogen from throat swab.
6. Isolation and identification of pathogen from Sputum.
7. Antibiotic sensitivity test by Disc diffusion method.
8. Antibiotic Sensitivity Test by Well Diffusion method.
9. Glucose tolerance test

REFERENCE BOOKS:

1. J.G. Cappuccino and N. Sherman. 1996 Microbiology – A laboratory manual Benjamin CuMMINS.New York.
2. N. Kannan. 1996. Laboratory manual in general microbiology. Palani Paramount Publ., Palani

VI SEMESTER		
DSCP 8	CORE MICROBIOLOGY PRACTICALS-VIII	18UCMB6P2
Hrs/ Week: 4	Hrs / Sem: 4x 15 = 60	Credits: 2

TECHNIQUES IN INDUSTRIAL MICROBIOLOGY

1. Isolation and identification of industrially important micro organisms- crowded plate technique.
2. Isolation of yeast from grape juice.
3. Production of alcohol from sugar cane.
4. Production of alcohol from grape juice.
5. Acid and Alkaline hydrolysis of agricultural raw materials for fermentation.
6. Isolation of Biopolymer producing *Rhizobium sp* from root nodules.
7. Isolation of amylase producing *Bacillus sp.*,
8. Solvent –Solvent Extraction of fermentation product
9. Cell immobilization.

VI SEMESTER		
SEC 2	BASIC DIETETICS	18USMB61
Hrs/ Week: 2	Hrs / Sem: 2 x 15 = 30	Credits: 2

UNIT I Diet therapy (6 hours)

Definition, purposes of a therapeutic diet, principles and types of hospital diet: clear fluid, full fluid, soft, light, bland and regular diet. Dietitian – Types, qualities, qualification and role of dietitian in managing hospital dietary.

UNIT II Nutritional care for weight management (6 hours)

Obesity and overweight: Identification, etiology, dietary management and behavioral modifications. Under weight: Etiology, assessment and dietary management. Nutritional care for febrile condition – Acute, chronic and recurrent: Malaria, Typhoid and TB – Etiology, symptoms and dietary management.

UNIT III Nutritional care for diseases of the Gastro Intestinal tract (6 hours)

Gastric and duodenal ulcer, diarrhea, constipation, malabsorption syndrome, hemorrhoids, ulcerative colitis, flatulence and steatorrhea – Etiology, symptoms and dietary management.

UNIT IV Nutritional care for diseases of liver and biliary system (6 hours)

Viral hepatitis, cirrhosis of liver, cholelithiasis and cholecystitis: Etiology, symptoms and dietary management.

UNIT V Nutritional care for deficiency disorders (6 hours)

PEM, Nutritional anemia, Vitamin A deficiency, Iodine deficiency, osteoporosis and osteomalacia- Etiology, symptoms and dietary management.

REFERENCE BOOKS

1. Mahan, L.K., Arlin, M.T., Krause's Food, Nutrition and Diet Therapy, W.B. Saunders Company, London Publications, 8th edition, 1992.
2. Robinson, C.H., Chenoweth, W.L. and Garwivk, A.E. Normal and Therapeutic Nutrition, MacMillan Publishing Co., 17th edition, 1986.
3. Raheena, Begum, A textbook of Foods, Nutrition and Dietetics, Sterling Publishers, New Delhi, 1989.
4. Joshi, S.A., Nutrition and Dietetics, Tata McGraw Hill Publications, New Delhi, 2004.
5. Srilakshmi B., Dietetics, New Age International (P) limited Publications, 2004.
6. Paul. S., Textbook of Bio-Nutrition, Curing diseases through diet, CBS publications, first edition, 2005.

VI SEMESTER		
SBC	PERSONALITY DEVELOPMENT	18USPD62
Hrs/ Week: 2	Hrs / Sem: 2 x 15 = 30	Credits: 2

UNIT I

PERSONALITY - Definition – Determinants – Personality Traits –Theories of Personality – Importance of Personality Development. **SELF AWARENESS** – Meaning – Benefits of Self – Awareness – Developing Self – Awareness. **SWOT** – Meaning – Importance- Application – Components.

UNIT – II

SELF MONITORING – Meaning –Advantages and Disadvantages self-monitor – Self-monitoring and job performance. **PERCEPTION**- Definition- Factor influencing perception- Perception process. **ATTITUDE** – Meaning- Formation of attitude – Types of attitude - Measurement of Attitudes. **ASSERTIVENESS** - Meaning – Assertiveness in Communication – Assertiveness Techniques.

UNIT – III

TEAM BUILDING – Meaning – Types of teams – Importance of Team building- Creating Effective Team. **LEADERSHIP** – Definition – Leadership style – Qualities of an Effective leader. **NEGOTIATION SKILLS** – Meaning – Principles of Negotiation – Types of Negotiation – The Negotiation Process. **CONFLICT MANAGEMENT** – Definition- Types of Conflict- Levels of Conflict.

UNIT –IV

COMMUNICATION – Definition – Importance of communication – Process of communication –Barriers in communication – Overcoming Communication Barriers. **EMOTIONAL INTELLIGENCE**: Meaning – Components of Emotional Intelligence- Significance of managing Emotional intelligence. **STRESS MANAGEMENT** – Meaning – Sources of Stress – Symptoms of Stress – Consequences of Stress – Managing Stress.

UNIT – V

SOCIAL GRACES – Meaning – Social Grace at Work – Acquiring Social Graces. **TABLE MANNERS** – Meaning – Table Etiquettes in Multicultural Environment- Do's and Don'ts of Table Etiquettes. **DRESS CODE** – Meaning- Dress Code for selected Occasions – Dress Code for an Interview. **GROUP DISCUSSION** – Meaning – Personality traits required for Group Discussion- Process of Group Discussion. **INTERVIEW** – Definition- Types of skills – Employer Expectations –Planning for the Interview – Interview Questions- Critical Interview Questions.

REFERENCE BOOKS:

1. Dr.S. Narayana Rajan, Dr. B. Rajasekaran, G. Venkadasalapathi, V. Vijuresh Nayaham and Herald M.Dhas, **Personality Development**, Publication Division, Manonmaniam Sundaranar University, Tirunelveli
2. Stephan P.Robbins, **Organisational Behaviour**, Tenth Edition, Prentice Hall of India Private Limited, New Delhi,2008
3. Jit S. Chandan, **Oragnisational Behaviour**, Third Edition, Vikas Publishing House Private Limited, 2008
4. Dr.K.K. Ramachandran and Dr.K.K. Karthick, **From Campus to Corporate**, Macmillan Publishers India Limited, New Delhi, 2010.

SCHEME OF EXAMINATIONS UNDER CBCS (2018 - 2021)
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The medium of instruction in all UG and PG courses is English, and students must write the CIA Tests and Semester Examinations in English.

**DISTRIBUTION OF MARKS FOR CIA AND SEMESTER EXAMINATIONS
UNDERGRADUATE, CERTIFICATE & DIPLOMA COURSES**

SUBJECT	TOTAL MARKS	CIA TEST	SEMESTER EXAMINATION	PASSING MINIMUM		
				CIA TEST	SEM. EXAM.	OVER ALL
Theory	100	25	75	Nil	30	40
Practical (4 hrs)	100	40	60	Nil	24	40
Practical (2 hrs)	50	20	30	Nil	12	20
Project	100	Nil	Report - 60 marks Viva Voce - 40 marks	Nil	Nil	40

DIVISION OF MARKS FOR CIA TEST

SUBJECT	MARKS	ASSIGNMENT FOR UG / ASSIGNMENT OR SEMINAR FOR PG	RECORD NOTE	TOTAL MARKS
Theory	20	5	--	25
Practical (4 hrs)	30	--	10	40
Practical (2 hrs)	15	--	5	20

1. The duration of each CIA Test is ONE hour, and the Semester Examination is THREE hours.
2. Three CIA tests of 20 marks each will be conducted and the average marks of the best two tests out of the three tests will be taken.
3. The I test will be based on the first 1.5 units of the syllabus, the II test will be based on the next 1.5 units of the syllabus and the III test will be based on the next 1.5 units of the syllabus.
4. Two assignments for Undergraduate, Certificate, Diploma and Advanced Diploma Courses and two assignments OR two seminars for Postgraduate Courses has to be submitted.
5. The duration and the pattern of question paper for practical examination may be decided by the respective Boards of Studies. However, out of 60 marks in the semester practical examination, 10 marks may be allotted for record and 50 marks for practical.
6. Two internal practical tests of 30/15 marks each will be conducted for science students in the respective semester and the average will be taken. The record marks allotted for the above practical are 10 and 5 respectively.

QUESTION PAPER PATTERN FOR CIA TEST (THEORY)

Duration: 1 Hr
Maximum Marks: 20

Section	Question Type	No. of Questions & Marks	Marks
A	No Choice Answer should not exceed 75 words	2 Questions 2 marks each	$2 \times 2 = 4$
B	Internal choice (Either or type) Answer should not exceed 200 words	2 Questions 4 marks each	$2 \times 4 = 8$
C	Open Choice (Answer ANY ONE out of Two) Answer should not exceed 400 words	1 Question 8 marks	$1 \times 8 = 8$
TOTAL			20 MARKS

QUESTION PAPER PATTERN FOR SEMESTER EXAMINATION (THEORY)

Duration: 3 Hrs
Maximum Marks: 75

Section	Question Type	No. of Questions & Marks	Marks
A	No Choice Answer should not exceed 75 words	10 Questions - 2 marks each (2 Questions from each unit)	$10 \times 2 = 20$
B	Internal choice (Either or type) Answer should not exceed 200 words	5 Questions with internal choice. Each carry 5 marks (Two questions from each unit)	$5 \times 5 = 25$
C	Open Choice (Answer ANY THREE out of FIVE) Answer should not exceed 400 words	3 Questions out of 5 - 10 marks each (1 Question from each unit)	$3 \times 10 = 30$
TOTAL			75 MARKS