

# **SADAKATHULLAH APPA COLLEGE**

**(AUTONOMOUS)**

**(Reaccredited by NAAC at an 'A' Grade with a CGPA of 3.40 out of 4.00 in the III cycle An ISO 9001:2008 Certified Institution)**

**RAHMATH NAGAR, TIRUNELVELI- 11.**

**Tamilnadu**

## **DEPARTMENT OF MICROBIOLOGY**

**(Unaided)**



### **CBCS SYLLABUS**

**For**

### **B.Sc. Microbiology**

**(Applicable for students admitted in June 2015 and onwards)**

**(As per the Resolutions of the Academic Council  
Meeting held on 23.02.2016)**



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**Sadakathullah Appa College (Autonomous), Tirunelveli – 11**

**B. Sc. – MICROBIOLOGY**

**COURSE STRUCTURE UNDER CBCS**

**(Applicable for students admitted in June 2015 and onwards)**

**Allied I – Medical Lab Technology**

**Allied II – Biotechnology**

<b>I SEMESTER</b>				<b>II SEMESTER</b>			
<b>P</b>	<b>COURSE</b>	<b>H/W</b>	<b>C</b>	<b>P</b>	<b>COURSE</b>	<b>H/W</b>	<b>C</b>
<b>I</b>	Tamil / Arabic	6	3	<b>I</b>	Tamil / Arabic	6	3
<b>II</b>	English	6	3	<b>II</b>	English	6	3
<b>III</b>	Core 1	4	5	<b>III</b>	Core 3	4	5
	Core 2	3	4		Core 4	3	4
	Core Practical – I*	3	-		Core Practical – I*	3	3
	Allied I – 1	3	4		Allied I – 2	3	4
	Allied I Practical*	3	-		Allied I Practical*	3	2
	Environmental Studies	2	1		Value Education I/II	2	1
<b>TOTAL</b>		<b>30</b>	<b>20</b>	<b>TOTAL</b>		<b>30</b>	<b>25</b>
<b>III SEMESTER</b>				<b>IV SEMESTER</b>			
<b>I</b>	Tamil / Arabic	6	3	<b>I</b>	Tamil / Arabic	6	3
<b>II</b>	English	6	3	<b>II</b>	English	6	3
<b>III</b>	Core 5	3	4	<b>III</b>	Core 6	3	4
	Core Practical - II	3	-		Core Practical - II	3	3
	Allied II – 1	3	4		Allied II – 2	3	4
	Allied II Practical*	3	-		Allied II Practical*	3	2
<b>IV</b>	Skill Based Elective 1	3	2	<b>IV</b>	Skill Based Elective 2	3	2
	Non Major Elective 1	3	2		Non Major Elective 2	3	2
				<b>V</b>	Extension Activities	--	1
<b>TOTAL</b>		<b>30</b>	<b>18</b>	<b>TOTAL</b>		<b>30</b>	<b>23</b>
<b>V SEMESTER</b>				<b>VI SEMESTER</b>			
<b>III</b>	Core 7	6	6	<b>III</b>	Core 10	6	6
	Core 8	5	5		Core 11	5	5
	Core 9	5	5		Core 12 - Project	5	5
	Core Practical – III*	3	-		Core Practical - III*	3	3
	Core Practical – IV*	3	-		Core Practical - IV*	3	3
	Core Elective 1	5	6		Core Elective - 2	5	6
	Core Elective Practical*	3	-		Core Elective Practical*	3	3
<b>TOTAL</b>		<b>30</b>	<b>22</b>	<b>TOTAL</b>		<b>30</b>	<b>31</b>

\*Practical Examination at the end of the Even Semester

**G2**

## B.Sc. Microbiology Syllabus

(With Medical Lab Technology & Biotechnology Allied)

(Applicable for students admitted in June 2015 and onwards)

<b>DISTRIBUTION OF CREDITS, NO. OF PAPERS &amp; MARKS</b>						
<b>Part</b>	<b>Course</b>	<b>Semester</b>	<b>Hrs.</b>	<b>Credits</b>	<b>No. of Papers</b>	<b>Marks</b>
<b>I</b>	Tamil / Arabic	I to IV	24	12	4	400
<b>II</b>	English	I to IV	24	12	4	400
<b>III</b>	Core + Core Practical	I to VI	71	67	11+ 4	1500
	Core Elective + CE Practical + Project	V & VI	21	20	2 + 1 + 1	400
	Allied + Practical	I to IV	24	18	4 + 1	500
<b>IV</b>	Environmental Studies	I	2	1	1	100
	Social Value Education	II	2	1	1	100
	Skill Based Elective	III & IV	6	4	2	200
	Non Major Elective	III & IV	6	4	2	200
<b>V</b>	Extension Activities	I to IV	--	1	1 (No Exam)	100
<b>TOTAL</b>			<b>180</b>	<b>140</b>	<b>39</b>	<b>3900</b>

### SEMESTER WISE DISTRIBUTION OF HOURS

<b>Part</b>	<b>I</b>		<b>III</b>				<b>IV</b>			<b>Total</b>
	<b>I</b>	<b>II</b>	<b>Core + Practical</b>	<b>CE</b>	<b>PRO</b>	<b>Allied+ Practical</b>	<b>SBE</b>	<b>NME</b>	<b>EVS/ VE</b>	
<b>I</b>	6	6	7+3	-	-	6+0	-	-	2	<b>30</b>
<b>II</b>	6	6	7+3	-	-	6+0	-	-	2	<b>30</b>
<b>III</b>	6	6	3+3	-	-	3+3	3	3	-	<b>30</b>
<b>IV</b>	6	6	3+3	-	-	3+3	3	3	-	<b>30</b>
<b>V</b>	-	-	16+6	5+3	-	-	-	-	-	<b>30</b>
<b>VI</b>	-	-	11+6	5+3	5	-	-	-	-	<b>30</b>
<b>TOT</b>	<b>24</b>	<b>24</b>	<b>47+24=71</b>	<b>10+6=16</b>	<b>5</b>	<b>18+6=24</b>	<b>6</b>	<b>6</b>	<b>4</b>	<b>180</b>

**B.Sc. Microbiology Syllabus**  
**(With Medical Lab Technology & Biotechnology Allied)**  
**(Applicable for students admitted in June 2015 and onwards)**  
**TITLE OF THE PAPERS, CREDITS & MARKS**

<b>I SEMESTER</b>								
<b>P</b>	<b>SUB</b>	<b>TITLE OF THE PAPER</b>	<b>S.CODE</b>	<b>H/W</b>	<b>C</b>	<b>MARKS</b>		
						<b>I</b>	<b>E</b>	<b>T</b>
<b>I</b>	TA 1	இக்காலத் தமிழ் <b>OR</b>	15UTAL11	6	3	25	75	100
	AR 1	Applied Grammar and Translation - I	15UARL11					
<b>II</b>	EN 1	Prose, Poetry and Remedial Grammar-I	15UENL11	6	3	25	75	100
<b>III</b>	C 1	Introduction to microbial World	15UMBC11	4	5	25	75	100
	C 2	Microbial Diversity	15UMBC12	3	4	25	75	100
	CP-1	Core Practical - I	-	3	-	Examination II Semester		
	AI-1	Allied Heamatology	15UMBA11	3	5	25	75	100
	AI P	Allied I Practical	-	3	-	Examination II Semester		
<b>IV</b>	ES	Environmental Studies	15UEVS11	2	1	25	75	100
<b>TOTAL</b>				<b>30</b>	<b>21</b>	<b>150</b>	<b>450</b>	<b>600</b>
<b>II SEMESTER</b>								
<b>I</b>	TA 2	சமயத் தமிழ் <b>OR</b>	15UTAL21	6	3	25	75	100
	AR 2	Applied Grammar and Translation - II	15UARL21					
<b>II</b>	EN 2	Prose, Poetry and Remedial Grammar - II	15UENL21	6	3	25	75	100
<b>III</b>	C 3	Microbial Physiology and Metabolism	15UMBC21	4	5	25	75	100
	C 4	Environmental Microbiology	15UMBC22	3	4	25	75	100
	CP-1	Core Practical - I	15UMBC2P	3	3	40	60	100
	AI-2	Allied Transfusionology and Serology	15UMBA21	3	5	25	75	100
	AI P	Allied I Practical	15UMBA2P	3	2	40	60	100
<b>IV</b>	VE	Value Education-I <b>OR</b>	15USVE2A	2	1	25	75	100
		Value Education-II	15USVE2B					
<b>TOTAL</b>				<b>30</b>	<b>26</b>	<b>230</b>	<b>570</b>	<b>800</b>

**B.Sc. Microbiology Syllabus**  
**(With Medical Lab Technology & Biotechnology Allied)**  
**(Applicable for students admitted in June 2015 and onwards)**  
**TITLE OF THE PAPERS, CREDITS & MARKS**

<b>III SEMESTER</b>								
<b>P</b>	<b>SUB</b>	<b>TITLE OF THE PAPER</b>	<b>S.CODE</b>	<b>H/W</b>	<b>C</b>	<b>MARKS</b>		
						<b>I</b>	<b>E</b>	<b>T</b>
<b>I</b>	TA 3	பயன்பாட்டுத் தமிழ் <b>OR</b>	15UTAL31	6	3	25	75	100
	AR 3	Prose and Letter Writing	15UARL31					
<b>II</b>	EN 3	One-Act Plays and Writing Skill	15UENL31	6	3	25	75	100
<b>III</b>	C 5	Soil and Agricultural Microbiology	15UMBC31	3	4	25	75	100
	CP-II	Core Practical – II	-	3	-	Examination IV Semester		
	AII-1	Allied Introduction To Biotechnology	15UMBA31	3	4	25	75	100
	AII-P	Allied II Practical	-	3	-	Examination IV Semester		
<b>IV</b>	SBE1	Clinical Pathology	15UMBS31	3	2	25	75	100
	NME1	Choose from the list	-	3	2	25	75	100
<b>TOTAL</b>				<b>30</b>	<b>18</b>	<b>150</b>	<b>450</b>	<b>600</b>
<b>IV SEMESTER</b>								
<b>I</b>	TA 4	சங்கத் தமிழ் <b>OR</b>	15UTAL41	6	3	25	75	100
	AR 4	<i>Quran and Hadeeth</i>	15UARL41					
<b>II</b>	EN 4	A Practical Course in Spoken English	15UENL41	6	3	25	75	100
<b>III</b>	C 6	Medical Microbiology	15UMBC41	3	4	25	75	100
	CP-II	Core Practical - II	15UMBC4P	3	3	40	60	100
	AII-2	Allied Nano Biotechnology	15UMBA41	3	4	25	75	100
	AII-P	Allied II Practical	15UMBA4P	3	2	40	60	100
<b>IV</b>	SBE2	Applied Microbiology	15UMBS41	3	2	25	75	100
	NME2	Choose from the list	-	3	2	25	75	100
<b>V</b>	EX	Extension Activities (Choose from the list)	-	--	1	--	100	100
<b>TOTAL</b>				<b>30</b>	<b>24</b>	<b>230</b>	<b>670</b>	<b>900</b>



**B.Sc. Microbiology Syllabus**  
**(With Medical Lab Technology & Biotechnology Allied)**  
**(Applicable for students admitted in June 2015 and onwards)**  
**TITLE OF THE PAPERS, CREDITS & MARKS**

<b>V SEMESTER</b>								
<b>P</b>	<b>SUB</b>	<b>TITLE OF THE PAPER</b>	<b>S.CODE</b>	<b>H/W</b>	<b>C</b>	<b>MARKS</b>		
						<b>I</b>	<b>E</b>	<b>T</b>
<b>III</b>	C 7	Immunology	15UMBC51	6	6	25	75	100
	C 8	Microbial Genetics	15UMBC52	5	5	25	75	100
	C 9	Biochemistry	15UMBC53	5	5	25	75	100
	CP-III	Core Practical - III	15UMBC6P	3	-	Examination VI Semester		
	CP-IV	Core Practical - IV	15UMBC6P1	3	-	Examination VI Semester		
	CE 1	A) Bioinformatics <b>OR</b>	15UMBE5A	5	6	25	75	100
		B) Bio Degradation	15UMBE5B					
	CE-P	A) Core Elective Practical - A <b>OR</b>	-	3	-	Examination VI Semester		
		B) Core Elective Practical - B	-					
	<b>TOTAL</b>				<b>30</b>	<b>22</b>	<b>100</b>	<b>300</b>
<b>VI SEMESTER</b>								
<b>III</b>	C 10	Industrial microbiology	15UMBC61	6	6	25	75	100
	C 11	Food Microbiology	15UMBC62	5	5	25	75	100
	C 12	Core Practical - III	15UMBC6P1	5	5	25	75	100
	CP-IV	Core Practical - IV	15UMBC6P2	3	3	40	60	100
	CP-IV	Project	15UMBP61	3	3	40	60	100
	CE 2	A) Biostatistics <b>OR</b>	15UMBE6A	5	6	25	75	100
		B) Dairy Microbiology	15UMBE6B					
	CE-P	A) Core Elective Practical - A <b>OR</b>	15UMBE6PA	3	3	40	60	100
		B) Core Elective Practical - B	15UMBE6PB					
	<b>TOTAL</b>				<b>30</b>	<b>31</b>	<b>220</b>	<b>480</b>

**B.Sc. Chemistry Course Structure (CBCS)**  
(Applicable for students admitted in June 2015 and onwards)

**PART I AND PART II SUBJECTS**

**TITLE OF THE PAPERS, CREDITS & MARKS**

<b>GROUP II COURSES (TWO YEAR LANGUAGE COURSES)</b> (B.A. English, B.A. Islamic Studies, B.A. Tamil, B.Sc. Mathematics, B.Sc. Physics, B.Sc. Chemistry, B.Sc. Zoology, B.Sc. Microbiology and B.Sc. Nutrition and Dietetics)							
<b>SEM</b>	<b>Title of the paper</b>	<b>S.CODE</b>	<b>H/W</b>	<b>C</b>	<b>I</b>	<b>E</b>	<b>T</b>
<b>PART I – TAMIL</b>							
<b>I</b>	இக்காலத் தமிழ்	15UTAL11	6	3	25	75	100
<b>II</b>	சமயத் தமிழ்	15UTAL21	6	3	25	75	100
<b>III</b>	பயன்பாட்டுத் தமிழ்	15UTAL31	6	3	25	75	100
<b>IV</b>	சங்கத் தமிழ்	15UTAL41	6	3	25	75	100
<b>TOTAL</b>			<b>24</b>	<b>12</b>	<b>100</b>	<b>300</b>	<b>400</b>
<b>PART I – ARABIC</b>							
<b>I</b>	Applied Grammar and Translation – I	15UARL11	6	3	25	75	100
<b>II</b>	Applied Grammar and Translation – II	15UARL21	6	3	25	75	100
<b>III</b>	Prose and Letter Writing	15UARL31	6	3	25	75	100
<b>IV</b>	<i>Quran and Hadeeth</i>	15UARL41	6	3	25	75	100
<b>TOTAL</b>			<b>24</b>	<b>12</b>	<b>100</b>	<b>300</b>	<b>400</b>
<b>PART II – ENGLISH</b>							
<b>I</b>	Prose, Poetry and Remedial Grammar – I	15UENL11	6	3	25	75	100
<b>II</b>	Prose, Poetry and Remedial Grammar – II	15UENL21	6	3	25	75	100
<b>III</b>	One – Act Plays and Writing Skill	15UENL31	6	3	25	75	100
<b>IV</b>	A Practical Course in Spoken English	15UENL41	6	3	40	60	100
<b>TOTAL</b>			<b>24</b>	<b>12</b>	<b>115</b>	<b>285</b>	<b>400</b>

**DEPARTMENT OF MICROBIOLOGY**  
**B.Sc. Microbiology Syllabus**  
**PART III - CORE, CORE ELECTIVE AND PROJECT**

SEM	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
I	C 1	Introduction to microbial World	15UMBC11	4	5	25	75	100
	C 2	Microbial Diversity	15UMBC12	3	4	25	75	100
	CP-1	Core Practical - I	-	3	-	Examination II Semester		
II	C 3	Microbial Physiology and Metabolism	15UMBC21	4	5	25	75	100
	C 4	Environmental Microbiology	15UMBC22	3	4	25	75	100
	CP-I	Core Practical - I	15UMBC2P	3	3	40	60	100
III	C 5	Soil and Agricultural Microbiology	15UMBC31	3	4	25	75	100
	CP-II	Core Practical - II	-	3	-	Examination IV Semester		
IV	C 6	Medical Microbiology	15UMBC41	3	4	25	75	100
	CP-II	Core Practical - II	15UMBC4P	3	3	40	60	100
V	C 7	Immunology	15UMBC51	6	6	25	75	100
	C 8	Microbial Genetics	15UMBC52	5	5	25	75	100
	C 9	Biochemistry	15UMBC53	5	5	25	75	100
	CP-III	Core Practical - III	15UMBC6P	3	-	Examination VI Semester		
	CP-IV	Core Practical - IV	15UMBC6P1	3	-	Examination VI Semester		
	CE 1	A) Bioinformatics <b>OR</b>	15UMBE5A	5	6	25	75	100
		B) Bio Degradation	15UMBE5B					
CE-P	Core Elective Practical	-	3	-	Examination VI Semester			
VI	C 10	Industrial microbiology	15UMBC61	6	6	25	75	100
	C 11	Food Microbiology	15UMBC62	5	5	25	75	100
	C 12	Core Practical - III	15UMBC6P	5	5	25	75	100
	CP-III	Core Practical - IV	15UMBC6P1	3	3	40	60	100
	CP-IV	Project	15UMBP61	3	3	-	100	100
	CE 2	A) Biostatistics <b>OR</b>	15UMBE6A	5	6	25	75	100
		B) Dairy Microbiology	15UMBE6B					
	CE-P	Core Elective Practical	15UMBE6P	3	3	40	60	100
<b>TOTAL</b>				<b>92</b>	<b>31</b>	<b>220</b>	<b>480</b>	<b>700</b>

<b>B.Sc. Microbiology Syllabus</b>								
<b>PART III – ALLIED I – MEDICAL LAB TECHNOLOGY</b>								
SEM	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
I	AI-1	Allied Heamatology	15UMBA11	3	5	25	75	100
	AI-P	Allied I Practical	-	3	-	Examination II Semester		
II	AI-2	Allied Transfusionology and Serology	15UMBA21	3	3	25	75	100
	AI-P	Allied I Practical	15UMBA2P	3	2	40	60	100
<b>PART III – ALLIED II – BIOTECHNOLOGY</b>								
III	AII-1	Allied Introduction To Biotechnology	15UMBA31	3	4	25	75	100
	AII-P	Allied II Practical	-	3	-	Examination IV Semester		
IV	AII-2	Allied Nano Biotechnology	15UMBA41	3	4	25	75	100
	AII-P	Allied II Practical	15UMBA4P	3	2	40	60	100
<b>TOTAL</b>				<b>24</b>	<b>20</b>	<b>180</b>	<b>420</b>	<b>600</b>

**B.Sc. Microbiology Syllabus (2015-2018)**  
**PART IV – SKILL-BASED ELECTIVE SUBJECT**

SEM	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
III	SBE1	Clinical Pathology	15UMBS31	3	2	25	75	100
IV	SBE2	Applied Microbiology	15UMBS41	3	2	25	75	100
<b>TOTAL</b>				<b>6</b>	<b>4</b>	<b>50</b>	<b>150</b>	<b>200</b>

**B.Sc. Microbiology Syllabus (2015-2018)**  
**PART IV – SKILL-BASED ELECTIVE SUBJECT**

SEM	SUB	TITLE OF THE PAPER	S.CODE	H/W	C	MARKS		
						I	E	T
III	NME1	General Microbiology	15UMBN31	3	2	25	75	100
IV	NME2	Biotechnology	15UMBN41	3	2	25	75	100
<b>TOTAL</b>				<b>6</b>	<b>4</b>	<b>50</b>	<b>150</b>	<b>200</b>

**PART – V – Extension Activities**

SEM	Extension Activities (Choose any one)	S.CODE	H/W	C	MARKS		
					I	E	T
I to IV	Enviro Club	15UEXEVC	-	1	-	100	100
	NCC	15UEXNCC					
	NSS	15UEXNSS					
	Physical Education	15UEXPHY					
	Red Ribbon Club	15UEXRRC					
	Sadakath Outreach Programme	15UEXSOP					
	Youth Red Cross	15UEXYRC					
	Youth Welfare	15UEXYWL					
			-	1	-	100	100

PART – 1 TAMIL			
முதல் பருவம்			
Part – 1	இக்காலத் தமிழ்		15 UTAL11
Hrs/Week : 6	Hrs/Sem : 90	Hrs/Unit : 18	Credits : 3

**நோக்கம் :**

- ❖ தமிழ்ப் படைப்பிலக்கியங்களான புதுக்கவிதைகள், சிறுகதைகள் ஆகியவற்றை எழுத வைத்தல்.
- ❖ சமூகம் பற்றிய சிந்தனைகளைப் படைப்பிலக்கியங்கள் மூலம் ஏற்படுத்துதல்.

**அலகு - 1**

**தமிழ்ச் செய்யுள் - புதுக்கவிதைகள்**

- |                                                  |   |                              |
|--------------------------------------------------|---|------------------------------|
| 1. அல்லாஹ்                                       | - | மகாகவி பாரதியார்             |
| 2. தமிழுக்கு அமுதென்று பெயர்                     | - | பாவேந்தர் பாரதிதாசன்         |
| 3. பாடல்                                         | - | பட்டுக்கோட்டை கல்யாணசுந்தரம் |
| 4. ஆயிரம் திருநாமம் பாடி                         | - | கவிக்கோ அப்துல் ரகுமான்      |
| 5. தேசப்பிதாவுக்கு ஒரு தெருப்<br>பாடகனின் அஞ்சலி | - | மு. மேத்தா                   |
| 6. ஐந்து பெரிது ஆறு சிறிது                       | - | வைரமுத்து                    |
| 7. மழை கொடுக்கும்                                | - | கவியரசு கண்ணதாசன்            |
| 8. எத்திசையிலிருந்து எறியப்பட்டது                | - | கல்யாண்ஜி                    |
| 9. சினேகிதனின் தாழ்வான வீடு                      | - | கலாப்பிரியா                  |
| 10. தூக்கம் விற்ற காசுகள்                        | - | ரசிகவஞானியார்                |
| 11. தோழர் மோசிகீரனார்                            | - | ஞானக்கூத்தன்                 |
| 12. வயலும் வாழ்வும்                              | - | நா.முத்துக்குமார்            |
| 13. கடவுள் போற்றி                                | - | கவிமணி                       |
| 14. நண்பனே                                       | - | கலீல் ஜீப்ரான்               |

**அலகு -2 (சிறுகதைக் களஞ்சியம்)**

- |                         |   |                       |
|-------------------------|---|-----------------------|
| 1. காஞ்சனை              | - | புதுமைப்பித்தன்       |
| 2. கூறல்                | - | வண்ணதாசன்             |
| 3. சொர்க்க கன்னிகை      | - | கருணாமணாளன்           |
| 4. காலத்தின் ஆவர்த்தனம் | - | தோப்பில் முகமதுமீரான் |
| 5. கனவில் உதிர்ந்த பூ   | - | நாறும்பூநாதன்         |
| 6. ராஜமீன்              | - | கீரனார் ஜாஹிர்ராஜா    |
| 7. சங்காத்தி            | - | தீன்                  |

### **அலகு- 3 உரைநடை**

1. பாடிப்பது சுகமே – வெ. இறையன்பு இ.ஆ.ப.  
நீயூ செஞ்சுரி புக ஹவுஸ் (பி) லிட், சென்னை.

### **அலகு- 4 இலக்கிய வரலாறு**

1. தமிழ்ப் புதுக்கவிதைகள் தோற்றமும் வளர்ச்சியும்
2. தமிழ்ச் சிறுகதைகள் தோற்றமும் வளர்ச்சியும்
3. தடம் பதித்த தமிழ்ச் சிறுகதையாசிரியர்கள்
4. தற்காலத் தமிழ்ப் புதுக்கவிதைகள், சிறுகதைகளின் போக்கு

### **அலகு- 5 இலக்கணம்**

1. எழுத்து வகை பற்றிய விளக்கம்  
முதலெழுத்துகள், சார்பெழுத்துகள், சுட்டெழுத்துகள், வினாவெழுத்துகள்
2. மொழி முதல் எழுத்துக்கள், மொழி இறுதி எழுத்துகள்
3. வல்லினம் மிகுமிடங்கள், மிகா இடங்கள்

<b>PART – 1 TAMIL</b>			
<b>இரண்டாம் பருவம்</b>			
<b>Part – 1</b>	<b>சமயத் தமிழ்</b>		<b>15 UTAL21</b>
<b>Hrs/Week : 6</b>	<b>Hrs/Sem : 90</b>	<b>Hrs/Unit : 18</b>	<b>Credits : 3</b>

**நோக்கம் :**

- ❖ பலசமயக் கருத்துக்களை ஒப்பிட்டுச் சமய நல்லிணக்கத்தோடு மாணவர்கள் வாழ இப்பருவம் துணை புரிகிறது.
- ❖ தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையத் தேர்வுக்கு மாணவர்களை ஆயத்தப்படுத்துதல்

**அலகு- 1**

**தமிழ்ச் செய்யுள் (துறை வெளியீடு)**

**சைவம்**

1. தேவாரம்
  - திருநாவுக்கரசர் - மாசில் வீணையும்...
  - நாமார்க்கும் குடியல்லோம்...
  - அப்பன் நீ அம்மை நீ...
  - திருஞானசம்பந்தர் - தோடுடைய செவியன்...
  - வேயுறு தோளி பங்கன்...
  - மருந்தவை மந்திரம்...
  - சுந்தரமூர்த்தி நாயனார் - பித்தா பிறைகுடி...
2. திருவாசகம்
  - மாணிக்கவாசகர் - பால் நினைந்தாட்டும்...
3. திருவெம்பாவை
  - ஆதியும் அந்தமும் இல்லா...
4. திருமந்திரம்
  - திருமூலர் - ஒன்றே குலமும் ஒருவனே தேவனும்...

**வைணவம்**

5. பொய்கையாழ்வார்
  - வையம் தகளியா...
- பூதத்தாழ்வார்
  - அன்பே தகளியா...
- பேயாழ்வார்
  - திருக்கண்டேன்...
6. திருப்பாவை
  - ஆண்டாள் - மார்கழித் திங்கள்...
7. வளையாபதி
  - மக்கட் செல்வம்

### **பெளத்தம்**

8. புத்தபிரான் - மு.ரா.பெருமாள்

### **கிறித்தவம்**

9. இயேசு காவியம் (சில பகுதிகள்) - கண்ணதாசன்

### **இஸ்லாம்**

10. நபிகள் நாயக மான்மிய மஞ்சரி - சதாவதானி செய்குத்தம்பிப்பாவலர் ஸ்ரீ (குறிப்பிட்ட பாடல்கள்)
11. குணங்குடி மஸ்தான் பாடல்கள் - பாசக்கயிற்று வலை
12. ஞானப் புகழ்ச்சி - தக்கலை பீர்முகமது அப்பா
13. அலகிலா அருளும் - இறையருட் கவிமணி. கா.அப்துல்கபூர்

### **நீதி இலக்கியங்கள்**

14. திருக்குறள் (வான் சிறப்பு)
15. நாலடியார் - கல்வி கரையில
16. இன்னாநாற்பது - ஆன்றவித்த...

### **அலகு- 2 புதினம்**

- “கல்மரம்” - திலகவதி

### **அலகு - 3 உரைநடை (தமிழ்த் துறை வெளியீடு)**

1. நபிகள் நாயகம் (ஸல்) அன்பின் தாயகம்
2. சதக்கத்துல்லாஹ் அப்பா அவர்களின் வாழ்வும் பணியும்
3. [கவி.கா.மு.ஷெரிப்](#) - த.மு.சா காசாமைதீன்
4. கவிக்கோ அப்துல்ரகுமானின் கவிதைகள்
5. தமிழ் இலக்கியங்களில் மனிதநேயச் சிந்தனைகள்
6. இணையத்தில் தமிழ்

### **அலகு- 4 (போட்டித் தேர்வுத் தயாரிப்பு)**

### **இலக்கிய வரலாறு**

1. சைவம், வைணவம், கிறித்துவம், இசுலாம் வளர்த்த தமிழ்
2. புகழ் பெற்ற தமிழ் நூல்கள், நூலாசிரியர்கள்
3. தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையம் நடத்தும் போட்டித் தேர்வுக்குரிய பொதுத்தமிழ் பாடத்திட்டம் - ஓர் அறிமுகம்

### **அலகு- 5 இலக்கணம்**

வேர்ச்சொல் அறிதல், அகரவரிசைப்படி மாற்றியமைத்தல், செய்வினை, செய்யப்பாட்டுவினை, தன்வினை, பிறவினை, உடன்பாடு, எதிர்மறை, செய்தி வாக்கியம், கலவை வாக்கியம், பெயர்வினை, இடை, உரிச்சொற்களின் இலக்கணம் மற்றும் பெயர்ச்சொல், வினைச்சொல் வகைகள், லகர, ளகர, ணகர, ரகர, றகர வேறுபாடுகள்.



PART – 1 TAMIL			
முன்றாம் பருவம்			
Part – 1	பயன்பாட்டுத் தமிழ்		15 UTAL31
Hrs/Week : 6	Hrs/Sem : 90	Hrs/Unit : 18	Credits : 3

நோக்கம் :

- ❖ தமிழின் காப்பிய இலக்கிய வளத்தை மாணவர்களுக்கு உணர்த்துதல்
- ❖ இந்திய ஆட்சிப் பணித்தேர்வுக்கு மாணவர்களை ஆயத்தப்படுத்துதல்
- ❖ செய்தி வெளிப்பாட்டு உத்திகளைக் கற்றுத் தந்து மாணவர்களை ஊடகவியலாளர்களாக மாற்றுதல்.

**அலகு- 1**

**தமிழ்ச் செய்யுள் (துறை வெளியீடு)**

1. சிலப்பதிகாரம் - வழக்குரைக் காதை
2. மணிமேகலை - பாத்திரம் பெற்ற காதை
3. பெரியபுராணம் - மெய்ப்பொருள் நாயனார் புராணம்
4. கம்பராமாயணம் - சுந்தரகாண்டம் (ஊர் தேடு படலம்)
5. இயேசு காவியம் - சிலுவைப்பாடு
6. சீறாப்புராணம் - மதினத்தார் ஈமான் கொண்ட படலம்
7. குத்பு நாயகம் - வண்ணக் களஞ்சியப் புலவர் (காப்பியப் பாவிசம் மட்டும்)

**அலகு- 2**

இந்திய ஆட்சிப் பணிக்குத் தயார்படுத்தும் நோக்கிலமைந்த பயன்பாட்டுக் கட்டுரை நூல். ஐ.ஏ.ஏஸ் தேர்வும் அணுகுமுறையும் -வெ.இறையன்பு இ.ஆ.ப., நியூ செஞ்சரி புக் ஹவுஸ், அம்பத்தூர், சென்னை – 98.

**அலகு- 3**

**ஊடக அறிமுகம்**

இதழியல் அறிமுகம்  
சமூகமும் இதழ்களும்  
வானொலி, தொலைக்காட்சி நிகழ்ச்சிகளை அமைக்கும் முறை  
சிறப்புக் கட்டுரை எழுதுதல்  
இதழ்களின் அடிப்படைக் கொள்கைகள்  
தற்கால நாளிதழ்களில் தமிழ்

## அலகு - 4

### தமிழ் இலக்கிய வரலாறு

- ❖ ஐம்பெரும் காப்பியங்கள்
- ❖ ஐஞ்சிறு காப்பியங்கள்
- ❖ சிற்றிலக்கியங்கள் (உலா, தூது, பிள்ளைத் தமிழ், பரணி)

## அலகு - 5

### இலக்கணம்

(தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையத்தின் பொதுத் தமிழ் இலக்கணப் பகுதி)

பிழைத் திருத்தம், சந்திப் பிழைகள், ஒருமை – பன்மைப் பிழைகள், மரபுப் பிழைகள், வழுவச் சொற்களை நீக்குதல், பிறமொழிச் சொற்களை நீக்குதல், வேர்சொல்லைச் தேர்வு செய்தல்

பார்வை நூல்கள் :

- |                                                        |   |                                                                   |
|--------------------------------------------------------|---|-------------------------------------------------------------------|
| தமிழ் இலக்கிய வரலாறு                                   | - | முனைவர்.சு.ஆனந்தன்<br>கண்மணிப் பதிப்பகம்,<br>திருச்சி – 02.       |
| இதழியல் நுணுக்கங்கள்                                   | - | செண்பகா பதிப்பகம்<br>சென்னை – 17.<br>தொலைபேசி : 24331510          |
| குத்பு நாயகம் ஆய்வுரை                                  | - | டாக்டர்.மு.அப்துல்கரீம்<br>உலக தமிழாராய்ச்சி நிறுவனம்,<br>சென்னை. |
| சீறாப்புராணம் மூலமும் பொழிப்புரையும்<br>இரண்டாம் பாகம் | - | ஹாஜி எம்.முகமது யூசுப்                                            |

PART – 1 TAMIL			
நான்காம் பருவம்			
Part – 1	சங்கத் தமிழ்		15 UTAL41
Hrs/Week : 6	Hrs/Sem : 90	Hrs/Unit : 18	Credits : 3

**நோக்கம் :**

- ❖ சங்கத் தமிழ் குறித்த சிந்தனைகளை மாணவர்களுக்கு ஏற்படுத்துதல்
- ❖ இணைய ஊடகத்தில் தமிழ் இடம் பெற்றுள்ள இடத்தினை உணர்த்தி மாணவர்களை இணையத்தைப் பயன்படுத்த வைத்தல்

**அலகு- 1**

**தமிழ்ச் செய்யுள் (துறை வெளியீடு)**

நற்றிணை, குறுந்தொகை, ஐங்குறுநூறு, பதிற்றுப்பத்து, பரிபாடல், கலித்தொகை, அகநானூறு, புறநானூறு மற்றும் பத்துப் பாட்டில் முல்லைப்பாட்டு முழுவதும்

**அலகு- 2**

**உரைநடை**

சிற்பியே உன்னைச் செதுக்குகிறேன் - வைரமுத்து

**அலகு- 3**

**இணையத் தமிழ் (தமிழ்த்துறை வெளியீடு)**

இணையத் தமிழ் - முனைவர் ச.மகாதேவன்

இரண்டாம் பதிப்பு - பேரா.அ.மு.அய்யங்கான்

முனைவர்.அ.சே.சேக்சிந்தா

- ❖ இணையம் - ஓர் அறிமுகம் - உலகளாவிய தமிழ்
- ❖ வலைத்தளங்கள் - இணையத்தளத்தேடு பொறி
- ❖ இணையப் பயன்பாடு - தமிழில் வலைப் பூக்கள்

**அலகு- 4**

**இலக்கிய வரலாறு**

எட்டுத் தொகை, பத்துப் பாட்டு நூல்கள்

## அலகு- 5

இலக்கணம்

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

புறத்திணைகள் : 12 அறிமுகம்

### பார்வை நூல்கள்

தமிழ் இலக்கிய வரலாறு

முனைவர் சு.ஆனந்தன்

கண்மணி பதிப்பகம்

திருச்சி - 620002.

இணையத் தமிழ் (தமிழ்த்துறை வெளியீடு)

சதக்கத்துல்லாஹ் அப்பா கல்லூரி

திருநெல்வேலி.

<b>Part - I ARABIC</b>			
<b>Applicable for Group II Courses (Two Year Language Courses) such as B.A. English, B.A. Tamil, B.A. Islamic Studies, B.Sc., Mathematics, B.Sc., Physics, B.Sc., Chemistry, B.Sc, Zoology, B.Sc, Microbiology and B.Sc., Nutrition and Dietetics.</b>			
<b>PAPER-I</b>	<b>APPLIED GRAMMAR AND TRANSLATION-I</b>		<b>15UARL 11</b>
<b>Hrs/ Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/ Unit: 18</b>	<b>Credits: 3</b>

**Unit I :-**

**Lessons 1 to 5 (Reader)**

**Unit II :-**

**Lessons 6 to 10**

**Unit III :-**

**Grammar Portions**

- 1) Al Mufrad wal- muthanna wal jam'
- 2) Huroof ul Jarr
- 3) Asmaa – ul Ishaarah.
- 4) Adawaatul Istifhaam
- 5) Ad Damaair – ul – Munfasilah Val Muthasilah
- 6) Al-Idaafah
- 7) Al Mubtada wal khabar
- 8) As-sifatu wal mausoof
- 9) Al mudhakkar wal muannath
- 10) Asmaa-ul-mausool

**Unit IV :-**

**Lessons 11 to 15**

**Unit V :-**

**Lessons 16 to 20**

**TEXT BOOKS**

1) *Duroosul Lughatil Arabiya Part – I (Reader) - Lessons 1 to 20 only by Dr.V. Abdur Rahim. Available at Islamic foundation Trust, 78 Perambur High Road , Perambur, Chennai- 600 012.*

2) *An-Nahwul Waadih Ibtidayee – Part I (Grammar, selected topics only) by Ali Al-jaarim and Mustafa Ameen. Available at Hilal Book House , Tirurkad, Angadipuram, Kerala.*

<b>Semester - II</b>			
<b>PAPER-II</b>	<b>APPLIED GRAMMAR AND TRANSLATION-II</b>		<b>15UARL 21</b>
<b>Hrs/ Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/ Unit: 18</b>	<b>Credits: 3</b>

**Unit I :-**

**Lessons 1 to 3 (Reader)**

**Unit II :-**

**Lessons 4 to 7**

**Unit III :-**

**Grammar Portions**

- 1) Inna wa Akhavaatuha.
- 2) Ismut Tafleel
- 3) AlMali wal Mularee
- 4) Al-Amr wan Nahi
- 5) Al Fa-il
- 6) Al Maf-ool
- 7) Al-Asmaul Mausool
- 8) Taqseemu Fihl ila As-saheeh wal Muhtal
- 9) Ismul Maf'ool
- 10) Ismul Faa'il.

**Unit IV**

**Lessons 8 to 11**

**Unit V**

**Lessons 12 to 15**

**TEXT BOOKS**

1. **Duroosul Lughatil Arabiya** Part – II (Reader) Lessons 1 to 15 only by Dr.V. Abdur Rahim. Available at: Islamic foundation Trust, 78 Perambur High Road , Perambur, Chennai- 600 012.
2. **An-Nahwul Waadih Ibtidayee** –Part I &II (Selected Grammar Portions only) by Ali Al-jaarim and Mustafa Ameen. Available at: Hilal Book House , Tirurkad, Angadipuram, Kerala.

Semester III			
Paper – III	Prose and Letter Writing		15UARL31
Hrs/Week:6	Hrs/Sem:90	Hrs/Unit : 18	Credits:3

### Unit I

#### Lessons 1 to 9

الحركة - الكلمة - أنواع الكلمة - المركبات - الفراشة والزهرة - الزيارة - في السوق - المحطة - القطار -

### Unit II

#### Lessons 10 to 17

أسرة العم - دكان الفواكه - جنينة الحيوانات - نزهة طيبة - اللعب - السفر بالطائرة - العودة من الحج - حفل ديني

### Unit III

#### Lessons 18 to 25

سرقة الزهرة - نظام الحجرة - العبادة - محادثة - الخطاب - رحلة الي دهلي - منظر الحقول - البريد -

### Unit IV

#### Lessons 26 to 31

حديث الاطفال - دكان البقال - الصيدلية - الزمن - الساعة (الف) - الساعة (ب)

### Unit V

Kinds of letters - رسالة الي الوالد لطلب الفلوس للرسوم - رسالة طلب الاجازة - رسالة طلب وظيفة الي شركة (page no 14) - رسالة الاستفسار عن البضاعة - رسالة شكوي عن نقص البضاعة - رسالة الي مدير البنك - Glossary of Words

### TEXT BOOKS

1. **Al Qira't- ul- Waaliha** Part- II By: Waheeduz Zamaan Al-Keeranavi وحيد الزمان الكيرانوي (lessons 1 to 31 only) Available at: Husainiya Bookstall, Deoband, Utterpradesh.
2. Letter Writing in Arabic (For schools and colleges) (selected letters only) by Dr. Syed Karamathullah Bahmani – Available at: Published by Alif Books & Prints, Chennai – 600 014.

<b>Semester IV</b>			
<b>PAPER-IV</b>	<b>QURAN AND HADEETH</b>		<b>15UARL41</b>
<b>Hrs/ Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/ Unit: 18</b>	<b>Credits: 3</b>

**Unit I**

*Verses from 1 to 9 from (Sura – al – Hujraat)*

**Unit II**

*Verses from 10 to 18 from (Sura – al – Hujraat)*

**Unit III**

*Codification and Compilation of Hadeeth Literature, Life History of Imam Bukhari, Muslim, Tirmidi, Abu Dawood, Nasabee and Ibn Majah & Hadeeth 1 to 10*

**Unit IV**

*Hadeeth 11 - 20*

**Unit V**

*Verses from 12 to 19 from (Sura – Luqman)*

**TEXT BOOKS:**

1. **Tafseer Suratul Hujuraath and Suraah Luqman** (verses from 12-19) – A study material prepared by Dept. of Arabic, Sadakathullah Appa College , Rahmath Nagar, Tirunelveli-11.
2. **Hadeeth:** Ahadeeth Sahlah An Explana Hadeeth: *Sharhu Ahadeeth Sahlah An explanatory translation of Dr. V. Abdur Rahim's Ahadeeth Sahlah with grammatical notes.* Available at: Islamic foundation Trust, 78 Perambur High Road , Perambur, Chennai- 600 012.



**PART – II ENGLISH**  
**TWO – YEAR LANGUAGE COURSE**  
**B.A. English, History, Islamic Studies, B.Sc. Mathematics,**  
**Physics, Chemistry, Zoology, Microbiology and Nutrition and**  
**Dietetics**

<b>I SEMESTER</b>			
<b>EN1</b>	<b>PROSE, POETRY AND REMEDIAL GRAMMAR - I</b>		<b>15UENL11</b>
<b>Hrs/ Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/ Unit: 18</b>	<b>Credits: 3</b>

**Objectives:**

1. To answer comprehensive questions on passages of moderate level of difficulty.
2. To analyse the prescribed prose pieces and to attempt a critical appreciation of the poems.
3. To write grammatically.

**UNIT I – PROSE**

1. Letter to a Teacher - Nora Rossi and Tom Cole (Trans.)
2. Spoken English and Broken English - George Bernard Shaw
3. Voluntary Poverty - M.K. Gandhi

**UNIT II – PROSE**

4. A Snake in the Grass - R.K. Narayan
5. The Civilization of Today - C.E.M. Joad
6. Kamala Nehru - Jawaharlal Nehru

**UNIT III – POETRY**

1. On His Blindness - John Milton
2. Upon Westminster Bridge - William Wordsworth
3. When I have Fears - John Keats

**UNIT IV – FUNCTIONAL GRAMMAR**

1. Articles and Nouns (Units 68-80 of *Intermediate English Grammar*)
2. Pronouns and Determiners (Units 81-90 of *Intermediate English Grammar*)

**UNIT V – FUNCTIONAL GRAMMAR**

3. Reported Speech (Units 46-47 of *Intermediate English Grammar*)
4. Questions and auxiliary verbs (Units 48-51 of *Intermediate English Grammar*)
5. 'ing' and the infinitive (Units 52-67 of *Intermediate English Grammar*)

**TEXTBOOKS:**

1. T. Srirama, Colin Swatridge. ed. *College Prose and Poetry*. TRINITY, New Delhi: Trichy, 1989 (rpt. 2014).
2. Raymond Murphy. ed. *Intermediate English Grammar*. New Delhi : Cambridge University Press, 1994 (rpt. 2006).

<b>II SEMESTER</b>			
<b>EN2</b>	<b>PROSE, POETRY AND REMEDIAL GRAMMAR - II</b>		<b>15UENL21</b>
<b>Hrs/ Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/ Unit: 18</b>	<b>Credits: 3</b>

**Objectives:**

1. To answer comprehensive questions on passages of moderate level of difficulty.
2. To analyse the prescribed prose pieces and to attempt a critical appreciation of the poems.
3. To write grammatically.

**UNIT I – PROSE**

- |                          |                       |
|--------------------------|-----------------------|
| 1. With the Photographer | - Stephen Leacock     |
| 2. Professions for Women | - Virginia Woolf      |
| 3. On Letter Writing     | - Alpha of the Plough |

**UNIT II – PROSE**

- |                               |                         |
|-------------------------------|-------------------------|
| 4. The Night the Ghost Got In | - James Thurber         |
| 5. The Donkey                 | - Sir. J.Arthur Thomson |
| 6. A Cup of Tea               | - Katherine Mansfield   |

**UNIT III – POETRY**

- |                           |                        |
|---------------------------|------------------------|
| 1. The Flower             | - Alfred Lord Tennyson |
| 2. Homage to a Government | - Philip Larkin        |
| 3. Obituary               | - A.K. Ramanujan       |

**UNIT IV – FUNCTIONAL GRAMMAR**

1. Present and Past (Units 1-6 of *Intermediate English Grammar*)
2. Present Perfect and Past ( Units 7-18 of *Intermediate English Grammar*)
3. Future (Units 19-22 of *Intermediate English Grammar*)

**UNIT V – FUNCTIONAL GRAMMAR**

4. Future (Units 23-25 of *Intermediate English Grammar*)
5. Modals (Units 26-36 of *Intermediate English Grammar*)
6. Conditionals and 'Wish' (Units 37-40 of *Intermediate English Grammar*)
7. Passive (Units 41-45 of *Intermediate English Grammar*)

**TEXTBOOKS:**

1. T. Srirama, Colin Swatridge. ed. *College Prose and Poetry*. TRINITY, New Delhi: Trichy, 1989 (rpt. 2014).
2. Raymond Murphy. ed. *Intermediate English Grammar*. New Delhi: Cambridge University Press, 1994 (rpt. 2006).

III SEMESTER			
EN3	ONE – ACT PLAYS AND WRITING SKILL		15UENL31
Hrs/ Week: 6	Hrs/ Sem: 90	Hrs/ Unit: 18	Credits: 3

**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. Refund - Fritz Karinthy
2. Reunion - W.ST.John Tayleur
3. The Never Never Nest - Cedric Mount

**UNIT II – ONE – ACT PLAYS**

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

**UNIT III – WRITING SKILL**

1. **Messages** (Pages 1-9 of *Written English for You* be taught and the tasks given 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 10-19 of *Written English for You* 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 Applications
3. **Letters – 2** (Pages 36-40 of *Written English for You* be taught and the tasks given in pages 38 and 40 should be accomplished in the *Record of Writing*)
  - i) Letters to inform your plan of visits
  - ii) Letters of Request
  - iii) Letters of Apology

**UNIT IV – WRITING SKILL**

4. **Essays** (Pages 66-79 be taught and the tasks 1-3 given in pages 79 - 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) Transitional paragraph.
  - vii) Concluding paragraph.
  - viii) What can be the length of an Essay?
  - ix) Why am I writing this Essay?
  - x) Who am I writing for?
  - xi) How to begin an Essay?
  - xii) How to organize an Essay?
  - xiii) What to avoid in writing an Essay?
5. **Narrating** (Pages 109-116 of *Written English for You* be taught. The tasks 1 and 2 given in pages 115 - 116 should 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 a different viewpoint 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 given in pages 172 -178 should 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 text book **Written English**.

#### **TEXTBOOKS:**

1. Y. Sayed Mohammed. ed. *The Lamp of India*. Tirunelveli: Muhammed Taahaa Publications, 2011.
2. G. Radhakrishna Pillai. ed. *Written English for You*. Chennai: Emerald Publishers, 1990 (rpt. 2008).
3. Compiled by a Board of Editors. *A Book of Plays*. Chennai: Orient Blackswan, 2010.

<b>IV SEMESTER</b>			
<b>EN4</b>	<b>A PRACTICAL COURSE IN SPOKEN ENGLISH</b>		<b>15UENL41</b>
<b>Hrs/ Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/ Unit: 18</b>	<b>Credits: 3</b>

**Objectives:**

1. To express students' 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, etc., & Pronunciation Practice : Vowels  
(Chapter 4 – 8 of *A Course in Spoken English*)

**UNIT III**

Developing descriptive competency, narrative competency, arguing competency, comparing competency and Pronunciation Practice: Diphthongs (Chapter 9 – 13 of *A Course in Spoken English*)

**UNIT IV**

Practising 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. A Workbook for A Course in Spoken English.
3. Spoken English Practice Record.

**Evaluation Scheme:**

I Internal Oral Examination	: 15 Marks	} The best two of the three CIA test marks will be added up
II Internal Oral Examination	: 15 Marks	
III Internal Oral Examination	: 15 Marks	
Loud Reading	: 5 Marks	
Listening Test	: 5 Marks	
<b>Internal Marks</b>	<b>: 40 Marks</b>	
External Oral Examination	: 50 Marks	
Record Note	: 05 Marks	
Workbook	: 05 Marks	
<b>60 Marks</b>		

<b>I SEMESTER</b>			
<b>C-1</b>	<b>INTRODUCTION TO MICROBIAL WORLD</b>	<b>15UMBC11</b>	
<b>Hrs/Week:4</b>	<b>Hrs/Sem: 4×15 = 60</b>	<b>Hrs/Unit :12</b>	<b>Credits :5</b>

### **UNIT – I**

History and Scope of Microbiology – Contribution by pioneers – 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**

Classification of microorganisms – general principles and nomenclature – Difference between the prokaryotic and eukaryotic microorganisms. Spontaneous generation

### **UNIT – III**

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

### **UNIT –IV**

Sterilization: Instruments, Principles and methods – Physical (moist heat, dry heat, filtration, pasteurization, tyndallization, radiations) and Chemical (alcohols, aldehydes, phenols, halogens and hypochlorite’s), Antimicrobial chemotherapy.

### **UNIT – V**

Culture techniques: Types of media simple, defined, enriched and transport media with specific examples for each type. Isolation and purification of microorganisms. Methods of maintenance and preservation of cultures.

### **REFERENCE BOOKS:**

1. Microbiology – Jeeva
2. Pelczar Jr. M.J.Chan E.C.S. and Kreig N.R, (1993).
3. L.N.Prescott, J.P.Hartley and D.A., Mayes P.A. and D.A.Klein.1993.Microbiology. Wm.c.I Inc.

<b>I SEMESTER</b>			
<b>C-2</b>	<b>MICROBIAL DIVERSITY</b>		<b>15UMBC12</b>
<b>Hrs/Week:3</b>	<b>Hrs/Sem: 4×15 = 45</b>	<b>Hrs/Unit :9</b>	<b>Credits :4</b>

### **UNIT – I**

Bacteria – structure and function of cell wall, cilia, flagella, capsule, pili, cytoplasmic membrane and cytoplasmic inclusions, sporulation. Bacteria – aerobic gram positive - (cocci – *Staphylococcus* sp, rod – *Bacillus* sp) – gram negative (cocci – *Neisseria* sp, rod – *Pseudomonas* sp).

### **UNIT – II**

Archaeobacteria and other special groups – general characteristics – methanogens and extremophiles, sulphur bacteria. Anaerobic gram positive (rod – *Clostridium* sp), Gram negative (cocci – *Veillonella* sp, rod – *Bacteriodes* sp). Facultative – *Escherichia coli*, spirochetes.

### **UNIT – III**

Virus – General characteristics – plant virus (TMV), Animal virus (Rhabdo virus and Pox), bacteriophage (T4 series).

### **UNIT –IV**

Algae – Type and study (*Chlamydomonas* sp). Fungi – Type and study (*Aspergillus* sp) – Modes of multiplication.

### **UNIT – V**

Protozoa – General characteristics – Type study (*Trypanosoma* sp) – Modes of multiplication. Actinomycetes – Streptomycetes.

### **REFERENCE BOOKS:**

1. General microbiology – powar, Daginwalla, Himalaya publishing House, 1997
2. Text book of microbiology – Prescott fifth edition, 2008

<b>II SEMESTER</b>			
<b>C3</b>	<b>MICROBIAL PHYSIOLOGY AND METABOLISM</b>	<b>15UMBC21</b>	
<b>Hrs/Week: 4</b>	<b>Hrs / Sem : 4x 15 = 60</b>	<b>Hrs/unit:12</b>	<b>Credits: 5</b>

### **UNIT- I**

Microbial nutrition- The common nutrient requirements, Growth Factors. Uptake of Nutrient by cell – Passive transport, Active transport, Facilitated diffusion, Group translocation and Iron transport.

### **UNIT- II**

Basic concepts of metabolism: anabolism and catabolism. Anabolism: Glycogenesis and Gluconeogenesis. Amino acid synthesis – Essential amino acids.

### **UNIT III**

Catabolism: Carbohydrates - Glycolysis, TCA cycle, Pentose phosphate pathway, Entner - Doudorff pathway, Beta oxidation of fatty acids, Electron transport system.

### **UNIT IV**

Fermentation pathways - homo and heterolactate fermentation – propionate fermentation.

### **UNIT V**

Growth of microorganisms: Nutritional types of microorganisms, Growth Curve, Synchronous and Asynchronous growth, Factors influencing the growth of microorganisms – Temperature, pH, Osmotic pressure, moisture and Radiations.

### **Reference Books**

1. Lansing M. Prescott, “Microbiology”
2. Ronald M. Atlas, “Microbiology”



<b>SEMESTER –II</b>			
<b>C4</b>	<b>ENVIRONMENTAL MICROBIOLOGY</b>	<b>15UMBC22</b>	
<b>Hrs/Week:3</b>	<b>Hrs/Sem: 3×15=45</b>	<b>Hrs/unit :9</b>	<b>Credits :4</b>

### **UNIT –I**

Microbes in extreme environments: 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: carbon, phosphorous, sulfur and nitrogen cycles. Microbes in soil, water, air, Dead organic matter and plant surfaces (Rhizosphere, Phyllosphere and Spermosphere)

### **UNIT –III**

Biodeterioration: Biodeterioration of properties & cultural heritage; microbial deterioration of paper, textile, wood, paint and metal corrosion. Principal methods for their protection.

### **UNIT –IV**

Bioremediation: Microbial degradation of pesticides, hydrocarbons, Xenobiotics heavy metals and chlorinated solvents. Recovery of minerals and metals from ores.

### **UNIT –V**

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.

### **REFERENCE BOOKS:**

1. Environmental microbiology – Vijaya Ramesh ,MJP publishers
2. Textbook of Microbiology – Prescott

<b>I &amp; II SEMESTER</b>		
<b>CP-1</b>	<b>MICROBIOLOGY CORE PRACTICAL-I*</b>	<b>15UMBC2P</b>
<b>Hrs/ Week : 3</b>	<b>Hrs/ Sem : 3 ×15 =45</b>	<b>Credits :3</b>

**\* Examination at the end of II Semester**

### **TECHNIQUES IN MICROBIOLOGY & MICROBIAL PHYSIOLOGY**

1. Sterilization techniques and preparation of different types of media
2. Staining techniques – Simple, Gram's, Spore, Capsular staining.
3. Bacterial culture / isolation techniques.
  - a. Streaking method
  - b. Pour plate method
  - c. Serial dilution technique.
4. Isolation and cultivation of fungi.
5. Bacterial growth curve
6. Carbohydrate fermentation tests:
  - a. Glucose
  - b. Lactose
7. Microbial assessment of air quality – open plate method
8. Production of extra cellular enzymes:
  - a. Starch hydrolysis
  - b. Casein hydrolysis
  - c. Gelatin and Lipid hydrolysis
9. 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

### **REFERENCE BOOKS:**

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

<b>III SEMESTER</b>			
<b>C 5</b>	<b>SOIL AND AGRI MICROBIOLOGY</b>		<b>15UMBC31</b>
<b>Hrs/Week: 3</b>	<b>Hrs / Sem : 3 x 15 = 45</b>	<b>Hrs/unit:9</b>	<b>Credits: 4</b>

### **UNIT- I**

Classification of soil. Physical, Chemical characteristics and micro flora of various soil types (bacteria, fungi, algae and nematodes in relevance to soil types). Microbiological interaction – Symbiosis, Commensalism, Amensalism, Parasitism, Predation.

### **UNIT- II**

Post harvest decays caused by *Aspergillus*, *Mucor*, Control of Post harvest decays of fresh fruits and vegetables. Post harvest decays of grain and legume seeds caused by *Penicillium*, *Fusarium* – control of post harvest grain decays.

### **UNIT- III**

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

### **UNIT- IV**

Biological Nitrogen fixation: Asymbiotic association (*Azotobacter*), Symbiotic association (*Rhizobium*). Phosphate solubilizing Microorganisms. Biological cycles – Carbon and Phosphorous cycles.

### **UNIT- V**

Mycorrhizal association: types of Mycorrhizal association, Structure, nutrition and physiology, siderophores, Significance of mycorrhizae in agriculture. Composting – Vermi composting

### **Reference Books**

1. N.S. Subba Rao “Soil Microbiology”
2. Vijaya Ramesh “Environmental Microbiology”
3. P.C.Trivedi “Agricultural Microbiology”

IV SEMESTER			
<b>C 6</b>	<b>MEDICAL MICROBIOLOGY</b>		<b>15UMBC41</b>
<b>Hrs/Week: 3</b>	<b>Hrs / Sem : 3 x 15 = 45</b>	<b>Hrs/unit:9</b>	<b>Credits: 4</b>

### **Unit I**

Importance of Medical Microbiology, Normal flora of human body, Epidemic and Endemic diseases.

### **Unit II**

Medical Bacteriology- *Staphylococcus*, *Streptococcus*, *E.coli*, *Pneumococcus*, *Neisseria*; *Salmonella*, *Corynebacterium*, *Clostridium*, *Mycobacterium tuberculosis*, *Vibrio*.

### **Unit III**

Medical Virology - Poxvirus, Hepatitis virus – A and B, Influenza Virus, HIV, Rabies virus.

### **Unit IV**

Medical Mycology- Candidiasis, Dermatophytosis, Cutaneous and subcutaneous mycoses, Systemic mycoses, Opportunistic mycoses.

### **Unit V**

Parasitology- Entamoeba, Giardia. Antibiotics – Types and Mode of Action.

### **Reference books**

1. Ananthanarayanan and Panikar “Text book of microbiology”
2. P.Chakarborty “Text book of Microbiology”

<b>III &amp; IV SEMESTERS</b>		
<b>CP 2</b>	<b>MICROBIOLOGY</b>	<b>15UMBC4P</b>
<b>CORE PRACTICAL - II*</b>		
<b>Hrs/Week: 3</b>	<b>Hrs / Sem : 3 x 15 = 45</b>	<b>Credits: 3</b>

**TECHNIQUES IN SOIL AND AGRICULTURAL MICROBIOLOGY AND  
MEDICAL MICROBIOLOGY**

1. Enumeration of microbial population in soil.
2. Enumeration of phosphate solubilizing bacteria from soil.
3. Quantitative assay of microbes in soil-Phosphobacterium and Azotobacter sp
4. Production of Biofertilizers: Rhizobium / Azotobacter sp.
5. Biodiesel production from plants.
6. Quantification of coliphages from sewage(demonstration)
7. Screening of antibiotic producers from soil
8. Isolation of nitrogen fixing bacterium (Rhizobium) from root nodule
9. Estimation of microbial count in phyllosphere.
10. Urine analysis – normal & abnormal constituents of urine.
11. Stool examination.
12. Glucose tolerance test
13. Antibiotic sensitivity testing by MIC-KB method

**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.

<b>V SEMESTER</b>			
<b>C 7</b>	<b>IMMUNOLOGY</b>		<b>15UMBC51</b>
<b>Hrs/Week: 6</b>	<b>Hrs / Sem : 6 x 15 = 90</b>	<b>Hrs/unit:18</b>	<b>Credits: 6</b>

#### **UNIT I**

Introduction: History of Immunology – Immunity – types of immunity – innate and acquired. Immune systems - Primary lymphoid organ- Secondary lymphoid organs. Cells of the immune system –T and B cells – activation and function.

#### **UNIT II**

Antigens: Types, properties, haptens – adjuvants – Immunoglobulins. Structure types and properties - Hybridoma technology

#### **UNIT III**

Vaccines – types - Live, killed, recombinant DNA and edible – toxoids antitoxins,

#### **UNIT IV**

Antigen – antibody reactions – in vitro methods; ELISA, Immunoturbidometry Agglutination – Precipitation, Complement fixation, Immunodiffusion - Immuno fluorescence, ELISA, RIA, in vivo methods;

#### **UNIT V**

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

#### **TEXT BOOKS:**

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

<b>V SEMESTER</b>		
<b>C 8</b>	<b>MICROBIAL GENETICS</b>	<b>15UMBC52</b>
<b>Hrs/Week : 5</b>	<b>Hrs/Sem : 5x 15 = 75</b>	<b>Hrs./Unit: 15 Credits : 5</b>

**Unit I:**

DNA Structure, types, experimental evidence. DNA as genetic material. DNA replication in prokaryotes. Types of DNA polymerase. Steps involved in DNA synthesis. Central dogma of life.

**Unit II:**

Transcription in prokaryotes, RNA polymerase, promoter. Steps in transcription- promoter, enhancer and silencer. Translation- tRNA, steps in translation, post translational modification. General character of a genetic code.

**Unit III**

Bacterial plasmids- structure, types and properties of plasmids-plasmid replication. Transposons and IS elements- structure-types and properties. Viral replication – DNA (Ø X174), ds DNA (pox), ssRNA (retrovirus) and ssDNA (reovirus)

**Unit IV:**

Regulation of gene expression- negative, positive, repressive operon: lac, and trp. Mutation: types-spontaneous and induced-base pair changes-deletion-insertion-transversions, mutagens (physical, chemical, biological).

**Unit V:**

Gene transfer mechanisms: Bacterial transformation (mechanism of transformation, transfection, competence), transduction; generalized transduction, specialized transduction, abortive transduction, conjugation; effective contact and pili in conjugation, the 'F' factor, the conjugal transfer process.

**TEXT BOOKS:**

Biotechnology, Satyanarayana. U, (2008), Books and Allied (p) Ltd

**REFERENCE BOOKS :**

Maloy SR, Cronan Jr. J.S, Freidfelder D. 1994. Microbial Genetics. Jones and Bartlett Publishers.

Lewin B. 2007. Genes IX, Jones & Bartlett Publishers, Inc.

Willey J. Sherwood L. & Woolverton C. 2007. Prescott/Harley/Klein's Microbiology, McGraw Hill.

V SEMESTER			
<b>C -9</b>	<b>BIOCHEMISTRY</b>		<b>15UMBC53</b>
<b>Hrs/Week: 5</b>	<b>Hrs / Sem : 5x 15 = 75</b>	<b>Hrs/unit:15</b>	<b>Credits: 5</b>

#### UNIT I

**Carbohydrates:** Introduction, classification, of monosaccharide- structure, properties and function. Oligosaccharides- Dissaccharides- structure, properties and function. Polysaccharides-structure , properties and function.

#### UNIT II

**Amino acids :** Classification, Essential & Non essential amino acids, structure and properties **Protein:** Definition, classification and functions – structural levels of organization.

#### UNIT III

**Lipids:** i) Classification simple compounds. ii) Chemistry of fatty acids, unsaturated and saturated fatty acids, triglycerides, saponification, sterols, cholesterol , iii) Function of lipids.

#### UNIT IV

**Vitamins:** Classification, occurrence, deficiency symptoms, and biochemical functions of fat soluble and water soluble Vitamins

#### UNIT V

**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 by **Agarwal**. Global publications; 1999.
3. Text book 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 – **Lubert stryer**
7. Biochemistry- **U. Sathyanarayana, Chakrapani**; Edition 2 ;2007 Books and allied (P) Ltd.,



<b>V SEMESTER</b>			
<b>C E-1(A)</b>	<b>BIOINFORMATICS</b>		<b>15UMBE5A</b>
<b>Hrs/Week: 5</b>	<b>Hrs / Sem : 5 x 15 = 75</b>	<b>Hrs/unit:15</b>	<b>Credits: 6</b>

#### **UNIT-I**

Bioinformatics-definition, history; computer - system, topology and peripherals for communication; Internet - basics, connection, web browsing and URL

#### **UNIT-II**

Data bases - Nucleic acid sequence data bases (NCBI, EMBL, DDJB), Protein sequence data base-SWISS-PORT, data base searching - BLAST.

#### **UNIT-III**

Alignments local, global, pairwise & multiple sequences; analysis phylogenetics - CLUSTAL, PHYLIP & UPGAMAS. Gene finding and gene scan.

#### **UNIT-IV**

Protein prediction - physical properties, secondary structure, alpha & beta structure, motifs, tertiary structures, specialized structure and function. Molecular visualization - protein conformation and visualization tool (RASMOL).

#### **UNIT-V**

Drug discovery - role of bioinformatics in drug discovery, target discovery, lead discovery, microarray, docking and prediction of drug quality. Bioinformatics companies.

#### **REFERENCE**

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 Mc Graw Hill.
4. Developing bioinformatics in computer skill, Gibas C, Jambeek P.S, oreilly, 2001. associates inc. Shrott publishes

<b>VI SEMESTER</b>			
<b>C E-1(B)</b>	<b>BIODEGRADATION OF WASTE MATERIAL</b>	<b>15UMBE5B</b>	
<b>Hrs/Week: 5</b>	<b>Hrs / Sem : 5 x 15 = 75</b>	<b>Hrs/unit:15</b>	<b>Credits: 6</b>

### **UNIT I**

Solid waste disposal - sources of waste - nature of waste-sanitary land fills – composting - role of microorganisms in composting - vermi composting, biomethanation.

### **UNIT II**

Paper mill effluent - physico-chemical properties - treatment-standards for discharged effluent - breweries and leather industries - physico-chemical properties – treatment - standards.

### **UNIT III**

Textile dyeing industry – effluent – characteristics - treatment – standards. Pharmaceu ticals effluent - treatment-standards - food industry – dairy - nature of waste water –treatment - standards.

### **UNIT IV**

Hydrocarbon pollution - in soil, fresh water and marine environment - petroleum and its products - degradation paint pollution and control.

### **UNIT V**

Xenobiotics used in agriculture – pesticides – fungicides – insecticides - pesticide pollution of soil and waterways.

### **TEXT BOOKS:**

1. R.M.Atlas and R.Bartha 1987 Microbial ecology-fundamentals and applications Benjamin cummings, Menlo park, California.
2. M.J.Pelczar, E.C.S.Chan, and applications-Mc Graw Hill, Inc., New York.

### **REFERENCE BOOKS:**

1. Michael T Madigan Brock biology of microorganisms – 10<sup>th</sup>Edn 2003, (Edn.) Prenticehall.
2. K.P.Taloro and A.Taloro. 1999- Fundamentals in microbiology

<b>VI SEMESTER</b>			
<b>C 10</b>	<b>INDUSTRIAL MICROBIOLOGY</b>		<b>15UMBC61</b>
<b>Hrs/Week: 6</b>	<b>Hrs / Sem : 6 x 15 = 90</b>	<b>Hrs/unit:18</b>	<b>Credits: 6</b>

### **UNIT I**

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

### **UNIT II**

Design of a fermenter, types of fermenters and basic functions. Fermentation media formulation, types of fermentation - batch, continuous, fed batch.

### **UNIT III**

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

### **UNIT IV**

Microbial products of pharmaceutical value – raw materials, organism and Industrial processes involved in the production of Penicillin, streptomycin, Vitamin B12 and rabies vaccine.

### **UNIT V**

Microbial products of Industrial value – Raw materials, organism and Industrial processes involved in the production of ethanol, vinegar, protease, wine making, brewing, acetone – butanol.

### **TEXT BOOKS :**

1. Stanbury, P.F. Whitaker, A.Hall, S.J. 1995. Principles of Fermentation Technology, Pergamon Press.
2. kyta, B.1983. Methods in Industrial Microbiology, Ellis horwood limited.
3. Click, B.R.Pasternak, J.J.1994. Molecular Biotechnology – ASM Press.

### **REFERENCE BOOKS:**

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

<b>VI SEMESTER</b>			
<b>C 11</b>	<b>FOOD MICROBIOLOGY</b>	<b>15UMBC62</b>	
<b>Hrs/Week: 5</b>	<b>Hrs / Sem : 5x 15 = 75</b>	<b>Hrs/unit:15</b>	<b>Credits: 5</b>

### **UNIT I**

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

### **UNIT II**

Food fermentations: Cheese, bread, wine, fermented vegetables – methods and organisms used. Enzymes from microorganisms – amylase, protease.

### **UNIT III**

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

### **UNIT IV**

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

### **UNIT V**

Food preservation: 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.

### **TEXT BOOKS:**

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.

### **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.

<b>VI SEMESTER</b>		
<b>C12</b>	<b>PROJECT</b>	<b>15UMB61</b>
<b>Hrs/Week: 5</b>	<b>Hrs/Sem: 5×15= 75</b>	<b>Credits: 5</b>

**OBJECTIVES:**

At the end of the semester the students should be able to:

1. Identify the potential areas of research in his/her field;
2. Collect data from various sources including the internet, analyze them, make new connections and link them to life.
3. Read and write originally and usefully.

**GUIDELINES:**

1. The project may be done individually or in groups not exceeding five per group.
2. The minimum length of the project should be 30 pages in A4 size.
3. Marks for the project report will be 100 divided as 60% for the project and 40% for viva – voce.

**Evaluation scheme:**

The project will be evaluated by both Internal and External Examiners. Each Examiner will evaluate for 100 marks. The allocation of marks for project is as follows:

<b>Project</b>	<b>Internal</b>	<b>External</b>
Word of title	5	5
Objectives / Formulation including Hypothesis	5	5
Review of literature	10	10
Relevance of project to social needs	5	5
Methodology / Technique / Procedure adopted	20	20
Summary / Findings / Summation	5	5
Works cited / Annexure / Footnotes	10	10
<b>Total</b>	<b>60</b>	<b>60</b>

<b>VI SEMESTER</b>			
<b>C E-2(A)</b>	<b>BIOSTATISTICS</b>		<b>15UMBE6A</b>
<b>Hrs/Week: 5</b>	<b>Hrs / Sem : 5 x 15 = 75</b>	<b>Hrs/unit:15</b>	<b>Credits: 6</b>

#### **UNIT-I**

Biostatistics - definition - statistical methods - basic principles. Variables - measurements, functions, limitations and uses of statistics.

#### **UNIT-II**

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 - 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 - types and methods of correlation, regression, simple regression equation, fitting prediction, similarities and dissimilarities of correlation and regression.

#### **UNIT-V**

Statistical inference - hypothesis - simple hypothesis - student 't' test - chi square test.

#### **Reference**

1. Biostatistic, Danniell, 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

<b>VI SEMESTER</b>			
<b>C E-2(B)</b>	<b>DAIRY MICROBIOLOGY</b>		<b>15UMBE6B</b>
<b>Hrs/Week: 5</b>	<b>Hrs / Sem : 5 x 15 = 75</b>	<b>Hrs/unit:15</b>	<b>Credits: 6</b>

### **UNIT I**

Introduction - sources of microorganisms in milk - classification of microbes - bio chemical types, temperature, characteristics, pathogenicity.

### **UNIT II**

Bacteriological examination of milk, preservation of milk, pasteurization, dehydration, microbial standards and milk grading.

### **UNIT III**

Dairy products-fermented milk - flavoured milk - curd-butter milk, cheese, milk cream, yoghurt - lactic starter culture - contamination, spoilage, preservation.

### **UNIT IV**

Milkborne diseases-bacterial – Brucellosis, Q fever, Mastitis and viral diseases - Foot and Mouth disease - control measures.

### **UNIT V**

Preservatives in dairy products - mode of preservation - analytical procedures in dairy microbiology.

### **TEXT BOOKS :**

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 & VI SEMESTERS		
CP3	MICROBIOLOGY CORE	15UMBC6P1
<b>PRACTICAL – III*</b>		
Hrs/Week : 3	Hrs / Sem : 3 x 15 = 45	Credits: 3

\*Examination at the end of VI Semester

### TECHNIQUES IN IMMUNOLOGY, BIOCHEMISTRY & MICROBIAL GENETICS.

#### **Immunology**

1. Blood grouping
2. Blood cell analysis
3. Lymphocyte subset identification and enumeration.
4. Handling of laboratory animals.
5. Preparation of Antigen - Protocol of immunization
7. Complement fixation test

#### **Biochemistry**

1. Preparation of standard and buffer solutions.
2. Extraction and estimation of sugars and amino acids.
3. Estimation of proteins by Lowry's method.
4. Estimation of DNA and RNA by Diphenylamine and orcinol methods.
5. Estimation of ascorbic acid.
6. Separation of biomolecules by TLC and paper chromatography

#### **Microbial Genetics**

1. Induced mutagenesis (UV & NTG)
2. Isolation of chromosomal DNA from animal tissues & Bacteria.
3. Isolation of plasmid-DNA.
4. Isolation of total RNA from animal tissues.
5. Bacterial transformation
6. Transformation
7. Conjugation

#### **REFERENCE BOOKS:**

1. J.G. Cappuccino and N. Sherman. 1996 Microbiology – A laboratory manual Benjamin CUMMINS. New York.
2. Laboratory manual in biochemistry, Strolve, B.L.A., Mzka vora, V.C. 1989. MIR Publisher, Moscow.
3. Handbook of clinical biochemistry, Edwin H Lennette 2002, ASM press.
4. An Introduction to practical biochemistry. David T Plummer. 1998. Tata McGraw-Hill Education.



<b>V &amp; VI SEMESTERS</b>		
<b>CP4</b>	<b>MICROBIOLOGY</b>	<b>15UMBC6P2</b>
<b>PRACTICAL – IV*</b>		
<b>Hrs/Week : 3</b>	<b>Hrs / Sem : 3 x 15 = 45</b>	<b>Credits:3</b>

\*Examination at the end of VI Semester

### **TECHNIQUES IN FOOD AND INDUSTRIAL MICROBIOLOGY**

1. Isolation of yeast from Idly batter
2. Isolation of yeast from grape juice.
3. Ethanol Fermentation.
4. Production of alcohol from sugar cane.
5. Isolation and identification of industrially important micro organisms-crowded plate technique-giant colony technique.
6. Determination of quality of milk-Methylene blue and resazurin
7. Microbial examination of milk products.
8. Wet mount preparation of spoiled bread, tomato, grapes, potato.
9. Quantitative and qualitative examination of microbes in fruits.
10. Quantitative and qualitative examination of microbes in vegetables.
11. Quantitative and qualitative examination of microbes in meat.
12. Quantitative and qualitative examination of microbes in fish.
13. Quantitative and qualitative examination of microbes in canned foods.
14. Cell immobilization.

#### **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

<b>V &amp; VI SEMESTERS</b>		
<b>CEP A</b>	<b>CORE ELECTIVE PRACTICAL – A*</b>	<b>15UMBE6PA</b>
<b>Hrs/Week : 3</b>	<b>Hrs / Sem : 3 x 15 = 45</b>	<b>Credits:3</b>

**\*Examination at the end of VI Semester**

### **(A) BIOSTATICS**

1. Calculation of mean, standard deviation and standard error
2. Calculation of correlation coefficient values and finding out the probability
3. Calculation of 'F' value and finding out the probability value for the F value.
4. Analysis of Variance (ANOVA)
  - a. One way classification. b. Two way classification.
5. Parametric tests
  - a. Normal (z) b. t (Equal Variance) c. F d. Chi square

### **REFERENCE BOOKS:**

1. Agarwal BL. 2003. Basic Statistics. New Age.
2. Gupta SP. 2004. Statistical Methods. S. Chand & Sons.
3. Dutta NK. 2002. Fundamentals of Bio-Statistics. Kanishka Publ.

### **CE 1 (B) BIO INFORMATICS**

1. Usage of NCBI resources
2. Retrieval of sequence/structure from databases
3. Visualization of structures
4. Docking of ligand receptors
5. BLAST exercises.

### **REFERENCE BOOKS:**

1. Attwood TK & Parry-Smith DJ. 2003. Introduction to Bioinformatics. Pearson Education.
2. Rastogi SC, Mendiratta N & Rastogi P. 2004. Bioinformatics: Concepts, Skills and Applications. CBS.

V & VI SEMESTERS		
<b>CEP B</b>	<b>CORE ELECTIVE PRACTICAL -B</b>	<b>15UMBE6PB</b>
<b>Hrs/Week : 3</b>	<b>Hrs / Sem : 3 x 15 = 45</b>	<b>Credits: 3</b>

### (A) TECHNIQUES IN DAIRY MICROBIOLOGY

1. Determination of quality of milk-methylene blue reduction test
2. Resazurin test of milk
3. Microbial examination of milk products (TVC)
4. Microscopic observation of yeast in curd
5. Phosphatase test
6. Isolation of *Alcaligenes viscolactis* from ropy milk
7. Butter making –using lactic starter culture
8. Ice cream making-demonstration
9. Isolation of pathogens from spoiled milk products
  - a. Cheese
  - b. Curd
10. Visit to dairy industry

#### REFERENCE BOOKS:

1. James G.Cappuccino. 1996. Microbiology. The Benjamin/Cummings Pub.Co., California
2. Jay, J.M.1987. Modern Food Microbiology. CBS Publishers and distributors, New Delhi.
3. Atlas, R.M. 1989. Microbiology, A Fundamentals and Applications, Macmillan Publishing company.

### CE 2 (B) TECHNIQUES IN BIODEGRADATION

1. Composting(demonstration)
2. Vermicomposting(demonstration)
3. Isolation of cellulose degrading microorganisms(cellulomonas)
4. Determination of total alkalinity(industrial effluent)
5. Determination of sulphate and chloride
6. Isolation of protease producing microorganisms from dairy effluent
7. Isolation of lipase producing microorganisms from dairy effluent
8. Preparation of effluent and analyse the physical characteristics.
9. Visit to water treatment/effluent treatment plant

#### REFERENCE BOOKS:

1. James G.Cappuccino. 1996. Microbiology. The Benjamin/Cummings Pub.Co., California.
2. Martin Alexander Wiley. 1961. Introduction to Soil Microbiology. International Edn., New York

<b>PART-III – ALLIED – 1 – MEDICAL LAB TECHNOLOGY</b>		
<b>I SEMESTER</b>		
<b>AI1</b>	<b>HAEMATOLOGY</b>	<b>15UMBA11</b>
<b>Hrs/ Week : 3</b>	<b>Hrs/ Sem : 3 ×15 =45</b>	<b>Hrs/Unit:9</b>
		<b>Credits :4</b>

#### **UNIT –I**

Blood Composition, Function and separation of plasma proteins. Methods of collection of blood – Anticoagulants and its role. Preparation blood smear and staining.

#### **UNIT – II**

Estimation of – haemoglobin (cymeth haemoglobin method), RBC Count, WBC count by using Heamocytometer. Differential count using staining procedure. Estimation of ESR, PCV by wintrobe method

#### **UNIT –III**

Study of peripheral blood Smear for Reticocyte count. Haemopoiesis – Erythropoiesis, Leucopoiesis and Thrombopoiesis.

#### **UNIT –IV**

Determination of Bleeding time, Clotting Time, Prothrombin and partial thromboplastin time.

#### **UNIT –V**

Detection of blood parasites – leishmaniasis, Microfilament and Malarial parasite.

#### **REFERENCE BOOKS:**

1. Medical lab technology – L.K. Mukerjee
2. Medical lab technology – Rammik sood
3. Microbiology manual – Dr. Kannan

<b>II SEMESTER</b>			
<b>AI 2</b>	<b>TRANSFUSIONOLOGY &amp; SEROLOGY</b>	<b>15UMBA21</b>	
<b>Hrs/Week : 3</b>	<b>Hrs / Sem : 3x 15 = 45</b>	<b>Hrs/Unit: 9</b>	<b>Credits: 4</b>

### **UNIT I**

In trodution to Immunohneamotology – Immunologic reaction in blood banking – Blood Components – Introduction Basic principle involved in immunohaemotology.

### **UNIT II**

Major and Minor cross matching – Rhesus typing, Coombs test. Forward and reverse grooping

### **UNIT III**

Introduction to serology. WIDAL, RPR, General inflammatory markers – CRP, RA, ASO.

### **UNIT IV**

Screening Tests – HBs Ag, HIV(ELISA and Western Blot Test) TPHA, Malarial Parasite.

### **UNIT V**

Collection, Separation and Storage of blood and its components.

### **REFERENCE BOOKS :**

1. Lynch Medical Laboratory Technology – Rephale D.B,W.B Saunders.
2. Practical Biochemistry – Plummer
3. Clinical Laboratory Methods – john D. Bener
4. Clinical Laboratory Diagnosis – Levinson S A, Mac Fate R.D.
5. Clinical Lab. Methods & Diagnosis Vol. I & II – Alex C,S L Garelt.
6. Clinical Lab. Methods – John D Benger, Pilip G. Achermann, Gelsaon Toro

<b>I &amp; II - SEMESTERS</b>		
<b>AI P</b>	<b>ALLIED MEDICAL LAB TECHNOLOGY</b>	<b>15UMBA2P</b>
<b>PRACTICAL*</b>		
<b>Hrs/Week : 3</b>	<b>Hrs / Sem : 3 x 15 = 45</b>	<b>Credits: 2</b>

\* Examination at the end of II Semester

### **TECHNIQUES IN HEMATOLOGY, TRANSFUSIONOLGY AND SEROLOGY**

1. Blood grouping – Rh types
2. Routine blood examination (RBC, WBC, TC, DC, Hemoglobin Estimation and ESR)
3. Differential Count
4. VDRL Test
5. Bacterial Agglutination test- Widal test.
6. Latex agglutination test - CRP test, RPR.
7. Gel diffusion antigen – antibody reaction by Oucترلony double immune diffusion.
8. Immunoelectrophoresis
9. Rheumatoid arthritis
10. Antistreptolysin ‘O’.
11. Skin test – Mauntoux

### **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

<b>PART – III – ALLIED II – BIOTECHNOLOGY</b>			
<b>III SEMESTER</b>			
<b>AII 1</b>	<b>INTRODUCTION TO BIOTECHNOLOGY</b>	<b>15UMBA31</b>	
<b>Hrs / Week : 3</b>	<b>Hrs / Sem : 3 x 15 =45</b>	<b>Hrs / Unit : 9</b>	<b>Credits :4</b>

### **UNIT I**

Biotechnology – definition - History, scope and importance of Biotechnology, Basic concept of Genetic Engineering

### **UNIT II**

Nucleic acid - Structure, Components and forms of DNA, Nucleosides & Nucleotides (introduction, structure & bonding), Watson and Crick model.

### **UNIT III**

RNA and its components and Types. DNA is the genetic material, DNA Replication.

### **UNIT IV**

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

### **UNIT V**

Purification and Separation of nucleic acids – Gel Electrophoresis – AGE, SDS PAGE.

### **Reference Books**

1. Dubey, R. C. A - Text Book of Biotechnology (4 th Edition) S.Chand & Company Limited, 7361 Ram Nagar, New Delhi - 110 055
2. Gupta, P.K.Elements of Biotechnology. Rastogi Publications, Gangotri, Shivaji Road, Meerut - 250 002.
3. Jogdand, S. N .- Gene Biotechnology ( 5 th Edition ) Himalaya Publishing House, Ramdoot, Dr. BhaleroMarg, Giraon, Mumbai. – 400 004 .

<b>IV SEMESTER</b>			
<b>AII 2</b>	<b>NANOBIOTECHNOLOGY</b>		<b>15UMBA41</b>
<b>Hrs/Week : 3</b>	<b>Hrs / Sem : 3x 15 = 45</b>	<b>Hrs/Unit: 9</b>	<b>Credits:4</b>

### **Unit I**

Introduction- Nanotechnology, Nanoparticles, Important Contributions of Nanotechnology.

### **Unit II**

Overview of Nano Fabrication Methods: Top-down and bottom-up approaches, lithography, deposition.

### **Unit III**

Characterization Tools: UV spectrophotometer, Optical microscopy, Scanning Electron Microscope, AFM.

### **Unit IV**

Nanoparticles preparation using Microorganism- Silver Nanoparticles, Gold Nanoparticles.

### **Unit V**

Application of Nanoparticles- Drug delivery, cancer cell Imaging.

### **References Books:**

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



<b>PART-III-ALLIED - BIOTECHNOLOGY</b>		
<b>III &amp; IV SEMESTERS</b>		
<b>AII P</b>	<b>ALLED BIOTECHNOLOGY PRACTICAL*</b>	<b>15UMBA4P</b>
<b>Hrs / Week : 3</b>	<b>Hrs / Sem : 3 x 15 = 45</b>	<b>Credits : 2</b>

#### **TECHNIQUES IN BIOTECHNOLOGY AND NANOBIOLOGY**

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. Bio synthesis of Silver nanoparticles
7. Antimicrobial activity of silver nanoparticles
8. Immobilization of an enzyme or Cell.
9. Transformation (Demonstration).
10. Bacterial Conjugation.
11. Plant Tissue culture – Micropropagation (Demonstration).
12. Animal cell Culture – Monolayer Culture (Demonstration).

<b>PART-IV SKILL-BASED ELECTIVE</b>		
<b>III-SEMESTER</b>		
<b>SBE 1</b>	<b>CLINICAL PATHOLOGY</b>	<b>15UMBS31</b>
<b>Hrs/Week : 3</b>	<b>Hrs / Sem : 3x 15 = 45</b>	<b>Credits: 4</b>

### **UNIT I**

Normal Composition of urine – Routine Examination of Urine – Physical – colour, odour, pH, Specific gravity, Chemical – Sugar, protein, Ketone bodies, Bile Salt, Bile Pigments, Microscopy – Casts and Crystals, Pus Cells, RBCs, Epithelial cell, Bacteria, yeast Cells.

### **UNIT II**

Stool – Physical examination of Stool – Consistency, Colour, Mucus, blood. Chemical – Reducing Substance, Occult blood. Microscopy – Ova and Cysts of Entamoeba coli, Entamoeba histolytica, giardia.

### **UNIT III**

CSF – Normal composition, Examination CSF proteins sugar, Microscopical examination for pus cells, Bacteria. Findings in CSF in common diseases.

### **UNIT IV**

Semen – Physical Examination of Semen – Volume, Colour, Odour, Viscosity. Chemical examination – pH, Fructose. Microscopy – Sperm count, Motility and Morphology. Clinical Contions – Azoospermia, oligozoospermia. Aspermia, Hypospermia. Teratozoospermia.

### **UNIT V**

Renalfunction Test – Definition, purpose of RFT. UREA, Creatinine estimation, normal values and its clinical significance.

### **REFERENCE BOOKS:**

1. Text Book of Pathology Vol. I & II – N.C. Dey
2. Clinical Laboratory Diagnosis – Levinson S A, Mac Fate R.D.
3. Clinical Lab. Methods & Diagnosis Vol. I & II – Alex C, S L Garelt.
4. Clinical Lab. Methods – John D Bengler, Philip G. Achermann, Gelsaon Toro

<b>IV SEMESTER</b>			
<b>SBE 2</b>	<b>APPLIED MICROBIOLOGY</b>	<b>15UMBS41</b>	
<b>Hrs/Week : 3</b>	<b>Hrs / Sem : 3x 15 = 45</b>	<b>Hrs./Units.:9</b>	<b>Credits: 4</b>

### **UNIT I**

Fermentation- Definition and Types. Products from microorganisms - aminoacids (glutamic acid), organic acid (Citric acid) – enzymes - proteolytic enzymes.

### **UNIT II**

Vitamins (A&B12) - Growthhormone - gibberellin, Antibiotics (chloramphenicol & Streptomycin) - Vaccine production (rabies vaccine).

### **UNIT III**

Microbial fermentation products - baker's yeast, food and feed yeast, mushroom, single cell protein (bacteria, algae).

### **UNIT IV**

Alcoholic Beverage Production – wine production, Beer production on large and small scale.

### **UNIT V**

Production of dairy products by microorganisms, cheese, yogurt, dehydrated milk and milk cream.

### **TEXT BOOKS :**

1. Stanbury, P.F. Whitaker, A. Hall, S.J. 1995. Principles of Fermentation Technology, Pergamon Press.
2. Sikyta, B. 1983. Methods in Industrial Microbiology, Ellis Horwood Limited.

### **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. Macmillan Publishers.

**PART-IV NON-MAJOR ELECTIVE OFFERED BY DEPARTMENT OF  
MICROBIOLOGY TO OTHER MAJOR STUDENTS**

**III SEMESTER**

<b>NME 1</b>	<b>GENERAL MICROBIOLOGY</b>	<b>15UMBN31</b>
<b>Hrs/Week: 3</b>	<b>Hrs / Sem: 3 x 15 = 45</b>	<b>Hrs / Unit = 9</b>
		<b>Credits: 4</b>

**UNIT I**

Introduction to microorganisms-bacteria-fungi-algae-protozoa-viruses  
History of microbiology-important contributions

**UNIT II**

Staining-simple-gram-acid fast-spore-capsule

**UNIT III**

Morphology-arrangement of bacteria with examples-normal flora

**UNIT IV**

Tools, equipments and apparatus used in microbiology laboratory.

**UNIT V**

Culture media-types-uses.-control measures

**TEXT BOOKS:**

1. Pelczar Jr. M.J.Chan E.C.S., and Kreig N.R. (1993). Microbiology – McGraw Hill, Inc., New York.
2. Stainer R.Y., Ingraham J.L., Wheelis M.L., and Painter P.R.(1986). General Microbiology, MacMillan Education Ltd., London.

**REFERENCE BOOKS:**

1. Starr, M.P.Stolp, H., Truper, H.C.Balows, A and Schegel, H.C.(1991). The Prokaryotes. A hand book of Habitats, Isolation and Identification of Bacteria. Springer Verleg.
2. Brige E.A.(1992). Modern Microbiology – Win C.Brown Publishers, Dubuque, U.S.A.

<b>IV SEMESTER</b>			
<b>NME -2</b>	<b>BIOTECHNOLOGY</b>		<b>15UMBN41</b>
<b>Hrs / Week : 3</b>	<b>Hrs / Sem : 3 x 15 = 45</b>	<b>Hrs / Unit : 9</b>	<b>Credits :4</b>

### **UNIT I**

Biotechnology – definition - History, scope and importance of Biotechnology, Basic concept of Genetic Engineering

### **UNIT II**

Trangenic Plants (Maize, Rice, Tomato).Transgenic animals (Mice, Sheep, Goat and Fish).

### **UNIT III**

Recombinant DNA technology – Vectors- Plasmid, Cosmid, Phage. Restriction enzymes, Ligation of DNA, Identification of Recombination.

### **UNIT IV**

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

### **UNIT V**

Recombinant Vaccines, DNA Vaccines. DNA finger printing technique and applications.

### **Reference Books**

1. Dubey, R. C. A - Text Book of Biotechnology (4 th Edition) S.Chand & Company Limited, 7361 Ram Nagar, New Delhi - 110 055
2. Gupta, P.K.Elements of Biotechnology. Rastogi Publications, Gangotri, Shivaji Road, Meerut - 250 002.
3. Jogdand, S. N .- Gene Biotechnology ( 5 th Edition ) Himalaya Publishing House, Ramdoot, Dr. BhaleroMarg, Giraon, Mumbai. – 400 004 .

<b>PART IV – NON-MAJOR ELECTIVE (UNAIDED COURSES) (2015 – 2018)</b>							
<b>SEM</b>	<b>TITLE OF THE PAPER</b>	<b>S.CODE</b>	<b>H/W</b>	<b>C</b>	<b>MARKS</b>		
					<b>I</b>	<b>E</b>	<b>T</b>
<b>DEPT. OF ENGLISH</b>							
<b>III</b>	<i>Computer Assisted Language Learning: Reading &amp; Writing</i>	15UENN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Computer Assisted Language Learning: Listening &amp; Speaking</i>	15UENN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>DEPT. OF ISLAMIC STUDIES</b>							
<b>III</b>	<i>Arabic for Beginners</i>	15UISN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Fundamentals of Arabic Grammar</i>	15UISN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>DEPT. OF COMMERCE</b>							
<b>III</b>	<i>Principles of Commerce</i>	15UCON31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Basics in Accounting*</i>	15UCON41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>DEPT. OF COMMERCE (CA)</b>							
<b>III</b>	<i>Development of Small Business</i>	15UCCN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Basics in Accounting*</i>	15UCCN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>DEPT. OF COMMERCE (FINANCE)</b>							
<b>III</b>	<i>Investment Management</i>	15UCFN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Advertising</i>	15UCFN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>DEPT. OF BUSINESS ADMINISTRATION</b>							
<b>III</b>	<i>Basic in Management</i>	15UBAN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Retail Management</i>	15UBAN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>

<b>DEPT. OF COMPUTER SCIENCE</b>							
<b>III</b>	<i>Office Automation</i>	15UCSN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Desktop Publishing</i>	15UCSN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>DEPT. OF COMPUTER APPLICATION</b>							
<b>III</b>	<i>Internet &amp; HTML</i>	15UCAN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Desktop Publishing</i>	15UCAN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>DEPT. OF INFORMATION TECHNOLOGY</b>							
<b>III</b>	<i>Introduction to Computers</i>	15UITN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>MS Office</i>	15UITN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>DEPT. OF MATHEMATICS</b>							
<b>III</b>	<i>Mathematics for Competitive Examinations – I</i>	15UMAN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Mathematics for Competitive Examinations – II</i>	15UMAN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>DEPT. OF MICROBIOLOGY</b>							
<b>III</b>	<i>General Microbiology</i>	15UMBN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Biotechnology</i>	15UMBN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>DEPT. OF NUTRITION AND DIETETICS</b>							
<b>III</b>	<i>Introduction to Bakery</i>	15UNDN31	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>
<b>IV</b>	<i>Biotechnology</i>	15UMDN41	<b>3</b>	<b>2</b>	<b>25</b>	<b>75</b>	<b>100</b>

\* Common to Department of Commerce and Department of Commerce (CA)

\*\* Common to Department of Computer Science and Department of Computer Application.

<b>I SEMESTER</b>			
<b>EVS</b>	<b>ENVIRONMENTAL STUDIES</b>		<b>15UEVS11</b>
<b>Hrs/ Week: 2</b>	<b>Hrs/ Sem: 30</b>	<b>Hrs/ UNIT: 6</b>	<b>Credits: 1</b>

### **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 - Rain 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 & wind mills.
- Land resources: Land degradation

### **UNIT - III: Ecosystem**

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

### **UNIT - IV: Biodiversity & Its Conservation**

Introduction - Definition: ecosystem diversity, species and Genetic Hot spots of biodiversity - Western Ghats, Eastern Himalayas and Gulf of Mannar. Threats to biodiversity - Habitat Loss, Poaching of wild life and Man - wild life 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 and Marine water pollution
- c) Noise Pollution
- d) Soil pollution
- e) Bio degradable and Non Bio degradable wastes
  - Air (prevention & Control of Pollution) Act.
  - Environmental Protection Act
  - Water (Prevention & Control of pollution) Act
  - Environmental movements - Green peace and Chipco,
  - Role of State & Central pollution Control Boards.

### **REFERENCE BOOKS:**

1. Basic of Environmental Science. Vijajalakhmi, 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.
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.

<b>II SEMESTER</b>			
<b>VE1</b>	<b>VALUE EDUCATION – I</b>		<b>15USVE2A</b>
<b>Hrs/ Week: 2</b>	<b>Hrs/ Sem: 30</b>	<b>Hrs/ Unit: 6</b>	<b>Credits: 1</b>

**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 – Preservance – 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.

<b>II SEMESTER</b>			
<b>VE2</b>	<b>VALUE EDUCATION – II</b>		<b>15USVE2B</b>
<b>Hrs/ Week: 2</b>	<b>Hrs/ Sem: 30</b>	<b>Hrs/ Unit: 6</b>	<b>Credits: 1</b>

### **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.

**SCHEME OF EXAMINATIONS UNDER CBCS (2015 - 2018)**

The medium of instruction in all UG and PG courses is English and students shall write the CIA Tests and Semester Examinations in English. However, if the examinations were written in Tamil, the answer papers will be valued.

**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
<b>Theory</b>	100	25	75	Nil	30	40
<b>Practical</b>	100	40	60	Nil	24	40
<b>Project</b>	100	Nil	Report - 60 marks Viva Voce - 40 marks	Nil	40	40

**POSTGRADUATE COURSES**

SUBJECT	TOTAL MARKS	CIA TEST	SEMESTER EXAMINATION	PASSING MINIMUM		
				CIA EXAM.	SEM. EXAM.	OVER ALL
<b>Theory</b>	100	25	75	nil	38	50
<b>Practical</b>	100	40	60	nil	30	50
<b>Project</b>	100	nil	Report - 60 marks Viva Voce - 40 marks	nil	50	50

### DIVISION OF MARKS FOR CIA TEST

<b>SUBJECT</b>	<b>MARKS</b>	<b>ASSIGNMENT FOR UG / ASSIGNMENT OR SEMINAR FOR PG</b>	<b>REGULARITY</b>	<b>RECORD NOTE</b>	<b>TOTAL MARKS</b>
<b>Theory</b>	20	5	--	--	<b>25</b>
<b>Practical</b>	30	--	5	5	<b>40</b>

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.
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. Three internal practical tests of 25 marks each will be conducted for science students in the even semester and the best two out of the three will be taken. The total 50 marks of the best two tests will be converted to 30 by using the following formula:
 
$$\left( \frac{\text{Marks secured in the first best Practical Test (Out of 25)} + \text{Marks secured in the next best Practical Test (out of 25)}}{2} \right) \times 0.6$$
7. The Heads of Science Departments are requested to keep a record of attendance of practicals for students to assign marks for regularity.

**QUESTION PAPER PATTERN FOR CIA TEST (THEORY)**

**Duration: 1 Hr**

**Maximum Marks: 20**

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

**QUESTION PAPER PATTERN FOR SEMESTER EXAMINATION  
(THEORY)**

**Duration: 3 Hrs**

**Maximum Marks: 75**

<b>Section</b>	<b>Question Type</b>	<b>No. of Questions &amp; Marks</b>	<b>Marks</b>
<b>A</b>	No Choice Answer should not exceed 75 words	10 Questions - 2 marks each (2 Questions from each unit)	10 x 2 = 20
<b>B</b>	Internal choice (Either or type) Answer should not exceed 200 words	5 Questions with internal choice. Each carries 5 marks (Two questions from each unit)	5 x 5 = 25
<b>C</b>	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 x 10 = 30
<b>TOTAL</b>			<b>75 MARKS</b>