BACHELOR OF SCIENCE IN MICROBIOLOGY

SYLLABUS 2018-19

(Outcome Based Education)

Dr. N.G.P. ARTS AND SCIENCE COLLEGE
(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu and Accredited by NAAC with 'A' Grade (2nd Cycle)
Dr. N.G.P.- Kalapatti Road, Coimbatore-641048, Tamil Nadu, India
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BACHELOR OF SCIENCE IN MICROBIOLOGY
REGULATIONS

ELIGIBILITY:

A pass in Higher Secondary Examination with any Academic stream or Vocational stream with Biology / Zoology / Botany /Biotechnology/Microbiology/Life Science as one of the subject and as per the norms set by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the Academic Council, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the **Bachelor of Science (Microbiology)** Degree Examination of this College after a course study of three academic years.

OBJECTIVE OF THE PROGRAMME:

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

1. To inculcate practical knowledge in correlation with the theoretical knowledge.
2. To equip the students to meet the requirements of the current technology in Microbiology.
3. To motivate and train the students in various clinical and industrial sectors.
4. To encourage students to involve in research to explore microorganisms for the betterment of mankind.

PROGRAMME OUTCOMES

On the successful completion of the programme, the following are the expected outcomes.

PO Number	PO Statement
PO1	To prepare microbiologists who are competent, creative, and highly valued professionals in academia, industry and private/public sector that are capable of excelling in careers of their choice.
PO2	To impart basic knowledge on the theoretical basis of the tools and techniques and to imbibe and demonstrate the practical skills in microbiology.
PO3	To disseminate knowledge in microbiological discipline and to promote and develop competency in microbiology that have enduring value beyond the classroom.
PO4	To instill a pattern of life-long learning and to translate the potentials of microorganisms to the welfare of biosphere.
PO5	To explore the scope of various branches of microbiology to become an entrepreneur.

SCHEME OF EXAMINATIONS FOR UG COURSE

Course Code	Course	Hrs of Instruction	Exam Duration (Hrs)	Max Marks			Credit Points
				CA	CE	Total	
First Semester							
Part – I							
17UTL11T 17UHL11H 17UML11M 17UFL11F	Tamil-I Hindi-I Malayalam-I French – I	5	3	25	75	100	3
Part – II							
18UEG12G	English - I	5	3	25	75	100	3
Part – III							
17UMB13A	Core-I: Fundamentals of Microbiology	6	3	20	55	75	4
17UMB13P	Core Practical- I	8	6	30	45	75	4
17UMT1AC	Allied- I: Basic Mathematics	4	3	20	55	75	4
Part – IV							
17UFC1FA	Environmental Studies	2*	2	-	50	50	2
		30				**475**	**20**
Second Semester							
Part – I							
17UTL21T 17UHL21H 17UML21M 17UFL21F	Tamil-II Hindi-II Malayalam-II French – II	5	3	25	75	100	3
Part – II							
18UEG22G	English - II	5	3	25	75	100	3
Part – III							
17UMB23A	Core -II: Cell Biology	6	3	20	55	75	4
17UMB23P	Core Practical- II	6	6	40	60	100	3

17UCS2AA	Allied- II: Basics of Computers	3	3	20	55	75	2
17UCS2AP	Allied Practical- I: Fundamentals of Computers	3	3	20	30	50	2
Part – IV							
17UFC2FA	Value Education : Human Rights	2*	2	-	50	50	2
		30				**550**	**19**
Third semester							
Part – I							
17UTL31T 17UHL31H 17UML31M 17UFL31F	Tamil-III Hindi-III Malayalam-III French – III	4	3	25	75	100	3
Part - II							
17UEG32G	English-III	4	3	25	75	100	3
Part – III							
18UMB33A	Core-III: Microbial Physiology	5	3	20	55	75	4
17UMB33P	Core Practical- III	6	9	40	60	100	3
17UBC3AA	Allied-III: Biochemistry I	4	3	20	55	75	4
18UMB3SA	Skill based Course - 1: Introduction to Entrepreneurship	3	3	20	55	75	3
Part – IV							
	NMEC –I	2	-	-	50	50	2
17UFC3FA 17UFC3FB 17UFC3FC 17UFC3FD 17UFC3FE	Tamil / Advanced Tamil (OR) Yoga for Human Excellence / Women's Rights/ Constitution of India	2*	2	-	50	50	2
		30				**625**	**24**

Fourth Semester							
Part – I							
17UTL41T 17UHL41H 17UML41M 17UFL41F	Tamil-IV Hindi-IV Malayalam-IV French – IV	4	3	25	75	100	3
Part – II							
17UEG42G	English-IV	4	3	25	75	100	3
Part – III							
17UMB43A	Core-IV: Bioinstrumentation	4	3	20	55	75	4
17UMB43P	Core Practical- IV	4	6	40	60	100	2
17UBC4AB	Allied- IV: Biochemistry II	3	3	20	55	75	2
17UBC4AP	Allied Practical – II: Biochemistry	4	3	20	30	50	2
17UMB4SA	Skill based Course-2: Entrepreneurial Microbiology	3	3	20	55	75	3
Part – IV							
	NMEC – II	2	2	-	50	50	2
17UFC4FA 17UFC4FB 17UFC4FC	Tamil Advanced Tamil (OR) General Awareness	2*	2	-	50	50	2
		30				**675**	**23**
Fifth Semester							
Part – III							
17UMB53A	Core-V: Microbial Genetics	4	3	20	55	75	4
17UMB53B	Core-VI: Immunology	4	3	20	55	75	4
17UMB53C	Core-VII: Food Microbiology	4	3	20	55	75	4
17UMB53D	Core-VIII: Medical Microbiology – I	4	3	20	55	75	4
17UMB53P	Core Practical- V	6	9	40	60	100	3

	Elective- I	4	3	20	55	75	4
17UMB5SA	Skill based Course-3: Food Quality Control and Food Preservation	4	3	20	55	75	4
Part – IV							
17UMB53T	Industrial Training	Grade A to C					
		30				**550**	**27**
Sixth Semester							
Part – III							
17UMB63A	Core-IX: Virology	4	3	20	55	75	4
17UMB63B	Core-X: Industrial Microbiology	4	3	20	55	75	4
17UMB63C	Core- XI: Medical Microbiology – II	4	3	20	55	75	4
17UMB63P	Core Practical VI	6	9	40	60	100	3
	Elective-II	4	3	20	55	75	4
	Elective- III	4	3	20	55	75	4
17UMB6SA	Skill based Lab	4	6	40	60	100	2
Part – V							
17UEX65A	Extension Activity	**-**	-	-	50	50	2
		30				**625**	**27**
Grand Total						**3500**	**140**

*** Instruction hours given for placement training.**

ELECTIVE – I

(Student shall select any one of the following course as Elective - I in fifth semester)

S.No	Course Code	Name of the Course
1.	17UMB5EA	Recombinant DNA Technology
2.	17UMB5EB	General Biology
3.	17UMB5EC	Human Physiology

ELECTIVE - II

(Student shall select any one of the following course as Elective – II in sixth semester)

S.No	Course Code	Name of the Course
1.	17UMB6EA	Environmental and Agricultural Microbiology
2.	17UMB6EB	Intermediate Metabolism
3.	17UMB6EC	Hematology

ELECTIVE - III

(Student shall select any one of the following course as Elective - III in sixth semester)

S.No	Course Code	Name of the Course
1	17UMB6ED	Biotechnology
2	17UMB6EE	Enzyme Technology
3	17UMB6EF	Forensic Science

NON MAJOR ELECTIVE COURSES

- The Department offers the following two papers as Non Major Elective Courses for other than the Microbiology students.
- Student shall select any one of the following course as Non Major Elective Courses during their III and IV semester

S. No.	Semester	Course Code	Course Title
1.	III	18UNM34F	Microbiology and Public Health
2.	IV	17UNM44F	Microbes in and as food

FOR PROGRAMME COMPLETION

Students have to complete the following Courses:

1. Part I, II, III, IV and V as mentioned in the scheme.
2. Industrial training: Course code 17UMB53T**.**

- Student must undergo Industrial training for 15 to 20 days during Summer Vacation in IV Semester. Internal and external Examiner will evaluate the report in V Semester. Based on the performance Grade will be awarded as follows:

A- 75marks and above

B- 60-74 marks

C- 40-59 marks

Below 40 marks – Re Appear

Total Credit Distribution

Courses	Credits	Total		Credits	Cumulative Total
Part I: Tamil	3	04 x 100	400	12	24
Part II: English	3	04 x 100	400	12	
Part III:					
Core	4	11 x 75=	825	44	102
Core Practical	4	01 x 75	75	4	
Core Practical	2	01X100=	100	2	
Core Practical	3	04 x 100	400	12	
Allied Theory	2	02 x 75	150	04	
Allied Theory	4	02X75=	150	08	
Allied Practical	2	02 x 50	100	04	
Elective	4	03 x 75	225	12	
Skill based course theory	3	02X75=	150	06	
Skill based course theory	4	01X75=	75	04	
Skill based Lab	2	01X100=	100	02	
Part IV:					
Value Education	2	02 x 50	100	04	**12**
Environmental Studies	2	01 x 50	50	02	
Foundation Course	2	01 x 50	50	02	
NMEC	2	02 x 50	100	04	
Part V:					
Extension Activity	2	01 x 50	50	02	02
Total			**3500**	**140**	**140**

Earning Extra credits is not mandatory for course completion

Extra credits

Subject	Credit	Total credits
BEC/ Self study courses	1	**1**
Hindi / French/ Other foreign Language approved by certified Institutions	1	**1**
Type Writing / Short Hand Course	1	**1**
Diploma/certificate/CPT/ ACS Foundation	1	**1**
Representation – Academic/Sports /Social Activities/ Extra Curricular / Co-Curricular activities at University/ District/ State/ National/ International	1	**1**
Total	5	**5**

Rules:

The students can earn extra credits only if they complete the above during the course period (I to V sem) and based on the following criteria. Proof of Completion must be submitted in the office of the Controller of Examinations before the commencement of the VI Semester. (Earning Extra credits are not mandatory for Course completion)

- Student can opt BEC course/ Self study course to earn one credit. They have to Enroll and complete any one of the course during their course period before fifth semester (I sem to V sem).

  Self study paper offered by Microbiology Department

S. No.	Semester	Course Code	Course Title
1.	III Sem	17UMBSS1	Good Laboratory Practices
2.		17UMBSS2	Food Sanitation

- Student can opt Hindi/ French/ Other foreign Language approved by certified Institutions to earn one credit. The certificate (Hindi) must be obtained from **Dakshina Bharat Hindi Prachar Sabha** and He/ she has to enroll and complete during their course period (**first to fifth semester).**
- Student can opt for Type writing /short hand course to earn one extra credit. He/she has to enroll and complete the course during their course period to obtain certificate through **Tamil Nadu Board of Technical Education.**
- Student can opt for Diploma/certificate/CPT/ACS Foundation to earn one extra credit. Student who opt for Diploma/ Certificate course have to enroll any diploma/certificate course offered by Bharathiar University through our Institution. Student who opt for CPT/ ACS/CMA have to enroll and complete the foundation level during the course period.
- Award Winners in Academic/ Representation in Sports /Social Activities/ Extra Curricular/ Co-Curricular Activities at University/ District/ State/ National/ International level can earn one extra credit.

17UTL11T	தமிழ் - தாள் -1	SEMESTER - I

Total Credits: 3

Hours per week: 5

குறிக்கோள்:

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு, பகுத்தறிவு, கலை மற்றும் மரபு ஆகியவற்றை அறிந்து மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

பயனடைவுக்கல்வியின் விளைவாக ஏற்படும் பயன்பாடுகள்:

பாடத்திட்டப் பகுப்பு முறை	பாடத்திட்டத்தின் குறிக்கோள்	அறிவுத்திறன் வெளிப்படும் அளவு முறை
CO_1	வாழ்க்கைத் திறன்கள் (Life Skills) - மாணவனின் செயலாக்கத்திறனைத் தாய்மொழி வாயிலாக ஊக்குவித்தல்	K_1, K_2, K_3
CO_2	மதிப்புக்கல்வி (Attitude and Value educations)	K_2, K_4
CO_3	பாட இணைச்செயல்பாடுகள் (Co-curricular activities)	K_2, K_3, K_4
CO_4	சூழலியல் ஆக்கம் (Ecology)	K_4
CO_5	மொழி அறிவு (Tamil knowledge)	K_5, K_6

K_1-**Remembering,** K_2-**Understanding,** K_3-**Applying,** K_4-**Analysing,** K_5-**Evaluating,** K_6-**Creating**

Mapping with Programme outcomes

COs /POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	S	M	M	M	M
CO3	S	M	M	M	M
CO4	S	M	M	M	M
CO5	S	M	M	M	M

S – Strong, M – Medium, L – Low

17UTL11T	தமிழ் - தாள் -1	SEMESTER - I

Total Credits: 3
Hours per week: 5

கவிதை – சிறுகதை – இலக்கிய வரலாறு – இலக்கணம்

அலகு -1 கவிதைகள் - நாட்டுப்பற்று

1. பாரததேசம் – பாரதியார்
2. புத்தகசாலை,புதிய உலகு செய்வோம்– பாரதிதாசன்
3. ஒற்றுமையே உயிர்நிலை – கவிமணி
4. அவனும் அவளும் – நாமக்கல் கவிஞர்

அலகு – 2 சமூகமும், இயற்கையும்

1. ஒப்பில்லாத சமுதாயம்– அப்துல் ரகுமான்
2. காகிதப்பூக்கள் - நா.காமராசன்
3. கரிக்கிறது தாய்ப்பால்- ஆரூர் தமிழ்நாடன்
4. மரங்கள்– மு.மேத்தா
5. ஹைகூ கவிதைகள் (10 கவிதைகள்)

அலகு – 3 பெண்ணியம்

1. தற்காத்தல் – பொன்மணி வைரமுத்து
2. மாங்கல்ய மரமும் தொட்டில் மரமும் – ஆண்டாள் பிரியாதர்சினி
3. அம்மா – செல்வநாயகி
4. நீரில் அலையும் முகம்- அ.வெண்ணிலா

அலகு - 4 சிறுகதைகள்

1. பொன்னகரம் – புதுமைப்பித்தன்
2. விடியுமா? – கு.ப.ரா.
3. குருபீடம் – ஜெயகாந்தன்
4. காய்ச்சமரம் – கி.ராஜநாராயணன்
5. புதியபாலம் – நா. பார்த்தசாரதி
6. பூ .....– மேலாண்மை பொன்னுசாமி
7. வேட்கை- சூர்யகாந்தன்

அலகு- 5 இலக்கிய வரலாறு , இலக்கணம்

1. தமிழ்க் கவிதையின் தோற்றமும் வளர்ச்சியும் (மரபு,புதுக்கவிதைகள்)
2. தமிழ்ச் சிறுகதையின் தோற்றமும் வளர்ச்சியும்
3. வல்லினம் மிகும், மிகா இடங்கள்
4. ர,ற ; ல, ழ, ள ; ண, ந,ன, வேறுபாடு

பார்வை நூல்கள்:

1.செய்யுள் திரட்டு – தமிழ்த்துறை வெளியீடு
2.இலக்கிய வரலாறு - பேராசிரியர் முனைவர் பாக்யமேரி

17UHL11H	HINDI-I	SEMESTER - I

Total Credits: 3

Hours Per Week: 5

Preamble:

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

Course Outcomes:

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1	Learn the fundamentals of novels and stories	**K1**
CO2	Understand the principles of translation work	**K2**
CO3	Apply the knowledge writing critical views on fiction	**K3**
CO4	Build creative ability	**K3**
CO5	Expose the power of creative reading	**K2**

K1-Remembering, K2- Understanding, K3- Applying

Mapping with Programme Outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**M**	**M**	**M**	**S**
CO2	**S**	**M**	**M**	**M**	**S**
CO3	**S**	**M**	**S**	**M**	**S**
CO4	**S**	**M**	**S**	**M**	**S**
CO5	**S**	**M**	**S**	**M**	**S**

S – Strong, M – Medium, L – Low

17UHL11H	HINDI-I	SEMESTER - I

Total Credits: 3

Hours Per Week: 5

CONTENTS

UNIT – I

गदय – नूतन गदय संग्रह (जय प्रकाश)

पाठ 1- रजिया

पाठ 2- मक्रील

पाठ 3- बहता पानी निमला

पाठ 4- राष्ट्रपिता महात्मा गाँधी

प्रकाशक: सुमित्र प्रकाशन

204 लोला अपार्ट्मट्स, 15 हेस्टिंग्स रोड'

अशोक नगर इलाहाबाद-211001

UNIT – II

कहानी कुंज- डॉ वी.पी. 'अमिताभ'(पाठ 1-4)

प्रकाशक: गोविन्द प्रकाशन

सदर बाजार, मथुरा

उत्तर प्रदेश-281001

UNIT – III

व्याकरण : शब्द विचार (संज्ञा, सवनाम, कारक, विशेशण)

पुस्तक: व्याकरण प्रदिप - रामदेव

प्रकाशक: हिन्दी भवन 36

टेगोर नगर

इलाहाबाद-211024

UNIT - IV

अनुवाद अभ्यास-III (केवल अंग्रेजी से हिन्दी म)

(पाठ 1 to 10)

प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17

17UML11M	MALAYALAM-I	SEMESTER-I

Total Credits: 3

Hours per week: 5

Preamble:

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

Course Outcomes:

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1	Learn the fundamentals of novels and stories	**K1**
CO2	Understand the principles of translation work	**K2**
CO3	Apply the knowledge writing critical views on fiction	**K3**
CO4	Build creative ability	**K3**
CO5	Expose the power of creative reading	**K2**

K1-Remembering, K2- Understanding, K3- Applying

Mapping with Programme Outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S – Strong, M – Medium, L – Low

17UML11M	MALAYALAM-I	SEMESTER-I

Total Credits: 3
Hours Per Week: 5

CONTENTS

Paper I Prose, Composition & Translation

This paper will have the following five units:

1. **UNIT I &II** - Novel
2. **UNIT III & IV** - Short story
3. **UNIT V** **-** Composition & Translation

TEXT BOOKS:

1. Unit I &II -Naalukettu – M.T. Vasudevan Nair (D.C. Books, Kottayam, Kerala)

2. Unit III & IV - Manikkianum Mattu Prathana Kathakalum – Lalithampika Antharjanam (D.C.Books, Kottayam, Kerala)

3. Unit V- Expansion of ideas, General Essay and Translation of a simple passage from English about **100** words) to Malayalam

REFERENCE BOOKS:

1. Kavitha Sahithya Charitram –Dr. M.Leelavathi (Kerala Sahithya Academy, Trichur)
2. Malayala Novel sahithya Charitram –K.M.Tharakan(N.B.S. Kottayam)
3. Malayala Nataka Sahithya Charitram-G.Sankarapillai(D.C.Books, Kottayam)
4. Cherukatha Innale Innu –M.Achuyuthan(D.C. Books, Kottayam)
5. Sahithya Charitram Prasthanangalilude-Dr. K.M. George,(Chief Editor)(D.C. Books, Kottayam)

17UFL11F	FRENCH- I	SEMESTER- I

Total Credit: 3
Hours per week: 5

Preamble

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France
- To help the students to acquire Competency in translating simple French sentences into English and vice versa

Course Outcomes:

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	**K1**
CO2	To learn the adjectives and the classroom environment in France	**K2**
CO3	Learn the Plural, Articles and the Hobbies	**K3**
CO4	To learn the Cultural Activity in France	**K3**
CO5	To learn the Sentiments, life style of the French people and the usage of the conditional tense	**K2**

K1-Remembering, K2- Understanding, K3- Applying

Mapping with Programme Outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S – Strong, M – Medium, L – Low

17UFL11F	FRENCH- I	SEMESTER- I

Total Credit: 3

Hours per week: 5

Compétence Culturelle	Compétence De communication	Compétence grammaticale
UNITÉ 1 – Ici, en France		
• Moi et les Autres • La France Express	• INTERACTION: s'identifier • RÉCEPTION ECRITE: Comprendre une annonce d'aeroport • RÉCEPTION ORALE: comprendre l'ecrit de la rue (Panneaux, plaques, rues...) • PRODUCTION ÉCRITE**:** écrire un SMS	• Le présent des verbes: Je suis, je reste,J'arrive • Le lieu: (je suis) à… (je suis) ici • L'infinitif
UNITÉ 2 – Ici, en classe		
• Moi et le francais • Le francais dane le monde	• INTERACTION: Se présenter • RÉCEPTION ORALE: Comprendre des consignes Orales • RÉCEPTION ÉCRITE: Comprendre une fiche D''inscription • PRODUCTION ÉCRITE: écrire un texte à 'impératif	• Tu/vous • Le present des Verbes en-er et de être:je, tu,vous • La forme Impérative (tu ,vous) Des verbes en-er
UNITÉ 3 - Samedi		
• Le fil du temps	• INTERACTION: S'informer • RÉCEPTION ORALE: Comprendre une annonce • RÉCEPTION ÉCRITE: Comprendre un article (titres et illustrations)	• Les articles Défines:le,la,les • A,de+le,la,les: Au,aux,du,des,à l', de l' • Être(présent)I'heure • Ll faut+nom Ll faut+infinitive

	• PRODUCTION ÉCRITE: écrire des slogans	• Pharses verbe+complément, Complément+verbe
UNITÉ 4 - Dimanche		
• Les activités Culturelles des Français	• INTERACTION: Acheter,demander des Informations • RECEPTION ORALE: Comprendre les Titres du journal à la radio • RÉCEPTION ÉCRITE: Comprendre les Informations • PRODUCTION ÉCRITE: Inventer des noms de journaux	• Faire, present • Avior, present • Ll y a • Le présent des verbes en-er: Regarder • Combien? • Quand? • Complément de nom: Tremblement de terre, les noms de pays…. • Du,des,de la(reprise U2) • Les adjectifs possessifs: Mon,ta,son, Ma,ta,sa Mes,tes,ses
UNITÉ 5 – Dommage!		
• Un baby-boom en 2000 et 2001 • L'amour, toujours	• INTERACTION: exprimer la tristesse, la peur, conseiller,encourager • RÉCEPTION ORALE: Comprendre une émission De radio • RÉCEPTION ÉCRITE: Comprendre un sondage • PRODUCTION ÉCRITE: écrire des blogs	• Est-ce que • Le present des verbes pouvoir,Vouloir • Le conditionnel des Verbs pouvoir, Vouloir • Ne…pas

TEXT BOOK:

1. *Marcella Di Giura Jean-Claude Beacco,* **Alors I.** Goyal Publishers Pvt Ltd 86,University Block Jawahar Nagar (Kamla Nagar),New Delhi – 110007

18UEG12G	English –I	SEMESTER - I

Total Credits: 3
Hours Per Week: 5

PREAMBLE:

To learn and teach English in a more relevant way through ecological issues and focus on environmental issues, a current problem that affects all lives.

On successful completion of the course, students will be able to

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Identify the impact of nature on human lives	**K 3**
CO2	Experiment with ecofriendly ambience through technical advancements	**K 3**
CO3	Analyze and expose contemporary ecological issues	**K 4**
CO4	Analyze the situational conversations created based on ecological factors	**K 4**
CO5	Improve grammar and related reading of ecological issues	**K 6**

MAPPING WITH PROGRAMME OUTCOME

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	M	M

S – Strong, M – Medium, L - Low

18UEG12G	English –I	SEMESTER - I

Total Credits: 3
Hours Per Week: 5

CONTENTS

UNIT I – POETRY

To Nature – S. T. Coleridge

Sonnet 18 - Shall I Compare Thee To a Summer day? – W. Shakespeare

Stopping by Woods on a Snowy Evening – Robert Frost

UNIT II –PROSE

The Discovery of Radium – Eve Curie

The Bihar Earthquake – Jawaharlal Nehru

The Amazon Ants – F.W. Up de Graff

UNIT III – SHORT STORY

The Sound Machine – Roald Dahl

The Lamp at Noon - Sinclair Ross

The Last Leaf – O. Henry

UNIT IV – ONE ACT PLAY

Moonshine – Arthur Hopkins

UNIT V – FUNCTIONAL GRAMMAR AND COMPOSITION

Sentences

Verbs – tenses and Voice

Concord

Letter Writing

Dialogue Writing

TEXT BOOK:

1. **Eco English**

REFERENCE BOOKS:

1. Shakespeare, William. *Shakespeare's Sonnets*. Ed. Stephen Booth. New Haven: Yale University Press, 1977. Print.

2. Krishnaswamy. N., Modern *English: A Book of Grammar Usage and Composition*. Chennai: Macmillan, 1975. Print.

3. Collocott. T.C., *New Radiant Readers* Book X. Chennai: Allied Pvt. Ltd, 2015. Print.

4. Dohl, Roald. *The Sound Machine*. UK: Penguin, 2012. Print.

5. Hopkins, Arthur. Moonshine. Los Angles: Hard press, 2012. Print.

17UMB13A	CORE I: FUNDAMENTALS OF MICROBIOLOGY	SEMESTER - I

PREAMBLE

This course has been designed for students to learn and understand

- The history behind microbiology
- Microscopy, Sterilization methods and Culture media
- Microbial Diversity.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	• Describe the emergence of systematic microbiology. • Provide details about the Pioneers and their invaluable contributions in microbiology. • Familiarize the history of microbiology.	K1
CO2	• Gives technical ideas about the handling of microscopes. • Develop robust technology in microscopical observation. • Route map for bacteriological study. • Improves practical knowledge in microbes handling and their topological study.	K1,K2
CO3	• Understand the aseptic techniques which are applicable in day today life. • Familiarize various types of disinfecting agents and their mode of action and application on inanimate objects.	K2,K3
CO4	• Describes the cultivation of various types of microbes and their handling.	K3

CO5	• Interpret the knowledge of fungi and algae for human welfare.	K2, K3

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UMB13A	CORE I- FUNDAMENTALS OF MICROBIOLOGY	SEMESTER - I

Total Credits: 4

Hours per week: 6

CONTENTS

UNIT - I

History and Scope of Microbiology – Spontaneous generation theory and its disproval – Contribution of Leuwenhoek, Louis Pasteur, Robert Koch, Edward Jenner, Joseph Lister and John Tyndall.

UNIT - II

Microscopy – Principles and application – Bright field, Dark field, Phase contrast, Fluorescence, SEM & TEM . Stains - Staining reactions – Types of staining – Simple, Differential (Gram's, Spore, AFB), Capsule staining, fungal staining.

UNIT - III

Sterilization and Disinfection- Principles- Methods of Sterilization – Physical methods: Dry Heat, Moist heat, Filtration and Radiation. Chemical methods - Formaldehyde, Alcohol, Phenol and Gaseous sterilizing agents.

UNIT - IV

Culture Media - Types of Media – Enriched, Selective, Differential and Special Purpose Media (one e.g. for each type) - Pure culture techniques - Maintenance and Preservation of microbial culture.

UNIT - V

Morphology, General Characteristics, Classification, and economic important of Fungi (Aspergillus, Saccharomyces) Algae (Anabena, Chlamydomonas, Volvox, Spirogyra).

TEXT BOOKS:

1. *Joanne Wiley, Linda Sherwood, Christopher J Woolverton.* 2016. **Prescott's Microbiology**, *10th Edition. Mc Graw Hill Company.*

REFERENCE BOOKS:

1. *Salle A.J.* 2014. **Fundamental Principles of Bacteriology** *7th edition, Tata Mc Hill Publishing Company Ltd.,*
2. *Michael Madigan, John Martinko, Kelly Bender, Daniel Buckley and David Stahl, 2015.* **Brock Biology of Microorganisms** *14th edition. Pearsons Education Ltd.*

17UMB13P	CORE PRACTICAL - I	SEMESTER - I

Total Credits: 4

Hours per week: 8

CONTENTS

1. Laboratory precautions
2. Preparation of cleaning solutions - Chromic acid
3. Culture media preparation – Nutrient Broth
4. Nutrient Agar (Plate, Deep, Slant)
5. Differential medium
6. Selective medium.
7. Sterility testing of Autoclave
8. Sterility testing of Hot air Oven
9. Decimal Dilution Technique
10. Pure culture techniques – Streak plate method, Pour plate method, Spread plate method
11. Isolation and Enumeration of bacteria from soil
12. Isolation of fungi from soil
13. Isolation of Actinomycetes from soil
14. Bacterial staining - Simple Staining
15. Gram Staining
16. Slide culture Technique
17. Preservation of bacterial cultures – Mineral oil overlay method

LABORATORY MANUALS:

1. *James.C.Cappuccino.* 2017. **Microbiology A laboratory manual**. *11th edition, Pearson education publishers.*
2. *Kannan, N.* 1996. **Laboratory manual of General Microbiology**, *2nd edition, Panima publishing house.*

REFERENCE BOOKS:

1. *Aneja. K.R.* 2012. **Experiments in Microbiology, plant pathology and biotechnology,** *4th Edition. New age publishers.*
2. *Kannan, N.* 2003. **Hand book of Laboratory culture media** *1st edition, Panima publishing house.*

17UMT1AC	ALLIED I- BASIC MATHEMATICS	SEMESTER – I

PREAMBLE:

- On successful completion of this subject the students should have Understand the basic concepts of Mathematics.
- To know about the applications of Statistical and Numerical Techniques of Mathematics.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn about Numerical Differentiation	K1
CO 2	Learn about Numerical Integration	K1
CO 3	Apply Statistical Techniques for data collection	K2
CO 4	Solve the problems related to Measures of central tendency	K2
CO 5	Solve the problems related to System of Simultaneous Linear Algebraic Equation	K3

MAPPING WITH PROGRAMME OUTCOMES

COS/ POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	S	M	M	S
CO3	S	S	S	S	M
CO4	S	S	M	S	M
CO5	S	S	M	S	M

S- Strong; M- Medium; L- Low.

17UMT1AC	ALLIED – I: BASIC MATHEMATICS	SEMESTER – I

Total Credit: 4

Hours Per Week: 4

CONTENTS

UNIT - I

System of Simultaneous Linear algebraic Equation: Gauss elimination - Gauss Jacobi Gauss Jordon - Gauss Seidal methods.

UNIT - II

Numerical Differentiations: Newton's forward Difference - Backward Difference -Stirling's formula.

UNIT - III

Numerical Integration: Trapezoidal Rule & Simpson's rule - Numerical solutions of ordinary differential Equations: Taylor series for first order derivative.

UNIT - IV

Statistics: Meaning - Definition – Collection of data - Classification and Tabulation – Diagrammatic Representation and Graphical Representation.

UNIT - V

Measures of Central Tendency: Mean – Median – Mode - Measures of dispersion: Range – Standard deviation.

TEXT BOOKS:

1. *Kandasamy,P.and Thilagavathi ,K.* 2004. **Numerical Methods .***S.Chand and Company Ltd., New Delhi. (Unit I , II &III)*
2. *R.S.N.Pillai,V.Bagavathi*. 2002. **STATISTICS.** *S.Chand and Company Pvt. Ltd (Unit IV & V).*

REFERENCE BOOKS:

1. *Gupta, S.P. and Gupta, M.P .* 2002. **Business Statistics .** *Sultan Chand and Sons.*
2. *Venkataraman , M.K.* 2004. **Numerical Methods in Science & Engineering** . *NPC . Revised Edition*

17UFC1FA	PART-IV: VALUE EDUCATION-ENVIRONMENTAL STUDIES	SEMESTER - I

Total Credits: 2

Hours per week: 2

CONTENTS

UNIT- I

The Multi Disciplinary Nature of Environmental Studies: Definition, scope and importance-Need for public awareness-Natural resources-Natural resources and associated problems-Role of an individual in conservation of natural resources-Equitable use of resources for sustainable lifestyle…

UNIT- II

Eco System: Concept of an eco system-structure and function of eco system-Producers, consumers and decomposers-Energy flow in the eco system-Ecological succession-Food chain, food webs and ecological pyramids-Forest ecosystem-Grassland eco system-Desert eco system-Aquatic eco system…

UNIT- III

Bio Diversity and its Conservation Introduction Definition: Genetic, Species and Eco System Diversity-Bio Geographical Classification Of India: Value of bio diversity: conceptive use, productive use, social, ethical and option values-bio diversity at global, national and local levels-India as a mega diversity nation, hot spots-threats: habitat loss, poaching of wild life-man wild life conflicts-endangered and endemic species of India, conservation of bio diversity….

UNIT- IV

Environmental Pollution: Definition-causes, effects and control measures of air, water, soil, noise, thermal pollution-soil waste management: causes, effects and control measures of urban and industrial wastes-prevention of pollution-pollution case studies-disaster management: floods, earthquake, cyclone and landslides…

UNIT- V

Social Issues and the Environment: Sustainable development-urban problems related to energy-water conservation, rain water harvesting, watershed management-resettlement and rehabilitation of people ;its problems and concerns-environmental ethics: issues and possible solutions-climate change, global warming, ozone layer, depletion, acid rain, nuclear accidents and holo caust-consumerism and waste products-environmental protection act-air, water act-wild life protection act-forest conservation act-issues involved in enforcement of environmental legislation-public awareness-human population and the environment.

TEXT BOOK:

1. *Kumaraswamy. K, A. Alagappa Moses and M. Vasanthy. 2001,* **Environmental Studies.** Thanjavur- National Offset Printers.

17UTL21T	தமிழ் - தாள் - 2	SEMESTER - II

Total Credits: 3

Hours per week: 5

குறிக்கோள்:

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு, பகுத்தறிவு, கலை மற்றும் மரபு ஆகியவற்றை அறிந்து மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

பயனடைவுக்கல்வியின் விளைவாக ஏற்படும் பயன்பாடுகள்:

பாடத்திட்டப் பகுப்பு முறை	பாடத்திட்டத்தின் குறிக்கோள்	அறிவுத்திறன் வெளிப்படும் அளவு முறை
CO_1	வாழ்க்கைத் திறன்கள் (Life Skills) - மாணவனின் செயலாக்கத்திறனைத் தாய்மொழி வாயிலாக ஊக்குவித்தல்	K_1, K_2, K_3
CO_2	மதிப்புக்கல்வி (Attitude and Value educations)	K_2, K_4
CO_3	பாட இணைச்செயல்பாடுகள் (Co-curricular activities)	K_2, K_3, K_4
CO_4	சூழலியல் ஆக்கம் (Ecology)	K_4
CO_5	மொழி அறிவு (Tamil knowledge)	K_5, K_6

K_1-**Remembering,** K_2-**Understanding,** K_3-**Applying,** K_4-**Analysing,** K_5-**Evaluating,** K_6-**Creating**

Mapping with Programme outcomes

COs /POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	S	M	M	M	M
CO3	S	M	M	M	M
CO4	S	M	M	M	M
CO5	S	M	M	M	M

S – Strong, M – Medium, L – Low

17UTL21T	தமிழ் - தாள் -2	SEMESTER - II

Total Credits: 3

Hours per week: 5

செய்யுள் – உரைநடை – இலக்கிய வரலாறும் இலக்கணமும்

அலகு – 1

1.திருக்குறள் - அ. கூடா நட்பு (அ.எண் 83)
ஆ.கள்ளுண்ணாமை (அ.எண் 93)
இ. குறிப்பறிதல் (அ.எண் 110)
ஈ. காதல் சிறப்புரைத்தல் (அ.எண் 113)

2.மூதுரை –ஔவையார் (10 பாடல்கள்- 6,7,9,10,14,16,17,23,26,30)

அலகு – 2

1.புரட்சிக்கவி – பாரதிதாசன்

அலகு – 3 உரைநடை

1. சங்க நெறிகள் - வ.சுப.மாணிக்கம்
2. கர்ணனும் கும்பகர்ணனும் - ரா.பி.சேதுப்பிள்ளை
3. அறிவியலும் கலையும்- மு.வரதராசன்

அலகு – 4 உரைநடை

1. வாழ்வியல் இயக்கம் – குன்றக்குடி அடிகளார்
2. பெரியார் உணர்த்தும் சுயமரியாதையும் சமதர்மமும் - வே.ஆனைமுத்து
3. போதைப்பொருள் – அமுதன்

அலகு - 5 இலக்கிய வரலாறும் இலக்கணமும் (பாடத்திட்டம் தழுவியது)

1. பதினெண்கீழ்க்கணக்கு நூல்கள்
2. தமிழ் உரைநடையின் தோற்றமும் வளர்ச்சியும்
3. வழு, வழுவமைதி,வழாநிலை
4. பிறமொழிச் சொற்களைத் தமிழில் மொழிபெயர்த்தல்

பார்வை நூல்கள்:

1.செய்யுள் திரட்டு – தமிழ்த்துறை வெளியீடு
2.இலக்கிய வரலாறு - பேராசிரியர் முனைவர் பாக்யமேரி

17UHL21H	HINDI-II	SEMESTER - II

Total Credits: 3
Hours per week: 5

Preamble:

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

Course Outcomes:

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1	Learn the fundamentals of novels and stories	**K1**
CO2	Understand the principles of translation work	**K2**
CO3	Apply the knowledge writing critical views on fiction	**K3**
CO4	Build creative ability	**K3**
CO5	Expose the power of creative reading	**K2**

K1-Remembering, K2- Understanding, K3- Applying

Mapping with Programme Outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**M**	**M**	**M**	**S**
CO2	**S**	**M**	**M**	**M**	**S**
CO3	**S**	**M**	**S**	**M**	**S**
CO4	**S**	**M**	**S**	**M**	**S**
CO5	**S**	**M**	**S**	**M**	**S**

S – Strong, M – Medium, L – Low

17UHL21H	HINDI-II	SEMESTER - II

Total Credits: 3
Hours Per Week: 5

CONTENTS

UNIT – I

आधुनिक पद्य – शबरी (श्री नरेश मेहता)

प्रकाशक: लोकभारती प्रकाशन

पहली मंजिल, दरबारी बिल्डिंग,

महात्मा गाँधी मार्ग, इलाहाबाद-211001

UNIT – II

उपन्यास: सेवासदन-प्रेमचन्द

प्रकाशक: सुमित्र प्रकाशन

204 लीला अपार्ट्मेन्ट्स, 15 हेस्टिंग्स रोड'

अशोक नगर इलाहाबाद-211001

UNIT – III

अनुवाद अभ्यास-III (केवल हिन्दी से अंग्रेजी में)

(पाठ 1 to 10)

प्रकाशक: दक्षिण भारत प्रचार सभा चेन्नै -17

UNIT - IV

पत्र लेखन: (औपचारिक या अनौपचारिक)

17UML21M	MALAYALAM-II	SEMESTER-II

Total Credits: 3

Hours per week: 5

Preamble:

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

Course Outcomes:

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1	Learn the fundamentals of novels and stories	**K1**
CO2	Understand the principles of translation work	**K2**
CO3	Apply the knowledge writing critical views on fiction	**K3**
CO4	Build creative ability	**K3**
CO5	Expose the power of creative reading	**K2**

K1-Remembering, K2- Understanding, K3- Applying

Mapping with Programme Outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S – Strong, M – Medium, L – Low

17UML21M	MALAYALAM-II	SEMESTER- II

Total Credit: 3

Hours per week: 5

PAPER II PROSE: NON-FICTION

This Paper will have the following five units:

UNIT I & II

Biography

UNIT III, IV & V

Travelogue

TEXT BOOKS:

1. Unit III, IV & V Kappirikalude Nattil – *S.K. Pottakkadu* (D.C. Books, Kottayam)
2. Kannerum Kinavum – *V.T. Bhatathirippadu* Autobiography (D.C. Books, Kottayam)

REFERENCE BOOKS:

1. **Jeevacharitrasahithyam –** *Dr. K.M. George*(N.B.S. Kottayam)
2. **Jeevacharitrasahithyam Malayalathil** - *Dr. Naduvattom Gopalakrishnan* (Kerala Bhasha Institute, Trivandrum)
3. **Athmakathasahithyam Malayalathil –** *Dr. Vijayalam Jayakumar* (N.B.S. Kottayam)
4. **Sancharasahithyam Malayalathil** - *Prof. Ramesh Chandran. V*, (Kerala Bhasha Institute, Trivandrum)

17UFL21F	FRENCH- II	SEMESTER- II

Total Credit: 3
Hours per week: 5

Preamble

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France
- To help the students to acquire Competency in translating simple French sentences into English and vice versa

Course Outcomes:

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	**K1**
CO2	To learn the adjectives and the classroom environment in France	**K2**
CO3	Learn the Plural, Articles and the Hobbies	**K3**
CO4	To learn the Cultural Activity in France	**K3**
CO5	To learn the Sentiments, life style of the French people and the usage of the conditional tense	**K2**

K1-Remembering, K2- Understanding, K3- Applying

Mapping with Programme Outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S – Strong, M – Medium, L – Low

17UFL21F	FRENCH-II	SEMESTER- II

Total Credit: 3

Hours per week: 5

Compétence Culturelle	Compétence De communication	Compétence grammaticale
UNITÉ 1 – Super!		
• L'égalité homme/femme	• INTERACTION: Exprimer des sentiments, exprimer la joie, le plaisir, le bonheur • RÉCEPTION ORALE: Comprendre un jeu radiophonique • RÉCEPTION ÉCRITE: Comprendre des announces • PRODUCTION ÉCRITE: Écrire des cartes postales	• Les noms de professions masculine/feminine • Le verb finir et less Verbes du groupe en-ir • Le present de l'impératif • Savoir(present) • Le participle passé: Fini, aimé, arrive, dit,écrit • Quel(s), quelle(s)..: Interrogatifet Exclamatif • À + infinitive • Les articles: n,une,des
UNITÉ 2 – Quoi?		
• Le 20 siécle: Petits progrés Grand progrés	• INTERACTION: Decrire quelque chose, une personne • RECEPTION ORALE: Comprendre un message publicitaire • RÉCEPTION ÉCRITE: Comprendre un dépliant touristique • PRODUCTION ÉCRITE: Écrire des petites annonces	• On • Plus, moins • Le verbe aller: • Present, impératif • Aller + infinitife • Le pluriel en –x
UNITÉ 3 – Et aprés		
• Nouvelles du jour	• INTERACTION: Raconteur,situer un récit dans le temps	• L'imparfait:: quel-Ques forms pour introduire le récit:Il faisait, il y avait, il

	• RÉCEPTION ORALE: Comprendre une description • RÉCEPTION ÉCRITE: Comprendre un test • PRODUCTION ÉCRITE: écrire des cartes postales	Était • Un peu, beaucoup, trop,Assez • Trés • Le verbe venir: Présent, impératif • En Suisse, au Maroc, aux Etats-Unis
UNITÉ 4– Mais oui!		
• La génération des 20-30 ans	• INTERACTION: Donner son opinion, Expliquer pourquoi • RÉCEPTION ORALE: Comprendre des informations à la radio • RÉCEPTION ÉCRITE: Comprendre un texte informatif • PRODUCTION ÉCRITE: éncrire un mél de protestation	• Répondre, prendre: Présent, impératif, part Passé • Parce que pourquoi • Tout/tous, toute/s Tous/toutes les… (répétition action)
UNITÉ 5– Mais non!		
• De la ville à la campagne	• INTERACTION: Débat:: exprimer l'accord, exprimer le Désaccord • RECEPTION ORALE: Comprendre un message sur un répondeur téléphonique • RÉCEPTION ÉCRITE: Comprendre un témoignage • PRODUCTION ECRITE: Rediger des petites Announces immobilieres	• Le verbe devoir: Present et participe passé • Le verbe vivre, present • Aller + infinitive • Venir+ infinitive • Etre pour/contre

TEXT BOOK:

1. Marcella Di Giura Jean-Claude Beacco, **Alors I.** Goyal Publishers Pvt Ltd 86, University Block Jawahar Nagar (Kamla Nagar) New Delhi – 110007

18UEG22G	English – II	SEMESTER - II

Total Credits: 3
Hours per week: 5

PREAMBLE:

To learn and teach English in a more relevant way through ecological issues and to focus on environment issues, a current problem that affect all lives.

COURSE OUTCOMES:

On successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Take part in improving the eco system through eco literature	**K 4**
CO2	Apply conventional and new methods of learning speech and vocabulary	**K 3**
CO3	Analyze contemporary situation through current ecological issues	**K 4**
CO4	Interpret the situational Conversations created based on ecological factors	**K 2**
CO5	Develop spelling, punctuation, Grammar and related reading	**K 3**

MAPPING WITH PROGRAMME OUTCOME

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	M
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	M	S	S	S	M

S – Strong, M – Medium, L – Low

18UEG22G	English – II	SEMESTER – II

Total Credits: 3
Hours per week: 5

CONTENTS

UNIT I – POETRY

Nature The Gentlest Mother is – Emily Dickinson

To Autumn – John Keats

The Boat – Rabindranath Tagore

UNIT II –PROSE

Literature and Science – John Middleton Murry

Ecology – Barry Commoner

Town by the Sea – Amitav Ghosh

UNIT III – SHORT STORY

How the Camel Got His Hump – Rudyard Kipling

A Day in the Country – Anton Chekhov

The tale of Peter Rabbit – Beatrix Potter

UNIT IV – ONE ACT PLAY

Riders to the sea – J. M. Synge

UNIT V – FUNCTIONAL GRAMMAR AND COMPOSITION

Relative Pronoun

Degrees of Comparison

Reported speech

Correction of Sentences

Picture Composition

TEXT BOOK:

1. Eco English

REFERENCE BOOKS:

1. Synge J.M., *Riders to the Sea*. Delhi: Unique, 2014. Print.
2. Ross, Sinclair. *The Lamp at Noon*, Toronto: Mc Cleland and Stewart, 1968. Print.
3. Ghosh, Amitav. *The Town by the Sea*. India: Penguin, 2017. Print.
4. Faulkner, Julia. *Twelve Poems of Emily Dickinson*. Melbourne: Boston, 1820. Print.
5. Krishnaswamy. N., Modern *English: A Book of Grammar Usage and Composition*. Chennai: Macmillan, 1975. Print.

17UMB23A	CORE II: CELL BIOLOGY	SEMESTER – II

PREAMBLE

To develop basic knowledge in

- The complexity and harmony of cell structure and functions
- The mode of cell divisions and
- Mechanism of nutrient transportation inside the cell.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	• Describe the morphological details of prokaryote and their physiology. • Explain the structure of internal organelles and their functions in organisms.	K1
CO2	• Addressing the structural details of eukaryotic organisms and their internal organelles.	K1,K2
CO3	• Identify the reproduction methods or cell division strategies.	K3
CO4	• Summarise the nutrient uptake mechanism and their transportation among cell to cell.	K2
CO5	• Provides knowledge in the primitive life form. • Outline the characteristics of the life in the extreme environment. • Summarize the environmental adaptation strategies via microbial life in extreme environment.	K1,K2

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UMB23A	CORE II: CELL BIOLOGY	SEMESTER – II

Total Credits: 4

Hours per week: 6

CONTENTS

UNIT - I

Structure of Prokaryotes - Cell wall – Cell membrane- Extra mural layer - Slime – Capsule – Cytoplasmic inclusions – Mesosomes – Nuclear material – Reserve materials - Pigment – Cell appendages – Flagella – Pili. Endospore formation.

UNIT - II

Structure of Eukaryotes – Cell wall – Cell membrane - Mitochondria – Chloroplast – Endoplasmic reticulum – Golgi complex – Nucleus – Ribosomes – Inclusions Bodies - Flagella.

UNIT - III

Cell division in Bacteria – Binary fission - Cell division of Eukaryotes – Mitosis and Meiosis. Cell cycle.

UNIT - IV

Transport mechanisms – Diffusion - Facilitated diffusion – Active transport – Group translocation – Phagocytosis – Pinocytosis.

UNIT - V

Archaebacterial cell wall and cell membranes of Methanogens - Halophiles - Thermoacidophiles.

TEXT BOOK:

1. *Joanne Wiley, Linda Sherwood, Christopher J Woolverton.* 2016. *Prescott's Microbiology, 10th Edition. Mc Graw Hill Company.*

REFERENCE BOOKS:

1. *Tortora, Funke and Case***. 2016. Microbiology**, *11th edition. Pearson Education India.*
2. *Verma P S,* 2004. **Cell biology, Genetics, Evolution and Ecology**, *14th Edition. S Chand Publishers.*

17UMB23P	CORE PRACTICAL - II	SEMESTER – II

Total Credits: 3

Hours per week: 6

CONTENTS

1. Observation of Plant cell
2. Observation of animal cell
3. Measurement of Microbial cell size by Micrometry
4. Cell count- Microscope
5. Screening of PHB production
6. Observation of permanent slides of Algae, Fungi and Protozoa
7. Observation of permanent slide for stages of mitosis
8. Observation of permanent slide for stages of meiosis
9. Extraction of chlorophyll pigments.
10. Acid Fast Staining
11. Capsular staining – Negative staining
12. Spore Staining
13. Motility test - Hanging drop and SIM agar
14. Fungal staining – Lacto phenol Cotton Blue Mount

LABORATORY MANUALS:

1. *J Jayaraman,* 2005. **Laboratory manual in Biochemistry**. *1st Edition. New Age International.*
2. *James.C.Cappuccino.* 2017. **Microbiology A laboratory manual**. *11th edition, Pearson education publishers.*

REFERENCE BOOKS:

1. *Aneja. K.R.* 2012. **Experiments in Microbiology, Plant Pathology and Biotechnology**, *4th edition. New age publishers.*
2. *Kannan, N.* 2003. **Hand Book of Laboratory Culture Media** *1st edition, Panima publishing house.*

17UCS2AA	ALLIED – II: BASICS OF COMPUTERS	SEMESTER –II

PREAMBLE:

On successful completion of this course, the students shall enrich the knowledge in the applications of internet in biosciences which helps them to gather updated information.

COURSE OUTCOME:

On the successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	• Learn the fundamentals of number systems	K1
CO2	• Understand the principle of system software	K2
CO3	• Learn the concepts of internet technologies	K1
CO4	• Ability to get knowledge in database	K2
CO5	• Understand the basic structure of networks	K1

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UCS2AA	ALLIED – II: BASICS OF COMPUTERS	SEMESTER –II

Total Credits: 2

Hours Per Week: 3

CONTENTS

UNIT-I

General format of representing a number-Classification of number system: Positional and Non-positional number system. Decimal, Binary, Octal and Hexadecimal. Conversion from one system to another.

UNIT-II

Fundamentals of Information technology: History and Generations of computers-classification of programming languages- Operating systems and their types. Definitions of Compilers, Linker, Loaders, Assembler and Interpreter. Algorithms Flowchart and its components.

UNIT-III

Internet: Evolution of Internet-Internet terminologies: WWW, FTP, HTML, HTTP, Gopher, E-mail browsers, protocol Archie Telnet, Search engines. Application of Computers in education, business, entertainment, science, engineering and medicine

UNIT- IV

Database systems; Definitions: Data abstraction, Instances, Schemes, Entity, Entity set: Strong and weak entity sets, Primary key, Foreign key, Super key. Database models: Basic concepts of E-R model, Hierarchical model.

UNIT-V

Networking: Network architectures, Topologies, LAN, WAN, MAN AND Components of a network: Hubs, Routers, Repeaters, Bridges, Modems and cables. Linux: Installation-Basic commands.

TEXT BOOKS:

1. ***Leon A and Leon*** M, 2009. **Fundamentals of Information technology,** *second edition, Vikas publishing House Pvt. Ltd.*
2. *Date C.J.* 2003. **Introduction to Database systems.** *8th edition***,** *Pearson publisher.*

REFERENCES BOOKS:

1. *Andrew S. Tanenbaum*, 2002, **Computer networks**, *Fourth edition, Prentice Hall.*

17UCS2AP	ALLIE ALLIED PRACTICAL I-FUNDAMENTALS OF COMPUTERS	SEMESTER –II

Total Credits: 2
Hours Per Week: 3

OBJECTIVES:

Upon completion of this practical the students will gain knowledge on the hard ware components, operating systems, programming languages and basics of internet usage

CONTENTS

1. To create an email id, compose and send a mail.

2. To send a mail with an attachment and download the attached document of mail received.

3. Create a resume in MS Word and format it.

4. Create company letter head in MS Word.

5. Create a cover page of a project report using MS Word.

6. Create a simple News letter using MS Word.

7. Create a macro which creates a line chart using the data in the worksheet in

MS Excel.

8. Prepare Class Time-Table using MS Excel

9. Prepare student marksheet using MS Excel.

10. Prepare a mark list for the following conditions in MS Excel

a) Data Filter

b) Data sort

11. Create a website to display a message using basic HTML tags

12. Create a web page using HTML Tags &change its back ground.

13. Design a time-table using HTML Tags.

14. Prepare a presentation using MS powerpoint to advertise a product

15. Create a database for employee payroll using MS Access

TEXT BOOK:

1. *Balagurusamy .E*, 2004, **Programming In Basics**, *3rd edition, Tata McGraw-Hill Education*

REFERENCE BOOK:

1. Patrick Naughton, Internet complete reference

17UFC2FA	PART–IV:VALUE EDUCATION-HUMAN RIGHTS	SEMESTER - II

Total Credits: 2

Hours per week: 2

CONTENTS

UNIT- I

Concept of Human Values, Value Education Towards Personal Development

Aim of education and value education; Evolution of value oriented education; Concept of Human values; types of values; Components of value education.

Personal Development: Self analysis and introspection; sensitization towards gender equality, physically challenged, intellectually challenged. Respect to - age, experience, maturity, family members, neighbours, co-workers.

Character Formation towards Positive Personality: Truthfulness, Constructivity, Sacrifice, Sincerity, Self Control, Altruism, Tolerance, Scientific Vision.

UNIT - II

Value Education Towards National and Global Development National and International Values: Constitutional or national values - Democracy, socialism, secularism, equality, justice, liberty, freedom and fraternity.

Social Values - Pity and probity, self control, universal brotherhood.

Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith.

Religious Values - Tolerance, wisdom, character.

Aesthetic values - Love and appreciation of literature and fine arts and respect for the same.

National Integration and international understanding.

UNIT - III

Impact of Global Development on Ethics and Values: Conflict of cross-cultural influences, mass media, cross-border education, materialistic values, professional challenges and compromise.

Modern Challenges of Adolescent Emotions and behave or; Sex and spirituality: Comparison and competition; positive and negative thoughts. Adolescent Emotions, arrogance, anger, sexual instability, selfishness, defiance.

UNIT – IV

Therapeutic Measures

Control of the mind through

a. Simplified physical exercise
b. Meditation – Objectives, types, effect on body, mind and soul
c. Yoga – Objectives, Types, Asanas
d. Activities:
   (i) Moralisation of Desires
   (ii) Neutralisation of Anger
   (iii) Eradication of Worries
   (iv) Benefits of Blessings

UNIT- V

Human Rights

1. Concept of Human Rights – Indian and International Perspectives
   a. Evolution of Human Rights
   b. Definitions under Indian and International documents

2. Broad classification of Human Rights and Relevant Constitutional Provisions.
   a. Right to Life, Liberty and Dignity
   b. Right to Equality
   c. Right against Exploitation
   d. Cultural and Educational Rights
   e. Economic Rights
   f. Political Rights
   g. Social Rights

3. Human Rights of Women and Children
   a. Social Practice and Constitutional Safeguards
      (i) Female Foeticide and Infanticide
      (ii) Physical assault and harassment
      (iii) Domestic violence
      (iv) Conditions of Working Women

4. Institutions for Implementation
   a. Human Rights Commission
   b. Judiciary

5. Violations and Redressel
   a. Violation by State
   b. Violation by Individuals
   c. Nuclear Weapons and terrorism
   d. Safeguards.

REFERENCE BOOKS:

1. *Dey A. K*, 2002, **Environmental Chemistry.** New Delhi – Vile Dasaus Ltd.
2. *Gawande . E.N*. **Value Oriented Education.** Vision for better living. New Delhi, Saruptsons.
3. *Brain Trust Aliyar*, 2008, **Value Education for health, happiness and harmony.** Vethathiri publications, Erode.
4. *Ignacimuthu S. J. S,* 1999, **Values for life.** Bombay Better Yourself.
5. *Seetharam. R. (Ed),* 1998 **, Becoming a better Teacher** Madras Academic Staff College.
6. *Grose. D. N* , 2005, **A text book of Value Education.** Dominant Publishers and Distributors, New Delhi.
7. *Shrimali K. L,* 1974, **A Search for Values in Education**. Vikas Publishers, Delhi.
8. *Yogesh Kumar Singh & Ruchika Nath* , 2005, **Value Education.** P. H Publishing Corporation, New Delhi.

9. *Venkataram & Sandhiya. N,* 2001, **Research in Value Education.** APH Publishing Corporation, New Delhi.
10. *Ruhela S. P.* **Human Value and Education.** Sterling publishers, New Delhi.
11. *Brain Trust Aliyar*, 2004, **Value Education for Health, Happiness and Harmony.** Vethathiri publications , Erode.
12. *Swami Vivekananda* , 2008, **Personality Development.** Advaita Ashrama, Kolkata.
13. *Swami Jagadatmananda*, **Learn to Live.** Sri Ramakrishna Math, Chennai.

17UTL31T	PART I : TAMIL - III	SEMESTER III

Total Credits: 3
Hours Per Week: 4

குறிக்கோள்

மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு, பகுத்தறிவு, கலை மற்றும் மரபு ஆகியவற்றை அறிந்து மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

பயனடைவுக்கல்வியின் விளைவாக ஏற்படும் பயன்பாடுகள்

பாடத்திட்டப் பகுப்பு முறை	பாடத்திட்டத்தின் குறிக்கோள்	அறிவுத்திறன் வெளிப்படும் அளவு முறை
CO_1	வாழ்க்கைத் திறன்கள் (Life Skills) - மாணவனின் செயலாக்கத்திறனைத் தாய்மொழி வாயிலாக ஊக்குவித்தல்	K_1, K_2, K_3
CO_2	மதிப்புக்கல்வி (Attitude and value educations).	K_2, K_4
CO_3	பாட இணைச்செயல்பாடுகள் (Co-curricular activities)	K_2, K_3, K_4
CO_4	சூழலியல் ஆக்கம் (ecology)	K_4
CO_5	மொழி அறிவு (tamil knowledge)	K_5, K_6

Mapping with Programme outcomes

COs /POs	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	M	M	M	M
CO 2	S	M	M	M	M
CO 3	S	M	M	M	M
CO 4	S	M	M	M	M
CO 5	S	M	M	M	M

S-Strong, M-Medium, L-Low

17UTL31T	தமிழ் தாள் - 3	SEMESTER - III

Total Credits: 3
Hours Per Week: 4

காப்பியம் – சிற்றிலக்கியம் – நாடகம் – இலக்கிய வரலாறு – இலக்கணம்

அலகு -1 காப்பியங்கள்

1. சிலப்பதிகாரம் – மனையறம் படுத்த காதை

2. மணிமேகலை – வஞ்சிமாநகர் புக்க காதை

3. கம்பராமாயணம் – கும்பகர்ணன் வதைப்படலம் (பா. எண் : 60 – 100)

4. பெரிய புராணம் – அதிபத்தநாயனார் புராணம்

அலகு – 2 சிற்றிலக்கியங்கள்

1. முத்தொள்ளாயிரம் (சேரனைப்பற்றியது) பா. எண் : 1- 20

2. கலிங்கத்துப்பரணி – களம் பாடியது (போர்க்களக் காட்சி – பா.எண்: 472– 503)

3. திருக்குற்றாலக்குறவஞ்சி – வசந்தவல்லி பந்தாடிய சிறப்பு (6: 4கண்ணிகள்)

அலகு – 3 நாடகம்

1. குறிஞ்சிப்பாட்டு - இன்குலாப்

அலகு - 4 இலக்கிய வரலாறு

1. காப்பியங்களின் தோற்றமும் வளர்ச்சியும்

2. சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும்

3. நாடகத்தின் தோற்றமும் வளர்ச்சியும்

அலகு- 5 இலக்கணம்

1. ‘பா’ வகைகள் : வெண்பா, ஆசிரியப்பா, கலிப்பா, வஞ்சிப்பா - பொது இலக்கணம்

2. அணி – உவமையணி, உருவக அணி, இல்பொருள் உவமையணி

3. அலுவலகம் சார்ந்த கடிதம் – விண்ணப்பங்கள், வேண்டுகோள், முறையீடு

பார்வை நூல்கள்:

1.செய்யுள் திரட்டு – தமிழ்த்துறை வெளியீடு

2. குறிஞ்சிப்பாட்டு - இன்குலாப் – அன்னம் வெளியீடு

3.தமிழ் இலக்கிய வரலாறு – பேராசிரியர் முனைவர் பாக்யமேரி

17UHL31H	Part I- HINDI-III	SEMESTER - III

Total Credits: 3
Hours Per Week: 4

CONTENTS

UNIT – I

पद्य – काव्य पराशर (भोलानाथ)

(प्राचीन- कबीर, तुलसी, सुर, मीरा, आधुनिक- गुप्त, प्रसाद, पंत, निराला, दिनकर, अज्ञेय)

प्रकाशक: जवाहर पुस्तकालय

सदर बाजार, मथुरा

उत्तर प्रदेश-281001

UNIT – II

हिन्दी साहित्य का इतिहास: (केवल आदिकाल और भक्तिकाल - साधारण ज्ञान)

अलंकार:अनुप्रास,यमक, श्लेष, वक्रोक्ति, उपमा,रूपक

प्रकाशक: विनोद पुस्तक मंदिर

आगरा-282002

17UML31M	PART I - MALAYALAM-III	SEMESTER III

Total Credits: 3
Hours Per Week: 4

Preamble

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1	Learn the fundamentals of novels and stories.	K1
CO2	Understand the principles of translation work.	K2
CO3	Apply the knowledge writing critical views on fiction.	K3
CO4	Build creative ability.	K3
CO5	Expose the power of creative reading.	K2

Mapping with Programme Outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S: Strong M: Medium L: Low

15UML31M	PART-I: MALAYALAM-III	SEMESTER III

Total Credits: 3
Hours Per Week: 4

CONTENTS

PAPER III- POETRY

This Paper will have the following five units:

Unit I, II & III

A part of Ezuthachan's Work

Unit IV & V

A Khandakavya of Vallathol

Text Books prescribed:

Unit I, II & III

Karnnaparvam – Ezuthachan
(Poorna Publications, Calicut)

Unit IV & V

Achanum Makalum – Vallathol (D.C. Books, Kottayam)

17UFL31F	FRENCH-III	SEMESTER -III

Total Credits: 3

Hours Per Week: 4

Preamble

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression.
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France.
- To help the students to acquire Competency in translating simple French sentences into English and vice versa.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents.	K1
CO2	To learn the adjectives and the classroom environment in France.	K2
CO3	Learn the Plural, Articles and the Hobbies.	K3
CO4	To learn the Cultural Activity in France.	K3
CO5	To learn the Sentiments, life style of the French people and the usage of the conditional tense.	K2

Mapping with Programme Outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S: Strong M: Medium L: Low

17UFL31F	FRENCH-III	SEMESTER -III

Total Credits: 3

Hours Per Week: 4

CONTENTS

Compétence Culturelle	Compétence de Communication	Compétence Grammatical
UNITÉ 1- Excuses et vœux		
•Convivialité (lieux et société, l'apéritif)	•INTERACTION ORALE: Accueillir quelqu'un, s'excuser,remercier •RÉCEPTION ORALE: Comprendre des announces enregistrées •RÉCEPTION ÉCRITE: Compremdre une affiche •PRODUCTION ÉCRITE:Écrire des cartes de vœux	•Pronoms personnels toniques *moi,je…;toi…tu* •Pronoms personnels objets *Me,te,le…* •Lesverbsen-ercomme appeler,acheter •Lesadjectives possessives *nos,vos,leurs*
UNITÉ 2 – Bravo et merci		
•Communication et technologies (leportable, internet)	• INTERACTION ORALE: Interagir au téléphone , féliciter • RÉCEPTION ORALE: Comperendre une emission à la radio • RÉCEPTION ORALE: Comprendre une définition • PRODUCTION ECRITE: Écrire des plaques commemoratives	• Oui,que • Le passé composé • Le participe passé *J'ai eu,ella a été* • Longtemps,pendant …, de… à
UNITÉ 3 – Faire et dire		
• Jeunes : enquête	• INTERACTION ORACE: Demander de l'aide, donner	• Ce/*cet,cette,ces* • Le verbe voir

	des instructions • RÉCEPTION ORALE: Comprendre un message enregistré • RÉCEPTION ÉCRITE : Comprendre un article d'un magazine de consommateurs • PRODUCTION ÉCRITE : Écrire un règlement	• Envoyer,appuyer • Les articles partitifs *du,de la (de l)',des,de*
UNITÉ 4 – Faire ci ou faire ça		
• Les vacances des Français	• INTERACTION ORALE : Proposer quelque chose,accepter,refuser • RÉCEPTION ORALE : Comprendre une émission de cuisine • RECEPTION ÉCRITE : Comprendre une brochure d'informations • PRODUCTION ÉCRITE : Ecrire un'texte de promotion touristique	• *S'il y a du soleil* : L'hypothèse (supposition, Condition) la préposition *S i + indicatif* • *Sinon… ou + indicatif* • *Sortir,partir* • *Quelques, plusieurs* • *Le long de* • *Au milieu de…* • *Au sommet de…*
UNITÉ 5 – Cœur et santé		
• Author du Couple	• INTERACTION ORALE: Exprimer son intérêt pour quelqu'un, exprimer l'affection • RECEPTION ORALE: Comprendre une chanson • RECEPTION ÉCRITE: Lire un horoscope • PRODUCTION ÉCRITE: Écrire une letter au courrier du cœur	• J'étais…L'imparfait(1) • Aussi brilliant que… • Le plus beau, le moins cher • Le verbe connaître

TEXT BOOK:

1. *Marcella Di Giura Jean-Claude Beacco,* Alors II . Goyal Publishers Pvt Ltd 86, University Block ,Jawahar Nagar (Kamla Nagar), New Delhi – 110007.

17UEG32G	PART II- ENGLISH III	SEMESTER - III

Total Credits: 3

Hours Per Week: 4

PREAMBLE:

To develop and enrich the language competencies of the students with the Functional English

COURSE OUTCOMES:

On successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Develop knowledge on behavioral pattern and morale through prose	K3
CO2	Extend focus on Ecology through poetry	K2
CO3	Educate on Illustrating the significance of Short Stories	K2
CO4	Build knowledge on One-Act plays	K3
CO5	Test for descriptive Functional Grammar	K4

MAPPING WITH PROGRAMME OUTCOME

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	S	S	M	M	S
CO3	S	S	M	S	S
CO4	M	S	S	S	S
CO5	M	S	M	S	S

S – Strong, M – Medium, L – Low

17UEG32G	PART II- ENGLISH- III	SEMESTER- III

Total Credit: 3
Hours Per Week: 4

CONTENTS

UNIT I –PROSE

1. Mobile and Mixed Up – Anil Dharker
2. Good Manners – J.C. Hill
3. Chasing Celebrities – R.K. Narayan

UNIT II - POETRY

1. The Stolen Boat – William Wordsworth
2. Money Madness – D.H. Lawrence
3. On Killing a Tree – Gieve Patel

UNIT III – SHORT STORIES

1. The Scorn - Bama
2. The Dying Detective – Sir Authur Canon Doyle
3. The Refugees – Pearl.S.Buck

UNIT IV – ONE ACT PLAY

1. Refund – Fritz Karinthy
2. Mother's Day – J.B. Priestley

UNIT V – FUNCTIONAL ENGLISH

1. Agenda, Minutes & Notice
2. Report Writing
3. Electronic Correspondence

TEXT BOOK:

1. Board of Editors, *Melody*. Department of English. Dr. N.G.P. Arts and Science College (Autonomous), Coimbatore.

REFERENCE BOOKS:

1. Syamala.V., *Effective English Communication for You.,* Emerald Publishers., Chennai.
2. N. Krishnaswamy., *Modern English: A Book of Grammar, Usage And Composition*., Macmillan India Ltd-New Delhi.
3. Wren and Martin, *High School English Grammar and Composition*. S. Chand Publishing 2006, New Delhi.

18UMB33A	CORE III- MICROBIAL PHYSIOLOGY	SEMESTER - III

PREAMBLE

Gain a fundamental understanding of microbial nutritional requirements, transport, growth, energy generation, diversity of metabolic processes and techniques used to elucidate physiological processes.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Formulate a comprehensive definition of microbial physiology. Understand the nutritional requirements and modes of nutrient uptake by microorganisms. Categorize the microorganism based on mode of nutrition.	K1
CO2	Describe how environmental factors impact microbial growth, metabolism and physiology. Understand the physiology of growth and calculation of generation time. Evaluate the growth of microorganisms by experimental methods.	K3, K4
CO3	Confer the significance of different pathways of Carbohydrate metabolism. Infer the concepts of energy generation in aerobic cellular processes with calculation of ATP. Infer and extrapolate how small molecules are integrated into macromolecule (Biosynthetic process).	K3, K3
CO4	Respond on the concepts of anaerobic respiration. Describe and distinguish the various types of fermentation processes. Reiterate the importance of methanogens and methanogenic	K3, K2

	processes. Demonstrate the atmospheric nitrogen fixation process. Compare oxygenic and anoxygenic process.	
CO5	Acquire knowledge on the concepts of biosynthesis of aminoacids. differentiate gram-positive and gram-negative cell wall synthesis State the biological process of bioluminescence in microbes.	K3, K1

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

18UMB33A	CORE III: MICROBIAL PHYSIOLOGY	SEMESTER - III

Total Credits: 4

Hours per week: 5

CONTENTS

UNIT – I

Definition, Introduction, terminologies and basic concepts of Microbial physiology. Nutritional requirements and up taken by vegetative and dormant stage of microbes. Factors influencing in microbial growth – Growth curve.

UNIT – II

Different phases of growth in batch cultures, continuous, semi continuous, synchronous and biphasic growth, calculation of generation time, Estimation of Microbial growth: Direct method - Microscopic count, Turbidometric assay and TVC. Indirect Metho**d -** CO_2 liberation.

UNIT – III

Aerobic respiration - EMP and its alternative pathways (HMP shunt & ED pathways) - TCA cycle – Electron transport – Energy generation via Oxidative and Substrate level phosphorylation. Calculation of ATP in aerobic cellular processes. Glyoxylate cycle, β oxidation of fatty acids.

UNIT - IV

Anaerobic respiration – Methanogens - Sulphur and nitrogen metabolism. Nitrogen fixation in legumes by *Rhizobium* sp. Fermentation – alcoholic, propionic and mixed acid fermentation. Oxygenic and anoxygenic photosynthesis in bacteria.

UNIT - V

Microbial Metabolism: Biosynthesis of amino acids (Pyruvate family – alanine, leucine and Glutamic acid family). Lipids (Phospholipids and Archeal lipids) -Biosynthesis of bacterial cell wall – Bioluminescence – Biotransformation in antibiotics production.

TEXT BOOKS:

1. *Gerhard Gottschalk,* 2006. **Bacterial Metabolism**. *Springer-Verlag New York.*
2. *David White and George D. Hageman.* 2000. **Microbial Physiology and Biochemistry Laboratory**. *Oxford University Press*.
3. *Moat. A.G. and Foster. J. W*. 1988. **Microbial Physiology**. *4th edition. John Wiley & sons.*
4. *Stanbury P T and Whitaker* 1984. **Principles of Fermentation Technology**, *1str Edition. Adithya Books pvt ltd. New Delhi.*

REFERENCE BOOKS:

1. *Doelle. H.W.*1975.**Bacterial Metabolism**. 2nd edition. Academic Press.
2. *David L. Nelson* and *Michael M. Cox*. 2009. Fourth edition. **Lehninger Principles of Biochemistry**. *Printed Test Bank, Terry Platt and Eugene Barber, University of Rochester Medical Center).*

17UMB33P	CORE PRACTICAL - III	SEMESTER - III

Total Credits: 3

Hours per Week: 6

CONTENTS

1. Measurement of microbial growth – TVC-Haemocytometer-Turbidity method-Determination of generation time
2. Utilization of amino acid as Carbon source
3. Mixed acid Fermentation test
4. Non-acid end product test
5. Citrate utilization test
6. Carbohydrate fermentation test
7. Preferential sugar utilization and H2S production test – TSI
8. Starch hydrolysis
9. Catalase test
10. Oxidase test
11. Urease test
12. Gelatin liquefaction
13. Casein hydrolysis test
14. Nitrate reduction test
15. Microbial Degradation of textile dyes

LABORATORY MANUALS:

1. *James.C.Cappuccino.* 2013. **Microbiology A laboratory manual**. *1st edition, Pearson education publishers.*
2. *Kannan, N.* 1996. **Laboratory manual of General Microbiology**, *2nd edition, Panima publishing house.*

REFERENCE BOOKS:

1. *Aneja. K.R.* 2012. **Experiments in Microbiology, plant pathology and biotechnology,** *4th Edition. New age publishers.*
2. *Kannan, N.* 2003. **Hand book of Laboratory culture media** *1st edition, Panima publishing house.*

17UBC3AA	ALLIED III -BIOCHEMISTRY- I	SEMESTER - III

PREAMBLE:

1. This course provides an overview of nature of biological macromolecules namely carbohydrate, lipids, proteins and nucleic acids.
2. Students can gain basic knowledge and key understanding of the role of Vitamins, Minerals and Hormones in the functioning of cell.

COURSE OUTCOME:

On successful completion of the course, students will be able to

CO number	CO Statement	Knowledge Level
CO1	Outline carbohydrate definition, classification and function. Explain Monosaccharides, Disaccharides and Polysaccharides	K1 & K2
CO2	Define and classify lipids. List and compare saturated and unsaturated fatty acids. Summarize the physiochemical properties of lipids.	K1 & K2
CO3	Compare the different structural levels & Organization of proteins with suitable examples. Classify the standard amino acids and list the non protein aminoacids Experiment with aminoacids.	K1, K2 & K3
CO4	Define Nucleic acids. Identify the structures of purines, pyrimidines, nucleoside and nucleotides. Classification and identification different forms of DNA and RNA.	K1, K2 & K3
CO5	Define and classify vitamins. Explain the functions of minerals in biological system. Illutrate the role of hormones in metabolic regulation.	K1 & K2

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UBC3AA	ALLIED III- BIOCHEMISTRY- I	SEMESTER – III

Total Credits: 4

Hours Per Week: 4

CONTENTS

UNIT - I

Carbohydrate – classification, structure, properties & chemical reactions of monosaccharide – Glucose, Fructose, Galactose, Mannose, Arabinose. Disaccharides – Maltose, Lactose and Sucrose. Polysaccharides – Homo polysaccharides – Starch, Glycogen and Cellulose & Hetero polysaccharides – Hyaluronic acid, Heparin, Chondroitin sulphate. Biological importance of sugar derivates – glycosaminoglycan, proteoglycan & glycoprotein – Blood group & Bacterial cell wall polysaccharides.

UNIT - II

Lipids: Definition classification of lipids, physiochemical properties. Storage lipids – fatty acids – types. Structural lipids – phospholipids, glycolipids & sphingolipids. Structure & Biological role of cholesterol.

UNIT - III

Classification of amino acids, general properties, Non protein amino acids. Peptide bond – structure & conformation, Protein classification, Physiochemical properties of proteins. Organization of protein Structure – Primary, Secondary (Keratin, Collagen) Tertiary (Myoglobin), Quaternary structure (Hemoglobin).

UNIT - IV

Structures of Purines, Pyrimidines, Nucleoside & Nucleotides. Properties of nucleic acids. DNA Double helical structure – Isoform. RNA – Types – mRNA, tRNA, rRNA - structure & function.

UNIT - V

Minerals in biological system & their importance – Iron, Calcium, Phosphorous, Iodine, Copper, Zinc. Vitamins – Definition, classification: Fat soluble (Vitamin A,D,E,K) and Water Soluble vitamins (Vitamin B)- Sources, functions and deficiencies. Role of vitamins as antioxidants & cofactors. Hormones involved in regulatory metabolism: Insulin, Glucagon and thyroid.

TEXT BOOKS:

1. *J.L.Jain.* 2016. **Fundamentals of Biochemistry,** *7th edition. S. Chand and company Ltd.*
2. *Sathyanarayana U.* 2013. **Biochemistry,** *4th Edition. Books and Allied (P) Ltd.*
3. *Stryer L.* 2011**. Biochemistry,** *7th Edition. W. H. Freeman and Company, New york.*

REFERENCE BOOKS:

1. *Zubay***,** 1999**. Biochemistry,** *4th edition. William.C.Brain publishers.*

18UMB3SA	SKILL BASED COURSE I - INTRODUCTION TO ENTREPRENEURSHIP	SEMESTER-III

PREAMBLE

The course will impart knowledge on the Concept, roles and responsibilities of Entrepreneurship, Small scale Industries planning and facilities available through Government and NGOs to become entrepreneur.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember and understand the Concept, roles of Entrepreneurship	K1 & K2
CO2	To understand and design different SSU	K2 & K3
CO3	To procure knowledge on planning & raising funds	K2
CO4	To acquaint the Schemes available and roles of Banks	K2
CO5	To think and act as socially responsible entrepreneur.	K3 & K4

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

18UMB3SA	SKILL BASED COURSE I : INTRODUCTION TO ENTREPRENEURSHIP	SEMESTER- III

Total credits: 3

Hours per Week: 3

CONTENTS

UNIT - I

Entrepreneurship – Definition –Concept – Role of entrepreneurs and reasons for growth of entrepreneurship in India. Entrepreneurial scenario in India – Entrepreneurial environment.

UNIT - II

Establishment of Small scale Industries – Generation of project – Project identification – Designing capital structure – Preparation of Project report – Provisional registration of small scale units- Statutory licenses – Applying for Permanent Registration.

UNIT - III

Planning – Characteristics of Planning – Elements of Planning – Advantages and Limitations. Promotion of Venture – Legal requirements – Raising of Funds – Needs of Funds.

UNIT - IV

Financial institutions – Small Industries Development Bank of India (SIDBI) – Industrial Development Bank of India (IDBI) – State Financial Corporation (SFCs) – National Bank of Agricultural and Rural Development (NABARD) – Role of Commercial Banks – Schemes available with Commercial Banks - MSME.

UNIT - V:

Women Entrepreneurship: Introduction, Self Help Group- Functions. Social responsibility of Entrepreneur – Business ethics.

TEXT BOOKS:

1. *Dr. O. P. Gupta.* 2015. **Fundamentals of Entrepreneurship**. *SBPD publications.*
2. *Dr. P. T. Vijayashree and Dr. M. Alagammai*. 2013. **Entrepreneurship and Small Business Management**. *Margham Publications.*

REFERENCE BOOKS:

1. *Donald F. Kuratko.* **Introduction to Entrepreneurship,** 9th Edition, South Western Cengage Learning, 2013.
2. *Mohanty*. **Fundamentals of Entrepreneurship,** Prentice Hall India Learning Private Ltd. 2005.

18UNM34F	NMEC I- MICROBIOLOGY AND PUBLIC HEALTH	SEMESTER - III

PREAMBLE:

The course is designed

1. To create awareness about the nature of diseases and their transmission.
2. To inculcate the importance of health and its values.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept, roles of Epidemiology. Provide basic knowledge about communicable diseases.	K1 & K2
CO2	To know the role of disinfection and sterilization.	K2 & K3
CO3	To procure knowledge on Non communicable diseases.	K2
CO4	To acquaint the principles of food borne diseases and its control.	K2
CO5	Provide awareness regarding personal hygiene and nutritious food for life.	K3 & K4

18UNM34F	NMEC I- MICROBIOLOGY AND PUBLIC HEALTH	SEMESTER - III

Total Credits: 2

Hours per Week:2

OBJECTIVES:

The course is designed

3. To create awareness about the nature of diseases and their transmission.
4. To inculcate the importance of health and its values.

CONTENTS

UNIT - I

Epidemiology – Definition and Aims – Epidemiological Approaches – Mortality – Morbidity – Epidemiological Methods: Descriptive – Analytical – Experimental. Uses of Epidemiology. Communicable Diseases: Introduction, Terminology. Modes of disease transmission, general measures for prevention & control of communicable diseases.

UNIT - II

Disinfection & Sterilization: Effective disinfection by liquid chemical agents like Halogen, Potassium per magnate solution etc. Solid chemical agent – Bleaching powder, Lime.

UNIT - III

Non-Communicable Diseases: Diagnosis & prevention of Cancer, Cardiovascular Diseases and Diabetes.

UNIT - IV

Food borne infection – Salmonellosis, Shigellosis and Hemorrhagic colitis. Food intoxication – *Staphylococcus aureus, Bacillus cereus* and Mycotoxins.

UNIT - V

Personal Hygiene: Factors influencing health & hygiene. Health habits & practice. Maintenance of normal circulation, respiration, digestion etc. Skin care cleanliness. Dental care. Care of hands, hand washing. Exercises-importance. Food values. Nutrition.

TEXT BOOKS:

1. *Park K.* 2013. **Preventive and Social Medicine 22nd Edition,** *Banarsidas Bhanot Publishers.*
2. *Davidson H. Hamer, Jeffrey K. Griffiths, James H Maguire.* **Public Health and Infectious Diseases**. Elsevier Academic Press. 2010.

REFERENCE BOOK:

1. *Robert S Burlage,* 2012. **Principles of Public Health Microbiology,** *Jones and Bartlett Publishers.*
2. *Michael P Doyle and Robert L. Buchanan.* **Food Microbiology: Fundamentals and Frontiers.** Fourth Edition, ASM Press, 2013.

17UFC3FA	பகுதி – 4 : அடிப்படைத்தமிழ் தாள் : 1 (Basic Tamil)	**SEMESTER- III**

இளங்கலை 2017 – 2018 ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது

(10 மற்றும் 12 – ஆம் வகுப்பு வரை தமிழ் மொழிப்பாடம் பயிலாதவர்களுக்கு)
(பருவத் தேர்வு உண்டு)

அலகு : 1. தமிழ் மொழியின் அடிப்படைக் கூறுகள் .

அ) எழுத்துகள் :

- உயிர் எழுத்துக்கள் - குறில் , நெடில் எழுத்துகள்
- மெய் எழுத்துக்கள் - வல்லினம், மெல்லினம், இடையினம்
- உயிர்மெய் எழுத்துக்கள்

ஆ) சொற்களின் வகைகள் : பெயர்ச்சொல், வினைச்சொல் – விளக்கம் (எ.கா.)

அலகு : 2. குறிப்பு எழுதுதல்

- பெயர், முகவரி, பாடப்பிரிவு , கல்லூரியின் முகவரி
- தமிழ் மாதங்கள்(12), வாரநாட்கள்(7),
  எண்கள் (ஒன்று முதல் பத்து வரை), வடிவங்கள்,
  வண்ணங்கள்
- ஊர்வன, பறப்பன, விலங்குகள், மனிதர்களின்
  உறவுப்பெயர்கள்
- இந்திய மாநிலங்கள், நதிகள், தேசத் தலைவர்கள் பற்றிய
  குறிப்புகள்

வினாத்தாள் அமைப்பு முறை மொத்த மதிப்பெண்கள் – 50			
பகுதி –அ	சரியான விடையைத் தேர்வு செய்தல்	10x2=20	அனைத்து அலகுகளில் இருந்தும் வினாக்கள் அமைதல் வேண்டும்
பகுதி –ஆ	அரைப்பக்க அளவில் விடையளிக்க	5x3=15	
பகுதி-இ	இரண்டு பக்க அளவில் விடையளிக்க	1x15=15	

17UFC3FB	பகுதி – 2 : சிறப்புத் தமிழ் தாள் : 1 (Advanced Tamil)	**SEMESTER- III**

இளங்கலை 2017 – 2018 ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது

(10 மற்றும் 12 – ஆம் வகுப்புகளில் தமிழ் மொழிப்பாடம் பயின்றவர்களுக்கு உரியது)

(பருவத் தேர்வு உண்டு)

அலகு – 1: மரபுக் கவிதைகள்

அ)பாரதியார் கவிதைகள்

- தமிழ்நாடு
- மனதில் உறுதி வேண்டும்
- வருகின்ற பாரதம் (பா.எண்.5-8)

ஆ)பாரதிதாசன் கவிதைகள்

- இன்பத்தமிழ்
- நீங்களே சொல்லுங்கள்
- உலக ஒற்றுமை
- வாளினை எடடா!

அலகு – 2 : புதுக்கவிதைகள்

- கம்பன் கவியரங்கக் கவிதை - மு.மேத்தா
- தமிழா! நீ பேசுவது தமிழா! - காசியானந்தன்
- நட்புக் காலம் (10 கவிதைகள்) - அறிவுமதி கவிதைகள்

அலகு – 3 : இலக்கணம்

- வல்லினம் மிகும் மற்றும் மிகா இடங்கள்
- ர, ற, - ல, ழ, ள - ந, ண, ன - வேறுபாடு அறிதல்

அலகு – 4: கடிதங்கள் எழுதுதல்

- பாராட்டுக் கடிதம்
- நன்றிக் கடிதம்
- அழைப்புக் கடிதம்
- அலுவலக விண்ணப்பங்கள்

அலகு – 5: பாடம் தழுவிய வரலாறு

- பாரதியாரின் இலக்கியப் பணி
- பாரதிதாசனின் இலக்கியப்பணி
- மரபுக்கவிதை, புதுக்கவிதை - விளக்கம்

வினாத்தாள் அமைப்பு முறை - மொத்த மதிப்பெண்கள் - 50			
பகுதி –அ	சரியான விடையைத் தேர்வு செய்தல்	10x1=10	ஒவ்வொரு அலகிலும் இரண்டு வினாக்கள்
பகுதி –ஆ	அரைப்பக்க அளவில் விடையளிக்க	5x3=15	ஒவ்வொரு அலகிலும் ஒரு வினா
பகுதி –இ	இரண்டு பக்க அளவில் விடையளிக்க	5x5=25	ஒவ்வொரு அலகிலும் ஒரு வினா
குறிப்பு: பகுதி ஆ மற்றும் இ –க்கான வினாக்கள் இது அல்லது அது என்ற அடிப்படையில் அந்தந்த அலகுகளில் அமைதல் வேண்டும்			

17UFC3FC	PART-IV: YOGA FOR HUMAN EXCELLENCE	SEMESTER – III

Total Credits: 2
Hours Per Week: 2

CONTENTS

UNIT – I

Yoga and Physical Health

1.1 Physical Structure-Three bodies-Five limitations

1.2 Simplified physical Exercise – Hand Exercises – Leg Exercises – Breathing Exercises – Eye Exercises –Kapalapathi

1.3 Maharasanas 1-2 Massages - puncture-Relaxation

1.4 Yogasanas – Padmasana- Vajrasanas-Chakrasanas (side) – Viruchasanas –Yoga muthra – Patchimothasanas – Ustrasanas – Vakkarasanas – Salabasanas

UNIT - II

Art of Nurturing the life force and Mind

2.1 Maintaing the youthfulness –Postponing the ageing process

2.2 Sex and Spirituality – Significancew of sexual vital fluid – Married life Chastity

2.3 Ten stages of Mind

2.4 Mental frequency – Methods for concentration

UNIT - III

Sublimation

3.1 Purpose and Philosophy of life

3.2 Introspection – Analysis of Thought

3.3 Moralization of Desires

3.4 Neutralization of Anger

UNIT IV

Human Resources Development

4.1 Eradication of worries

4.2 Benefits of Blessings

4.3 Greatness of Friendship

4.4 Individual Peace and World Peace

UNIT V

Law of Nature

5.1 Unified force – Cause and Effect system

5.2 Purity of Thought and Deed and Genetic Centre

5.3 Love and Compassion

5.4 Cultural Education – Fivefold Culture

17UFC3FD	PART-IV: WOMEN'S RIGHTS	SEMESTER - III

Total Credits: 2
Hours Per Week: 2

CONTENTS

UNIT- I

Laws, Legal Systems and Change: Definition - Constitutional law, CEDAW and International Human Rights – Laws and Norms – Laws and Social Context – Constitutional and Legal Framework.

UNIT- II

Politics Of Land And Gender In India: Introduction – Faces of Poverty – Land as Productive Resources – Locating Identities – Women's Claims to Land – Right to Property - Case Studies.

UNIT- III

Women's Rights: Access to Justice: Introduction – Criminal Law – Crime Against Women –Domestic Violence – Dowry Related Harassment and Dowry Deaths – Molestation –Sexual Abuse and Rape – Loopholes in Practice – Law Enforcement Agency.

UNIT- IV

Women's Rights: Violence Against Women – Domestic Violence - The Protection of Women from Domestic Violence Act, 2005 - The Marriage Validation Act, 1982 - The Hindu Widow Re-marriage Act, 1856 - The Dowry Prohibition Act, 1961.

UNIT –V

Special Women Welfare Laws: Sexual Harassment at Work Places – Rape and Indecent Representation – The Indecedent Representation (Prohibition) Act, 1986 - Immoral Trafficking – The Immoral Traffic (Prevention) Act,

1956 - Acts Enacted for Women Development and Empowerment - Role of Rape Crisis Centers.

REFERENCES BOOKS:

1. *Nitya Rao.* 2008. "**Good Women do not Inherit Land**" Social Science Press and Orient Blackswan.
2. *International Solidarity Network* , 2006 ,"**Knowing Our Rights**" An imprint of Kali for Women.
3. *Kaushik. P.D*. 2007. **"Women Rights"** Bookwell Publication.
4. *Aruna Goal.* 2004. "**Violence Protective Measures for Women Development and Empowerment.**" Deep and Deep Publications Pvt.
5. *Monica Chawla.* 2006. "**Gender Justice"**. Deep and Deep Publications Pvt Ltd.
6. *Preeti Mishra.* 2007. "**Domestic Violence Against Women**". Deep and Deep Publications Pvt.
7. *ClairM.Renzetti, Jeffrey L.Edleson*, and *Raquel Kennedy Bergen*. 2001. Source Book on "**Violence Against Women**". Sage Publications.

17UFC3FE	PART-IV: CONSTITUTION OF INDIA	SEMESTER – III

Total Credits: 2

Hours Per Week: 2

CONTENTS

UNIT I

Making of Constitution - Constituent Assembly- Dr.RajendraPrasath- Dr.B.R.Ambedkar - Salient features - Fundamental Rights.

UNIT II

Union Executive - President of India - Vice-President - Prime Minister - Cabinet - Functions

UNIT III

Union Legislature - Rajiya Sabha - Lok Sabha - Functions and Powers

UNIT IV

Union Judiciary - Supreme Court - Functions - Rule of law

UNIT V

State - Executive - Legislature – Judiciary – Role of Tamilnadu Public Service Commission.

REFERENCE BOOKS:

1. *Agharwal.R.C.* 1977, **National Moment and Constitutional Development.** New Delhi.
2. *Chapra B.R.,* 1970,**Constitution of India.** New Delhi.
3. *Rao B.V*, 1975**. Modern Indian Constitution.** Hyderabad.
4. *Nani Palkhivala* ,1970, **Constitution of India**, New Delhi.
5. *Krishna Iyer, V.R.*, 2009, **Law and Justice**. New Delhi.
6. Reference Manual from the Govt. of Tamilnadu

17UMBSS1	SELF STUDY PAPER I- GOOD LABORATORY PRACTICES	SEMESTER III

PREAMBLE:

1. To provide knowledge in the principles of Good Laboratory Practices (GLP) and understanding in the requirements and its regulations.
2. To apply these principles successfully in a laboratory setting and to correctly analyse, interpret and report laboratory data.

COURSE OUTCOME:

On successful completion of the course, students will be able to

CO number	CO Statement	Knowledge Level
CO1	Understand the requirements of laboratory safety, handling and disposal of wastes.	K1, K2 & K3
CO2	To create awareness on the highly specific requirements and intent of GLP regulation	K1 & K2
CO3	Infer the knowledge of regulatory agencies and its importance in Microbiology	K1 & K2
CO4	To acquaint the requirements for Personnel and instrumentation resources in the laboratory.	K1, K2 & K3
CO5	Explain the imporatnce of calibration of laboratory instruments and apparatus.	K1 & K2

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UMBSS1	SELF STUDY PAPER I- GOOD LABORATORY PRACTICES	SEMESTER III

Total credits: 1

OBJECTIVES:

1. To inculcate the knowledge on proper and safe handling of hazardous materials in the laboratory.
2. To understand the role of GMPs.

CONTENTS

UNIT - I

Chemical Labelling & Safety - Safe handling of chemicals and equipment in the laboratory. Handling and disposal of infected, dangerous materials, accidents, safety measures, emergency treatment.

UNIT - II

Good Manufacturing Practice - Good Laboratory Practices (GLPs)- Fire Safety Regulatory Agencies.

UNIT - III

International and federal regulatory agencies that impact the work of Microbiology.

UNIT - IV

Emergency Equipment & Standard Operating Procedures – Maintenance of emergency equipment in a laboratory setting - evaluating Standard Operating Procedures (SOPs) and safety plans.

UNIT - V

Calibration of volumetric and gravimetric equipment and apparatus.

TEXT BOOKS:

1. *Mark Gregory Slomiany*. **The indispensable guide to Good laboratory practices**. *Second edition.*
2. *Sandy Weinberg*. **Good Laboratory Practice Regulations**, *Fourth Edition. CRC Press.*

REFERENCE BOOKS:

1. *Jurg P Seiler.* **Good Laboratory Practice.** Second Edition. Springer Publishers, 2005.
2. *Mindy J. Allport Settle.* **Good Laboratory Practice – Nonclinical Laboratory Studies Concise Reference.** Pharma Logika 2010.

17UMBSS2	SELF STUDY PAPER II - FOOD SANITATION	SEMESTER III

PREAMBLE:

1. To understand the laws and regulations related to food standards.
2. To widen the knowledge on hygiene and sanitation on food preparation.

COURSE OUTCOME:

On successful completion of the course, students will be able to

CO number	CO Statement	Knowledge Level
CO1	Understand the laws and regulations related to food standards.	K1, K2 & K3
CO2	Explain the health defects due to food additives and adulterants.	K1 & K2
CO3	Familiarise the hygienic and sanitary measures in food sector.	K1 & K2
CO4	Introduce the knowledge about international food regulatory bodies and their responsibilities.	K1, K2 & K3
CO5	Explain the role of state regulatory bodies in promoting food safety.	K1 & K2

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UMBSS2	SELF STUDY PAPER II - FOOD SANITATION	SEMESTER III

Total credits: 1

OBJECTIVES:

3. To understand the laws and regulations related to food standards.
4. To widen the knowledge on hygiene and sanitation on food preparation.

CONTENTS

UNIT - I

Food Laws and Regulations – Essential commodities Act, Standards of Weights and Measures Act, Agmark, Bureau of Indian Standards, Export and Quality Control, Prevention of Food Adulteration Act.

UNIT - II

Food additives and contaminants, food colours flavouring agents and related substances, sweeteners, preservatives, antioxidants, emulsifying and stabilizing agents, antimicrobial substances, -Indirect additives, residues, contaminants and adulterants, pesticide residues, contaminants from packaging material, Metallic contaminants , adulterants Irradiated Food.

UNIT - III

Hygiene and sanitation in food sector – pest control measures, Garbage and Sewage disposal, Water – Sources, purification, Hazards Analysis & Critical Control Point (HACCP), Good Manufacturing Practices (GMP) .

UNIT - IV

International Organizations – FAO (Food & Agriculture Organization), WHO(World Health Organization), Codex Alimentaruis, ISO, WTO.

UNIT - V

National Organizations – ICMR, ICAR, Council for social welfare, Ministry of Health & Family Welfare – delivery Health Services in India.

TEXT BOOKS:

1. *Julie Lewthwaite*. **Introduction to Food Safety**. *Lulu Press Inc.*
2. *Norman Marriott, Gill Robertson*. **Essentials of Food Sanitation**. *Springer Science & Business Media.*
3. *S Roday*. **Food Hygiene and Sanitation**. *Tata McGraw-Hill Education.*

REFERENCE BOOK:

1. *Norman G. Marriott, M. Wes Schiling & Robert B. Gravani.* **Principles of Food Sanitation.** Sixth Edition, *Springer Publications*, 2018.
2. *Sunetra Roday*. Food Hygiene and Sanitation, Second Edition. *Tata McGraw- Hill Publishers,* 2011.

17UMB43A	CORE IV- BIOINSTRUMENTATION	SEMESTER IV

PREAMBLE

The subject aims to build knowledge on

1. Concept of buffers, pH and biochemical calculations
2. Instrumental aspects in microbiology
3. Separation, Purification & Quantification of Biomolecules.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	• Describe the properties of Buffers. • Calculate different concentration units of solutions. • Understand the working principle of pH electrodes. • Determine the pH of samples using pH meter.	K2
CO2	• Demonstrate the use of instruments to maintain sterility and aseptic transfer of microbial cultures. • Use of instruments to preserve microorganisms. • Use of instruments to mix and blend substances.	K3
CO3	• Understand the core principles of Centrifugation. • Describe the features and components of major types of centrifuges.	K2

	• Illustrate how centrifugation methods are utilized for bioanalysis.	
CO4	• Estimate the concentration of an unknown colored solution using colorimetry. • Explain the basic principles of spectrophotometer. • Demonstrate how to measure concentration by a UV Visible spectrophotometer.	K3, K4
CO5	• Become familiar with fundamental concepts of chromatography and their role in achieving separations across different types of chromatography. • Develop the core skills and identify the key factors influencing in Electrophoresis.	K2, K3

MAPPING WITH PROGRAMME OUTCOMES

CO5/ PO5	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S-Strong, M-Medium, L-Low

17UMB43A	CORE IV- BIOINSTRUMENTATION	SEMESTER - IV

Total Credits: 4

Hours per week: 4

CONTENTS

UNIT - I

pH meter - Instrumentation - pH electrodes - calomel and glass electrode – Applications. Buffers - Types of Buffers. Preparation of solutions - Molarity and Normality- Calculation methods.

UNIT - II

Principle, Instrumentation, and Applications of Autoclave, Hot air oven, Incubator, Laminar air flow, metabolic shaker, Lyophilizer. Biosafety cabinets – Introduction and types.

UNIT - III

Centrifugation: Principle- Types of Centrifuges –Low speed, High speed, Microfuge-Ultra centrifuge- Analytical and Differential Centrifuge- Applications.

UNIT - IV

Colorimetry- Principle, Instrumentation and Applications- Spectrometry – UV & Visible Spectrophotometer. Spectrofluorimeter.

UNIT - V

Chromatography– Paper, Thin layer, Column, Ion-exchange, Gas and HPLC. Electrophoresis –SDS – PAGE and Agarose gel electrophoresis.

TEXT BOOKS:

1. *L Veerakumari.* 2011. **Bioinstrumentation,** *1st Edition. MJB Publishers.*
2. *Keith Wilson and John Walker*. 2010. **Principles and Techniques of Biochemistry and Molecular Biology.** *Cambridge University Press. UK.*

REFERENCE BOOKS:

1. *Gedder , A. and L. E. Balser*, **Principles of applied Biomedical instrumentation.** *John Wiley and Sons Publications.*
2. *Dean, Willard and Merrit*. **Instrumental Methods of analysis** *Asian Ed.*
3. *Boyer, Rodney, F. Benjamin and Cummins*, **Modern Experimental Biochemistry** 2 Edi.

17UMB43P	CORE PRACTICAL - IV	SEMESTER - IV

Total credits: 2

Hours per week: 4

CONTENTS

1. P reparation of Buffers-Acidic, neutral and alkaline range

2. Preparation of Normal solutions-0.1 N and 1N

3. Preparation of Normal solutions-0.1 M and 1M

4. Measurement of pH -pH meter

5. Extraction and quantification of Pigments from Plants

6. Extraction and quantification of Pigments from bacteria

7. Density Gradient Centrifugation – Sucrose Gradient

8. Estimation of Protein-Lowry *et al* method

9. Estimation of sugars-DNSA method

10. Separation of amino acids-Paper Chromatography

11. Separation of amino acids-Thin Layer Chromatography

12. Agarose Gel Electrophoresis-Demonstration

LAB MANUALS:

1. *Aneja. K.R*. 2012. **Experiments in Microbiology, plant pathology and biotechnology,** *4th Edition. New age publishers.*
2. *James.C.Cappuccino.* 2013. **Microbiology A laboratory manual**. *1st edition, Pearson education publishers.*
3. *Rajan S. and Selvi Christy.* **Experimental Procedures in Life Sciences**. *Anjana book House.*
4. *Kannan,N*. 1997. **Laboratory Manual of General Microbiology,** *1st edition, Panima Publishing*

17UBC4AB	ALLIED IV- BIOCHEMISTRY - II	SEMESTER - IV

PREAMBLE:

1. This course provides an overview of information related to carbohydrate, fat, and nucleic metabolism that takes place in our body.
2. Students can gain basic knowledge and key understanding on Enzyme classification, specificity, kinetics and regulation.

COURSE OUTCOME:

On successful completion of the course, students will be able to

CO number	CO Statement	Knowledge Level
CO1	Illustrate what happens during glycolysis, glycogenesis, and glycogenolysis. Explain the events that make up the process of TCA cycle, pentose phosphate pathway and HMP shunt.	K1, K2 & K3
CO2	Understand the chemical logic of lipid metabolic pathways.	K1 & K2
CO3	Explain how nucleic acids are synthesized and degraded. Demonstrate a model for DNA replication.	K1, K2 & K3
CO4	Define and classify enzymes. Explain active site and specificity of enzymes. Illustrate kinetics of enzyme catalysis.	K1, K2 & K3
CO5	Compare and contrast different types of enzyme inhibition.	K1 & K2

MAPPING WITH PROGRAMME OUTCOMES

CO5/ PO5	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S-Strong, M-Medium, L-Low

17UBC4AB	ALLIED IV- BIOCHEMISTRY - II	SEMESTER - IV

Total Credits: 2

Hours per Week: 3

CONTENTS

UNIT - I

Carbohydrate metabolism: Glycolysis- The citric acid cycle and regulation. The pentose phosphate pathway & its importance. Glycogenesis and Glycogenolysis

UNIT – II

Lipid metabolism: α , β, γ - Oxidation of fatty acids: Saturated and unsaturated – Biosynthesis of Lipids: Triacylglycerols, Glycerophospholipids and Cholesterol.

UNIT - III

Nucleic acid metabolism: Biosynthesis of Purines and Pyrimidines. Synthesis, Replication and Degradation of DNA and RNA.

UNIT - IV

Enzymes Classification & nomenclature. Specificity of Enzymes. Active site- Overview of Coenzymes and cofactors in enzyme catalyzed reaction.- - Enzyme Kinetics - factors affecting enzyme activity, Michaelis- Menten plot, Lineweaver-Burk plot.

UNIT – V

Enzyme regulation - Enzyme inhibition – Reversible - competitive, noncompetitive, uncompetitive and mixed inhibition- irreversible inhibition.

TEXT BOOKS:

1. *Deb A.C.* (2001). **Fundamentals of Biochemistry,** *9th edition, New Central Book Agency, Kolkatta.*

2. *Chatterjea M. N.* (2012)**, Textbook of Medical Biochemistry,** *8th edition, Jaypee Brothers, New Delhi.*

3. Palmar, T., 2001. **Understanding enzymes,** *1st edition, Horwood publishing house, Chichesper.*

4. *Asokan, P.* 2006. **Enzymes**, *1st edition, Chinnaa publications.*

5. *Sathyanarayana U.* 2013. **Biochemistry,** *4th Edition. Books and Allied (P) Ltd.*

REFERENCE BOOKS:

1. *Nelson, D.L., Cox, M.M.* 2008. Lehninger **Principles of Biochemistry**, *5th edition, W.H. Freeman and Company, New York.*

2. *Murray R.K., Granner D.K, Mayes P.A and Rodwell U. W.,* (2015)**, Harper's Biochemistry,** *30th edition, Lange Medical Publications*.

3. Price, N.C. and Stevens, L., 1999. **Fundamentals of Enzymology**, *3rd edition, Oxford University Press.*

17UBC4AP	ALLIED PRACTICAL II - BIOCHEMISTRY	SEMESTER- IV

Total Credits: 2

Hours per Week: 4

CONTENTS

1. **Analysis of Carbohydrates:**
   a. Monosaccharide - Pentose- Arabinose. Hexoses- Glucose, Fructose,
   b. Disaccharides - Sucrose, Maltose and Lactose
   c. Polysaccharide - Starch.

2. **Analysis of Amino acids:**
   a. Histidine
   b. Tyrosine.
   c. Tryptophan
   d. Arginine

3. **Characterization of lipids**
   1. Determination of acid number.
   2. Determination of iodine number.

4. **Quantification technique**
   a. Quantification of Protein by Lowry *et al* method
   b. Quantification of Carbohydrate by DNSA method

REFERENCE BOOKS:

1. *D.T. Plummer*, (2006), **An Introduction to Practical Biochemistry,** *3rd edition, TMH, New Delhi.*
2. *Pattabiraman T. N and Sitarama Acharya U.* (2015)**. Laboratory Manual in biochemistry,** *4th Edition. All India Traveller Book Seller.*
3. *J Jayaraman, (*2015)**. Laboratory manual in Biochemistry.** *5th Edition. New Age International (P) Ltd.*

17UMB4SA	SKILL BASED COURSE II : ENTREPRENEURIAL MICROBIOLOGY	SEMESTER - IV

PREAMBLE

To augment the ideas of the production of microbial products, techniques, trouble shooting and their role in improving economy.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	• Describe the microbial products that are having rich nutritive and commercial value • Discuss different types of yeast and their applications • Familiarize the fermented food products .	K1,K2
CO2	• Teach variety of enzymes and their beneficial aspects • Demonstrate large scale production of enzymes • Route map for industrial application of enzymes	K1,K3
CO3	• Explain the mushroom cultivation techniques • Acknowledge the variety of mushroom and their characterization • Review the protocol for mushroom cultivation	K2,K3
CO4	• Teach the historical aspects of bio fertilizer	K3,K1

	• Illustrate different types of bio fertilizer • Describe the organic farming and their importance	
CO5	• Describe about the media formulation • Interpret the involvement of microbes in the production of industrially important products • Augments the knowledge in alcohol production	K2, K3

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UMB4SA	SKILL BASED COURSE II- ENTREPRENEURIAL MICROBIOLOGY	SEMESTER - IV

Total credits: 3

Hours per Week: 3

CONTENTS

UNIT - I

Introduction, Opportunities and challenges in entrepreneurial microbiology:

Microbial cells as fermentation products- Baker's yeast, food and feed yeasts, Bacterial Insecticides, Legume Inoculants, Algae. Yeast - microscopic observation of yeast, isolation and production, Commercial application of yeast products, preservation techniques followed in yeast products.

UNIT - II

Enzymes as fermentation products- Bacterial and Fungal Amylases, Proteolytic Enzymes, Pectinases. Penicillin structure and types, antibiotics application in food industry, Aseptic techniques followed in food industry.

UNIT - III

Mushroom cultivation and Composting- Cultivation of *Agaricus campestris*, *Agaricus bisporus,* and *Volvariella volvaciae;* Preparation of compost, filling tray beds, spawning, maintaining optimal temperature, casing, watering, harvesting, storage.

UNIT - IV

Biofertilizers - Historical background, Chemical fertilizers versus biofertilizers, organic farming. *Rhizobium* sp, *Azospirillum* sp, *Azotobacter* sp, Azolla, PGPR as Biofertilizers.

UNIT - V

Brewing- Media components, preparation of medium, Microorganisms involved, maturation, carbonation, packaging, keeping quality, contamination, Aging, by products. Production of Industrial alcohol. Pre and pro biotic definition, role, large scale production and side effects

TEXT BOOKS:

1. Dimitris Charalampopoulos, Robert A. Rastall, 2009 **Prebiotics and Probiotics Science and Technology**, *Volume 1, Springer Science & Business Media, pp - 1262*

2. Koen Venema and Ana Paula do Carmo -Editors, 2015. **Probiotics and Prebiotics: Current Research and Future Trends** .

3. Handbook of Probiotics and Prebiotics, 2009, Second Edition, Edited by YUAN KUN LEE and SEPPO SALMINEN , *published by John Wiley & Sons.*

17UMB53A	CORE V- MICROBIAL GENETICS	SEMESTER – V

PREAMBLE:

To familiarize the concept of genetic material, Storage of genetic information, expression of genetic information, heritable transfer of genetic information and mutation of genes for the better understanding of genetic constitution.

COURSE OUTCOMES

On the successful completion of the course, students will be able

CO Number	CO Statement	Knowledge level
CO1	To understand the concept of genetic material and its replication.	K_2,K_3
CO2	To describe the principle behind transcription, protein synthesis and genetic code.	K_2
CO3	To categorize the mutational types, significance of mutation in recombinantion and repair mechanism.	K_2
CO4	To be familiar with microbial recombination.	K_4,K_2
CO5	To distinguish constitutive and inducible enzymes and their expression.	K_2, K_3

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong,M-Medium,L-Low

17UMB53A	CORE V- MICROBIAL GENETICS	SEMESTER – V

Total Credits: 4

Hours per Week: 4

CONTENTS

UNIT-I

DNA: DNA as genetic material - Structure of DNA and RNA - DNA Replication: Semiconservative, enzymology and mechanism.

UNIT-II

Transcription - Genetic Code: Organization of the code, Establishment of genetic code - Translation – Initiation, Elongation and Termination – Protein splicing.

UNIT-III

Mutation – definition, types – silent, missense, non – sense, insertion, deletion, substitution - spontaneous and induced. Repair – light – dark – SOS –Recombinant.

UNIT-IV

Bacterial Genetics (Mutant phenotype, DNA mediated Transformation; Conjugation (Cointegrate Formation and Hfr Cells, Time–of–Entry Mapping, F' Plasmid); Transduction (Generalized transduction, Specialized Transduction) - gene mapping.

UNIT-V

Molecular Mechanism of gene regulation in prokaryotes - Lac, Trp, Ara operons. Eukaryotic gene regulation – important differences in the genetic organization of Prokaryotes and Eukaryotes – Gene rearrangement. Yeast mating type.

TEXT BOOKS:

1. *Prescott, Harley, Klein.* 2002. **Textbook of Microbiology,** *5th Edition. McGraw Hill Education.*
2. *Gardner, E. J,Simmons, M J& D P Snustard* . 1991, **Principles of Genetics**, *8th edition. John Wiley &Sons.NY.*
3. *Freifelder .S.* 1987. **Microbial Genetics**, *1st Edi. Jones & Bartlett, Boston.*
4. *Robert H. Tamarin.* 1992. **Principles of Genetics**, *7th edition, Cm Brown Publishers.*

REFERENCE BOOKS:

1. *David Freofelder.* 1996. **Essentials of Molecular Biology**, *2nd Edition.*
2. *Lewin.B,* 1990. **Genes**, *1st edition, Oxford University Press.*
3. *Klug .W.S. & Cummings, MR*. 1996, **Essentials of Genetics**, *Mentics Hail. NewJersey.*

17UMB53B	CORE VI- IMMUNOLOGY	SEMESTER – V

PREAMBLE:

The aim of the course is

- To develop knowledge among students about the immune system, its interaction with pathogens and
- Responses to stimulation and vaccines.

COURSE OUTCOMES

On the successful completion of the course, students will be able

CO Number	CO Statement	Knowledge level
CO1	Understand the process of inflammation and immunity.Recognise the importance of cell and organs of the immune system.	K1 and K2
CO2	Define the cellular pathways of humoral/cell-mediated adaptive responses.	K2 and K3
CO3	Compare the four types of hypersensitivity for the Immunologic mechanism involved.	K2,K3 and K4
CO4	Detailed knowledge in diagnostic and therapeutic techniques and research.	K2 and K3
CO5	Understand the consequences of general types of immunodeficiency diseases and organ transplantation.	K2 and K3

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong,M-Medium,L-Low

17UMB53B	CORE VI- IMMUNOLOGY	SEMESTER – V

Total Credits: 4

Hours per Week: 4

CONTENTS

UNIT- I

History and Scope of Immunology. The basis of defense mechanisms. Cells and Organs involved in immune system.

UNIT- II

Types of immunity, Antigen and Antibody types, Complement pathways - Classical, alternate and lectin pathway. Immunoglobin – structure, Isotypes, and functions.

UNIT- III

Allergy and Hypersensitivity - Classification types and Mechanisms. Autoimmunity mechanisms and autoimmune response diseases: cell specific: Systemic Lupus Erythematosis and Organ Specific: Myasthenia Gravis.

UNIT –IV

Antigen-Antibody reactions - Agglutination: Direct, indirect, RPR and Hemaaglutination. Precipitation: Double Immuno Diffusion. ELISA. Radio immune assay (RIA). Monoclonal antibodies and its applications.

UNIT –V

Immuno hematology - Blood transfusion - ABO grouping - Rh factor. Tissue transplantation - HLA typing - Mechanism of acceptance and rejection. Immunodeficiency disease: AIDS.

TEXT BOOKS:

1. *NandhiniShetti,* 2009. **Immunology, an Introductory Text Book**. *1st edition. New Age International Limited.*
2. *Tizard, I R.* 1998. **Immunology an Introduction**, *4th edition. Thomson publishers, Australia.*

REFERENCE BOOKS:

1. *Roitt, IM.* 2011. **Immunology***1st edition. Mosboy Publishers.*
2. *Kuby.J.* 2002. **Immunology***5th edition. W.H.Freeman, NY*.
3. *Rao C. V.* 2002, **An Introduction to Immunology**, *Narosa Publishing House, Chennai.*

17UMB53C	CORE VII- FOOD MICROBIOLOGY	SEMESTER -V

PREAMBLE

This course has been designed for students to learn and understand

- To know the types of microorganisms and their role in food and factors disturbing microbes
- To understand the role of microbes in fermented food product
- To acquire the knowledge on food borne illness and diseases by various microbes and hazards

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge level
CO1	To understand the relation between the food and microbes and types of microorganisms in related to food.	K2, K3
CO2	To understand the role of microbes involved in production of various fermented food.	K3
CO3	To acquaint the knowledge on spoilage of various types of food by microbes.	K3
CO4	To describe the characteristics food infections and poisoning.	K3
CO5	To impart the knowledge on nonbacterial food borne illness.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UMB53C	CORE VII- FOOD MICROBIOLOGY	SEMESTER –V

Total credits: 4

Hours per week: 4

CONTENTS

UNIT – I

Food and Microorganisms – Important microorganisms in food (List of Bacteria, Mold and yeasts); Factors affecting the growth of microorganisms in food – pH, moisture, oxidation – Reduction potential, Nutrient content and Inhibitory substances and biological structure.

UNIT - II

Elementary knowledge on Fermented & Semi fermented food – Bread, pickle, fermented fish and meat products – Fermented dairy products – Yoghurt and cheese. Fermented beverages: Wine and beer.

UNIT -III

Spoilage and preservation of food - vegetables, fruits, Meat, Fish, Poultry, egg and milk – canned foods.

UNIT – IV

Bacterial Food borne diseases – Food poisoning and Food borne infections – *Salmonella, E.coli, Staphylococcus, Clostridum, Listeria, Shigella, Campylobacter, Yersinia, Vibrio, Aeromonas, Mycobacterium and Bacillus.*

UNIT- V

Non Bacterial Food borne illness: Mycotoxins, Parasites, Viruses, Biohazards and other hazards - Investigation of food poisoning outbreaks.

TEXT BOOKS:

1. *Frazier. W.C and D.C Westhoff.* 1978. **Food Microbiology**. *3rd ed. Tata Macgraw Hill publishing Co., New Delhi.*
2. *Adams M.R. and Moss M. O.,* 2000. **Food Microbiology***2nd edition. Panima Publishers.*

REFERENCE BOOKS:

1. *Roger.Y.Stainer*. 2003. **Basic Food Microbiology**. *2nd edition, CBS Publishers.*
2. *Jay,J.M* . 1991. **Modern Food Microbiology***4th edition. Van Nostra and Rainhokdd Co.*

17UMB53D	CORE VIII- MEDICAL MICROBIOLOGY - I	SEMESTER V

PREAMBLE

To comprehend the concept of infections, types, infectious disease process, morphology, pathogenicity and laboratory diagnosis of medically important microorganisms.

COURSE OUTCOMES

On the successful completion of the course, students will be able

CO Number	CO Statement	Knowledge level
CO1	To define the concept of infection, types and infectious disease process.	K_1, K_2
CO2	To classify the morphology, cultural characteristics, pathogenesis of gram positive cocci.	K_2, K_4
CO3	To identify and classify the gram positive and negative.	K_2, K_3
CO4	To infer the morphology, cultural characteristics, pathogenesis of gram negative rods.	K_2
CO5	To demonstrate the importance of Mycobacterium, Spirochete and Leptospira.	K_2, K_3

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UMB53D	CORE VIII- MEDICAL MICROBIOLOGY - I	SEMESTER- V

Total Credits: 4

Hours per week: 4

CONTENTS

UNI T- I

Infections- sources of infections- Types of infections- methods of infections -Definitions- Epidemic, Pandemic, Endemic diseases- Epidemiology of Infectious diseases, Infectious diseases cycle- Investigation of epidemics- control ofepidemics. Nosocomial infections.

UNIT-II

Morphology, Pathogenicity and laboratory diagnosis- Gram positive & negative coccus- Staphylococcus aureus, Streptococcus pyogenes, Micrococcus, Enterococcus, Pneumococcus, Neisseriagonorrhea and Neisseria meningitidis, Hemophilusinfluenzae.

UNIT- III

Morphology, Pathogenicity and laboratory diagnosis- Gram positive organisms-Bacillus anthracis, Corynebacteriumdiptheriae, Clostridiumbotulinum, Clostridiumtetani, Listeria monocytogenes.

UNIT -IV

Morphology, Pathogenicity and laboratory diagnosis- Gram negative Organisms -Escherichia coli, Klebsiella, Proteus, Salmonella, Shigella, Pseudomonas, Vibriocholerae.

UNIT-V

Morphology, pathogenicity and laboratory diagnosis- Mycobacteriumtuberculosis, Mycobacterium leprae, Treponemapallidum, Leptospira.

TEXT BOOKS:

1. *Ananthanarayanan R and CK JayaramPanicker*, 1994, **Textbook of Microbiology.***Orient Longman*.
2. *Chakraborty P* 1995, **A Text book of Microbiology**, *New Central Book Agency PvtLtd. Calcutta.*

REFERENCE BOOKS:

1. *Bailey and Scotts*, 1994, **Diagnostic Microbiology**, *9th edition, Baron and Finegold CVMosby Publications.*
2. *Jawetz E Melnic JL and Adel berg EA* 1998, **Review of Medical Microbiology.** *LangeMedical Publications, USA.*
3. *MackieandMcCatney*,1994,**MedicalMicrobiologyNoIandII**.*ChurchillLivingston,14th edition.*

17UMB53P	CORE PRACTICAL –V	SEMESTER- V

Total Credits: 3

Hours per Week: 6

CONTENTS

1. DNA Extraction from Bacteria.
2. Plasmid Extraction.
3. Separation of DNA by Agarose electrophoresis (Under DBT Star Scheme).
4. Isolation of drug resistant mutants using UV – Gradient plate and Replica plating
5. Ames test
6. Slide agglutination -Blood grouping
7. Tube agglutination- WIDAL
8. Precipitation – Ouchterlony'sImmunodiffusion
9. Flocculation - RPR
10. DOT ELISA
11. Separation of proteins by SDS – PAGE (Under DBT Star Scheme).
12. Processing of Clinical samples – Urine, Pus, Blood, Sputum
13. Isolation and Identification of clinical pathogens – *Staphylococcus aureus, Streptococcus pyogenes, Escherichia coli, Klebsiellapneumoniae, Proteus, Salmonella, Shigella* and Pseudomonas.
14. Milk Quality Test – MBRT
15. Isolation and identification of microbes from spoiled foods – Bacteria and Fungi (Under DBT Star Scheme)

LABORATORY MANUALS:

1. *Maniatis, T. Tritsch E F and Sambrook J,* 2010. **Molecular Cloning. A Laboratory Manual.***Cold Spring Harbor Laboratory, New York.*
2. *Rajan S. and Selvi Christy.***Experimental Procedures in Life Sciences**. *Anjana book House.*
3. *Aneja. K.R.* 2012. **Experiments in Microbiology, Plant Pathology and Biotechnology**, *2nd edition, New age publishers.*

REFERENCE BOOKS:

1. *Jeffrey H. Miller,* 1972. **Experiments in Molecular genetics.***Cold Spring Harbor Laboratory, New York.*
2. *Kannan N.,* 1997. **Laboratory Manual of General Microbiology**, *2nd ed. Panima Publications.*

17UMB5EA	ELECTIVE I- RECOMBINANT DNA TECHNOLOGY	SEMESTER – V

PREAMBLE

- To impart knowledge on the basic aspect of Restriction-Modification system and its probable use in r-DNA technology.
- To utilize the basic knowledge in the development of recombinant genetic material.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand what a Restriction Modification system is and classify them based on their mode of action.	K2, K3
CO2	Outline the principle and procedure of Isolation and Purification of DNA and RNA.	K2, K3
CO3	Appraise the knowledge about different types of Vectors.	K2, K3
CO4	Understand the theoretical principles behind Gene transfer techniques.	K2, K3
CO5	Understand the principles behind DNA amplification.	K2, K3

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UMB5EA	ELECTIVE I - RECOMBINANT DNA TECHNOLOGY	SEMESTER – V

Total Credits: 4

Hours per week: 4

CONTENTS

UNIT - I

Restriction Modification System in prokaryotes –Gene manipulation – Restriction Enzymes (Endonuclease and Exonuclease), ligases and methylases– Discovery, types and mode of action– Prokaryotic Polymerases –DNA & RNA polymerases.

UNIT - II

Isolation and Purification of DNA (Chromosomal and Plasmid)-Isolation and Purification of RNA - Chemical Synthesis of DNA - Genomic Library and cDNA Library.

UNIT - III

Vectors – Plasmid based Vectors - Natural vectors – pSC101, pSF2124 and pMB1. Artificial vectors - pBR322 &pUC. Phage based Vectors- ʎ phage Vectors. Hybrid Vectors - Phagemid, Phasmid and Cosmid, BAC and YAC – capacity of each vectors in transformation.

UNIT - IV

Gene Transfer Techniques – Biolistic Method, Calcium chloride, electroporation and DEAE Methods. Screening and Selection of recombinants - Direct Method –Antibiotic screening - Selection by Complementation - Marker inactivation Methods. Indirect Methods - Immunological and Nucleic acid hybridization.

UNIT - V

Amplification of recombinant DNA - PCR - DNA Sequencing (Sanger's Method) –Methods in Molecular cloning - Blotting (Southern, Western, Northern) Techniques - RFLP - RAPD –DNA Microarray analysis.

TEXT BOOKS:

1. Brown TA. (2010). **Gene Cloning and DNA Analysis**. 6th edition. Blackwell Publishing, Oxford, U.K.
2. Primrose SB and Twyman RM. (2006). **Principles of Gene Manipulation and Genomics**, 7th edition. Blackwell Publishing, Oxford, U.K
3. Sambrook J and Russell D. (2001). **Molecular Cloning-A Laboratory Manual**. 3rd edition. Cold Spring Harbor Laboratory Press

REFERENCE BOOKS:

1. *Winnecker, E.D,* 1987. **From Gene to Clones**, *Introduction to Gene Technology, 1 st edition. Panima educational book agency.*
2. *Glick B .R and Pasternak J .J* .1994. **Molecular Biotechnology**. **Principles and Application of recombinant DNA**, *2 nd edition. ASM Press, Washington.*
3. Wiley JM, Sherwood LM and Woolverton CJ. (2008). **Prescott, Harley and Klein's Microbiology**. McGraw Hill Higher Education
4. Primrose SB and Twyman RM. (2008). **Genomics: Applications in human biology**. Blackwell Publishing, Oxford, U.K.

17UMB5SA	SKILL BASED COURSE III- FOOD QUALITY CONTROL AND FOOD PRESERVATION	SEMESTER - V

PREAMBLE

This course has been designed for students to learn and understand

- To get the knowledge about wide variety of parameters affecting food safety
- To understand the quality food manufacturing & food safety regulations act
- Acquire skills in methods of food preservation.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge level
CO1	Understand the principles of food safety and sanitation.	K1
CO2	Interpret the knowledge on GMP, SSOP and HACCP and their Principles.	K2, K3
CO3	Describe about the food laws and laboratory. sampling, various food safety policies in food industry	K3
CO4	Understand the principles of food preservation.	K2
CO5	Describes the preservation of food by low temperature, drying and chemical preservatives.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong,M-Medium,L-Low

17UMB5SA	SKILL BASED COURSE III- FOOD QUALITY CONTROL AND FOOD PRESERVATION	SEMESTER – V

Total credits: 4

Hours per week: 4

CONTENTS

UNIT-I

Principles of food safety–Establishment: design and facilities –emergency preparedness –Maintenance cleaning and sanitation–personal hygienic–packaging and labeling– transportation– traceability–recall procedure.

UNIT -II

Codex Alimentarius –GMP -SSOP, HACCP-principles–Hazard analysis–determine CCP–establish critical limit–establish monitoring procedure–establish corrective action–recordkeeping–verification –HACCP plan chart. Food Adulteration: Intentional and unintentional.

UNIT -III

Food Laws: FSSAI, Essential Commodities Act, BIS, organizational chart – prohibition and regulation of sales – Scope and objective of industry – food safety policy – environmental policy Glass policy – jewelry policy– visitor policy. Laboratory and sampling analysis.

UNIT -IV

Principles of food preservation – General principles and application methods – Asepsis - Techniques of removal – use of high temperature preservation and Canning Process.

UNIT -V

Preservation by use of low temperature, Drying, chemical preservatives and Radiation.

TEXT BOOKS:

1. *Frazier. W.C and D.C Westhoff*. 1978. **Food Microbiology. 3rd ed.***TataMacgraw Hill Publishing Co., New Delhi.*
2. *Adams. M. R and M. D Moss*. 1995. **Food Microbiology**. *5th Edition. New Age International limited.*

REFERENCE BOOKS:

1. Food safety and standards regulations, 2010.
2. *Jay,J.M* .1991. **Modern Food Microbiology***4th edition, Van Nostra and Rainhokdd Co.*
3. The ministry of health and family welfare,The Gazette of India : Extraordinary, Part - III, section.
4. *D Kumar Bhatt*, *PriyankaTomar*, 2010**.An Introduction to Food Science Technology and Quality Management***1st Edition, Kalyani Publishers.*

17UMB63A	CORE IX: VIROLOGY	SEMESTER- VI

PREAMBLE

To comprehend the concept of viral infections, types, infectious disease process, morphology, pathogenicity and laboratory diagnosis of medically important virus.

COURSE OUTCOMES

On the successful completion of the course, students will be able

CO Number	CO Statement	Knowledge level
CO1	Recall the early development of Virology – Virus – Morphology.	K2, K3
CO2	Compare the reproduction of DNA phages.	K2
CO3	Distinguish the Lysogeny and its induction of lysogens.	K2, K3
CO4	Discuss the Viruses of Eukaryotes. Categorize the reproduction of animal and plant viruses.	K2, K3
CO5	Understand the process of Human viral infections.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UMB63A	CORE IX- VIROLOGY	SEMESTER- VI

Total Credits: 4

Hours per week: 4

CONTENTS

UNIT - I

Early development of Virology – Virus - Morphology, General characteristics, Structure of viruses - Virion size - Helical and icosahedra capsid - Nucleic acids - Viral envelopes and enzymes. Concept of viroids, virusoids, satellite viruses and prions. Classification and nomenclature of of viruses – Baltimore system of Classification. Cultivation of Viruses. Virus purification and assays.

UNIT - II

Reproduction of DNA phages - ds DNA lytic phages - T4 phage - The one step growth – Adsorption, penetration, synthesis, assembly and release of phage particles. ss DNA phage - φX 174 - Rolling circle replication.

UNIT - III

Lysogeny - Temperate bacteriophages - lambda phage - Induction of lysogens - Generation of defective phages and their uses. Reproduction of RNA phages.

UNIT – IV:

Viruses of Eukaryotes - Reproduction of animal and plant viruses - Viruses of Algae, fungi and viruses.

UNIT - V

Human viral infections - Pathogenicity and diagonosis of HBV, Mumps, AIDS, Rabies, Influenza, Measles, Rubella, Polio virus, Emerging viral diseases: Ebola. Oncogenic viruses. Concepts of oncogenes and proto – oncogenens.

TEXT BOOKS:

1. Stainier R.V., Ingraham, J.L., Wheelis, M.L. and Painter P.R. The Microbial World. Printice-Hall of India (Pvt.) Ltd., New Delhi
2. Pelczar M., Chan E.C.S. and Krieg, N.R. Microbiology. Tata Mc Grew Hill Publishing Co. Ltd., New Delhi.
3. *Dimmock.* 1998. **Introduction to Modern Virology**.*5th edition. Blackwell scientific publications.*
4. *Rogger Hull*. 2001. **Mathews Plant Virology**. *4th edition. Academic press.*

REFERENCE BOOKS:

1. *Luria S.E. Darnel, J.E Jr. Baltimore. D and Campbell A.* 1978. **General Virology,** *3rd edition, Wiley and sons.*
2. *Ananthanarayanan R and CK JayaramPanicker*, 2005. **Introduction to Medical Microbiology**, *2nd edition .Orient Longman.*

17UMB63B	CORE X- INDUSTRIAL MICROBIOLOGY	SEMESTER- VI

PREAMBLE

To comprehend the commercial value of fermented products, fermentation types, harvesting and purification processing and the application of economically important microorganisms for the large scale production.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Intimate the economically and commercially important microbes	K1,K3
CO2	Recall the types and components of fermentor.	K1
CO3	Illustrate the large scale production of fermented foods	K3
CO4	Demonstrate the nutritive and the commercial value of SCP	K1,K3
CO5	Outline the harvesting techniques of industrially important microbial products.	K1, K2

MAPPING WITH PROGRAMME OUTCOMES

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

S –Strong, M – Medium, L – Low.

17UMB63B	CORE X- INDUSTRIAL MICROBIOLOGY	SEMESTER VI

Total Credits: 4

Hours per week: 4

CONTENTS

UNIT –I

Industrially important strains- Screening methods- Primary and Secondary screening. Strain development for improved yield- Mutation, Recombination and protoplasmic fusion.

UNIT -II

Fermentation- Definition & types - Submerged and Solid state. Batch fermentation – Continuous fermentation. Fermentors –Design of a fermentor- Components (Baffles, Agitator, Impellers and Antifoaming agents). Types of Fermentors - Tower, cylindroconical&airlift,CSTF

UNIT -III

Industrial scale Production of beverages – beer and wine- vitamin B12 and Riboflavin – Antibiotics- penicillin and streptomycin - production of enzymes - Amylases and Proteases.

UNIT- IV

Single cell protein- Baker's yeast, Spirulina- Details of mushroom development- *Oyster Pleurotus*) and Button (*Agaricus*) mushroom. Baker's yeast - Cell and Enzyme immobilization methods and its applications.

UNIT -V

Downstream process- Intercellular and extracellular – Filteration-Centrifugation-Breakage of cells - physical and chemical methods, Floatation- solvent extraction, precipitation-Chromatography-Drying and Crystallisation.

TEXT BOOKS:

1. *Patel A.H.* 2011. **Industrial Microbiology**. *2nd Edition. Mac Millan Publishers.*
2. *Crueger W and Crueger A*. 1991. **Biotechnology. A textbook of Industrial Microbiology**. *Sinauer Associates Inc.,U.S.*
3. *Stanbury P T and Whitaker* 1984. **Principles of Fermentation Technology**, *1str Edition. Adithya Books pvt ltd.*

REFERENCE BOOKS:

1. *Casida L E J R*. 2007. **Industrial Microbiology**. *1 st edition. New Age International.*
2. *R.C.Dubey.*,2006. A textbook of Biotechnology. 4th Revised Edition. S Chand Publishers.

17UMB63C	CORE XI- MEDICAL MICROBIOLOGY - II	SEMESTER - VI

PREAMBLE

To comprehend the concept of fungal infections and its types, opportunistic mycoses, medically important parasites and its life cycle, antibiotics and prevention of its resistance.

COURSE OUTCOMES

On the successful completion of the course, students will be able

CO Number	CO Statement	Knowledge level
CO1	To acquaint with the collection procedure of clinical samples.	K_2
CO2	To classify the fungal infections and its pathogenesis of superficial mycoses.	K_2, K_4
CO3	To inspect the opportunistic mycosesTo infer the antifungal agents and its testing methods	K_2, K_4
CO4	To classify the medically important parasites and its significance.	K_2
CO5	To analyze the life cycle and infection of medically important parasites	K_2, K_4

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong, M-Medium, L-Low

17UMB63C	CORE XI- MEDICAL MICROBIOLOGY – II	SEMESTER - VI

Total Credits: 4

Hours per week: 4

CONTENTS

UNIT-I

Collection, transport, processing and microbiological examination of clinical samples – urine, sputum, blood, CSF, feces and pus.

UNIT-II

Classification of Fungal infections: Mycoses - Superficial Mycoses- Pityrasisversicolor, Tineanigra, Piedra. Dermatophytoses - Trichophyton, Epidermophyton and Microsporum. Candidosis. Deep mycoses – Subcutaneous mycoses – systemic mycoses.

UNIT-III

Opportunistic systemic mycoses – Aspergillus, Penicillium, Mucor. Mycotoxins, Antifungal agents, testing and methods.

UNIT-IV

Introduction to medical Parasitology – Classification, Protozoa – Entameoba – Plasmodium- Leishmania – Trypanosoma –Giardia – Trichomonas.

UNIT-V

Life cycle and infection - Platyhelminthes – Taenia-Nematihelminthes – Ascaris - Enterobius – Trichuris – Wuchereria. **Antibiotics**: Introduction, Mode of action with example of each class, Antibiotic resistance and prevention of antibiotic resistance.

TEXT BOOKS:

1. *Ananthanarayanan R and CK JayaramPanicker*, 1994, **Textbook of microbiology.***Orient Longman.*
2. *Chakraborty P* 1995, **A Text book of microbiology**, *New Central Book Agency PvtLtd. Calcutta.*
3. *CK JayaramPaniker.* 2007. **Medical Parasitology**, *6th Edition. Jaypee Brothers Medical Publishers (p) Ltd. New Delhi*.

REFERENCE BOOKS:

1. *Prescott, L.M J.P. Harley and C.A. Klein*. 1995. **Microbiology***2nd edition. Wm, C. Brown Publishers.*
2. *Bailey and Scotts*, 1994, **Diagnostic Microbiology**, *9th edition, Baron and Finegold CVMosby Publications.*
3. *Jawetz E Melnic JL and Adel berg EA* 1998, **Review of Medical Microbiology.** *LangeMedical Publications, USA.*
4. *JagdishChander*, 2009. **Textbook of Medical Mycology**, *3rd edition. Mehta Publishers, New Delhi.*

17UMB63P	CORE PRACTICAL - VI	SEMESTER- VI

Total Credits: 3

Hours per Week: 6

CONTENTS

1. Isolation and titration of coli phages.
2. Cultivation of Animal viruses - Demonstration.
3. Enzyme production and assay – protease
4. Enzyme production and assay - amylase
5. Alcohol production - wine
6. Immobilization using Sodium alginate
7. Study of parasites – Entamoeba, Plasmodium, Ascaris, Taenia.
8. Isolation and Identification of clinically important fungi – Candidasp., andAspergillus sp.,
9. Water potability test-MPN Test
10. Isolation of free living nitrogen fixers –Azotobacter, Azospirillum
11. Phosphate solubilizers
12. Isolation of symbiotic nitrogen fixers - Rhizobium from nodule.
13. Microbial degradation of synthetic dyes
14. Isolation of Antibiotic producing microorganisms from soil-Crowded plate technique, Secondary screening (Under DBT Star Scheme)
15. Determination of optimum temperature and pH for soil bacteria (Under DBT Star Scheme)
16. Antibiotic sensitivity test (Kirby Bauer Method) & MIC (Under DBT Star Scheme)

LABORATORY MANUALS:

1. *Aneja. K.R.*2nd edition, **Experiments in Microbiology, Plant Pathology and Biotechnology,***New age publishers.*
2. *Rajan S. and Selvi Christy.***Experimental Procedures in Life Sciences**.*Anjana book House.*

REFERENCE BOOKS:

1. *James.C.Cappuccino.* 2013. **Microbiology A laboratory manual**. *1st edition, Pearson education publishers.*
2. *Kannan N.,* 1997. **Laboratory Manual of General Microbiology**, *2nd edition, Panima Publishing House.*

17UMB6EA	ELECTIVE II- ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY	SEMESTER - VI

PREAMBLE

To understand the role and significance of microbes in a better ecological niche.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	List the distribution of microorganisms and importance of microbial communities in soil.	K1,K2,K3
CO2	Discuss the carbon cycle, nitrogen cycle, phosphorous cycle, sulphur cycle and iron cycle.	K2, K3
CO3	Recall the decomposition process taking place in soil.	K1, K2
CO4	Demonstrate the procedure of water treatment.	K1, K2, K3
CO5	Identify the factors influencing air quality. Demonstrate the methods of air quality analysis.	K1, K2, K3

MAPPING WITH PROGRAMME OUTCOMES

CO5/ PO5	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S- Strong, M – Medium, L – Low.

17UMB6EA	ELECTIVE II- ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY	SEMESTER -VI

Total Credits: 4

Hours per Week: 4

CONTENTS

UNIT - I

Distribution of microorganisms in nature – Microbial communities in soil - Factors influencing the microbial density in soil - zymogenous and autochthonous flora in Soil - Microbial interactions – Mutualism, synergism, commensalism, competition, amensalism, parasitism, predation with suitable examples.

UNIT – II

Microorganisms in the decomposition of organic matter- carbon cycle – nitrogen Cycle - nitrogen fixing microorganisms - root nodule bacteria (symbiotic) – non symbiotic Nitrogen fixers – Mycorrhizial association – phosphorous cycle - phosphate solubilisers, sulfur cycle – microorganisms involved, iron cycle – microorganisms involved – Biofertilizers and its applications.

UNIT - III

Solid waste management - Microbial decomposition - Cellulose, Hemi-cellulose, lignin, pectin and chitin – Factors influencing degradation - acetate utilization - bioconversion of organic wastes - composting, vermi-composting – principles, Applications and quality standards (parameters) - conversion process sugarcane wastes - coir pith composition.

UNIT - IV

Water microbiology, algae, phytoplankton – eutrophication - water treatment - Primary, secondary and tertiary – parameters involved in analyzing water treatment – Biological Oxygen Demand, Chemical Oxygen Demand. Drinking water – Potability - MPN technique – Presumptive, confirmed and completed test for faecal coliform.

UNIT - V

Aero microbiology - aerosol, droplet nuclei, air pollution - sources (Microbiological) – air quality analysis - air sampling devices.

TEXT BOOKS:

2. *Atlas R. Roland, Richard Bartha*., 1998. **Microbial Ecology**. *1st edition. Pearson education.*
3. *Subbarao.* 2005. **Soil Microbiology Soil Microorganisms and Plant Growth**. *1st edition. Oxford and IBH,*
4. *Mark S Coyne*, **Soil Microbiology: An Exploratory Approach**, *Delmar Publishers.*
5. R. Mitchel, 2009. **Environmental Microbiology** (2nd edition), Wiley-Blackwell, 2009
6. Wiley JM, Sherwood LM and Woolverton CJ. (2013) **Prescott's Microbiology**. 9th Edition. McGraw Hill International.

REFERENCE BOOK:

1. *Black, J.G.* 2013. **Microbiology,***8th Edition. John Wiley and Sons*.
2. *N.S. SubbaRao*2014**. Soil Microbiology (Fourth Edition of Soil Microorganisms and Plant Growth**), *Science Publishers.*
3. *Michael J.Pelczar* 2001, **Microbiology**, *Tata McGraw Hill Eduaction.*
4. Cappucino J and Sherman N. (2010). **Microbiology: A Laboratory Manual.** 9th edition. Pearson Education Limited

17UMB6ED	ELECTIVE III- BIOTECHNOLOGY	SEMESTER –VI

PREAMBLE:

The subject aims to build the concepts regarding:

1. Microbial synthesis of commercial products
2. Transgenic plants, transgenic animals and Bioremediation

COURSE OUTCOMES

On the successful completion of the course, students will be able

CO Number	CO Statement	Knowledge level
CO1	To introduce the concept Biopharmaceuticsin commercial production.	K_2,K_3
CO2	To explain and understand the role of Ti plasmid in genetic recombination.	K_2
CO3	To comprehend the methods of producing transgenic animals.	K_2
CO4	To summarize biotechnological remedies for environmental issues.	K_4,K_2
CO5	To know the applications of genetic engineering in forensic science.	K_2, K_3

MAPPING WITH PROGRAMME OUTCOMES

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

S-Strong,M-Medium,L-Low

17UMB6ED	ELECTIVE III- BIOTECHNOLOGY	SEMESTER -VI

Total Credits: 4

Hours per Week: 4

CONTENTS

UNIT - I

Microbial synthesis of commercial products-Proteins-Pharmaceuticals – Interferon's - Human growth hormone- Antibiotics -Biopolymers. Vaccines – subunit vaccines, Edible vaccines, Recombinant vaccine –Monoclonal antibody.

UNIT - II

Transgenic plants-Ti plasmid – insect, virus, herbicide resistant plants – microbial insecticides – bacteria, fungi and viruses.

UNIT - III

Transgenic animals – mice – retroviral method – DNA Microinjection method – embryonic stem cell method. Application-Transgenic Sheep and Transgenic Fish.

UNIT - IV

Microbial Degradation of Xenobiotics: Manipulation by Transfer of Plasmids. Manipulation by gene alteration. Utilisation of Starch and Sugars – Imporving alcohol production, Improving fructose production, Zymomonasmobilis –Utilisation of cellulose – Isolation of prokaryotic and Eucaryotic cellulose gene. Manipulation of cellulose gene.

UNIT - V

DNA finger printing and its Application. Gene therapy. Human Genome Project.

TEXT BOOKS:

1. *Brown T.A.,* 2002. **Genomes**, *1st edition, John- Wiley & Son.*
2. *Glick B .R and Pasternak J .J* .1994. **Molecular Biotechnology**. **Principles and Application of recombinant***DNA, 2 nd edition. ASM Press, Washington.*

REFERENCE BOOKS:

1. *Winnecker, E.D,* 1987. **From Gene to Clones**, *Introduction to Gene Technology, 1 st edition. Panima educational book agency.*
2. *Old. RW and Primbrose,* 1995. **Principle of Gene Manipulation**, *5th edition. Blackwell Scientific Publication, Boston.*

17UMB6SA	SKILL BASED LAB	SEMESTER - VI

Total Credits: 2

Hours per week: 4

CONTENTS

1. Production of Button Mushroom
2. Production of Oyster Mushroom
3. Production of Biofertilizer-Phosphobacteria
4. Production of Biofertilizer-Azospirillum
5. Quality control of packed food and canned food
6. Biomass production of Baker yeast
7. Biomass production of Brewer's yeast
8. Biomass production of Single Cell protein-Spirulina
9. Vermicomposting
10. Production of Biopesticide - *Trichoderma* sp.,

LABORATORY MANUALS:

1. *James.C.Cappuccino.* 2013. **Microbiology A laboratory manual**. *1st edition, Pearson education publishers.*
2. *Kannan, N.* 1996. **Laboratory manual of General Microbiology**, *2nd edition, Panima publishing house.*

REFERENCE BOOKS:

1. *Aneja. K.R.* 2012. **Experiments in Microbiology, plant pathology and biotechnology,** *4th Edition. New age publishers.*
2. *Kannan, N.* 2003. **Hand book of Laboratory culture media***1st edition, Panima publishing house.*

17UNM44F	NMEC II- MICROBES IN AND AS FOOD	SEMESTER - IV

Total Credits: 2

Hours per Week: 2

OBJECTIVES:

The course is designed

1. To understand the relationship between food and microorganisms.
2. To create an awareness on production of fermented foods.

CONTENTS

UNIT - I

History and development of Food microbiology - Common Food borne Bacteria and Molds - Role and Significance of Microorganisms in Foods. Parameters Affecting Microbial Growth: Intrinsic and Extrinsic.

UNIT - II

Detection of Microorganisms in Foods - Milk, Fruits and Vegetables, fermented foods - Culture, Microscopic, and Sampling Method for detecting microbes.

UNIT - III

Production of Fermented foods- Idly, Bread, wine, Curd, Yoghurt, Butter milk, Cheese.

UNIT - IV

Microbial Food Spoilage and Food borne diseases - *Staphylococcal, E coli,* Salmonellosis, Shigellosis, Listerial infections. Mycotoxins and Aflatoxins.

UNIT - V

Applications of Food Microbiology: Beneficial Uses of Microorganisms in Food - Intestinal Beneficial Bacteria- Concept of Prebiotics and Probiotics – Mushroom – Single Cell Protein. Genetically modified foods. Biosensors in food

TEXT BOOKS:

1. *Frazier, W.C. and Westhoff, D.C.* 2008. **Food microbiology**. *4th Edition. McGraw Hill NY.*
2. *Roger Y Stainer,* 1989. **Food Microbiology. 2nd edition.** *CBS, New Delhi.*

REFERENCE BOOKS:

1. *Adams, M.R.and Moss.* M.O. 1996. **Food Microbiology.** *2nd edition. Panima Publishers.*
2. *James M Jay,* 1996. **Modern Food Microbiology.** *1st edition. CBS, New Delhi.*