BACHELOR OF SCIENCE

IN

BIOTECHNOLOGY

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
Web: www.drngpasc.ac.in | Email: info@drngpasc.ac.in | Phone: +91-422-2369100

BACHELOR OF SCIENCE (BIOTECHNOLOGY)
REGULATIONS

ELIGIBILITY

A candidate who has passed in Higher Secondary Examination with Life Science stream under Higher Secondary Board of Examination and as per the norms set by the Government of Tamil Nadu or an Examination accepted as equivalent there to by the Academic Council, subject to such conditions as may be prescribed there to are permitted to appear and qualify for the **Bachelor of Biotechnology Degree examination** of this College after a course of study of three academic years.

OBJECTIVES OF THE COURSE

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

1. To demonstrate a substantial understanding of concepts in key areas of Biotechnology and its applications.
2. To supplement the academic input of students by way of seminars, conferences, guest lectures and industrial visits.
3. To describe the common methods and applications of biotechnology with regards to microorganisms, plants, animals and Pharma industries.

PROGRAM OUTCOMES

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

PO Number	PO Statement
PO1	Students will be able to identify, analyze and understand problems related to biotechnology and finding valid conclusions with basic knowledge in biotechnology.
PO2	Graduates will be able to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices.
PO3	Provide education that leads to comprehensive understanding of the principles and practices of biotechnology that will help to undertake any responsibility as an individual and as a team in a multidisciplinary environment.
PO4	Graduates will be able to demonstrate knowledge of project management when dealing with Biotechnology problems.
PO5	Students will possess hands-on technical skills necessary for supporting biotechnology research activity and empower students with the ability to think and solve problems in the field of biotechnology.

SCHEME OF EXAMINATIONS

Course Code	Course	Hrs of Instruction	Exam Duration (Hrs)	Max Marks			Credit Points
				CA	CE	Total	
First Semester							
Part – I							
17UT L11T 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							
18UBT13A	Core -I: Biodiversity	4	3	25	75	100	4
18UBT13B	Core – II: Cell and Molecular Biology	5	3	25	75	100	4
18UBT13P	Core Practical- I: Cell Biology& Biodiversity	5	5	20	30	50	2
18UBT1AA	Allied - I: Biomolecular Chemistry	4	3	20	55	75	3
Part – IV							
17UFC1FA	Environmental Studies	2#	2	-	50	50	2
		30				**575**	**21**
Second Semester							
Part – I							
17UT L21T 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							
18UBT23A	Core -III: Principles of Genetics	5	3	25	75	100	4
18UBT23P	Core Practical– II: Genetics	5	5	20	30	50	2
18UBT2AA	Allied -II:	4	3	20	55	75	3

20.12.2019
BoS Chairman/HoD
Department of Biotechnology
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048

Academic Council
Dr. N.G.P. Arts and Science College
CHAIRMAN
20/12/19

	Biochemistry						
18UBT2AP	Allied Practical - I: Biochemistry	4	5	20	30	50	2
Part – IV							
17UFC2FA	Value Education: Human Rights	2#	2	-	50	50	2
		30				**525**	**19**
Third Semester							
Part – I							
17UTL31T 17UML31H 17UHL31M 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							
18UBT33A	Core -IV: Microbiology	4	3	25	75	100	4
18UBT33P	Core Practical –III: Microbiology	4	5	20	30	50	2
18UBT3AA	Allied - III: Bioinformatics	4	3	20	55	75	3
18UBT3AP	Allied Practical - II: Bioinformatics	4	5	20	30	50	2
17UBT3SV	Skill Based Course–I: Basic Computer Skills*	2	**Grade A to C**				
Part-IV							
17UFC3FA 17UFC3FB 17UFC3FC 17UFC3FD 17UFC3FE	Tamil/Advanced Tamil (OR) Yoga for Human Excellence/Women's Rights/Constitution of India	2#	2	-	50	50	2
	NMEC-I:	2	2	-	50	50	2
		30				**575**	**21**
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							
18UBT43A	Core -V:	5	3	25	75	100	4
18UBT43P	Core Practical – IV: Immunology	5	5	20	30	50	2
17UMT4AC	Allied -IV: Mathematics	4	3	20	55	75	3
18UBT4SA	Skill Based Course-II: Molecular Techniques	4	3	20	55	75	4
Part – IV							
17UFC4FA/ 17UFC4FB/ 17UFC4FC	Tamil/Advanced Tamil (OR) General Awareness	2#	2	-	50	50	2
	NMEC- II:	2	2	-	50	50	2
		30				**600**	**23**
Fifth Semester							
Part – III							
18UBT53A	Core - VI: Recombinant DNA Technology	4	3	25	75	100	4
18UBT53B	Core –VII: Microbial Biotechnology	4	3	25	75	100	4
18UBT53C	Core -VIII: Plant Biotechnology	4	3	25	75	100	4
18UBT53P	Core Practical - V: rDNA, Microbial and Plant Biotechnology	6	5	20	30	50	3
	Elective –I:	4	3	20	55	75	4
18UBT5SA	Skill Based Course-III: Entrepreneurial	4	3	20	55	75	4

	Biotechnology						
18UBT5SB	Skill Based Course- IV: Pharmaceutical Biotechnology	4	3	20	55	75	4
Part – IV							
18UBT53T	Internship**	**Grade A to C**					
		30				**575**	**27**
Sixth Semester							
Part – III							
18UBT63A	Core -IX: Animal Biotechnology	4	3	25	75	100	4
18UBT63B	Core - X: Environmental Biotechnology	4	3	25	75	100	4
18UBT63C	Core -XI: Nano Biotechnology	4	3	25	75	100	4
18UBT63D	Core-XII: Bioethics, Biosafety and IPR	4	3	25	75	100	4
18UBT63P	Core Practical - VI: Animal, Environmental and Nano Biotechnology	6	5	20	30	50	3
	Elective- II	4	3	20	55	75	4
	Elective- III	4	3	20	55	75	4
Part –V							
17UEX65A	Extension Activity	-	-	50	-	50	2
		30				**650**	**29**
Grand Total						**3500**	**140**

Two Instruction hours given for placement

The candidate must submit hard copies, making use of all the advanced formatting in word document (Formal Letters) and excel (Tables, Graph with calculations) with his/her Register Number as watermark. Concerned to E-mail, candidate must create a new mail ID from which they would send CC and Bcc, group mailing of official mails must be submitted as a printed version. A soft copy of power point slide must be designed using all the video and audio effects with the candidate himself appearing for the video shoot. Printed version of Downloaded Nucleic acid sequence, Protein structures and construction of Phylogenetic tree should be submitted.The performance of the candidate will be evaluated by External and Internal Examiner based on Report submitted on above mentioned contents and presentation. Based on their performance Grade will be awarded as A To C. (75 marks and above – A Grade, 60 – 74 marks – B Grade, 40 – 59 marks – C Grade, Below 40 marks – Reappear (RA))

Students must undergo training in well reputed institution/company for not less than 15 days during IV Semester Summer Vacation. Evaluation of the Report will be done by the Internal and External Examiners in the V Semester. Based on their performance Grade will be awarded as A To C. (75 marks and above – A Grade, 60 – 74 marks – B Grade, 40 – 59 marks – C Grade, Below 40 marks – Reappear (RA)).

ELECTIVE – I

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

S.No	CourseCode	Name of the Course
1.	18UBT5EA	Bioprospecting
2.	18UBT5EB	Basics of Clinical Trials

ELECTIVE – II

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

S.No	CourseCode	Name of the Course
1.	18UBT6EA	Marine Biotechnology
2.	18UBT6EB	Agricultural Biotechnology

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.	18UBT6EC	Food and Dairy Technology
2.	18UBT6ED	Forensic Biotechnology

NON MAJOR ELECTIVE COURSES (NMEC)

The department offers the following two papers as Non Major Elective Course for other than the Biotechnology students.

Student shall select the following courseas Non Major Elective Course during their third and fourth semester

.No	NMEC	CourseCode	Name of the Course
1.	I	18UNM34E	Mushroom Technology
2.	II	18UNM44E	Apiculture

Total Credit Distribution

Courses	Credits	Total		Credits	Cumulative Total
Part I: Tamil	3	4x 100 =	400	12	24
Part II: English	3	4x 100 =	400	12	
Part III:					
Core Theory	4	12 x 100= =	1200	48	102
CorePracticals	3	2 x 50 =	100	06	
Core Practicals	2	4 x 50 =	200	08	
Allied Theory	3	4 x 75 =	300	12	
Allied Practicals	2	2 x 50 =	100	04	
Elective	4	3 x 75 =	225	12	
Skill Based Subjects	4	3 x 75 =	225	12	
Part IV:					
Languages & Others	2	4 x 50 =	200	08	12
NMEC	2	2 x 50 =	100	04	
Part V:					

Extension Activity	1	1 x 50 =	50	02	02
Total			**3500**	**140**	**140**

FOR PROGRAMMECOMPLETION

Students have toComplete the following courses:

1. Language papers (Tamil/Malayalam/French/Hindi, English) in I, II, III and IV semester.
2. Environmental Studies, Human Rights,Women's Rights andGeneral Awareness- Online Examin I, II, III and IV semester respectively.
3. Allied papers in I, II, III and IV semesters.
4. Two Non Major Elective Courses in III and IV semester.
5. Four Skill Based Courses in III,IV and V semester.
6. Extension activity in VI semester
7. Three Elective papers in the Fifth and Sixth semesters.
8. One Internship training in IV Semester.

Earning Extra credits is not mandatory for program completion
Extra credits

Part	Course	Papers	Credit	Total credits	Papers
1.	BEC/ Self study courses	1 papers	1	**1**	1
2.	Hindi / French/ Other foreign Language approved by certified Institutions	1 Course	1	**1**	-
3.	Type Writing / Short Hand Course	1 Course	1	**1**	-
4.	Diploma/certificate/CPT/ACS/ Foundation Course	1 Course	1	**1**	-
5.	Representation – Academic/Sports /Social Activities/ Extra Curricular / Co-Curricular activities at University/ District/ State/ National/ International level	1	1	**1**	-
Total		**4**		**5**	**1**

Rules:
The students can earn extra credit only if they complete the above during the course period (I to V semester) and based on the following criteria. Proof of Completion must be submitted in the beginning of VI Semester. (Earning Extra credits is not mandatory for Course completion)

1. 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 Biotechnology Department

S. No.	Semester	Course Code	Course Title
1.	Semester III	18UBTSS1	Environment, Health And Management
2.		18UBTSS2	Biofertilizer Technology

2. 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 PracharSabha**and He/ she has

to enroll and complete during their course period. (**first to fifth semester)**

3. Student can opt for Type writing /short hand course to earn one credit extra. He/she has to enroll and complete the course during their course period to obtain certificate through **TamilNadu Board of Technical Education.**
4. Student can opt for Diploma/certificate/CPT/ACS/ Foundation Course to earn one credit extra. 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 at foundation level during the course period. The course content of which shall be equivalent to that prescribed by ICAI/ICMA/ICSI.
5. Award Winners in Academic/ Representation in Sports /Social Activities/ Extra Curricular/ Co-Curricular Activities at University/ District/ State/ National/ International level can earn one credit extra.

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

பயனடைவுக்கல்வியின்விளைவாக 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,புதியஉலகு செய்வோம்– பாரதிதாசன்
3. ஒற்றுமையே உயிர்நிலை – கவிமணி
4. அவனும் அவளும் நாமக்கல் கவிஞர் –

அலகு – சமூகமும் 2, இயற்கையும்

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

அலகு – பெண்ணியம் 3

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

அலகு 4 -சிறுகதைகள்

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

அலகு 5 -இலக்கிய வரலாறு , இலக்கணம்

.1தமிழ்க் கவிதையின் தோற்றமும் வளர்ச்சியும் மரபு),புதுக்கவிதைகள்(

.2தமிழ்ச் சிறுகதையின் தோற்றமும் வளர்ச்சியும்

.3வல்லினம் மிகும், மிகா இடங்கள்

.4ர,ற ; ல, ழ, ள ; ண, ந,ன, வேறுபாடு

பார்வை நூல்கள்:

.1செய்யுள் திரட்டு – தமிழ்த்துறை வெளியீடு

.2இலக்கிய வரலாறு பேராசிரியர் முனைவர் பாக்யமேரி -

17UHL11H	HINDI-I	SEMESTER - I

Total Credits: 3
Hours Per Week: 5

Preamble:

1. To develop the writing ability and develop reading skill.
2. 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

गद्य – नूतन गद्य संग्रह (जय प्रकाश)

पाठ 1- रजिया

पाठ 2- मक्रील

पाठ 3- बहता पानी निर्मला

पाठ 4- राष्ट्रपिता महात्मा गाँधी

प्रकाशक: सुमित्र प्रकाशन

204 लीला अपाट्मेंट्स, 15 हेस्टिंग्स रोड'

अशोक नगर इलाहाबाद-211001

UNIT – II

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

प्रकाशक: गोविन्द प्रकाशन

सदर बाजार, मथुरा

उत्तरप्रदेश-281001

UNIT – III

व्याकरण : श्ब्द विचार (संज्ञा, सर्वनाम, कारक, विशेश्ण)

पुस्तक: व्याकरण प्रदिप– रामदेव

प्रकाशक: हिन्दी भवन 36

टेगोर नगर

इलाहाबाद-211024

UNIT - IV

अनुवाद अभ्यास-III (केवल अंग्रेजी से हिन्दी में)

(पाठ 1 to 10)

प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17

17UML11M	MALAYALAM-I	SEMESTER-I

Total Credits: 3
Hours per week: 5

Preamble:

1. To develop the writing ability and develop reading skill.
2. 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

1. To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression
2. To Introduce the Culture, life style and the civilization aspects of the French people as well as of France
3. 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) • PRODUCTION ÉCRITE:	• 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 • Pharses

	écrire des slogans	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:

1. 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.

18UBT13A	CORE I: BIODIVERSITY	SEMESTER - I

Total Credits: 4
Hours Per Week: 4

Preamble:

1. To study the diversity and conservation of organisms and to know the importance of diversity.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the nature, concept and definition of Biodiversity, conservation strategies.	K1, K2
CO2	Familiarize with Global patterns of Biodiversity	K1,K2
CO3	Focus on Biodiversity & major biomes of world	K1,K2
CO4	Highlight Biodiversity for Sustainable Development	K1,K2
CO5	Awareness on Ethics of Conservation	K2,K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT13A	CORE I: BIODIVERSITY	SEMESTER - I

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT – I **(8 hours)**

Biodiversity –Concept and definition

Scope and Constraints of Biodiversity Science, Composition and Scales of biodiversity.

Biodiversity and its types : Genetic Diversity, Species/Organismal Diversity, Ecological/Ecosystem Diversity, Landscape/Pattern Diversity, Agrobiodiversity, Bicultural Diversity and Urban Biodiversity

UNIT– II **(10 hours)**

Global patterns of Biodiversity

Cataloging and Discovering Species, Geographical Patterns of Species Richness, Biogeography, Importance of Distribution Patterns (Local Endemics, Sparsely Distributed Species, Migratory Species), GAP Analysis.

Species & individual in the ecosystem - a) Habitat & niche b) Ecological equivalence c) Biological clock d) Basic behavioral patterns

UNIT – III **(10 hours)**

Biodiversity Threats and Conservation

Specific flora & fauna.Biodiversity & Conservation – Overexploitation threatening living species, rare and endangered species, International Trade.

Threats to Biodiversity - Animals threatened by International trade, Problems in Controlling International Trade (Enforcement, Reservations, Illegal Trade), Free Trade & the Environment, Free Trade & Conservation, etc., In situ and ex situ conservation.

UNIT – IV **(12 hours)**

Community Ecology

Interspecific interactions - Interspecific Competition, Host-Parasite interactions, Predator-prey interactions, Plant herbivore interaction

Community ecology - Structure and function of communities, Functional aspects of communities, Stability and change in communities

Regulation of communities - Role of species diversity, Role of predators, Role of competition, Role of nutrients, other factors

UNIT– V **(10 hours)**

Biodiversity for Sustainable Development

Sustainable management of biodiversity: International and regional policies. Biodiversity Act, National Biodiversity Board and other organizations worldwide. International conventions and treaties on conservation.

Biodiversity Institutes in India: Zoological Survey of India, Botanical Survey of India, Forest Research Institute, Central Marine Fisheries Research Institute.

Ethics of conservation: Legal, Ethical and Conservation issues related to uses of biodiversity, Global Conservation Issues.

TEXT BOOKS:

1. Krishnamurthy K V.2003. **Textbook of Biodiversity.** 1st edition. Science Publisher.
2. Narendran, T. C. 2006. **An Introduction to Taxonomy**. Zoological Survey of India, Kolkata.

REFERENCE BOOKS:

1. Negi, S.S**.**1993**. Biodiversity and its Conservation in India.** 1st edition. Indus Publishing Co.
2. Mike J Jeffries. 2006. **Biodiversity and Conservation**. 1st edition. Routledge.
3. Michael I. Jeffery, Jeremy Firestone, Karen Bubna-Litic. 2008. **Biodiversity Conservation, Law and Livelihoods.** 1st edition. Cambridge University Press.
4. Singh, G.2008. **Plant Systematics: Theory and Practice**. Oxford & IBH Publishing Co. Pvt. Ltd.
5. Joanne M. Willey, Linda M. Sherwood. 2011. **Prescott's Microbiology**. 8th edition. McGraw Hill Education.

18UBT13B	CORE- II: CELL AND MOLECULAR BIOLOGY	SEMESTER - I

Total Credits: 4
Hours Per Week: 5

Preamble:

1. To understand cellular organization, transport of molecules, cell interactions and signalling.
2. To describe gene expression and regulation.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamental concepts in the structure and functioning of a cell and membrane transport processes.	K1
CO2	Interpret precisely the diversified roles of cytoskeletal filaments and infer the cascade of events in signal transduction and theirsignificance.	K1, K2
CO3	Discuss and distinguish the replication of prokaryotic and eukaryotic DNA.	K1, K2
CO4	Explain the synthesis of RNA and post-transcriptional modification and protein	K1, K2
CO5	Understand the gene regulation, DNA damage and repair mechanisms.	K1, K2

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT13B	CORE- II: CELL AND MOLECULAR BIOLOGY	SEMESTER - I

Total Credits: 4
Hours Per Week: 5

UNIT – I

Cell Architecture and Cell Division (10 hours)

Discovery of Cell and Cell theory, Chemical composition of cell. Structural organization of prokaryotic and eukaryotic cells; membrane bound organelles and non-membrane bound organelles.
Cell division and Regulation-Cell cycle, Cell division (mitosis, meiosis) and Regulation.Cell communication and its types –Extracellular and intracellular signaling molecules.

UNIT – II

Membrane Architecture and Transport (10 hours)
Cell membrane and chemical compositions. Models of membrane structure – Lipid Mono layer, Lipid bilayer, Protein Lipid sandwich, Unit Membrane and Fluid Mosaic Model. Factors affecting Membrane fluidity and permeability, Solute transport by Simple diffusion, Facilitated diffusion and Active transport.

UNIT – III

Replication of DNA and regulation (10 hours)
DNA replication – Experimental proof for Semiconservative method, Mechanism of DNA replication, Enzymes in replication.Differences between Prokaryotic and eukaryotic replication.
Replication model - Theta, Strand displacement and Rolling circle model. DNA Repair- Nucleotide excision, Base excision, Mismatch repair, Photo-reactivation, SOS and recombination repair. Regulation ofDNA replication.

UNIT – IV
Transcription and regulation (12 hours)
Features of promoters, enhancers, activators and repressors.RNA polymerases and Types; Transcription in prokaryotes and eukaryotes. Antisense RNA, RNA interference (RNAi), hn RNA, Si RNA, Sn RNA and Micro RNA. Post-transcriptional modifications; RNA Splicing, Polyadenylation and Capping, RNA editing. Prokaryotic transcriptional regulation – lac operon.

UNIT – V

Translation and regulation (8 hours)

Genetic code – codon and anticodon concepts, wobble hypothesis, translation in prokaryotes and eukaryotes. Post translation modifications – Phosphorylation, Deformylation, Glycosylation, Acetylation, Amidation, Lipid attachment, S - Nitrosylation and Disulfide bond formation. Translational inhibitors.

TEXT BOOKS:

1. Bruce Alberts. 1998. **Essential Cell Biology.** 1st edition. Garland Publishers.
2. De Roberties. 2003. **Cell and Molecular Biology.** 8th edition. EDP Lippincott Williams.

REFERENCE BOOKS:

1. Lewin, B. 2004. **Genes V.**Oxford University press.
2. Freifelder, D. and Malacinski, G. M. 1996. **Essential of Molecular Biology**, 2nd edition. Panima Publishing Co., New Delhi.
3. Lodish, H. & Baltimore. D. 1994. **Molecular cell Biology**. 2nd edition. American Scientific Books.
4. Gerald Karp. 2002. **Cell and Molecular Biology.** 3rd edition. John Wiley Sons.
5. S.C.Rastogi. 2010.**Cell and Molecular Biology.**3rd edition. New Age International Publisers.

18UBT13P	CORE PRACTICAL- I: CELL BIOLOGY AND BIODIVERSITY	SEMESTER – I

Total Credits: 2
Hours Per Week: 5

CONTENTS

1. Demonstration of Basic Laboratory Practices and instrument handling
2. Calculations of Molarity, Normality and Percentage Solution
3. Preparation of buffer in different pH - Phosphate, Acetate, Tris buffer
4. Preparation of equilibrated phenol
5. Simple staining of Bacteria
6. Microscopic observation of Monocot and Dicot Leaf, Root and Stem section
7. Staining of plant cells – Onion epidermal cells
8. Staining of starch granules
9. Cell counting using Haemocytometer
10. Blood smear preparation for blood cell identification
11. Mitotic preparation from onion root tip
12. Preparation of Herbaria – Five families (1 Plant from each family) with Authentication from authorized agencies
13. Field visits to nearby Zoo, Forest, Nursery, and Culture collection centre – Herbaria/Botanical Garden.
14. Introduction to Biodiversity Database-IBIN
15. Preparation of Insect Box and Calculation of Species richness by line and plot analysis.

REFERENCE BOOKS:

1. Janarthanan, S. and Vincent,S. 2007. **Practical Biotechnology– Methods and Protocols.**

2. Jeffery M Becker., Guy A Caldwell. and Eve Ann Zachgo. 2007. **Biotechnology– A laboratory Course.** 2nd edition. Academic Press.

3. Joseph Sambrook**,** Michael R. Green**.**2012**. Molecular Cloning: A Laboratory Manual.** 4th edition. Cold Spring Harbor.

4. John Davey, Michael Lord.2003. **Essential Cell Biology Volume 1: Practical Approach.** 1st edition. OUP Oxford.

5. David Lindenmayer, Mark Burgman. 2005. **Practical Conservation Biology**. CSIRO Publishing, Australia

18UBT1AA	ALLIED- I: BIOMOLECULAR CHEMISTRY	SEMESTER – I

Total Credits: 3
Hours Per Week: 4

Preamble:

1. To familiarize with chemistry of different Biomolecules and their importance.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Know the principles and laws governing biomolecules and the importance of water and its properties	K1, K2
CO2	Understand the concepts of surface and nuclear chemistry	K1, K2
CO3	Gain information on organic chemistry and reaction intermediates	K1, K2
CO4	Know the concept ofcoordination chemistry and electro chemistry	K1, K2
CO5	Understand the classification, structure and functions of biomolecules	K1, K2

Mapping with Programme Outcomes

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

S-Strong:M-Medium;L-Low

18UBT1AA	ALLIED I: BIOMOLECULAR CHEMISTRY	SEMESTER – I

Total Credits: 3
Hours Per Week: 4

CONTENTS

UNIT I

Introduction to Biomolecular chemistry (10 hours)

Water- Chemical properties -Function as medium of cellular reactions and activities - Ionization of water - Weak acids and weak bases - Buffers - Buffering in biological systems. Chemical bonds and its types (Covalent and Non covalent bonds).Principles of Bioenergetics- Laws of thermodynamics and their applications in biological system – Entropy and Enthalpy - Standard free energy changes.

UNIT II

Surface Chemistry (10 hours)

Elementary concepts of adsorption (excluding adsorption isotherms); Colloids: types, methods of preparation and general properties; Elementary ideas of emulsions, surfactants and micelles (only definitions and examples).

Nuclear Chemistry

Radioactivity: isotopes and isobars; Properties of alpha, beta and gamma rays; Kinetics of radioactive decay (decay series excluded), carbon dating; Stability of nuclei with respect to proton-neutron ratio; Brief discussion on fission and fusion reactions.

UNIT III

Organic Chemistry (8 hours)

Introduction to functional groups, chemical & physical properties, Reaction intermediates in organic chemistry, Nucleophilic addition & substitution reactions at carbonyl group,E1& E2 reactions in alcohols, Heterocyclic compounds, Optical & geometrical isomerism, Tautomerism& its applications

UNIT IV

Coordination Chemistry (10 hours)

Introduction to co-ordinations compounds,Crystal field theory, Colour& magnetic properties of complexes, Chelation & applications, biologically relevent co-ordination compounds **Electrochemistry**- Electrode potential, related problems, Nernst equation & its applications, emf of the cell, Redox reactions in cells, free energy change & standard emf of the cell, Redox titrations applications with examples

UNIT V

Biomolecules **(8 hours)**

Carbohydrates:classification based on structure. Stereoisomerism, linkages. Lipids: monomers, linkages (glycolipids, glycoproteins). Proteins: amino acids, peptides, levels of structures in proteins. Nucleic acids: Purines and Pyrimidines.DNA- double helix structure.Forms of DNA.RNA – structure of m-RNA, t-RNA and r-RNA.

TEXT BOOKS

1. Puri B.R. Sharma L.R. Kalia K.K. 2001. **Principles of Inorganic Chemistry**.23rd edition.ShobulalNagin Chand & Co.

2. Bahl B.S. and ArunBahl. 2012. **A text book of Organic Chemistry**. 21st edition. Sultan Chand & Co.

REFERENCE BOOKS

1. Puri B.R. Sharma L.R. Pathania M.S. 2008. **Principles of Physical**

Chemistry, Vishal Publishing Company.

2. Kamaraj P. and Arthanareeswari M. 2006. **Chemistry – A Technological**

approach.3rd edition Sudhandira Publications.

3. Chemistry. Chang R. 2007. **Chemistry**.10th edition.McGraw-Hill.

4. Solomon. G &Fryhle.C 2004. **Organic chemistry**.8th Edition.John Wiley Press.

5. Atkins & de Paula**.**2010. **Physical Chemistry**. 9th edition.Oxford Press.

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

பயனடைவுக்கல்வியின்விளைவாக 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 2- தாள் -	SEMESTER - II

Total Credits: 3
Hours per week: 5

செய்யுள் – உரைநடை – இலக்கிய வரலாறும் இலக்கணமும்

அலகு – 1

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

.2மூதுரை 10) ஔவையார்–பாடல்கள்6 -,7,9,10,14,16,17,23,26,30(

அலகு – 2

.1புரட்சிக்கவி –பாரதிதாசன்

அலகு – உரைநடை 3

1. சங்க நெறிகள்மாணிக்கம்.சுப.வ -
2. கர்ணனும் கும்பகர்ணனும் சேதுப்பிள்ளை.பி.ரா -
3. அறிவியலும் கலையும்வரதராசன்.மு -

அலகு – உரைநடை 4

1. வாழ்வியல் இயக்கம் – குன்றக்குடி அடிகளார்
2. பெரியார் உணர்த்தும் சுயமரியாதையும் சமதர்மமும் ஆனைமுத்து.வே -
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:

.1செய்யுள் திரட்டு – தமிழ்த்துறை வெளியீடு

.2இலக்கிய வரலாறு பேராசிரியர் முனைவர் பாக்யமேரி -

17UHL21H	HINDI-II	SEMESTER - II

Total Credits: 3
Hours per week: 5

Preamble:

1. To develop the writing ability and develop reading skill.
2. 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 अपाट्मेंट्स, 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 चेनैई -17

UNIT - IV

पत्र लेखन: (औपचारिक या अनौपचारिक)

17UML21M	MALAYALAM-II	SEMESTER-II

Total Credits: 3
Hours per week: 5

Preamble:

1. To develop the writing ability and develop reading skill.
2. 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

1. To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression
2. To Introduce the Culture, life style and the civilization aspects of the French people as well as of France
3. 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 • RÉCEPTION ORALE: Comprendre une description	• L'imparfait:: quel-Ques forms pour introduire le récit:Il faisait, il y avait, il Était • Un peu, beaucoup,

	• RÉCEPTION ÉCRITE: Comprendre un test • PRODUCTION ÉCRITE: écrire des cartes postales	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:

1. 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.

18UBT23A	CORE III: PRINCIPLES OF GENETICS	SEMESTER - II

Total Credits: 4
Hours Per Week: 5

Preamble:

1. To study the Mendelian and non Mendelian models of inheritance that govern passage of genetic traits across generation

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the history andconcept of Mendelian laws	K1,K2
CO2	Know the structure of chromosome, gene and its interaction	K1,K2
CO3	Identify with the natural horizontal gene transfer methods	K1,K2
CO4	Recognize chromosomal variations and genetic disorders	K1, K2 &K3
CO5	Realize the importance of pedigree analysis and genetic counseling	K1, K2 &K3

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	M	M	S
CO4	S	M	M	M	S
CO5	S	S	S	S	S

S-Strong: M-Medium; L-Low

18UBT23A	CORE III: PRINCIPLES OF GENETICS	SEMESTER - II

Total Credits: 4
Hours Per Week: 5

CONTENTS

UNIT- I (10Hours)

Mendelian Inheritance: History of Genetics, Mendel's work: Monohybrid Experiment, Dihybrid Experiment, Back Cross and Test Cross. **Non Mendelian Inheritance:** Chromosomal theory of Inheritance, Extranuclear inheritance (mitochondrial, chloroplast), Maternal inheritance, Uniparental inheritance.

UNIT- II (10 Hours)

Concept of Gene and Alleles: Gene vs Allele, Multiple Alleles, Pseudo alleles **Gene Interactions:** Allelic (Co-Dominance, Incomplete Dominance, Pseudo dominance), Non Allelic (Epistasis and Lethal genes). **Concept of Chromosome:**Loci on Chromosome, Structure of Prokaryote and Eukaryote chromosome, Karyotyping.

UNIT- III (10 Hours)

Mutation: Physical and Chemical. **Chromosomal Variations and Abberations:**Numerical – Euploidy and Aneuploidy; Structural – deletion, duplication, inversion and translocation.**Genetic Disorders :** Autosomal Dominant -Achondroplasia, polycystic kidney, Autosomal Recessive - Cystic fibrosis, Sickle cell Anaemia, X- Dominant - Rett syndrome, X linked recessive - Haemophilia, Trinucleotide repeat syndromes - Huntington's, Multifactorial - Cleft lip and palate.

UNIT- IV (10 Hours)

Natural Horizontal Gene Transfer Methods

Genetic analysis of bacteria - Bacterial transformation, Conjugation (sex factor, Hfr strain, F' factor), Transduction in Bacteria (General and Specialized), Linkage and Crossing over, Recombination- Holliday model.

UNIT- V (10 Hours)

Model organism for genetic analysis: Development ofDrosophila&Arabidopsis.**Transposons:** Transposable elements of Prokaryotes (IS Elements, Composite and Tn3 Family) and Eukaryotes (Maize transposable elements).**Population Genetics:** Gene frequency,

Calculation of Gene frequency, Hardy – Weinberg law, Pedigree analysis, Genetic Counseling.

TEXT BOOKS:

1. Strickberger, M. W. 2013. **Genetics.** 3rd edition. Prentice Hall College Division, New Delhi.
2. Gardner, E.J. 1991. **Principles of Genetics**. 8th edition. John Wiley and Sons Inc, New York.

REFERENCE BOOKS:

1. S.R. Maloy, J.E. Cronan, D. Friefelder, 1994.**Microbial Genetics.**2nd Edition.Jones and Bartlett Publishers.
2. N. Trun and J. Trempy, 2004. **Fundamental Bacterial Genetics,**Blackwell publishing.
3. Strachan T and Read A P, 2006. **Human molecular genetics**. 3rd Edition. Wiley Bios.
4. Winter, P.C., Hickey,G. I. and Fletcher, H.L. 2000. **Genetics**. 1st edition. Viva Books Pvt LtD
5. Brown, T. A. 1999.**Genetics**. 3rd edition. Chapman and Hall.

18UBT23P	CORE PRACTICAL II: GENETICS	SEMESTER - II

Total Credits: 2
Hours Per Week: 5

CONTENTS

1. Problem solving in Monohybrid and Dihybridcross
2. Isolation of Auxotrophic Mutants
3. Antibiotic Resistants by Gradient plate technique
4. Sex chromatin observation from Buccal smear
5. Effect of UV radiation on bacterial growth
6. Bacterial Transformation
7. Bacterial Conjugation
8. Determination of Phage Titre
9. Problem solving in Pedigree Analysis
10. Determination of Thermal death time
11. Determination of gene frequency using Hardy Weinberg law.
12. Isolation of DNA from cheek cells.
13. Agarose Gel Electrophoresis.
14. Preparation of polytene chromosome squashes from chironomus larvae

REFERENCE BOOKS:

1. Joseph Sambrook, Michael R. Green.2012. **Molecular Cloning: A Laboratory Manual.** 4th edition. Cold Spring Harbor.
2. Thomas R. Mertens and Robert L. Hammersmith. 1997. **Genetics Laboratory Investigations.** 11th edition. Benjamin Cummings.

18UBT2AA	ALLIEDII: BIOCHEMISTRY	SEMESTER – II

Total Credits: 3
Hours Per Week: 4

Preamble:

1. To learn the structure, function & interrelationship of various bio molecules & consequences of deviation from normal.
2. To study the integration of the various aspects of metabolism & their regulatory pathways.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts of biochemical pathwaysand carbohydrates	K1, K2
CO2	Know the classification, structure, properties and metabolism of aminoacids and protein	K1, K2
CO3	Discuss the classification, structure, properties, biosynthesis and oxidation of lipids	K1, K2
CO4	Learn the classification, structure, functions of nucleic acids and metabolism of nucleotides	K1, K2
CO5	Understand the classification of enzymes, Mechanism of action and enzyme kinetics	K2, K3

Mapping with Programme Outcomes

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

S-Strong; M-Medium; L-Low

18UBT2AA	ALLIED II : BIOCHEMISTRY	SEMESTER – II

Total Credits: 3
Hours Per Week: 4

CONTENTS

UNIT-I (10 Hours)

Basic concepts of Biomolecules

Carbohydrates: Structure and classification, Glycolysis- regulation, energetic and pathway of utilization of pyruvate and gluconeogenesis.Krebs's cycle and its regulation.Electron transport chain.Glyoxylate cycle. HMP shunt pathway interconversion of hexoses.

UNIT- II (10 Hours)

Protein

Amino acid: Essential and non essential amino acids,Properties and Metabolism of amino acids (Glycine and Tryptophan). **Protein**: Classification and Properties – four levels of protein structure & conformations, Ramachandran Plot, Structural categories of proteins. Relationship between structure and function and Properties.

UNIT-III (10 Hours)

Metabolism of Lipids

Lipids: Nomenclature, Classification and biological significance. Simple Lipids and Compound lipids.Synthesis and metabolism of fatty acids (α, β and ω Oxidation of fatty acids).Cholesterol Biosynthesis and regulation, Phospholipids.

UNIT- IV (8 Hours)

Metabolism of Nucleic acids

Nucleic acids: Classification, structure and functions of nucleic acids, Biosynthesis of Purines and pyrimidines -De novo pathway, Salvage pathway, Regulation and Metabolism of Purine and pyrimidine.

UNIT –V (12 Hours)

Enzyme kinetics

Enzymes: Nomenclature and Classifications of enzyme. Coenzymes, Abzymes, Ribozymes.Mechanism of enzyme actions - Active site, Lock and Key model & Induce fit Hypothesis, Enzyme substrate complex formation. Kinetics: Derivation of Michaelis- Menton equation, Activators, Types of

inhibitions - Competitive, Non Competitive, Uncompetitive, Feedback and Allosteric.

TEXTBOOKS:

1. Geoffery L Zubay. 1995. **Principles of Biochemistry**. 1st edition. WCB publishers.
2. Robert K.Murray, Victor W. Rodwell.2009.Harper's Illustrated Biochemistry, 28th edition, McGraw Hill publications

REFERENCE BOOKS:

1. Lehninger Albert. L , Nelson David. L and Cox Michael M,1993. **Principles of Biochemistry.** 2nd edition. CBS Publishers And Distributors, New Delhi.
2. Voet, D. and Voet, J. G. 1995. **Fundamentals of Biochemistry.** 2ndedition. John Wiley and sons inc.
3. G.F.Zubay, W.W.Parson, D. E. Vance,.**Principles of Biochemsitry**, Latest Edition.WBC Publishers.
4. Jeremy M. Berg, LubertStryer, John L. Tymoczko, Gregory J. Gatto. 2015. **Biochemistry**. 8th edition.Palgrave Macmillan Publications
5. Herbert J. Fromm, Mark Hargrove.2012.Essentials of biochemistry, Kindle edition, Springer publisher.

18UBT2AP	ALLIED- I: BIOCHEMISTRY	SEMESTER - II

Total Credits: 2
Hours Per Week: 4

CONTENTS

1. Estimation of Glucose by Anthrone method.
2. Estimation of Fructose by Dinitro Salicylic Acid method.
3. Estimation of Amino Acids by Ninhydrin method.
4. Estimation of Ascorbic acid by DNPH method.
5. Estimation of DNA by Diphenylamine method*
6. Estimation of RNA by Orcinol method*
7. Estimation of Protein by Lowry's method*
8. Estimation of Protein by Bradford's method*
9. Determination of lactate dehydrogenase activity in Liver tissues.
10. Detection of ATP from Animal tissue
11. Estimation of Saponification value
12. Identification of Carbohydrate (Glucose, Galactose and Starch) by Phenylhydrazine method.
13. Separation of Amino acids by Paper Chromatography.
14. Separation of Amino acids by Thin layer Chromatography.

***DBT STAR Scheme

REFERENCE BOOK:

1. Sadasivam, S. and Manickam,A.1996. **Biochemical Methods,**New Age International.
2. MaheswariNandha, 2016. Clinical Biochemistry and Parasitology, 3rd edition Jaypee Brothers Medical Publishers.

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. DeyA.K, 2002, **EnvironmentalChemistry.** NewDelhi–VileDasausLtd.
2. Gawande. E.N. **Value OrientedEducation.**Visionforbetterliving.NewDelhi, Saruptsons.
3. BrainTrust Aliyar, 2008, **ValueEducationforhealth, happinessandharmony.**Vethathiripublications, Erode.
4. IgnacimuthuS.J.S, 1999, **Valuesforlife.**BombayBetter Yourself.
5. Seetharam.R. (Ed), 1998 **,BecomingabetterTeacher**MadrasAcademicStaffCollege.
6. Grose.D.N , 2005, **Atext bookofValueEducation.** Dominant PublishersandDistributors, NewDelhi.
7. ShrimaliK.L, 1974,**ASearch forValuesinEducation**. Vikas Publishers, Delhi.
8. YogeshKumarSingh&RuchikaNath , 2005, **Value Education.** P.HPublishingCorporation, NewDelhi.
9. Venkataram&Sandhiya. N, 2001, **ResearchinValue Education.** APHPublishingCorporation, NewDelhi.
10. RuhelaS.P. **HumanValueandEducation.**Sterlingpublishers, NewDelhi.
11. BrainTrust Aliyar, 2004,**ValueEducationforHealth, Happinessand Harmony.**Vethathiripublications , Erode.
12. SwamiVivekananda, 2008, **PersonalityDevelopment.** AdvaitaAshrama,Kolkata.
13. SwamiJagadatmananda, **LearntoLive.**SriRamakrishnaMath, Chennai.

17UTL31T	CORE-PART I TAMIL	SEMESTER-3

Total Credits: 3
Hours Per Week: 4

குறிக்கோள்

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

பயனடைவுக்கல்வியின்விளைவாக 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(tamilknowledge)	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	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 3 - தாள் -	SEMESTER - III

Total Credits: 3

Hours per week: 4

2017201-8 ஆம் கல்வியாண்டு முதல் பயில்வோருக்குரிய பாடத்திட்டம்

இரண்டு ஆண்டுகள் தமிழ் பயிலும் மாணவர்களுக்கு உரியது)

(B.Sc. MICROBIOLOGY, BIOTECHNOLOGY, BIO- CHEMISTRY, CHEMISTRY,PHYSICS, MATHS, N&D, B.A. ENGLISHCA)

மூன்றாம் பருவம்

பகுதி 1-தமிழ் 3- தாள் -

காப்பியம் – சிற்றிலக்கியம் – நாடகம் – இலக்கிய வரலாறு – இலக்கணம்

அலகு 1-காப்பியங்கள்

.1சிலப்பதிகாரம் – மனையறம் படுத்த காதை

.2மணிமேகலை – வஞ்சிமாநகர் புக்க காதை

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

4. பெரிய புராணம் – அதிபத்தநாயனார் புராணம்

அலகு – சிற்றிலக்கியங்கள் 2

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

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

(503

.3திருக்குற்றாலக்குறவஞ்சி – வசந்தவல்லி பந்தாடிய சிறப்பு 6):(கண்ணிகள்4

அலகு – நாடகம் 3

.1குறிஞ்சிப்பாட்டு - இன்குலாப்

அலகு 4 -இலக்கிய வரலாறு

1 . காப்பியங்களின் தோற்றமும் வளர்ச்சியும்

2 சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும் .

3 நாடகத்தின் . தோற்றமும் வளர்ச்சியும்

5 -அலகுஇலக்கணம்

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

2 அணி . – உவமையணி, உருவக அணி, இல்பொருள் உவமையணி

.3அலுவலகம் சார்ந்த கடிதம் – விண்ணப்பங்கள், வேண்டுகோள், முறையீடு

பார்வை நூல்கள்:

.1 செய்யுள் திரட்டு தமிழ்த்துறை வெளியீடு –

.2குறிஞ்சிப்பாட்டு - இன்குலாப்– அன்னம் வெளியீடு

.3 தமிழ்இலக்கிய 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, निरारा, दिनकर, अज्ञेय)

प्रकाशक: जवाहर पुस्तकालय

सदर बाजार, मथुरा

उत्तरप्रदेश-281001

UNIT – II

हिन्दी साहित्य का इतिहास : (केवलआदिकाल 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

1. To develop the writing ability and develop reading skill.
2. 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**

1. 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

17UML31M	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

1. To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression.
2. To Introduce the Culture, life style and the civilization aspects of the French people as well as of France.
3. 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

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 des instructions • RÉCEPTION ORALE: Comprendre un message	• Ce/cet,cette,ces • Le verbe voir • Envoyer,appuyer • Les articles partitifs

	enregistré • RÉCEPTION ÉCRITE : Comprendre un article d'un magazine de consommateurs • PRODUCTION ÉCRITE : Écrire un règlement	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

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:

1. 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.

18UBT33A	CORE IV: MICROBIOLOGY	SEMESTER - III

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

1. Define the science of microbiology and general techniques used in the study of microorganisms.
2. Describe various beneficial activities of microorganisms to humans.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental concepts of microbiology	K1
CO2	Know the basics of media preparation and different sterilization techniques	K1, K2
CO3	Distinguish different phases in microbial growth and learn about nutritional classification	K2, K3
CO4	Discuss the structure, reproduction and the causative diseases of bacteria	K2, K3
CO5	Discuss the structure, reproduction and the causative diseases of virus	K2, K3

Mapping with Programme Outcomes

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

S-Strong; M-Medium; L-Low

18UBT33A	CORE – IV: MICROBIOLOGY	SEMESTER - III

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT - I

Basic concepts of Microbiology

History of Microbiology & Microscopy: Biogenesis Vs Abiogenesis, Contributions of Louis Pasteur, Robert Koch, Edward Jenner, Alexander Fleming. Microscopy: Light –Bright, Dark Field, Phase contrast, Fluorescence. Electron Microscopy – Scanning Electron Microscope (SEM), Transmission Electron Microscope(TEM).

UNIT - II

Media Preparation and Sterilization Techniques

Sterilization: Definition – Methods of sterilization -: Physical methods – Dry Heat(Hot Air Oven), Moist Heat(Autoclave), Cold sterilization and Chemical methods of sterilization. Culture Media – Definition – Different types of classification of media. Pure culture methods.

UNIT - III

Growth phases of microbes and their nutritional classification

Microbial Growth – Growth curve, Determination of Generation Time, Measurement of Growth – Viable count, Turbidometry and Direct Cell count. Nutritional classification of microbes.

UNIT IV

Bacteria – Structure and its causative diseases

Bacterial Structure,Reproduction of Bacteria. Diseases caused by Mycobacterium tuberculosis (Tuberculosis), Salmonella typhi (Typhoid), Vibrio cholera (Cholera), Clostridium tetani (Tetanus) and Staphylococcus aureus (Skin Infections).

UNIT V

Virus – Structure and its causative diseases

Virus structure, Classification (Baltimore), Reproduction – Generalized and Specialized, Diseases caused: HIV (AIDS), Hepatitis B Virus (Jaundice), Varicella zoster (Chicken Pox), H1N1Virus (Swine Flu) and Polio myelitis (Polio).

TEXTBOOKS:

1. Atlas M, Ronald. 1995. **Principles of Microbiology.** Mcgraw - hill Inc.
2. Michael Pelzar Jr.,. **Microbiology.** 5th edition. McGraw Hill Education (India) Pvt Ltd.

REFERENCE BOOKS:

1. Prescott, L.M., John P. Harley, Donald A. Klein. 2004**. Microbiology.** 6th edition. McGraw-Hill Science Publication.
2. Gerard J. Tortora.2012. **Microbiology: An Introduction**, 11th edition. Benjamin Cummings Publishers.

18UBT33P	CORE PRACTICAL- III: MICROBIOLOGY	SEMESTER - III

Total Credits: 2
Hours Per Week: 4

CONTENTS

1. Isolation of Bacteria from Soil.
2. Isolation of Fungi from Soil.
3. Isolation of Actinomycetes from soil.
4. Pure Culture methods.
5. Staining Techniques
    a. Gram
    b. Lacto phenol Cotton Blue
    c. Negative
    d. Endospore
6. Antibiotic Sensitivity Test.
7. Bacterial growth Curve by Turbidometry method.
8. Phenol co-efficient.
9. Slide culture technique.
10. Demonstration – 16S rDNA Sequencing*.
11. Methylene Blue Reduction test.

***DBT STAR College Scheme Experiment**

REFERENCE BOOKS:

1. Cappuccino. 2005. **Microbiology**: **A Laboratory Manual**, Pearson Education.
2. Kannan, N. 2002. **Laboratory Manual in General Microbiology.** Panima Publishers.

18UBT3AA	ALLIED III: BIOINFORMATICS	SEMESTER - III

Total Credits: 3
Hours Per Week: 4

PREAMBLE:

1. To provide a fundamental knowledge in bioinformatics and its applications in bioscience.

COURSE OUTCOMES

In the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	Impart knowledge on basics of bioinformatics and importance of multidisciplinary concept.	K1
CO2	Acquire knowledge on different databases and their characteristics	K1, K2
CO3	Gain insight on sequence alignment and gene finding and some related tools.	K1, K2, K3
CO4	Understand protein structures and related databases and visualization tools.	K2
CO5	Highlight the applications of bioinformatics to drug discovery.	K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT3AA	ALLIED III: BIOINFORMATICS	SEMESTER - III

Total Credits: 3
Hours Per Week: 4

CONTENTS

UNIT - I

Introduction

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

UNIT - II

Data bases

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

UNIT - III

Sequences and Phylogenetics

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

UNIT - IV

Protein prediction

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

UNIT - V

Drug discovery

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

TEXT BOOKS:

1. AH wood, T.K. Parry smith D. 2001. **Introduction to Bioinformatics**. Pearsoneducation Asia.
2. Rastogi S C. 2008. **Bioinformatics Methods and Applications: Genomics Proteomics and Drug Discovery**. 3rd edition, PHI Learning Pvt. Ltd., India.

REFERENCE BOOKS:

1. Mount D. 2004. **Bioinformatics: Sequence and Genome Analysis.** 2nd edition, University of Tuscan Press.
2. Ouellette BFF. and Baxevanais AD. 2004. **Bioinformatics: A practical Guide to the Analysis of Genes and Proteins**. 3rd edition, Wiley, John & sons.

18UBT3AP	ALLIED PRACTICAL- II: BIOINFORMATICS	SEMESTER - III

Total Credits: 2
Hours Per Week: 4

1. Retrieving articles using PubMed.
2. Retrieving a sequence of nucleotide
3. Identification of the location of a gene on a chromosome
4. Retrieving gene expression from Gene Expression Omnibus (GEO)
5. Retrieving structural data of a protein using PDB database
6. Retrieving Motif Information of a Protein Using Prosite
7. Pairwise alignment using BLAST
8. Global alignment of two sequences - Needleman-Wunsch Algorithm
9. Alignment of multiple sequences using ClustalW
10. Construction of a phylogenetic tree
11. Visualizing secondary structure of a protein.
12. Finding active site pockets of a given protein molecule
13. Retrieving details of a drug molecule
14. Protein ligand interaction Procedure

17UBT3SV	SKILL BASED COURSE – I: BASIC COMPUTER SKILLS	SEMESTER - III

Hours Per Week: 2

UNIT - I
MS - Office

Microsoft Word – Introduction - Basics in using MS Word - Formatting – Advanced features -Applications of MS Word. MS Power Point – presentation creation **-** Add visual enhancements - **w**ork with slides and slide text - add animations. MS Excel - Introduction – What is new in Excel – Tools in Excel –Calculations and operations – Formatting – Charts – Macros – advanced Excel usage. E - mail formats and ethics.

UNIT - II
Video Tutorials

Introduction to apps – downloading of apps – types – using app for documentary creation – creating short video lectures using apps to edit-applications of apps – advanced apps. Introduction of apps for audio effects – development of video screening with various effects.

UNIT - III
Biological Databases

Introduction - Scope – Types – Applications. Information retrieval from Biological Databases. Phylogenetic basics - Molecular Evolution and Molecular Phylogenetic - Terminology - Gene Phylogeny versus Species Phylogeny - Forms of Tree Representation – Procedure.

TEXT BOOKS:

1. Joan Lambert and Joyce Cox, 2013. **Microsoft Word 2013.** Microsoft Press.
2. Joan Lambert and Joyce Cox, 2013. **Microsoft PowerPoint 2013.** Microsoft Press.
3. Curtis D.Frye, 2013.**Microsoft Excel**. 2013. Microsoft Press.
4. A H Wood, T.K. Parry Smith D. 2001. **Introduction to Bioinformatics.** Pearson Education Asia.
5. https://animoto.com
6. https://videohive.net

17UFC3FA	பகுதி : 4 –அடிப்படைத்தமிழ்தாள் 1 : (Basic Tamil)	SEMESTER- III

இளங்கலைஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது 2018 – 2017

10)மற்றும் – 12 ஆம் வகுப்பு வரை தமிழ் மொழிப்பாடம் பயிலாதவர்களுக்கு

(பருவத் தேர்வு உண்டு)

அலகு .தமிழ் மொழியின் அடிப்படைக் கூறுகள் .1 :

அ) எழுத்துகள் :

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

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

அலகு குறிப்பு எழுதுதல் .2 :

- 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 –2சிறப்புத் தமிழ் : தாள் :1 (Advanced Tamil)	SEMESTER- III

இளங்கலைஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது 2018 – 2017
)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 (8-5.எண்.பா)

ஆ பாரதிதாசன் கவிதைகள்(

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

அலகு : 2 –புதுக்கவிதைகள்

- கம்பன் கவியரங்கக் கவிதை மேத்தா.மு -
- தமிழா நீ !பேசுவது தமிழாகாசியானந்தன் - !
- 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 கடிதங்கள் :4 – எழுதுதல்

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

அலகு பாடம் தழுவிய வரலாறு :5 –

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

வினாத்தாள் அமைப்பு முறை - **மொத்த மதிப்பெண்கள்50-**			
பகுதி –அ	சரியான விடையைத் தேர்வு செய்தல்	10x10=1	ஒவ்வொரு அலகிலும் இரண்டு வினாக்கள்
பகுதி –ஆ	அரைப்பக்க அளவில் விடையளிக்க	5x15=3	ஒவ்வொரு அலகிலும் ஒரு வினா
பகுதி –இ	இரண்டு பக்க அளவில் விடையளிக்க	5x25=5	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. InternationalSolidarityNetwork , 2006 ,"**KnowingOurRights**"Animprintof 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

UNITI

Making of Constitution - Constituent Assembly- Dr.RajendraPrasath-

Dr.B.R.Ambedkar - Salient features - Fundamental Rights.

UNITII

UnionExecutive-PresidentofIndia -Vice-President-PrimeMinister

-Cabinet- Functions

UNITIII

UnionLegislature-Rajiya Sabha -Lok Sabha -Functions and Powers

UNITIV

UnionJudiciary-Supreme Court- Functions-Rule oflaw

UNITV

State - Executive - Legislature – Judiciary – Role of Tamilnadu

Public Service Commission.

REFERENCE BOOKS:

1. Agharwal.R.C.1977,**National Moment and Constitutional Development.** NewDelhi.
2. ChapraB.R., 1970,**Constitution ofIndia.** New Delhi.
3. Rao B.V, 1975**. ModernIndianConstitution.**Hyderabad.
4. Nani Palkhivala ,1970, **Constitution ofIndia**,New Delhi.
5. KrishnaIyer, V.R., 2009, **Lawand Justice**. New Delhi.
6. ReferenceManual from theGovt. ofTamilnadu.

18UNM34E	NMEC –I: MUSHROOM TECHNOLOGY	SEMESTER - III

Total Credits: 2
Hours Per Week: 2

PREAMBLE:

1. To learn the structure, function & interrelationship of various mushroom varieties.
2. To study the cultivation process
3. To Understand the applications of Mushroom Technology

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the types and names of mushrooms	K1, K2
CO2	Know the classification, structure and properties of mushroom	K1, K2
CO3	Discuss the biosynthesis and benefits of each type of mushroom	K1, K2
CO4	Pros and cons of cultivation of mushroom	K1, K2
CO5	Understand the uses to develop as a skill or convert to business	K2, K3

Mapping with Programme Outcomes

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

S-Strong; M-Medium; L-Low

18UNM34E	NMEC –I: MUSHROOM TECHNOLOGY	SEMESTER - III

Total Credits: 2
Hours Per Week: 2

PREAMBLE:

1. To learn about the basics of Mushrooms, production and its applications

CONTENTS

UNIT - I

Basic concepts of Mushroom Technology

Mushroom Technology - Introduction, History and Scope. Edible and Poisonous Mushrooms. Importance and nutritive value of edible mushrooms. Mushroom research centers in India.

UNIT - II

Types of mushroom and its cultivation

Cultivation of button mushroom (Agaricus bisporus), milky mushroom (Calocybe indica), oyster mushroom (Pleurotus sajorcaju) and paddy straw mushroom (Volvariella volvcea).

UNIT-III

Production, Harvest and Storage methods

Isolation and culture of spores, culture media preparation. Production of mother spawn, multiplication of spawn - Inoculation Technique - Cultivation technology - Substrates, composting technology, bed, polythene bag preparation, spawning - Cropping - Mushroom production - Harvest - Storage methods and marketing.

TEXT BOOKS:

1. Krishnamoorthy, A.S et al., 1991. **Oyster Mushrooms.** Department of Plant Pathology, Tamil Nadu.
2. Suman B C, Sharma V P**.** 2007. **Mushroom Cultivation in India.**Daya Publishing House.

REFERENCE BOOKS:

1. NIIR Board of Consultants and Engineers. 2011. **Handbook on Mushroom Cultivation and Processing (with Dehydration, Preservation and Canning).** Asia Pacific Business Press Inc.
2. Biswas S. 2012. Mushrooms: A Manual for Cultivation. PHI Learning Private Limited-New Delhi.

18UBTSS1	ENVIRONMENT, HEALTH AND MANAGEMENT	SEMESTER: III

Total Credits: 1

PREAMBLE:

1. To study about Environmental Characters.
2. To understand types of Pollution and its management.
3. To gain insight about policies and standards.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	To create awareness on the ecosystem and cycling	K1, K2
CO2	To discuss the interrelationship of energy flow	K1, K2
CO3	To gain insight on the policies on pollution	K1, K2
CO4	To understand the pollution control mechanisms	K1, K2
CO5	To value ethics and sustainable developments	K2, K3

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	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

18UBTSS1	ENVIRONMENT, HEALTH AND MANAGEMENT	SEMESTER: III

Total Credits: 1

OBJECTIVES:

1. To study about Environmental Characters.
2. To study the various types of Pollution and its management.

CONTENTS

UNIT - I

Ecology - ecosystem and their types - definitions - environmental components and interrelationships - physical, chemical and biological characteristics of environment energy flow and materials cycling.

UNIT - II

Definition - source of pollution - types of pollution - air, water, soil, noise and radioactive pollution - environmental sanitation - environmental issues - global - national - regional and local.

UNIT - III

Prescribed environmental standards - WHO - Pollution Control Board – risk probability and hazards to humans - toxicology - chemical hazards - biological hazards: disease development and developing countries.

UNIT - IV

Pollution control methods - physical, chemical and biological - waste water treatment - activated sludge process, oxidation ponds and trickling filter - anaerobic process.

UNIT-V

Tool for environment management - Environmental Impact Assessment – waste minimization techniques - environmental planning in urban development – natural resources and sustainable development - environmental ethics.

REFERENCE BOOKS:

1. Kurian Joseph and R.Nagendra. 2004. **Essentials of Environmental Studies.** Pearson Education, New Delhi.
2. Tyler Miller.J.R. 2004. **Environmental Science.** Thomson Brooks/Cole, Singapore.
3. Suresh K.Dhameja. 2005. **Environmental Science and Engineering.** Kataria sons,Delhi.
4. Dubey.R.C. 2006. **Environmental Health Ecological Perspectives.** Jones and Bartlett Publishers, Singapore.

18UBTSS2	BIOFERTILIZER TECHNOLOGY	SEMESTER: III

Total Credits: 1

PREAMBLE:

1. To study about Biofertilizers.
2. To study the various microbial species.
3. To study morphological and biochemical characters of species.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	To understand the types of fertilizers	K1, K2
CO2	To comprehend the culturing methods of algae	K1, K2
CO3	To elucidate the morphology of algae and inoculums preparations	K1, K2
CO4	To gain knowledge on mass production of fertilizers	K1, K2
CO5	To discuss applications and limitations of composting	K2, K3

Mapping with Programme Outcomes

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

S-Strong; M-Medium; L-Low

18UBTSS2	BIOFERTILIZER TECHNOLOGY	SEMESTER: III

Total Credits: 1

OBJECTIVES:

1. To study about Biofertilizers.
2. To study the various microbial species.

CONTENTS

UNIT - I

An introduction to fertilizers, synthetic fertilizers, natural fertilizers, inorganic fertilizers, organic fertilizers, bio-fertilizers - importance, advantages and constraints.

UNIT - II

Isolation, culturing methods, enumeration and identification of microbial species - Rhizobium, Azospirillum Azotobacters, blue green algae and phosphate solubilisers.

UNIT - III

Morphology of Rhizobium, Azospirilium, Azotobacters, blue green algae and phosphate solubilisers and maintenance - inoculant preparation.

UNIT - IV

Preparation of microbial inoculants - large-scale production of microbes – their application as biofertilizers - crop responses to biofertilizers.

UNIT - V

Azolla - distribution, morphological and biochemical characteristics – cyanobacterial symbionts - azolla biofertilizer technology - organic matter and composting – method of processes, applications and limitations.

REFERENCE BOOKS:

1. N.S.Subba Rao. 2000. **Biofertilizers in Agriculture.** Oxford & IBH publishing Co., New Delhi.
2. Daniel Sundararaj, D. and G. Thulasidas. 1993. **Botany of Field Crops**. 2nd Edition. McMilan India Ltd.
3. Jeswani, L.M. and Balddev, B. 1990. **Advances in Pulse Production Technology.** ICAR, New Delhi.
4. Malsen, L.J.G.V. and S. Somaatmadja. 1993. **PROSEA - Plant Resources of South East Asia. No.1. Pulses.** International Book Distributors, Dehradun.

17UTL41T	தமிழ் தாள் 4	SEMESTER - IV

Total Credits: 3
Hours Per Week: 4

குறிக்கோள்:

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

பயனடைவுக்கல்வியின்விளைவாக 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 Outcome

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

17UTL41T	தமிழ் தாள் 4	SEMESTER - IV

Total Credits: 3
Hours Per Week: 4

பகுதி -1- தமிழ் தாள்- 4
நான்காம் பருவம்
சங்க இலக்கியம் புதினம் – இலக்கிய வரலாறு - இலக்கணம்

அலகு - 1 எட்டுத்தொகை

1. குறுந்தொகை
   - (பாலை, பா :எண். 27 – வெள்ளிவீதியார் (
   - (குறிஞ்சி, பா : எண் . 32 – அள்ளூர் நன்முல்லையார்(
   - (நெய்தல், பா : எண். 57 – சிறைக்குடி ஆந்தையார் (
   - (மருதம், பா :எண். 61 – தும்பிசேர்கீரன் (
   - (முல்லை, பா :எண். 167 – கூடலூர்கிழார் (
2. கலித்தொகை
   - (பாலைக்கலி, பா: எண் .9 – பெருங்கடுங்கோ(
3. அகநானூறு
   - (மருதம்,பா :எண் . 86 – நல்லாவூர் கிழார்;
   - குறிஞ்சி,பா எண். 198 – பரணர் (
4. புறநானூறு
   - (பா .எண். 188 – பாண்டியன் அறிவுடைநம்பி,
   - பா.எண். 192 – கணியன் பூங்குன்றனார்,
   - பா : எண். 279 – ஒக்கூர் மாசாத்தியார்,
   - பா :எண். 312 - பொன்முடியார்(

அலகு - 2 2 பத்துப்பாட்டு

- பட்டினப்பாலை – கடியலூர் உருத்திரங்கண்ணனார்

அலகு - 3 புதினம்

- ஆத்தங்கரை ஓரம் இறையன்பு.வெ - (புதினம்)

அலகு - 4 இலக்கிய வரலாறு

- எட்டுத்தொகை நூல்கள்
- பத்துப்பாட்டு நூல்கள்
- புதினத்தின் தோற்றமும் வளர்ச்சியும்

அலகு -5 இலக்கணம்

- அகத்திணை அன்பின் ஐந்திணை)– விளக்கம் (
- புறத்திணை – விளக்கம்)12 திணைகள்(

பாட நூல்

1. செய்யுள் மற்றும் உரைநடைத் திரட்டுதொகுப்பு :
   தமிழ்த் துறை, டாக்டர் என்கலை மற்றும் அறிவியல் கல்லூரி .பி.ஜி .,
   வெளியீடு நியூ செஞ்சுரி புக் ஹவுஸ் :, சென்னை – 600 098.

பார்வை நூல்கள்

1. ஆத்தங்கரை ஓரம் – வெஇறையன்பு.
2. தமிழ் இலக்கிய வரலாறு – பேராசிரியர் முனைவர் பாக்யமேரி

17UHL41H	PART I- HINDI-IV	SEMESTER - IV

Total Credits: 3
Hours Per Week: 4

Preamble:

1. To develop the writing ability and develop reading skill.
2. 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

17UHL41H	PART I- HINDI-IV	SEMESTER - IV

Total Credits: 3
Hours Per Week: 4

CONTENTS

UNIT – I

नाटक – लडाई–सर्वेश्वरदयाल सक्सेना

प्रकाशक: वाणीप्रकाशन

21-A, दरियागंज

नई दिल्ली-110002

UNIT – II

एकांकी : एकांकी पंचामृत– डॉ राम कुमार

(भोर और तारा छोड्कर)

प्रकाशक: जवाहर पुस्तकालय

सदर बाजार, मथुरा

उत्तरप्रदेश-281001

UNIT – III

साधारण निबंध

प्रकाशक: आदर्श निबंध

विनोद पुस्तक मंदिर

आगरा-282002

17UML41M	PART I- MALAYALAM-IV	SEMESTER- IV

Total Credits: 3
Hours Per Week: 4

Preamble:

1. To develop the writing ability and develop reading skill
2. 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

17UML41M	PART I- MALAYALAM-IV	SEMESTER- IV

Total Credits: 3
Hours Per Week: 4

CONTENTS

Drama & Folklore Paper IV. Drama & Folklore

Unit I, II & III
A Drama

Unit IV & V
Folklore

TEXT BOOKS:

1. Unit I, II & III Lankalakshmi – C. N. Sreekantan Nair (D.C. Books, Kottayam).
2. Amkapurappadu – From Vadankkanpattu Folk song. By Thikkurissi Gangadharan.

REFERENCE BOOKS:

1. Natyasasthram, K.P. Narayana Pisharodi, Trans. (Kerala Sahithya Akademi, Thrissur).
2. Malayala Nataka Sahithya Charithram, G. Sankara Pillai (Kerala Sahithya Akademi, Thrissur).
3. Malayala Nataka Sahithya Charithram, Vayala Vasudevan Pillai (Kerala Sahithya Akademi Thrissur).
4. Natakam – Oru Patanam (C. J. Smaraka Prasanga Samithi, Koothattukulam).
5. Natakaroopacharcha, Kattumadam Narayanan (NBS, Kottayam)
6. Folklore – Raghavan Payyanadu (Kerala Bhasha Institute, Trivandrum)

17UFL41F	PART I- FRENCH-IV	SEMESTER-IV

Total Credits: 3
Hours Per Week: 4

Preamble:

1. To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression
2. To Introduce the Culture, life style and the civilization aspects of the French people as well as of France

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

17UFL41F	FRENCH-IV	SEMESTER-IV

Total Credits: 3
Hours Per Week: 4

CONTENTS

Compétence Culturelle	Compétence de Communication	Compétence Grammatical
UNITÉ 6 – Problémes problems		
• Le bénvolat	• INTERACTION ORALE: Interroger sur la tristesse, I'abattement, exprimer sa sympathie, rassurer • RÉCEPTION ORALE: Comprendre une interview à la radio • RECEPTION ÉCRITE: Comprendre un test de magazine • PRODUCTION ÉCRITE: Écrire une letter a un(e) amie	• Les pronoms indfinis rien, quelque chose • Le verbe crier • Du pluriel: eau, eu, al • Se soigner, s'excuser, se renseigner, s'appeler • La phrase ngative: ne… plus, ne… jamais, ne… rien, ne… personne
UNITÉ 7 – C'est qui? C'est comment?		
• Les classes socials	• INTERACTION ORALE: Décrire quelqu'un • RECEPTION ORALE: Comprendre un bulletin météo • RECEPTION ÉCRITE: Comprendre une courte interview • PRODUCTION ÉCRITE: Écrire des notices biographiques	• Les adjectifs qualificatifs: Formes au masculin et au féminin • ll fait beau, il neige, il pleut… • Le verbe décrier • Les verbs en –indre • Les adjectifs possessifs féminins mon, ton, son devant voyelle ou h
UNITÉ 8 – Et après? Et après		
• La mémoire et l'histoire	• INTERACTION ORALE: Raconter une anecdote, une histoire, attire l'attention • RÉCEPTION ORALE:	• L'imparfait(2) • Les verbs en – oir • Les pronoms démonstratifs ça et cela

	Comprendre une interview à la radio • RÉCEPTION ÉCRITE: Comprendre des faits divers • PRODUCTION ÉCRITE: Écrire une bréve	• Prés de… Loin de… • La forme passive
UNITÉ 9 – Sûr et certain		
• L'université en France	• INTERACTION ORALE Expreimer un point de vue, exprimer une certitude • RÉCEPTION ORALE : Comprendre et apprecier un poème • RÉCEPTION ÉCRITE : Comprendre un appel à participer à la vie collective • PRODUCTION ÉCRITE : • Ecrire une letter de motivation	• Le futur des verbes parler, Avoir,être,voir • Le verbe valoir • Par • Les pronoms démonstratifs celui-ci, cella –là
UNITÉ 10 – Peut –être…peut-être		
• Le système de santé en France	• INTERACTION ORALE : Exprimer une incertitude, exprimer l'évidence • RÉCEPTION ORALE : Comprendre et apprecier une chanson • RECEPTION ÉCRITE : Comprendre un débat d'idées • PRODUCTION ÉCRITE : Écrire au courier des lecteurs	• Les pronoms personnels objets,indirect lui, leur • L'impératif affirmative + COD et COL • Les verbes en – ayer • Linterrogation à inversion

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.

17UEG42G	Part II- ENGLISH- IV	SEMESTER- IV

Total Credits: 3
Hours Per Week: 4

PREAMBLE:

1. To develop and enrich English language competencies of students in Functional English

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

CO Number	CO Statement	Knowledge Level
CO 1	Infer the prose works of R.K.Narayan, Stephen Leacock and Kasturi Sreenivasan.	**K2**
CO 2	Compare Indian poetry with British Poetry.	**K4**
CO 3	Analyse the themes in similitude by understanding the short stories.	**K4**
CO 4	Organize role plays after understanding the one act plays.	**K3**
CO 5	Test for Functional Grammar, Interviews skills, Group Discussions and Presentations.	**K4**

MAPPING WITH PROGRAMME OUTCOMES

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

S – Strong, M – Medium, L – Low

17UEG42G	Part II- ENGLISH- IV	SEMESTER- IV

Total Credits: 3
Hours Per Week: 4

CONTENTS

UNIT I – PROSE

Sweets for Angels – R.K. Narayan's - Biography- Narrative structure- Exploration of the text- passage analysis- insight of ideas- cohesion and context- style- language techniques

How to be a Doctor – Stephen Leacock's - Biography- Narrative structure- Exploration of the text- passage analysis- insight of ideas- cohesion and context- style- language techniques

I prepared to go to Coimbatore – Kasthuri Srinivasan's - Biography- Narrative structure- Exploration of the text- passage analysis- insight of ideas- cohesion and context- style- language techniques

UNIT II – POETRY

The Road Not Taken – Robert Frost's - Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques

Ode on a Grecian Urn – John Keats's - Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques

Indian Weavers – Sarojini Naidu's - Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques

UNIT III – SHORT STORIES

The Monkey's Paw – W.W. Jacobs's biography - Background- Setting- Plot overview- Characters- Themes, Symbols and Motifs - Critical analysis

The Imp and the Crust – Leo Tolstoy's biography - Background- Setting- Plot overview- Characters- Themes, Symbols and Motifs - Critical analysis

The Doll's House – Katherine Mansfield's biography - Background- Setting- Plot overview- Characters- Themes, Symbols and Motifs - Critical analysis

UNIT IV – ONE ACT PLAYS

Never Never Nest – Cedric Mount's biography- Plot Summary- Detailed summary and Analysis- Themes- Important Quotations- Characters- Description- analysis- Terms- Symbols- Critical analysis

The Bishop's Candlesticks – Norman Mckline's biography- Plot Summary- Detailed summary and Analysis- Themes- Important Quotations- Characters- Description- analysis- Terms- Symbols- Critical analysis

UNIT V – FUNCTIONAL ENGLISH

Preparing for Interviews
Preparing for group discussions
Presentations

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.

18UBT43A	CORE V: IMMUNOLOGY	SEMESTER - IV

Total Credits: 4
Hours Per Week: 5

PREAMBLE:

1. To learn the cells of immune system
2. To impart knowledge on different techniques in immunology.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental concepts in immunology	K1
CO2	Know the basics of Immune Response and Transplantation Technology	K1, K2
CO3	Discuss and distinguish different antigen antibody interactions, Allergic reactions and Tumour immunology	K2, K3
CO4	Learn about different antibody production techniques	K2, K3
CO5	Awareness on types of vaccines and its significance	K2, K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium; L-Low

18UBT43A	CORE - V: IMMUNOLOGY	SEMESTER - IV

Total Credits: 4
Hours Per Week: 5

CONTENTS

UNIT - I

Basic concepts of Immunology

History and scope of immunology - types of immunity - primary and secondary lymphoid organs - immunoglobulin structure - function and synthesis; memory cells, idiotypic network, lymphocyte differentiation.

UNIT - II

Types of immune response

Complement systems - structure and function of MHC class I and II molecules - antigen recognition and presentation - Humoral and Cell mediated immune responses - immune suppression and immune tolerance - Transplantation immunology- Graft rejection.

UNIT - III

Hypersensitivity and Tumor immunology

Antigen- antibody reaction, Hypersensitivity - IgE mediated, antibody mediated, immune complex mediated and delayed type hypersensitivity. Tumor immunology- tumor associated antigens, Immune response to tumor. Auto immune disorders.

UNIT - IV

New Generation Antibodies

Hybridoma and monoclonal antibody production, immune diagnosis and applications - human monoclonal antibodies, catalytical antibodies - complement fixation - assessment of immune complexes in tissues.

UNIT- V

Vaccinology

Vaccines- Immunization types- Vaccine types- live attenuated vaccines, killed vaccines and purified polysaccharide vaccines- toxoid vaccines - recombinant vaccines and DNA vaccines.

TEXT BOOKS:

1. Kuby, J. 2003. **Immunology**.5th edition. W.H. Freeman and Company.
2. Rao, C.V. 2002. **Textbook of Immunology.**1st edition. Narosa Publishing House.

REFERENCE BOOKS:

1. Ivan Riot.1988. **Essentials of Immunology.** 6th edition. Blackwell Scientific Publications.
2. Tizard.1995. **Immunology**. 4th edition. Saunders college publishers.
3. Nandini Shetty.2005.**Immunology: Introductory Textbook**. 2nd edition.Newage Publishers.
4. Ramesh. 2016. **Immunology**. 1st edition. McGraw Hill Education India Private Limited.
5. Ed Harlow, David Lane. 1988. **Antibodies Laboratory Manual**, Cold Spring Harbor, Laboratory Press.

18UBT43P	CORE PRACTICAL – IV: IMMUNOLOGY	SEMESTER - IV

Total Credits: 2
Hours Per Week: 5

CONTENTS

1. Methods of Animal Handling
2. Methods of immunization
3. Blood grouping and Rh typing
4. Preparation of Serum
5. Precipitin ring test
6. Single Radial Immuno diffusion
7. Double Radial Immuno diffusion
8. Immuno electrophoresis
9. Rocket Immuno electrophoresis
10. WIDAL Test
11. ELISA
12. HCG test
13. Preparation and quantification of Immunoglobulin*.

*** DBT STAR College Scheme Experiments**

REFERENCE:

1. Ivan Lefkovits. 1996. **Immunology Methods Manual: The Comprehensive Sourcebook of Techniques.** 1st edition. Academic Press Inch.

2. Jack Bradshaw,L. 1995. **Laboratory Immunology.** 2nd Edition. Saunders College Publishing.

17UMT4AC	ALLIED-IV: MATHEMATICS	SEMESTER – IV

Total Credits :3
Hours Per Week: 4

PREAMBLE:

1. To understand the basic concepts of Mathematics and applications of Statistical and Numerical Techniques of Mathematics.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn about Set Theory	K1
CO 2	Learn about Matrices	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 Probability	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	M	S	S	S
CO 2	S	S	M	S	S
CO 3	M	S	S	S	S
CO 4	M	S	S	S	S
CO 5	M	S	S	S	S

S- Strong; M-Medium; L-Low

17UMT4AC	ALLIED-IV: MATHEMATICS	SEMESTER – IV

Total Credits :3
Hours Per Week: 4

CONTENTS

UNIT – I

Set Theory - Definition - Notations - Description of sets- Types of sets - Venn Diagrams - Set operations - Laws and properties of sets - Number of elements (Sums involved in two sets only) –Permutation – Combination.

UNIT - II

Matrix: Basic Concepts - Types of Matrices - Addition and Multiplication of Matrices – Determinants - Crammer's Rule - Inverse of a Matrix - Matrix Method - Rank of Matrix.

UNIT- III

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

UNIT- IV

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

UNIT- V

Interpolation – Binomial, Newton's and Lagrange's methods **-** Probability - Concept and Definition – Addition and Multiplication theorems of Probability (Statement only) - Simple problems based on Addition and Multiplication theorems only.

TEXT BOOKS:

1. Navnitham, P.A. 2013. **Business Mathematics & Statistics.** Jai Publishers, Trichy.

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.

18UBT4SA	SKILL BASED COURSE- II: MOLECULAR TECHNIQUES	SEMESTER - IV

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

1. To study the function and application of several common measurement systems used in Biotechnology.
2. To learn the technical vocabulary associated with instrumentation and design and basic signal analysis

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the Principle and the types of Centrifugation	K2, K3
CO2	Classifying the chromatographic techniques and analyzing its applications	K3, K4
CO3	Imparts knowledge on the Electrophoresis and Blotting Techniques	K3, K4, K5
CO4	Focus on Spectroscopic Techniques and it's applications	K4, K5
CO5	In depth understanding of Radio-isotopic Techniques and its applications	K4, K5

Mapping with Programme Outcomes

COs/Pos	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

18UBT4SA	SKILL BASED COURSE- II: MOLECULAR TECHNIQUES	SEMESTER - IV

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT - I
Centrifugation

Sedimentation Principle, Types of rotors, Preparative and Analytical Centrifuges, Density Gradient Centrifugation, Differential centrifugation.

UNIT - II
Chromatography Techniques

Theory and Application of Paper Chromatography, TLC, Gel Filtration Chromatography, Ion Exchange Chromatography, Affinity Chromatography, GLC and HPLC.

UNIT - III
Electrophoresis Techniques

Theory and Application of PAGE, Agarose Gel Electrophoresis, 2D gel electrophoresis, Iso-electric Focusing, Immuno diffusion, Immuno Electrophoresis, ELISA, RIA, Southern, Northern and Western Blotting.

UNIT -IV
Spectroscopic Techniques
Theory and Application of UV and Visible Spectroscopy, Fluorescence Spectroscopy, MS, NMR, ESR, Atomic Absorption Spectroscopy.
UNIT - V
Radio-isotopic Techniques

Introduction to Radioisotopes and their Biological Applications, Radioactive Decay – Types and Measurement, Principles and Applications of GM Counter, Solid and Liquid Scintillation Counter, Autoradiography.

TEXT BOOKS:

1. Sawhney, S.K. & Randhir Singh. 2006. **Introductory Practical Biochemistry**. 3rd edition. Narosa publishing House.
2. Boyer, Rodney F Benjamin and Cummins. 2001. **Modern Experimental Biochemistry**, 2nd edition. Pearson Education.

REFERENCE BOOKS:

1. Freifelder, D. 1982. **Physical Biochemistry**: **Application to Biochemistry and Molecular Biology.** 2nd edition. W. H. Freeman Publishers.
2. Walker, J. & Wilson, K. 2000. **Principle & Technique – Practical Biochemistry**, 5th edition. Cambridge university press.
3. Rakesh S. Sengar , Amit Kumar , Reshu Chaudhary , Ashu Singh . 2018.**Advances in Molecular Techniques**. 1 edition. CRC Press
4. Walt Ream, Katharine G. Field.**Molecular Biology Techniques: An Intensive Laboratory.**1998.Academic Press.
5. Stefan Surzycki.**Basic techniques in molecular biology**. 2000.Springer.

17UFC4FA	பகுதி – 4: தமிழ்த் தாள் - 2 அடிப்படைத் தமிழ்	SEMESTER - IV

[illegible]: 2
[illegible]: 2

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

அலகு 1 :நீதி நூல்கள்

- ஆத்திசூடி 12 – முதல்)பாடல்கள் – (அறம் செய விரும்பு முதல் " வரை "ஒளவியம் பேசேல்
- கொன்றை வேந்தன் 7 – முதல்)பாடல்கள் அன்னையும் பிதாவும் -(வரை "முதல் எண்ணும் எழுத்தும் கண் எனத் தகும் "முன்னறி தெய்வம்
- திருக்குறள் 6)பாடல்கள் (
    - அகர முதல (1) .....,
    - மனத்துக் கண்(34).....
    - இனிய உளவாக (100).....,
    - தீயவை தீய பயத்தலான் (202)..
    - கற்க கசடற (391).....,
    - கண்ணோடு கண்ணினை(1100)..

அலகு 2 :

அ எளிய நீதிக்கதைகளும் வாழ்க்கை முறைகளும் (

- நீதிகாத்த மன்னன்
- சிங்கமும் முயலும்
- புத்திசாலி உழவனும் போக்கிரிப் பூதமும்
- தேனியும் புறாவும்
- முயல் கூறிய தீர்ப்பு

ஆதமிழகப் (பண்பாடுகள் சொற்களைத்) : தொடராக்குதல்(

- தமிழர் விழாக்கள் பொங்கல்), ஆடிப்பெருக்கு(
- தமிழர் கலைகள் தெருக்கூத்து), ஓவியம், சிற்பம்,)
- தமிழர் விளையாட்டுகள் (ஏறுதழுவுதல், சடுகுடு)

17UFC4FB	பகுதி – 4: சிறப்புத் தமிழ்த் தாள் – 2	SEMESTER – IV

Total Credits: 2

Hours Per Week: 2

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

(பருவத் தேர்வு உண்டு)

அலகு - 1: திருக்குறள்

அ) அறத்துப்பால்

- இனியவை கூறல் (அதிகார எண் : 10)
- அடக்கமுடைமை (அதிகார எண் : 13)

ஆ) பொருட்பால்

- கல்வி (அதிகார எண் : 40)
- உழவு(அதிகார எண் : 104)

இ) இன்பத்துப்பால்

- தகையணங்குறுத்தல் (அதிகார எண் :109)
- பிரிவாற்றாமை (அதிகார எண் : 116)

அலகு - 2 : உரைநடை (கட்டுரைத்தொகுப்பு)

- "இளைஞர்களின் ஒளிமயமான எதிர்காலத்திற்கு " கு.வெ .பாலசுப்பிரமணியம்

அலகு - 3 : காப்பியமும் ஊடகமும்

அ) குறிப்புகள் எழுதுதல்

- சிலப்பதிகாரம், மணிமேகலை, கம்பராமாயணம் மற்றும் பெரியபுராணம்

ஆ)காட்சி ஊடகங்கள்

- தொலைக்காட்சி, திரைப்படம், இணையம், முகநூல், கீச்சகம் மற்றும் கட்செவி அஞ்சல்

அலகு - 4: இலக்கணம்

- வழக்கறிதல் (இயல்பு வழக்கு, தகுதி வழக்கு)

அலகு -5 : படைப்பாற்றல் பயிற்சி

" கவிதை,கட்டுரை எழுதச்செய்தல்

17UFC4FC	PART-IV: GENERAL AWARENESS	SEMESTER - IV

Total Credits: 2
Hours Per Week: 2

CONTENTS

1. Verbal Aptitude
2. Numerical Aptitude
3. Abstract Reasoning
4. Tamil And Other Literature
5. General Science And Technology And Education
6. Computer Science
7. Economics And Commerce
8. History And Freedom Struggle
9. Sports
10. Current Affairs

18UNM44E	NMEC –I: APICULTURE	SEMESTER - IV

Total Credits: 2
Hours Per Week: 2

PREAMBLE:

1. To learn the basics of apiculture.
2. To study the cultivation process
3. To Understand the applications of apiculture

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understanding the concepts of apiculture mushrooms	K1, K2
CO2	Know the classification and types of apiculture	K1, K2
CO3	Discuss the pros and cons of rearing bees	K1, K2
CO4	Transform into a business	K1, K2
CO5	Understand the uses and applicaitons	K2, K3

Mapping with Programme Outcomes

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

S-Strong; M-Medium; L-Low

18UNM44E	NMEC –II: APICULTURE	SEMESTER - IV

Total Credits: 2
Hours Per Week: 2

PREAMBLE:

1. To learn about the lifecycle of honey bees, production and applications of honey

CONTENTS

UNIT - I

History

History of Bee keeping – Present status of Apiculture in India – species of honey bees.

UNIT - II

Lifecycle and Cultivation

Bee colony, Castes. Natural colonies and their yield. Types of beehives – structure – location, care and management. Products of Apiculture Industry and its Uses (Honey, Bees Wax, Propolis), Pollen etc.

UNIT - III

Social status of Apiculture

Bee foraging: Pollen and nectar yielding plants. Honey Extraction, seasonal maintenance. Economics of Apiculture and Management. Honey yield in national and international market. Prospects of apiculture as self-employment venture.

TEXT BOOKS:

1. Ghosh G. K. 1998. **Beekeeping in India.** Ashish Publishers.
2. Abrol D. P. 2010. **A Compressive Guide to Bees and Beekeeping**. Scientific Publishers.

REFERENCE BOOKS:

1. Singh Dharm Singh Devender Pratap.2006. **A Handbook of Beekeeping**. Agrobios (India).
2. NPCS Board of Consultants & Engineers. 2015. **The Complete Book on Beekeeping and Honey Processing.** 2nd edition. NIIR Project Consultancy Services.

18UBT53A	CORE - VI: RECOMBINANT DNA TECHNOLOGY	SEMESTER - V

Total Credits: 4

Hours Per Week: 4

PREAMBLE:

To understand the guidelines for Recombinant DNA Technology research which involves all the molecular Biology techniques and to study about different Cloning techniques.

COURSE OUTCOMES

In the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	Understand the steps in recombinant DNA preparation, introduction and selection	K1,K2
CO2	Explain the features of various types of bacterial cloning vectors	K1, K2
CO3	Explain the features of various types of cloning vectors for yeast, animal and plants	K1,K2
CO4	Describe and apply various molecular techniques	K2, K3
CO5	Demonstrate the different applications of recombinant based products	K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT53A	CORE - VI: RECOMBINANT DNA TECHNOLOGY	SEMESTER - V

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT-I

Fundamentals of recombinant DNA technology

History and scope of rDNA technology, Strategies of cloning, Cutting and Joining of DNA- Linkers and Adapters, other enzymes involved in cloning, Features of host cell. Selectable and Screenable markers used in recombinant DNA technology.

UNIT – II

Cloning vectors for Bacteria

Plasmids - properties of plasmid, types of plasmids, plasmid compatibility and incompatibility, copy number and its control. Features of Bacterial Vectors, *E.coli* vectors- pBR322 and pUC vectors, Bacterial Artificial Chromosome (BAC). Cloning in *Bacillus*.

UNIT-III

Viral vectors and other special vectors

Viral Vectors Lambda Phage vectors, cosmid, phagemid, M13. Yeast vectors – YIP, YEP, YRP and YAC. Animal vectors- SV40 Vectors, Retero viral and Baculo viral vectors. Plant Vectors- Ti plasmid as a gene vector, expressionvectors and shuttle vectors.

UNIT-IV

Molecular techniques and their applications

Construction of cDNA and genomic DNA libraries. PCR and its types. DNA Sequencing, Probes - probe construction and labeling. Introduction of cloned genes into cell – transformation, particle bombardment, liposome

mediation, and electroporation. Blotting techniques Southern, Western and Northern blotting. Micro array.

UNIT-V

Applications of Recombinant DNA based products

Recombinant DNA based products – Humulin, Somatotropin, Erythropoietin, Tissue Plasminogen activator, Factor-VIII and Interferon. Ethical issues in GM products, Institutional Animal Ethics Committee, Recombinant DNA Advisory Committee and Institutional Bio safety Committee.

TEXT BOOKS:

1. *Brown, T. A.* 1998. **Introduction to Gene Cloning**. 3rd edition. Stanley Thornes Publishing Ltd.
2. *Primrose, S. B.* 2003. **Principles of Gene Manipulation**. 6th edition. Blackwell Science Ltd.

REFERENCE BOOKS:

1. *Ernst. L. Winnacker.* 2003. **From Genes to Clones**. 2nd edition. Panima Publishing Corporation.
2. *James. D. Watson.* 2001. **Recombinant DNA technology**. 2nd edition. WH Freeman and company.

18UBT53B	CORE – VII: MICROBIAL BIOTECHNOLOGY	SEMESTER - V

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

To recognize the fundamentals of Microbial Biotechnology and to analyze the bioprocess paradigm: Scale-down, bioprocess simulation and economics, sterilization in biological manufacturing.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic principles of Microbial Biotechnology	K1
CO2	Explain the features of various types of	K1, K2
CO3	Explain the production and development of microbial products	K1,K2
CO4	Understand the application of microbes in agricultural techniques	K2, K3
CO5	Demonstrate microbial product testing and finishing	K3

Mapping with Programme Outcomes

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

18UBT53B	CORE – VII: MICROBIAL BIOTECHNOLOGY	SEMESTER - V

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT-I

Basics of Microbial Biotechnology

History and scope of Microbial biotechnology, basic principles of microbial biotechnology. Strategies for Microbial product development - Microbial biomass, enzymes, metabolites, recombinant products, transformation process. Upstream and Downstream processing

UNIT-II

Fermentation techniques

Fermentation - Types of fermentations- Aerobic and anaerobic fermentation, Submerged and solid state fermentation. Basic structure and types of fermentor. Submerged fermentation types - Batch, continuous and fed batch - CSTR, Tower fermenter, Jet loop, Air lift, Bubble column, Packed bed. Solid state fermentation types - Tray fermenter, Column fermenter, and Drum fermenter. Factors affecting submerged and solid state fermentation.

UNIT-III

Microbial Product development

Recent developments in the production of valuable microbial products - organic acids (Citric acid, Lactic acid and Acetic acid), amino acids (Glutamic acid, lysine and Tryptophan), probiotics, healthcare products (β Lactam Antibiotics, Peptide antibiotics, Vitamin B12 and Riboflavin) and edible biomass.

UNIT-IV

Microbes in agriculture

Microbes in agribiotechnology (livestock and transgenic plants); Bio-insecticides, Biofertilizer, Bio-inoculants manufacture. Microbes in production of alternative energy; Bioprospecting of microbial endophytes.

UNIT-V

Product regulations

Finished Product Testing - Writing product specifications - Conditions and options for finished product testing, distributors – product storage - packaging, distribution. Definition of GMP, Principles and Importance of GMP, Quality management, Personnel, Risk management, Quality control, Documentation, Inspections. GMP regulations - USFDA, Europe, Japan, ICH, PICS/S, WHO.

TEXT BOOKS:

1. *Glazer***.**2008. **Microbial Biotechnology.** 2nd edition. Cambridge University Press
2. *Jose Luis Barredo*. 2005. **Microbial Enzymes and Biotransformations**.Humana Press
3. *VarunShastri.* 2006. **Industrial Biotechnology**. 1st Edition. Isha Press.

REFERENCE BOOKS:

1. *Stanbury, A. H., Whittaker, A and Hall, S. J.* 1995. **Principles of fermentation Technology**. 2nd edition. S.J. Pergamon Press.
2. *El-Mansi, E.M.T, Bryce, C. F., A, Arnold L. Demain,* and *Allman, A.R.* 2011. **Fermentation Microbiology and Biotechnology**. 3rd edition.CRC Press.
3. *Reddy M VijayaBhaskara,Sasikala P ,Dileep Kumar Reddy P.*2013.**Agriculture Microbiology**. 1st Edition.Lambert Academic Publishing.

18UBT53C	CORE - VIII: PLANT BIOTECHNOLOGY	SEMESTER - V

Total Credits: 4

Hours Per Week: 4

PREAMBLE:

To provide a fundamental knowledge in Plant Molecular Biotechnology and its application in laboratory settings

COURSE OUTCOMES

In the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	Impart knowledge on basics of plant tissue culture and its requirements	K1
CO2	Acquire knowledge about the gene transfer techniques and applications	K1, K2
CO3	Understand the genetic engineering and gene modification in agriculture	K3
CO4	Gain insight about valuable secondary metabolites, its production and purification	K2, K3
CO5	Highlight the applications of plant biotechnology in the modern era	K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT53C	CORE - VIII: PLANT BIOTECHNOLOGY	SEMESTER - V

Total Credits: 4

Hours Per Week: 4

CONTENTS

UNIT-I

Plant tissue culture

Tissues culture media - Composition and its preparation. Plant Tissue Culture applications- Micropropagation, Callus culture, somatic embryogenesis, suspension culture, embryo culture, haploid culture, protoplast culture and fusion, Somoclonal variation, artificial seeds, hardening.

UNIT-II

Gene transfer

Plant transformation technology- Ti and Ri plasmids, binary & co-integrated vector systems; viral vectors and their applications; 35S and other promoters; genetic markers-reporter genes- virulence genes- Cloning Strategies- Gene transfer methods in plants- Direct DNA transfer methods, Agrobacterium mediated nuclear transformation.

UNIT-III

Plant Genetic Engineering

Applications of Plant Genetic Engineering – crop improvement, herbicide resistance, insect resistance, virus resistance, plants as bioreactors. Genetic modification in Agriculture - transgenic plants, genetically modified foods, ecological impact of transgenic plants.

UNIT-IV

Secondary metabolites

Secondary metabolic pathways in plants. Industrial phytochemical products from plants- Alkaloids, Biodegradable Plastics, Therapeutic proteins, antibodies, plant vaccines, herbal drugs, bioethanol and biodiesel.

UNIT-V

Plant biotechnological application

Extraction & purification of phyto-chemicals. phytoremediation; Green house and green home technology. Molecular pharming; Applications for producing fine chemicals, drugs, and alternative fuels, herbicide and pest resistant plants, ethical issues relating to plant breeding.

TEXT BOOKS:

1. *Chawla, H. S.* 2013. **Introduction to Plant Biotechnology.** 3rd edition. Oxford & IBH publishing company.
2. *Razdan, M. K.* 2002. **Introduction to Plant tissue culture.** 2nd edition. Oxford &IBH publishing company.

REFERENCE BOOKS:

1. *Grierson, D.* and *Covey, S.V.* 1988. **Plant Molecular Biology**. 2nd edition. Blackie Publishers.
2. *Bhojwan, S. S.* 1996. **Plant tissue culture - Theory and Practice.** 1st edition. Elsevier Publishers.

18UBT53P	CORE PRACTICAL - V: rDNA, MICROBIAL AND PLANT BIOTECHNOLOGY	SEMESTER - V

Total Credits: 3
Hours Per Week: 6

CONTENTS

1. Isolation of Genomic DNA from bacteria
2. Isolation of Plasmid DNA from bacteria
3. Isolation of Genomic DNA from Plant Tissue
4. Isolation of Genomic DNA from Animal Tissue
5. Southern blotting
6. Western blotting
7. PCR*
8. Restriction Digestion and Ligation*
9. Screening of Antibiotic producing microorganism
10. Screening of Amylase producing microorganism
11. *In vitro* germination of seeds
12. Micropropagation
13. Callus induction
14. Artificial seed production

*DBT STAR college experiments

REFERENCE BOOKS:

1. *Satish Kumar Sinha*. 2012**. Plant tissue culture: Theory and Practice**.1st edition. Oxford University Press.
2. *Choudhary, S. S, Choudhary, P. and Choudhary, S.K.* 2005. **Laboratory guide in biosciences.** 2nd edition. Kalyani publishers.

18UBT5EA	ELECTIVE- I: BIOPROSPECTING	SEMESTER - V

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

1. To Learn various methods of Bioprospecting.
2. To study about potentials of Bioprospecting

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Focus on Major areas of Bio-prospecting	K1
CO2	Comprehend knowledge on Natural products from plants	K1, K2
CO3	Elucidate Screening for bioactive Compounds	K3
CO4	Highlight Drug discovery and product development	K2
CO5	To understand Regulatory legislation and convention in Bioprospecting	K2, K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT5EA	ELECTIVE- I: BIOPROSPECTING	SEMESTER - V

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT-I

Major areas of Bio-prospecting

Major area of Bioprospecting : Chemical prospecting, Bionic prospecting and Gene prospecting. Bioresources mapping, inventorisation and monitoring of biological diversity. Historical context of present bioprospecting, biodiversity prospecting – the InBio experiences, contracts for Bioprospecting.

UNIT-II

Natural products from plants

Drugs derived from plants, Antitumor agent - Etoposide, Colchicine, Taxol, Vinblastine, Vincristine. Cardiotonic – Convallatoxin, Acetyldigoxin, Adoniside, Antiinflammatory – Aescin, Bromelain, Choleretic – Curcumin. QuinineCinchona-Antimalarial Morphine-Opium plant- analgesic.

UNIT-III

Screening for bioactive Compounds

Screening for bioactivity, antimicrobials, pharmacologically active agents of microbial origin, bioprospecting for industrial enzymes, plant growth promoting agents, biotreatment, bioprospecting novel antifoulants and anti-biofilm agents from microbes.

UNIT-IV

Drug discovery and product development

Drug discovery and product development: Discovery from traditional medicine. Modern tools in drug discovery.Role of chromatography in drug

analysis.Product development procedures and policies.

UNIT-V

Regulatory legislation and convention in Bioprospecting

Regulatory legislation and convention in Bioprospecting: rules and regulations in patenting of products and process development and various conventions pertaining to Bioprospecting of products from microorganism, plant and animal products.

TEXTBOOKS:

1. *Joseph Priest*. 2008. **Energy: Principles, Problems, Alternatives**. 6th edition. Kendall and Hunt Pub Co,.
2. *Alan T.Bull*.2004. **Microbial Diversity and Bioprospecting.**1st edition. ASM Press.

REFERENCE BOOKS:

1. *Srinivasan, K. and Awasthi,H.K.* 1997. **Law of Patents.** 1st edition. Jain Book Agency.
2. *Cori Hayden.*2003.**When Nature Goes Public: The Making and Unmaking of Bioprospecting in Mexico.**1st edition.Princeton University Press.

18UBT5EB	ELECTIVE- I : BASICS OF CLINICAL TRIALS	SEMESTER – V

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

To learn about the regulations in Clinical trialsand its guidelines.

COURSE OUTCOMES

In the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	Understand the Pre and Post Clinical Studies	K1,K2
CO2	To understand about the regulations and guidelines in clinical research	K1,K2
CO3	Understand the concepts about clinical research on Humans	K2,K3
CO4	Know the protocols and Standardization methods	K2,K3
CO5	Comprehend information's regarding clinical trials	K2,K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT5EB	ELECTIVE - I: BASICS OF CLINICAL TRIALS	SEMESTER - V

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT-I

Preclinical Studies

Introduction to Pharmaceutical Industry, Preclinical studies - Preclinical technology. Phase I, Phase II A and B, Phase III A and B, Phase IV and Types of Post marketing, surveillances.

UNIT-II

Food and Drug Administration

FDA Regulations for Clinical Trials, FDA Guidelines and Information Sheets, FDA Compliance Program Guidance Manuals, FDA Bioresearch Monitoring Program (BIMO).

UNIT-III

Ethical Guidelines

Ethical Guidelines for Biomedical Research in Human Subjects, Central Ethics committee on Human Research (CECHR), Clinical research regulation DCGI.

UNIT-IV

Good Clinical Practice

History of GCP, ICH Guidelines for Good Clinical Practice, Central Drugs Standardization and Control Organization, Government of India, Schedule Y.

UNIT-V

Case Report Form

CRF design, Informed Consent Documents - Subject Information Sheet and Informed Consent Form, Ethics Committee Approvals.

TEXT BOOKS:

1. *Allan Hackshaw.* 2009. **A Concise Guide to Clinical Trials.** 1st edition. Wiley Publishers.
2. *Richard Chin* and *Bruce Y. Lee***.** 2008. **Principles and Practice of Clinical Trial Medicine.** 1st edition. Academic Press.

REFERENCE BOOKS:

1. *Sandy Weinberg. 2009.* **Guide Book for Drug Regulatory Submissions.** 1st edition.John Wiley & sons.
2. *Haynes, R.B., Sackett, D.L., Guyatt, G.H.,*and *Tugwell, P*. 2005.**Clinical Epidemiology: How to Do Clinical Practice Research**. 3rd edition. Lippincott- Williams and Wilkins.

18UBT5SA	SKILL BASED COURSE – III: ENTREPRENEURIAL BIOTECHNOLOGY	SEMESTER - V

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

To learn about the entrepreneurial opportunities in Biotechnology and to study the good laboratory procedure and practices, standard operating procedures for biotechnology research

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of Entrepreneurship strategy	K1,K2
CO2	Know about the business opportunities in plant tissue culture companies	K1, K2
CO3	Understand the various farming technique and its certification procedures	K1, K2
CO4	Learn about business scope in commercial important products like Biofertilizer, Biopesticide, Vermicompost etc	K1, K2
CO5	Application of Biopharmaceutical products, IPR and product safety	K1, K2,K3

Mapping with Programme Outcomes

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

18UBT5SA	SKILL BASED COURSE – III: ENTREPRENEURIAL BIOTECHNOLOGY	SEMESTER - V

Total Credits:4
Hours Per Week: 4

CONTENTS

UNIT – I

Introduction

Concept of Entrepreneurship, Definition, characteristics of entrepreneurship, Types of entrepreneurship. Startup process. Business identification, Project plan, Source of fund, production and marketing. Importance of ROC, Risk involved in entrepreneurship.

UNIT – II

Opportunities in PTC

Business opportunities in Plant Tissue Culture – Banana, Bamboo, Sugarcane and Orchids like Carnation and Gerbera. Important PTC companies in India.

UNIT – III

Procedures and Certification in Organic farming

Organic farming- Methods, Standards, Market potential and products impact. Tamilnadu Organic Certification Department (TNOCD) – process of organic certification, TNOCD certified products.

UNIT – IV

Commercialization

Business scope for Biofertilizer, Biopesticide, Vermicompost, Mushroom, Single Cell Protein, Apiculture, Dairy products (Example with one commercially important product for all the above)

UNIT – V

Biopharmaceutical products, IPR and product safety

Insulin, Vaccines, Therapeutic products, Monoclonal antibodies, Hormones, Interferon (Example with one commercially important product for all the above). Importance of IPR, Patents, Trade Marks, Trade secret, Copyright, Product safety and liability, Insurance and contracts.

TEXT BOOKS:

1. D. *KumariManimuthuVeeral*. 2015. **Textbook of organic farming.**Agrotech Publishing Academy.

2. S. S. *Kanka*. 1997. **Entrepreneurship Development**, S.Chand and Co, New Delhi

REFERENCE BOOKS:

1. *Kolehinsky P.* 2004. **The Entrepreneur's guide to Biotechnology startup**, 4th edition. (www.elelexa.com)
2. *Casson M, Yeung B, Basu A and Wadespm N*. 2006, **The Oxford Handbook of Entrepreneurship**, Oxford University Press.
3. *Shimasaki C.* 2014. **Biotechnology Entrepreneurship.** 1st edition, Academia Press.

18UBT5SB	SKILL BASED COURSE- IV: PHARMACEUTICAL BIOTECHNOLOGY	SEMESTER – V

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

To study the mechanism of drug action and to learn the production andapplication of new drugs.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn basic of Biopharmaceutical	K1
CO2	Understand the sources of Biopharmaceutical and therapeutic enzymes	K1, K2
CO3	Know the drug development process	K1, K2
CO4	Learn about Dosage forms, Manufacturing Principles and packing techniques	K1, K2, K3
CO5	Know the regulatory aspects with respect to clinical trails	K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT5SB	SKILL BASED COURSE- IV: PHARMACEUTICAL BIOTECHNOLOGY	SEMESTER – V

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT - I

Introduction to Pharmaceuticals

Introduction- Biopharmaceuticals and pharmaceutical biotechnology; Sources of drug - plant, animals, microbes; Physico-chemical properties of the drugs; Drug isolation and evaluation; Delivery of biopharmaceuticals- Oral, Pulmonary, Nasal, Transmucosal and Transdermal delivery system; Drug metabolism-Pharmacokinetics: Absorption, Distribution, Metabolism and Excretion (ADME) and Pharmacodynamics.

UNIT - II

Sources of Biopharmaceuticals

Sources of Biopharmaceuticals- *E.coli*; Animal cell culture system; Yeast (*Saccharomy cescerevisiae*); Fungus; Transgenic animals; Transgenic plants and Insect-based systems. Nucleic acids of therapeutic interest; Biosimilar drugs- Growth Hormones, Blood products; Therapeutic enzymes.

UNIT - III

Drug Development Processes

Discovery of biopharmaceuticals-Impact of genomics and related technologies upon drug discovery; Gene chips; proteomics; structural genomics; pharmacogenetics; Initial product characterization; Pre-clinical studies.

UNIT - IV

Dosage forms and Manufacturing Principles

Compressed tablets; dry and wet granulation; slugging or direct compression; tablet presses; coating of tablets; capsule preparation; oral liquids – vegetable drugs – topical applications; preservation of drugs. Packing techniques, quality management.

UNIT - V

Regulatory Aspects

Regulatory authorities - Food and drug administration (USA) - Investigational new drug application, Regulations in clinical trials - Central Drugs Standard Control Organization- Drug Controller General of India- Roles and Responsibilities.

TEXTBOOKS:

1. *Gary Walsh* (Ed) 2005. **Pharmaceutical Biotechnology – Concepts and Application.**
2. *Andrew Sinclair* 2006. **A Practical Guide to Biopharmaceutical Manufacturing.**
3. *Goodman & Gilman* "*s.* 2006. **The Pharmacological Basis of Therapeutics**, PermagonPress, New York
4. *Lachman* L *Lieberman*, HA, *Kanig*, J. 1986. "**Theory and Practice of Industry pharmacy**", 3rd Edition, Varghese Publishing & Co, New Delhi.

REFERENCE BOOKS:

1. *Murugesh*, N. 2014. **A Concise text book of Pharmacology**. 7th edition. Sathya Publications.
2. *Katzung*, B.G. 1995. **Basic and Clinical Pharmacology**. 12th edition. Prentice Hall of Intl.
3. *Goodman and Gilman*. 2006. **The Pharmacological Basis of Therapeutics**. 11th edition. McGraw Hill Medical Publishing Division

18UBT63A	CORE-IX: ANIMAL BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

To provide a basic understanding of animal biotechnology and its applications.

COURSE OUTCOMES

In the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	To develop an understanding on basic pattern of animal cell culture and controlling	K1
CO2	Acquire knowledge on handling animal cell culture and their applications	K1, K2
CO3	Understand the gene transfer technology , transgenic animal and stem cell technology	K3
CO4	Emphasize techniques on fertilization in animals and its development	K2, K3
CO5	Highlight the applications of animal biotechnology in various fields	K2, K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT63A	CORE-IX: ANIMAL BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT-I

Animal cell culture media and reagents

Animal cell culture basics- Preparation of culture media- Role of carbon dioxide, serum and growth factors in cell culture, Types of cell culture media, Ingredients, Physiochemical properties, Antibiotics, growth supplements, Fetal bovine serum; Serum free media. Conditioned media, other cell culture reagents, Preparation and sterilization of cell culture media and other reagents.

UNIT-II

Animal cell culture

Principles of sterile techniques and cell propagation; Primary cell culture, secondary cell culture, continuous cell lines, suspension cultures - Chemically defined and serum free media for cell culture Contamination and eradication, cryopreservation of animal cells - Tissue engineering and organotypic culture, Cytotoxicity and viability assays.

UNIT-III

Gene transfer technology

Gene transfer in cells; physical, chemical and biological methods. Production of native and recombinant proteins in animal cell. Hybridoma technology and its applications- gene targeting, silencing and knock-out. Gene transfer technology in animals. Production of transgenic animals.

UNIT-IV

Fertilization in animals

Fertilization in animals: Blastulation, gastrulation, early embryonic development - fate map. Conventional methods of improvement of animal live stock: artificial insemination, *in vitro* fertilization, embryo culture, embryo sexing, splitting and cloning. Stem cell technology.

UNIT-V

Biotechnological application

Biotechnology of silk worm - commercial production of silk, Baculovirus in Biocontrol, Integrated pest management. Manipulation of Growth hormone -somatotropic hormone-Thyroid hormone; Manipulation of lactation – Lactogenesis- galactopoiesis - Manipulation of wool growth.

TEXT BOOKS:

1. *Freshney.R.I*, "**Culture of Animal cells: A manual of basic technique**", Fifth edition, Wiley Publishers, 2010.
2. *Ramadass.P*, "**Animal Biotechnology: Recent concepts and Developments**", MJP Publications, India, 2008.
3. *Ranga,M.M.* 2007. **Animal biotechnology**. 3rd Edition. Agrobios India.
4. *John R. Masters.* 2000. **Animal cell culture**. 3rd edition. Oxford University Press.

REFERENCE BOOKS:

1. *Rastogi,V.* 2001. **Developmental Biology**. 1st edition. KedarnathRamnath Publishers.
2. *Leach.C.K*, ***In vitro*** **cultivation of Animal cell**, Butterworth and Heinnmamm Ltd., 1994.
3. *Renaville.R and Burny.A*, **Biotechnology in Animal husbandry**, Kluwer Academic Publishers, 2001.

18UBT63B	CORE – X: ENVIRONMENTAL BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

To understand the basic vocabularies of environmental biology and to study about the hazards of industrial pollutants on environment.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	To understand the basics of Ecosystem structure and organization	K1
CO2	To Acquire knowledge on handling Pollution and waste management	K1, K2
CO3	Understand the concept and application of Biodegradation	K1, K2
CO4	Emphasize techniques on Bioremediation	K2, K3
CO5	Highlight the applications, Policies and Regulations relating toEnvironmental biotechnology.	K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT63B	CORE – X: ENVIRONMENTAL BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT- I

Ecosystem- structure and organization

Ecosystem- Definition, structure- primary production, secondary production- food chain - food web- trophic levels- energy flow- pyramid of biomass– pyramid of energy. Biogeochemical cycle: Nitrogen and Phosphorous.

UNIT- II

Pollution and Waste Management

Pollution- types- sources- effects and its control measures- air- water- land- noise- thermal- pesticide- radioactive- green house effect, ozone and its importance - global warming - Acid rain.Sewage Treatment System- Characteristics, Primary, secondary and tertiary treatment. Solid waste disposal and solid waste Management.

UNIT- III

Biodegradation

Biodegradation – Definition, Acclimation, bio-availability, effect of chemical structure on biodegradation, recalcitrants, Factors affecting biodegradation. Microbial degradation of hydrocarbons: Methane, ethane. Aerobic and anaerobic biodegradation of aromatic compounds.Microbial degradation of pesticides. Microbial degradation of biopolymers- Cellulose, starch, pectin and lignin. Polyhydroxyalkanoates (Bioplastics).

UNIT- IV

Bioremediation

Bioremediation- advantages and applications, Types of bioremediation - Natural and engineered, *ex-situ* and *in-situ*, solid phase and slurry phase bioremediation, Oxygen delivery for Bioremediation, Criteria to be met for considering bioremediation - factors affecting bioremediation, Bioaugmentation and biostimulation. Phytoremediation. Bioleaching.

UNIT- V

Social issues and the environment

Sustainable development, role of individual in the protection of environment, environmental ethics-issues and possible solutions, resettlement and rehabilitation of people and its problems, Environmental Protection Act, Air Act, Water Act, Wildlife Protection Act, Forest Conservation Act, issues involved in enforcement of environmental legislation.

TEXT BOOKS:

1. Y.K.Singh, 2006. **Environmental Science.** 1st Edition. New Age International (P) Limited, Publishers.

2. Agarwal,S.K. 2007. **Environmental Biotechnology**.1st Edition. APH Publishing.

3.Chatterji, A.K. 2011.**Introduction to Environmental Biotechnology**. 3rd edition. Prentice-Hall of India.

4. Dash. M.C. 1998. **Fundamentals of Ecology.** 2nd edition. Tata McGraw Hill.

REFERENCE BOOKS:

1. *Martin Alexander.* 1999. **Biodegradation and Bioremediation.** 2nd edition. Academic Press.
2. *Alan Scragg.* 2007. **Environmental Biotechnology.** 2nd edition. Oxford university press.
3. *G. Tyler Miller, JR. Scott* E. *Spoolman.* 2010. **Environmental Science**. Thirteenth edition. Yolanda cossio publisher

18UBT63C	CORE – XI: NANOBIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

To learn the basics of Bionanotechnology and study the latest trends in nano level application of bionanoparticles in the medical field.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn basic of Bio nanotechnology	K1
CO2	Understand the basic of Bionanomachinery and protein folding structure	K1, K2
CO3	Know the functional concept of biomaterials	K1, K2
CO4	Learn about microarray technology,Nanobiosensors, Biochips, Biorobotics and its application	K1, K2, K3
CO5	Know the drug delivery system and cancer biology based on bionanotechnology	K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT63C	CORE – XI: NANOBIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT - I

Introduction

Introduction to Bionanotechnology: Opportunities & challenges of Bionanotechnology. Key features of Nano-size, Comparison of particle behavior at nanosize to macrosize. Strategies for Nanoarchitecture (top down & bottom up approaches). Biomolecular design and Bionanomachines in action.

UNIT – II

Structural Bionanotechnology

Structural principles of Bionanotechnology: Natural Bionanomachinery. Overview of Nanodevices. Strategies for construction of Nanomachines. Carbon as a raw material. Protein folding Aspects: Stable structure, Globular proteins, Role of chaperones in folding, lipid bilayer, DNA based nanostructures. Flexibility of biomolecules.

UNIT - III

Functional Bionanotechnology

Principles of Functional Bionanotechnology. Information driven nanoassembly: Energetics; Biomaterials- Filaments and fibrils, Minerals combined with biomaterials for specific applications. Biomolecular sensing taste and light sensors. Bacterial sensors, Self-replication, Machine phase Bionanotechnology- Muscle sarcomeres and nerves.

UNIT - IV

Applications

Microarray technology- Principle, types and Applications of Bionanoimaging. Magnetic Nano particles, Nanobiosensors, Biochips, Biorobotics, Synthesis of gold, Titania, Nanopore technology, Nanoarrays, DNA computers.

UNIT - V

Clinical based Bionanotechnology

Medical Applications of Nanoparticles & Nanosystems. Nano drug delivery. Conventional drug delivery & targeted drug delivery and advantages. Delivery profile, Role of Nanotechnology in drug delivery & Cancer biology. Nanoparticle synthesis in plants, bacteria and yeast.

TEXT BOOKS:

1. *Niemeyer*, C.M. and *Mirkin*, C.A.2004. **Nanobiotechnology: Concepts, Applications and Perspectives.** Wiley-VCH.
2. *Goodsell*, D.S. 2004. **Bionanotechnology**. John Wiley and Sons, Inc.,
3.*Shoseyov*, O. &*Levy*, I., 2007. **Nanobiotechnology: Bioinspired Devices and Materials of the Future**. Humana Press.
4. *David S. Goodsell. 2004.* **Bionanotechnology: Lessons from Nature**. John Wiley & Sons, Inc., Publication.

REFERENCE BOOKS:

1. *Bhushan*, B. 2004. **Springer Handbook of Nanotechnology**. Springer-Verlag BerlinHeidelberg,
2. *Freitas*Jr R.A. 2004. **Nanomedicine**. Vol. II, 1st Edition, Landes Biosciences,.
3. *Kohler*, M. &*Fritzsche*, W. 2004.**Nanotechnology – An Introduction to Nanostructuring Techniques**. Wiley-VCH.
4. *Richard Brooker*&*Earl Boysen.* 2006. **Nanotechnology.**Wiley Publishing Inc., India.

18UBT63D	CORE XII: BIOETHICS,BIOSAFETY AND IPR	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

To equip students with issues related to ethical and legal issues concerning biotechnology products.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Impart basic knowledge about lab safety and committees involved.	K1,K2
CO2	Understand the role of bioethics in the field of biotechnology and its products	K3
CO3	Gain insight on types of IPR and its licensing.	K3, K4
CO4	Imbibe skills on patenting and strategies involved.	K4, K5
CO5	Highlight the global scenario on IPR	K4, K5

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT63D	CORE XII: BIOETHICS, BIOSAFETY AND IPR	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

UNIT- I

Biosafety

Good Lab Practices, Introduction to Biological Safety Cabinets, Primary Containment for Biohazards, Biosafety Levels, GMOs and LMOs and their environmental impact, Roles of Institutional Biosafety Committee, RCGM, GEAC.

UNIT- II

Bioethics

Bioethical issues related to Healthcare & medicine Food & agriculture. Genetic engineering, Human Genome Project. Genetic Testing, types, pros and cons, informed consent. Socioeconomic problems and environmental problems relating to bioethics.

UNIT - III

Introduction to IPR

Definition, Concept of Intellectual Property, Kinds of Intellectual Property Patents, Copyrights, Designs, Trademarks, Geographical Indication, Infringement of IPR, protection and Remedies, Licensing and its types.

UNIT - IV

Patenting Strategies

Requirement of patentable novelty, Inventive step, Prior art Classifying products as patentable and non-patentable, Procedure for applying for patent, Patent Infringement and related case studies Biological Patentability. Biopiracy and Bioprospecting. Farmers Rights and Plant breeders rights Biodiversity.

UNIT -V

Issues in Patenting

Traditional knowledge and patent issues with relevance to Indian context. Basmati rice patent case, turmeric patent case, Neem leaves patent, superbug patenting.

TEXT BOOKS:

1. *DeepaGoel.* 2013.**IPR Biosafety and Bioethics,**1stedition. Pearson Education.
2. *Sateesh, M.K.* 2008.**Bioethics and Biosafety**. 1st Edition. I.K. International Publishing House.
3. *Catherine J. Holland.* 2007. **Intellectual Property: patents, trademarks, copyrights, trade secrets.** 1st edition. Entrepreneur Press.

REFERENCE BOOKS:

1. *Srinivasan, K. and Awsthi, H.K.* 1997. **Laws of Patents**. 1st edition. Jain Book Agency.
2. *Thomas H. Murray and Maxwell J. Mehlman*. 2005. **Encyclopedia of Ethical, Legal and Policy issues in Biotechnology**. 1st edition. Wiley Interscience.

18UBT63P	CORE PRACTICAL-VI: ANIMAL, ENVIRONMENTAL AND NANO BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 3
Hours Per Week: 6

CONTENTS

1. Preparation of ATC medium and membrane filtration
2. Preparation of primary culture from chick embryo.
3. Cell counting and cell viability.
4. MPN Test
5. Determination of Chemical oxygen demand
6. Estimation of Chloride
7. Qualitative Analysis of

   i) Starch Degradation

   ii) Cellulose degradation

   iii) Gelatin hydrolysis

   iv) Lipid degradation

   v) Casein hydrolysis
8. Biodegradation of Starch- Quantitative Estimation of starch by Iodine Method.
9. Synthesis of Silver Nano particles by microorganisms*
10. Spectral analysis of Silver Nano particles.*
11. Antibacterial screening of Silver Nano particles.*

*DBT STAR College Scheme

REFERENCE BOOKS:

1. *Freshney, R. I.* 2010.**Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications**. 6th edition. Wiley Blackwell.
2. *Choudhary, S. S, Choudhary, P. and Choudhary, S.K.* 2005. **Laboratory Guide in Biosciences.** 2nd edition. Kalyani publishers.

18UBT6EA	ELECTIVE – II: MARINE BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

To study the marine diversity and its relationship with biotechnology and ecology.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Acquaintance to various flora and fauna kingdoms and their biology.	K1
CO2	Insight to marine products and their use in biotechnology	K1,K2
CO3	Impart knowledge on relationship between marine lives and pathogens and toxins.	K1, K2, K3
CO4	Highlight ecological impact on marine pollution	K2, K3
CO5	Knowledge on applications of marine biotechnology	K2,K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT6EA	ELECTIVE – II: MARINE BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT -I

Marine flora

Phytoplankton, seaweeds, sea grasses and mangroves. Marine fauna– Zooplankton; marine invertebrates (crustaceans & molluscs); Vertebrates and marine mammals (dolphins and whales). Biology of marine organisms- feeding and reproduction.

UNIT- II

Marine natural products

Carrageenan, Agar- Agar, Seaweed fertilizer(SLF), bioactive compounds and commercial products from marine organisms- marine copepods as living capsules in aquaculture.

UNIT-III

Sea food spoilage

Fish and human pathogens. Marine Pharmacology- marine toxins, antiviral and antimicrobial agents.

UNIT-IV

Marine pollution

Pollutants (oil, thermal and radioactive). Biological indicators (microbes, Phyto and Zooplankton). Marine fouling-Macrofoulers, Biofilms, Antifouling methods.

UNIT-V

Aqua farms

Design and construction. Selection of cultivable species. Culture systems-extensive, semi intensive, intensive and raceway cultures. Induced spawning and mass production of seeds

TEXT BOOKS:

1. *ShyamKishor Agarwal.* 1996. **Biodiversity and Environment.** APH Publishing.
2. *Jeffery S. Levinton.* 2001. **Marine Biology: Function, Biodiversity, Ecology.**2nd edition. Oxford University Press.

REFERENCE BOOKS:

1. *Robert R.Stickney.* 2000. **Encyclopedia of Aquaculture.** 1st edition. John Wiley & Sons, Inc.
2. *Sverdrup H.U.* 1942. **The Oceans Their Physics, Chemistry and General Biology.** 1st edition. Prentice-Hall, Inc.

18UBT6EB	ELECTIVE III: AGRICULTURAL BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

- To study the basics of agriculture and the role of biotechnology
- **COURSE OUTCOMES**

  In the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept about agriculture	K1
CO2	Know the role of transgenic plants and their importance	K1, K2
CO3	To gain knowledge on the concepts of biofertilizer	K1, K2
CO4	Impart the concepts of soil science	K2, K3
CO5	Understand the strategies involved in agricultural economics	K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT6EB	ELECTIVE III : AGRICULTURAL BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT – I

Biotechnology in agriculture

Growth and historical perspective of agricultural biotechnology. Agricultural biotechnology – risks and applications. Transgenic plants – plants resistance to biotic and abiotic stress. Transgenic plants in crop improvement. Advantages and applications of transgenic plants.

UNIT – II

Transgenic Plants

Transgenic plants in quality modifications – starch, oil, proteins, golden rice, suppression of endogenous gene, male sterilization. Plants derived vaccines, flower modification and colour. Targetting transgenic product to chloroplast and mitochondria.

UNIT – III

Biofertilizer

Importance of Biofertilizers in agriculture (Rhizobium, Azotobacter, mycorrhiza, actinorhiza) – Advantages and current status, vericulture, composting, current practices and production of Biofertilizers.

UNIT – IV

Soil Science

Analysis of organic content of soil - physical and chemical properties, biological – diversity of microflora present. Texture – color- geographic importance. Fertility property of soil

UNIT – V

Agricultural Economics

Economic crops – importance in India and Global scenario. Recent Act and Pact signed for development – Fodder and bioactive compounds produced. Marketing strategies of biotechnology products.

TEXT BOOKS:

1. *Purohit, S.S.*2015.Biotechnology- Fundamental and Applications. 4th Edition Hardcover. CRC pub.
2. *Singh, B.D.*2014 **. Plant Biotechnology.** 3rd edition.Academic Press

REFERENCE BOOKS:

1. *Razdan, M. K.* 2002. **Introduction to Plant tissue culture.** 2nd edition. Oxford &IBH publishing company.
2. Yadav, P.R. and Rajiv, T. 2010. **Crop Biotechnology.** 1st edition**.** S.Chand, New Delhi.
3. Maartein, Christ Peels. J, David, E.S. 2012. **Plants, Genes and Agriculture**. 2nd edition. John Wiley and Sons, New York.
4. *Chawla, H. S.* 2013. **Introduction to Plant Biotechnology.** 3rd edition. Oxford & IBH publishing company.
5. *Razdan, M. K.* 2002. **Introduction to Plant tissue culture.** 2nd edition. Oxford &IBH publishing company.

18UBT6EC	ELECTIVE – III: FOOD AND DAIRY TECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

To study the cattle development, dairy farming, dairy products and food production from the dairy products

COURSE OUTCOMES

In the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of Food technology and its methods	K1
CO2	Know the role of various microorganisms in food production	K1, K2
CO3	Understand the various food preservation methods and its importance	K1, K2
CO4	Know the dairy food products and its different types and varieties	K2, K3
CO5	Understand the Quality and Safety monitoring of food products	K3

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT6EC	ELECTIVE – III : FOOD AND DAIRY TECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT – I

Introduction to food technology

Introduction to Food technology, Scope and application. Role of biotechnology in food production. Difference between conventional and non-conventional technology for food production.

UNIT – II

Role of Microbes in food production

Microbes of importance in food fermentations – Homo & hetero-fermentative bacteria, yeasts & fungi; Lactic acid bacteria fermentation and starter cultures, Alcoholic fermentations -Yeast fermentations - characteristics and strain selection, fungal fermentations. Microbes associated with typical food fermentations- yoghurt, cheese, fermented milks, breads, idly and soya products

UNIT – III

Objectives and techniques of food preservation:

Canning: classification of cans, canning of food items, Thermal process time calculations for canned foods, spoilage in canned foods. Water activity of food and its significance in food preservation. Low temperature preservation: cold storage and freezing including cryogenic freezing. Preservation by fermentation: curing and pickling; Use of preservative in foods: chemical preservative, biopreservative including antibiotics.

UNIT – IV

Dairy based products:

Composition of milk; Varieties of milk; Checks for purity of milk; Handling of fresh milk. Pasteurization of milk; HTST and UHT techniques; Packaging of milk; Manufacture of milk products like evaporated milk, powder milk, condensed milk, cream, butter, cheese, yogurt, ice cream, ghee, baby food and sweet meat. Quality control of milk and milk products; Milk plant hygiene and sanitation.

UNIT – V

Food safety and quality control

Impact of food safety on global trade; Food safety in retail food businesses; international food service operators, institutional food service operators; application of the principles of modern hygiene . HACCP, GMP; Surveillance networks, Consumer and food service operator education, function and roles of USFDA, USDA and EPA; Food Safety and Standards Act India 2006; Prevention of Food Adulteration Act, India, 1954.

TEXT BOOKS:

1. *Geoffrey Campbell-Platt*. 2017.**Food Science and Technology.** 2nd edition. Wiley Blackwell Publishers.
2. *W.C. Frazier, D.C. Westhoff*. 1977.**Food Microbiology.** 4th edition. Tata McGraw-Hill Education.
3. *M. Shafiur Rahman*. 1999.**Handbook of Food Preservation.** 1st edition. CRC Press.
4. *N. S. Rathore, S.S. Chasta ,G.k. Mathur*. 2008. **Fundamentals of Dairy Technology.** 1st edition. Himanshu Publications.

REFERENCE BOOKS:

1. *Gustavo F. Gutierrez-Lopez, Gustavo V. Barbosa Canosa*. 2003.**Food Science and Food Biotechnology.** CRC Press.
2. *Shivashraya Singh*.2014.**Dairy Technology: Set of 2 Volumes.** New India Publishing Agency.
3. *McSwaneD., N. Rue, R. Linton.* 1997.**Essentials of Food Safety and Sanitation.** Prentice Hall.
4. *Y. Motarjemi, H. Lelieveld*. 2013.**Food Safety Management.**1st edition. Academic Press.

18UBT6ED	ELECTIVE III: FORENSIC BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

PREAMBLE:

- To study the basic of criminology, forensic science technology and Biotechnologist role in collecting the evidences.

COURSE OUTCOMES

In the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept and development of forensic methods.	K1
CO2	Know the role of various methods to identify biological evidences.	K1, K2
CO3	To gain knowledge on the concepts of toxicology in forensic sciences.	K1, K2
CO4	Impart the concepts of drug analysis in forensic	K2, K3
CO5	Understand the techniques of DNA finger printing	K3,

Mapping with Programme Outcomes

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

S-Strong: M-Medium; L-Low

18UBT6ED	ELECTIVE III : FORENSIC BIOTECHNOLOGY	SEMESTER - VI

Total Credits: 4
Hours Per Week: 4

CONTENTS

UNIT – I

Introduction to Forensic Sciences

History and Development of Forensic Science, Deductive Reasoning, Organization of a Crime Laboratory, Services of the Crime Laboratory, Functions of the Forensic Scientist, Other Forensic Science Services, Detection Murder Trial Criminal Justice -Aspects of the Justice System, Aspects of Trials

UNIT – II

Identifying Biological evidences

Identifying the Body: Human or Nonhuman, Skin Coloration, Defensive Wounds and Other Visible Marks, Processes of Decay, Hair, Fiber and Botanical Remains - Identification and Comparison of Hair, Collection and Preservation of Hair Evidence, Types of Fibers, Identification and Comparison of Manufactured Fibers, Botanical Remains: Pollen, Seeds, and Other Remain

UNIT – III

Forensic Toxicology and Forensic Serology

Toxicology of Alcohol, Role of the Toxicologist, Techniques Used in Toxicology, Significance of Toxicological Findings, Drug Recognition Expert, Nature of Blood, Immunoassay Techniques, Forensic Characterization of Bloodstains, Stain Patterns of Blood, Principles of Heredity, Forensic Characterization of Semen, Collection of Rape Evidence

UNIT – IV

Drug Analysis

Narcotic Drugs, Hallucinogens, Depressants, Stimulants, Club Drugs, Anabolic Steroids, Drug-Control Laws, Drug Identification, Collection and Preservation of Drug Evidence

UNIT – V

DNA: The Indispensable Forensic Science Tool and finger prints

Recombinant DNA: Cutting and Splicing DNA, DNA Typing, The Combined DNA Index System (CODIS) Fingerprints: Fundamental Principles of Fingerprints, Classification of Fingerprints, Automated Fingerprint Identification Systems, Preservation of Developed Prints, Digital Imaging for Fingerprint Enhancement.

TEXT BOOKS:

1. *Stuart H. James, Jon J. Nord. Suzanne Bell* .2015.**Forensic Science: An Introduction to Scientific and Investigative Techniques**. 4th Edition Hardcover. CRC pub.
2. *Max M. Houck, Jay A. Siegel.*2015 **.Fundamentals of Forensic Science.** 3rd edition. Academic Press

REFERENCE BOOKS:

1. *William J. Tilstone, Kathleen A. Savage, Leigh A. Clark.*2006. **Forensic Science: An Encyclopedia of History, Methods, and Techniques.** 1st edition ABC-CLIO pub.
2. *Fred Smith.*2004. **Handbook of Forensic Drug Analysis.** 1st edition. Academic Press.

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