CURRICULUM

(R2015)

CHOICE BASED CREDIT SYSTEM

(Applicable to the batches admitted from July 2015)

B.Sc. MICROBIOLOGY

I-VI SEMESTERS

SEMESTER I

Part	Category	Sub Code	Sub Name	No. of periods per week			Credit
				L	T	P	
THEORY							
Part I	HS	BAL101	Tamil-I	4	0	0	4
		BAL102	French –I				
		BAL103	Hindi-I				
Part II	HS	BEH101	English-I	4	0	0	4
Part III	MC	BMI101	Core I- Fundamentals of Microbiology	3	1	0	4
	MC	BMI102	Enzymology	3	1	0	4
	MC	BMI103	Biodiversity and its Conservation	3	1	0	4
	PRACTICAL						
	MC	BMI1L1	Core III- Basic Microbiology Lab I	0	0	4	2
Total Contact Hours: 30						**Total Credits: 22**	

SEMESTER II

Part	Category	Sub Code	Sub Name	No. of periods per week			Credit
				L	T	P	
THEORY							
Part I	HS	BAL201/BAL2E1	Tamil-II	4	0	0	4
	HS	BCI203	Environmental Studies	2	0	0	2
Part II	HS	BEH201	English –II	3	0	0	3
Part	MC	BMI201	Cell Biology	3	1	0	4

III	MC	BMI202	Genetics	3	1	0	4
	MC	BMI203	Molecular biology	3	1	0	4
Part IV	EEC	BSS201	Value Education	2	0	0	2
	PRACTICAL						
	MC	BMI2L1	Cell biology Lab	0	0	4	2
Total Contact Hours: 30						**Total Credits: 26**	

SEMESTER III

Part	**Category**	**Sub Code**	**Sub Name**	**No. of periods per week**			**Credit**
				L	**T**	**P**	
THEORY							
Part I	HS	BAL301	Tamil- III	4	0	0	4
		BAL302	French-III				
		BAL303	Hindi- III				
Part II	HS	BEH301	English- III	4	0	0	4
Part III	MC	BMI301	Biochemistry	3	1	0	4
	MC	BMI302	Immunology	3	0	0	3
	MC	BMI303	Microbial Diversity	3	0	0	3
	NON MAJOR ELECTIVE I						
Part	NME	BAL002	Basic Tamil I- for those who studied other language under Part I	2	0	0	2
		BCA351	Special Tamil I- for those who studied Tamil under Part I				
	PRACTICAL						
	MC	BMI3L1	Biochemistry lab	0	0	4	2
Total Contact Hours: 30						**Total Credits: 24**	

SEMESTER IV

Part	**Category**	**Sub Code**	**Sub Name**	**No. of periods per week**			**Credit**
				L	**T**	**P**	
THEORY							
Part I	HS	BAL401	Tamil-IV	4	0	0	4
		BAL402	French-IV				

		BAL403	Hindi-IV				
Part II	HS	BEH401	English-IV	4	0	0	4
Part III	MC	BMI401	Clinical Microbiology	3	1	0	4
	MC	BMI402	Soil and Agricultural Microbiology	3	1	0	4
	MC	BMI403	Environmental Microbiology	3	1	0	4
Part IV	**NON MAJOR ELECTIVE II**						
	NME	BAL004	Basic Tamil II- for those who studied other language under Part I	2	0	0	2
		BCA453/BMI4E2	Special Tamil II- for those who studied Tamil under Part I				
	SBE	BMI4E3/BCA451	Skill Based Elective I	2	0	0	2
	PRACTICAL						
	MC	BMI4L1	Clinical Microbiology Lab	0	0	4	2
Total Contact Hours: 30						**Total Credits: 26**	

SEMESTER V

Part	Category	Sub Code	Sub Name	No. of periods per week			Credit
				L	T	P	
THEORY							
Part III	MC	BMI501	Food Microbiology	4	1	0	5
	MC	BMI502	Fermentation technology	4	1	0	5
	MC	BMI503	rDNA technology	3	1	0	4
	ME		Major Elective – I	3	1	0	4
	PRACTICAL						
	MC	BMI5L1	Food Microbiology Lab	0	0	4	2
	MC	BMI5L2	Fermentation technology lab	0	0	4	2
Part IV	SBE	BMI5E5	Skill Based Elective – II	2	0	0	2
	SBE	BMI5E6	Skill Based Elective – III	2	0	0	2

Total Contact Hours: 30	Total Credits: 24

SEMESTER VI

Part	Category	Sub Code	Sub Name	No. of periods per week			Credit
				L	T	P	
THEORY							
Part III	MC	BMI601	Microbial Bacteriology	3	1	0	4
	MC	BMI602	Virology, Mycology and Parasitology	3	1	0	4
	ME		Major Elective – II	3	0	0	3
	PRACTICAL						
	MC	BMI6L1	Immunology Lab	0	0	4	2
	MC	BMI6P1	Project	0	0	10	6
Part V	EEC	BMI6V1	Extension Activities	0	0	1	1
Total Contact Hours: 30						**Total Credits: 21**	
Total Credits – 143							

LIST OF ELECTIVES

MAJOR ELECTIVE I

SUBJECT CODE	SUBJECT	L	T	P	C
BMIE01	Microbial metabolites	3	0	0	3
BMIE02	Dairy technology	3	0	0	3
BMIE03	Fundamentals of Microbial Remediation	3	0	0	3

MAJOR ELECTIVE II

SUBJECT CODE	SUBJECT	L	T	P	C
BMIE04	Industrial waste treatment	3	0	0	3
BMIE05	Production of Microbial Biomass	3	0	0	3
BMIE06	Biochemical engineering	3	0	0	3

NON MAJOR ELECTIVE (NME) I

Sub Code	Sub Name	L	T	P	C
BAL002	Basic Tamil – I for those who studied other language under Part I	2	0	0	2
	Special Tamil – I for those who studied Tamil under Part I	2	0	0	2

NON MAJOR ELECTIVE (NME) II

Sub Code	Sub Name	L	T	P	C
	Basic Tamil – II for those who studied other language under Part I	2	0	0	2
	Special Tamil – II for those who studied Tamil under Part I	2	0	0	2

LIST OF SKILL BASED ELECTIVES (Choose any three courses – one in semester IV & two in semester V):

S.NO	Sub Code	Sub Name	L	T	P	C
1	BBA011	BPO Management	**1**	**0**	**2**	**2**
2	BBE002	Desk Top Publishing	**1**	**0**	**2**	**2**
3	BCA001	Computer Application	**1**	**0**	**2**	**2**
4	BCA002	Graphical and Web Design	**1**	**0**	**2**	**2**
5	BCA003	Multimedia	**1**	**0**	**2**	**2**
6	BCA004	Networking and Maintenance	**1**	**0**	**2**	**2**
7	BCA006	Web Designing	**1**	**0**	**2**	**2**
8	BSC001	Animation	**1**	**0**	**2**	**2**
9	BSC002	Computer Hardware and Networking	**1**	**0**	**2**	**2**
10	BSC003	Computer Programming	**1**	**0**	**2**	**2**
11	BSC004	Computer Technology	**1**	**0**	**2**	**2**

SEMESTER I

BAL101	□□□□□ – I	**L**	**T**	**P**	**C**
	Total Contact Hours – 60	4	0	0	4
	Prerequisite course – +2 Level Tamil				
	Course Coordinator Name& Department :முனைவர்.ம.சித்ராகண்ணு&தமிழ்த்துறை				

COURSE OUTCOMES (COs)	
CO1	இருபதாம் நூற்றாண்டு கவிதைஇலக்கியத்தைப் பற்றி அறிவர்
CO2	இருபதாம் நூற்றாண்டுகட்டுரைஇலக்கியத்தைப் பற்றி அறிவர்
CO3	இருபதாம் நூற்றாண்டுசிறுகதைஇலக்கியத்தைப் பற்றி அறிவர்
CO4	இக்கால இலக்கிய வரலாறுபற்றி அறிவர்
CO5	மொழி வரலாறு – செம்மொழிபற்றி அறிவர்
CO6	தற்கால இலக்கியத்தில் ஆழ்ந்த அறிவைப் பெறுவர்

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation)H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H	M	M
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies	Basic Sciences	Engg Sciences	Professional Core (PC)	Core Elective	Non-Major Elective	Open Elective	Any other	Project/Term Paper/ Seminar/ Internship (PR
		✓								

4	Approval		Academic Council Meeting

அலகு -1 இருபதாம் நூற்றாண்டு கவிதைகள் 9

1. பாரதியார் -யாமறிந்த மொழிகளிலே 2. பாரதிதாசன்-நீங்களே சொல்லுங்கள்!
3. கண்ணதாசன் -அழுகை 4. பெருஞ்சித்திரனார்- தமிழா நீ எங்கே?
5. தமிழ் ஒளி - (I) வள்ளைப்பாட்டு (II) பட்டமரம்
6. அப்துல் ரகுமான் - கல்லின் காயம்

அலகு -2 உரைநடை (I) 4 கட்டுரைகள் 9

1. மனிதனும் அழகும் - திரு.வி.க.2. வீட்டிற்கோர் புத்தகசாலை-அறிஞர் அண்ணா
3. பொறியியல் தமிழ் - நா. மால் முருகன்
4. தேசியமறை திருக்குறள் - வ.சுப.மாணிக்கம்

அலகு -3 உரைநடை (II) சிறுகதை - 4 கதைகள் 9

1. நட்சத்திரக் குழந்தைகள் - பி.எஸ்.இராமையா2. விடியுமா-கு.ப.ராசகோபாலன்
3. குருபீடம் – ஜெயகாந்தன்4. கடவுளும் கந்தசாமிப் பிள்ளையும்–புதுமைப்பித்தன்

அலகு -4 இக்கால இலக்கிய வரலாறு 9

1. இருபதாம் நூற்றாண்டு கவிதை இலக்கிய வரலாறு
2. இருபதாம் நூற்றாண்டு உரைநடை இலக்கிய வரலாறு
3. இருபதாம் நூற்றாண்டு சிறுகதை இலக்கிய வரலாறு

அலகு -5 மொழி வரலாறு 9

1. தமிழ்மொழி வரலாறு 2. உலகச் செம்மொழிகளின் வரலாறு
3. தமிழுக்கும் உலகச் செம்மொழிகளுக்குமான உறவு வரலாறு

பாடநூல்

1. இருபதாம் நூற்றாண்டு கவிதை, உரைநடை, சிறுகதை(அலகு-3) பாரத் பல்கலைக்கழக வெளியிடு

பார்வை நூல்கள்

1. சு. ஆனந்தன்,"தமிழ் இலக்கிய வரலாறு", பாரி நிலையம், 2012
2. ஞானப்பிரகாசர்,"தமிழ் அமைப்புற்றவரலாறு", வியாபார ஐக்கிய சங்கம்,2012
3. ஞா.தேவநேயன்,"தமிழ் வரலாறு", பூம்புகார் பதிப்பகம், 2009
4. ஞா.தேவநேயன்,"முதல் தாய்மொழி", பூம்புகார் பதிப்பகம்,2008
5. ஞா.தேவநேயன்,"சுட்டு விளக்கம்" , பூம்புகார் பதிப்பகம்,2006

Course Coordinator **HOD**

BAL102	**FRENCH-I**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	2	0	4
	Prerequisite course – Grade 12				
	Course Coordinator Name & Department:- Ms. Tushita Naidu K / Département De Française				

COURSE OBJECTIVES: -

Learners will study basic principles and practice of oral and written communication.

COURSE OUTCOMES (COs)	
CO1	Remember the basics of the language.
CO2	Understand the sentence patterns and form the grammar.
CO3	Apply the basics of grammar along with its principles.
CO4	Apply the anatomy of conjugations.
CO5	Analyse dialogs and conversation on their own within the language & to practice oral and written skills.
CO6	Analyse the necessary rules of the language

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO 3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
		√								

4	Approval		Academic Council Meeting

UNIT I - Vous comprenez **9**

Alphabets - French Accents - Les Nombres – Pronunciations.

UNIT II Au travail! **9**

Masculine Singular and Feminine singular - Conjugaison des verbes (present tense) -

Les articles définis.

UNIT III En se detend? **9**

Conjugaison (faire-aller-venir-Vouloir-Pouvoir-Devoir)

UNIT IV Racontez-moi **9**

La date et l'heure – les saisons – les couleurs

UNIT V Bon voyage! **9**

Adjectifs demonstratives - Adjectifs possessives - Les Voyages / les transport-Bon appétit!-Article partitif - Emploi des articles - Interrogation (Forme avec inversion) - Les repas - La fête

TEXT BOOKS:

A1 ECHO- J. GIRARDET, J. PECHEURB CLE PUBLICATION.

Course Coordinator **HOD**

BAL103	**Hindi-I**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	2	0	4
	Prerequisite course – Hindi as second language in Grade 12				
	Course Coordinator Name &Department:- Mrs Rani Selvan & Department of Hindi				

COURSE OBJECTIVES: -

Learners will understand , read, write and speak Hindi language with grammatical.

COURSE OUTCOMES (COs)

CO1	Remember the behaviour
CO2	Understand the importance of money by story
CO3	Apply the concept of Hindi grammar
CO4	Apply the usage of translation from English to Hindi
CO5	Analyze the unseen passage to answer the questions
CO6	Analyze the knowledge in Hindi Language

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation)H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
		✓									
4	Approval		Academic Council Meeting								

UNIT I **9**

NAVEEN GADYA CHAYANIKA – 2 - Bholaram ka jeev - Mehamaan se Bhagavaanbachaaye - NumberovaliThijori – Kaffan - Gunda

UNIT II **9**

NON DETAILED TEXT: KAHANI KUNJ - Stories: 6 – 10 only

UNIT II **9**

GRAMMAR: SHABDA VICHAR ONLY - NOUN, PRONOUN, ADJECTIVE, VERB, TENSE, CASE ENDINGS - Theoretical & Applied

UNIT-I **9**

TRANSLATION - English – Hindi only - ANUVADH ABHYAS – III - 1 – 15 Lessons Only

UNIT V **9**

COMPREHENSION - 1 Passage from ANUVADH ABHYAS – III (16 – 30)

TEXT BOOKS:

UNIT 1 - Dakshina Bharat Hindi Prachar Sabha, Chennai – 600017

UNIT II - Govind Prakashan, SadharBagaar, Mathura, Uttar Pradesh – 281001 - Editor: Dr V.P. Amithab

UNIT III - Vyakaran Pradeep by Ramdev - Hindi Bhavan, 36, Tagor Town, Allahabad – 211002.

UNIT IV - Dakshina Bharat Hindi Prachar Sabha, Chennai – 600017.

UNIT V - Dakshina Bharat Hindi Prachar Sabha, Chennai – 600017

Course Coordinator **HOD**

BEH101	ENGLISH I	L	T	P	C
	Total Contact Hours – 60	4	0	0	4
	Prerequisite course – + 2 level English				
	Course Coordinator Name & Dept: Mrs. SHEEBA - English				

COURSE OBJECTIVES:- :-

Learners will use English effectively for study purpose and enable the learner to communicate appropriately in real life situation.

	COURSE OUTCOMES (COs)
CO1	Remember and recall the words according to the given context.
CO2	Understand the necessity of grammar in Communication
CO3	Apply the plots and themes discussed
CO4	Analyze the various characters involved
CO5	Evaluate the characters and summarizes the prescribed literature
CO6	Create essays by evaluating the literary techniques and devices used.

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PSO2	PS O3
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
		✓							

4	**Approval**	Academic Council Meeting

UNIT I –POETRY **12**

Lucy Gray William Wordsworth – Author biography – Summary – Critical Analysis - Ulysses Alfred Lord Tennyson– Author biography – Summary – Critical Analysis - The Road Not Taken – Robert Frost – Author biography – Summary – Critical Analysis

UNIT II – ONE ACT PLAYS **12**

The Boy Comes Home - A.A.Milne – Author biography – Summary – Critical Analysis - The Referee - W.H.Andrews and Geoffrey Dearmer – Author biography – Summary – Critical Analysis

UNIT III- SHORT STORIES **12**

The Unicorn in the Garden – James Thurber – Author biography – Summary – Critical Analysis - The Avenger – Anton Chekov – Author biography – Summary – Critical Analysis - The Gift of the Magi - O.Henry – Author biography – Summary – Critical Analysis

UNIT IV –PROSE B **12**

Six Thinking Hats - Edward de Bono– Author biography – Summary – Critical Analysis - My Early Days Abdul Kalam – Author biography – Summary – Critical Analysis- I Have a Dream Martin Luther King– Author biography – Summary – Critical Analysis.

UNIT V – GRAMMAR **12**

Introduction to Basics of Communication Definitions, Types Listening Speaking Reading Writing

TEXT BOOKS:

1. Six Thinking Hats by Edward de Bono, Little Brown and Company, 1985
2. My Early Days by Abdul Kalam, October 7, 2013

REFERENCE BOOKS:

1. English for Communication by Board of Editors, Emerald

2. Roche Marc, "Advanced English Writing Skills: Master class for English Language, Roche Publishing ESL, 2019

3. Strings of Gold (Part- II) Edited by Prof. Jasbir Jain (MacMillan), 2007

Course Coordinator **HOD**

BMI101	FUNDAMENTALS OF MICROBIOLOGY	L	T	P	C
	Total Contact Hours – 45	3	1	0	4
	Prerequisite course – Biology at Higher Secondary Education				
	Course Designed by – Dr.Jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics of any microbiology concepts. The purpose of this course is providing a clear understanding the classification, characteristics and importance of microbes.

COURSE OUTCOMES (COs)

CO1	Remember the history and scope of basics of Microbiology.
CO2	Understand the classification of microbes based on physiological characteristics.
CO3	Apply the various techniques in microbiology lab maintenance
CO4	Apply the various staining techniques to visualize the microbial structure.
CO5	Analyze the nature of the microorganisms.
CO6	Analyze the pathogenicity of the microbes by various criteria.

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
					✓					

4	Approval	Academic Council Meeting

UNIT I INTRODUCTION **9**

Overview of history of Microbiology - Biogenesis and abiogenesis Contributions of Redi, Spallanzani, Needham, Pasteur, Tyndal, Joseph Lister, Koch [Germ Theory], Edward Jenner and Flemming [Penicillin], General Concepts of Microscopy- Simple and Compound, Fluorescent microscopy and Phase contrast microscopy. Scope of Microbiology and its application

UNIT II CLASSIFICATION **9**

Classification of microbes - general properties and principles of classification of microorganisms- Numerical taxonomy- Nutritional types (media preparation and examples), classification on the basis of Temp, pH, and Oxygen requirement

UNIT III STERILIZATION **9**

Concept of Sterilization and Disinfection – Physical methods of sterilization- dry and moist heat, pasteurization, tyndallisation, radiation, ultrasonication, filtration- Chemical methods of sterilization- Concept of Disinfection sanitization, antisepsis, sterilants and fumigation

UNIT IV STAINING TECHNIQUES **9**

Staining techniques – Classification of stains, Theories and Mechanism of Gram staining, acid fast staining, Negative staining, Capsule staining, Flagella staining, Endospore staining.

UNIT V PATHOGENESIS **9**

Common pathogenesis of bacteria, fungi and virus (Morphology, Biochemical characters, pathogenecity, treatment and preventive measures)

TEXT BOOKS:

1. Dubey, R.C. and Maheswari, D.K. (2003) A Text Book of Microbiology, 1st Edn. S. Chand & Co. Ltd., New Delhi.
2. Pelczar, M.J., Jr., Chan, E.C.S and Kreig, N.R. (1993) Microbiology. McGraw Hill, New York.

REFERENCES BOOKS

1. Prescott, L.M., Harley, J.P. and Klein, D.A. (1999) Microbiology. McGraw Hill, New Delhi
2. Madigan, M.T., Martinko, J.M. and Parker, J. (1999). Brock's Biology of Micro organisms, 9th Edn. Prentice Hall, New Jersey.
3. Ketchum, P.A. (1984) Microbiology: Concepts and Applications. John Wiley and Sons, New York.

Course Coordinator **HOD**

BMI302	ENZYMOLOGY	L	T	P	C
	Total Contact Hours – 45	3	1	0	4
	Prerequisite – Higher Secondary level biology, Basic knowledge of enzymes				
	Course Designed by – Dr.S.Sharmila/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics of enzymology. The purpose of this course is providing a clear understanding importance of enzymes in cellular functions.

COURSE OUTCOMES (COs)

CO1	Remember the basic concepts of enzymology.
CO2	Understand the structure, functions and the mechanism of action of enzymes
CO3	Apply to characterize the enzymes in each enzymatic class
CO4	Apply the application of enzymes in medicine.
CO5	Analyse the kinetics of enzyme catalysed reactions and enzyme inhibitory process.
CO6	Analyse the applications of enzymes and their future potentials

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
					✓					

4	Approval		Academic Council Meeting

UNIT I INTRODUCTION **9**

Structure and functions of Enzymes- Classification of enzymes- Specificity of enzyme action –Active site, Fischers lock and key model, Koshland induces fit hypothesis. Factors modifying enzyme activity, biotechnological applications of enzymes

UNIT II CHEMICAL NATURE OF ENZYME CATALYSTS **9**

Mechanism of Catalyst, Acid base catalyst, Electrostatic catalyst, Covalent and enzyme catalyst- Structural Components of Enzymes – apoenzymes, prosthetic group, cofactors, Mechanisms of reactions catalysed by enzymes- metalloenzymes, coenzymes.

UNIT III ENZYME KINETICS **9**

Kinetics of single substrate reactions, turnover number, Enzyme Inhibition, Kinetics of multi-substrate reactions, Temperature and pH effects on enzyme activity.

UNIT IV IMMOBILIZATION OF ENZYMES **9**

Methods of immobilization of enzymes, Determination of molecular weight of enzymes (Column Chromatography) - Application in medicine (assay of plasma enzyme) and its application

UNIT V EXTRACTION AND PURIFICATION OF ENZYMES **9**

Methods of production of enzymes, Extraction of Enzymes –soluble enzymes – membrane bound enzymes –Nature of extraction medium – purification of enzyme.

TEXT BOOKS

1. Enzymes by Trevor palmer

2. Enzymes by Robert A. Copeland, 2nd edition.

3. Biochemical Engineering by Harwey W. Blanch and Douglas S. Clark

REFERENCE BOOKS

1. Principles of Fermentation technology – Stanbury, 2nd edition, 2003

2. Enzyme technology by Martin F. Chaplin, C. Bucke

3. Methods in Enzymology vol. 152 by S.L. Berger and A.R. Kimmel

Course Coordinator **HOD**

BMI103	Biodiversity& Its Conservation	L	T	P	C
	Total Contact Hours – 60	3	1	0	4
	Prerequisite course – Basic bioscience/ Fundamental Studied in Higher Secondary studies				
	Course Coordinator Name & Department :- Dr.VasukideviRamachandran/BSc				

COURSE OBJECTIVES :-

Learners having knowledge in basics of biological diversity can understand the biodiversity patterns. The purpose of this course is providing a clear understanding of the concepts over-exploitation; deforestation; hydropower development.

COURSE OUTCOMES (COs)

CO1	Remember the important of biological diversity
CO2	Understand the seasonal fluctuations
CO3	Apply the ethical values of biodiversity
CO4	Apply the deforestation,hydropower development.
CO5	Analyze thehabitat degradation.
CO6	Analyze theIn &Ex-situ conservation

Mapping of Course Outcomes with Program outcomes (POs)

(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
					✓					

4	Approval		Academic Council Meeting

UNIT I INTRODUCTION **12**

Concept and levels of biodiversity, India as a mega diversity nation; Biogeographic zones of the country; Measurement of biodiversity, impact of hydropower development on biological diversity; status of protected areas and biosphere reserves in the country; National Biodiversity Action Plan.

UNIT II GRADIENT OF BIODIVERSITY **12**

Gradient of Biodiversity, Geological distribution of biodiversity. Spatial patterns: latitudinal and elevational trends in biodiversity; temporal patterns: seasonal fluctuations in biodiversity patterns, Barriers and means of disposal.

UNIT III ECONOMIC VALUES **12**

Economic values–medicinal plants, drugs, fisheries and livelihoods; ecological services – primary productivity, role in hydrological cycle, biogeochemical cycling; ecosystem services – purification of water and air, nutrient cycling, climate control, pest control, pollination, and formation and protection of soil; social, aesthetic, consumptive, and ethical values of biodiversity.

UNIT IV NATURAL AND ANTHROPOGENIC DISTURBANCES **12**

Natural and anthropogenic disturbances; habitat loss, habitat degradation, and habitat fragmentation; climate change; pollution; hunting; over-exploitation; deforestation; hydropower development; invasive species; land use changes; overgrazing; man wildlife conflicts; consequences of biodiversity loss; Intermediate Disturbance Hypothesis.

UNIT V IN-SITU CONSERVATION **12**

In-situ conservation (Biosphere Reserves, National Parks, Wildlife Sanctuaries); Ex-situ conservation (botanical gardens, zoological gardens, gene banks, seed and seedling banks, pollen culture, tissue culture and DNA banks), role of local communities and traditional knowledge in conservation; biodiversity hotspots; IUCN Red List categorization – guidelines, practice and application; Red Data book

TEXT BOOKS:

1. Gaston, K J. & Spicer, J.I. 1998. Biodiversity: An Introduction. Blackwell Science, London, UK.
2. Krishnamurthy, K.V. 2004. An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi.
3. Pandit, M.K. &Grumbine R.E. 2012. Ongoing and proposed hydropower development in the Himalaya and its impact on terrestrial biodiversity. Conservation Biology 26:1061-1071.
4. Primack, R.B. 2002. Essentials of Conservation Biology (3rd edition). Sinauer Associates, Sunderland, USA.

REFERENCE BOOKS:

1. Singh, J. S. & Singh, S. P. 1987. Forest vegetation of the Himalaya. The Botanical Review 53: 80-192.
2. Singh, J. S., Singh, S.P. & Gupta, S. 2006. Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.
3. Sodhi, N.S. & Ehrlich, P.R. (Eds). 2010. Conservation Biology for All. Oxford University Press.
4. Sodhi, N.S., Gibson, L. & Raven, P.H. 2013. Conservation Biology: Voices from the Tropics. Wiley-Blackwell, Oxford, UK.

Course Coordinator **HOD**

BMI1L1	**BASIC MICROBIOLOGY LAB**	L	T	P	C
	Total Contact Hours – 45	0	0	4	2
	Prerequisite- Basic Microbiology				
	Course Designed by – Dr.Jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics of microbial laboratory techniques. The purpose of this course is providing a clear understanding the microbial characteristics and identification of microbes in disease perspectives.

COURSE OUTCOMES (COs)

CO1	Perform the basics in microbial identification.
CO2	Handle and operate the various instruments.
CO3	Caliberate the concept of sterilization techniques.
CO4	Manipulate the results based on the microbial testing.
CO5	Sketches the sterilization techniques on media preparation.
CO1	Perform the protein separation based on the size of the particles.

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO1	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval	Academic Council Meeting									

1. Microscopy- light microscopy: principles, parts & function, operation
2. Image analysis of different classes of Microbes.
3. Preparation of Microbial media (Bacteria, yeast, mold, algae, protozoa)
4. Sterilization: principles & operations-Auto clave, Hot air oven, Filtration, Laminar air flow
5. Principles and operations of Incubators and shakers.
6. Principles and operations of Centrifuge.
7. Principles and operations of pH meter
8. Principles and operations of Colorimeter.
9. Principles and operations of Spectrophotometer.
10. Electrophoresis Techniques.

TEXT BOOKS:

1. Josephine A, Morello Paul A, Granato Helen and Eckel Mizer. Laboratory Manual and Workbook in Microbiology. Spiral Bound, Comb press, 1999.
2. Nina Parker. Microbiology Manual, OpenStax CNX,2001.

REFERENCE BOOKS:

1. Moat AG, Foster JW and Spector MP. Microbial Physiology, 4 th Edn., Wiley-Liss Publishers, 2002.
2. James Cappuccino. Microbiology: A Laboratory Manual, 10 ed., Pearson, 2013.

Course Coordinator **HOD**

SEMESTER II

BAL201	□□□□□ **- II**	**L**	**T**	**P**	**C**
	Total Contact Hours – 60	4	0	0	4
	Prerequisite course – TAMIL – I				
	ourse Coordinator Name& Department :முனைவர்.ம.சித்ராகண்ணு&தமிழ்த்துறை				

COURSE OBJECTIVES : சிற்றிலக்கியம் மற்றும் சமய இலக்கியத்தை அறியச் செய்தல்

COURSE OUTCOMES (COs)

CO1	சிற்றிலக்கியமான தூது,பள்ளு ,குறவஞ்சி பற்றி அறிந்துகொள்வர்
CO2	சைவ சமயஇலக்கியம்பற்றி அறிந்துகொள்வர்
CO3	வைணவ சமயஇலக்கியம்பற்றி அறிந்துகொள்வர்
CO4	பௌத்த, இசுலாம், கிறித்துவ சமயஇலக்கியம்பற்றி அறிந்துகொள்வர்
CO5	சிற்றிலக்கியம் மற்றும் சமய இலக்கிய வரலாறுபற்றி அறிந்துகொள்வர்
CO6	சிற்றிலக்கியம் மற்றும்சமய இலக்கியம் பற்றிய தெளிவான அறிவைப் பெறுவர்

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H	M	M
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
		✓								
4	Approval		Academic Council Meeting							

முக்கூடற்பள்ளு - நாட்டுவளம் - 21,22,25,26,35
திருக்குற்றாலக்குறவஞ்சி- குறத்திமலைவளம்கூறுதல் - 1 - 5

அலகு2 **9**
அற்புதத்திருவந்தாதி - 1 - 5
திருஞானசம்பந்தர் - தேவாரம் - திருவெண்காட்டுப்பதிகம் - 1 - 10
மாணிக்கவாசகர் -திருவாசகம் - திருச்சாழல் - 1 - 10

அலகு3 **9**
பெரியாழ்வார் - முதல்திருமொழி - 1 - 10
ஆண்டாள் - திருப்பாவை - - 1 - 10
தொண்டரடிப்பொடிஆழ்வார் - திருமாலை - 1 - 5

அலகு4 **9**
ஆசியஜோதி - கருணைக்கடல் - அறவுரைகூறுதல் - 1 - 10
பராபரக்கண்ணி - குணங்குடிமஸ்தான்சாகிபு - 1 - 20
இயேசுகாவியம் - பாடுகளின்பாதை- கண்ணதாசன்

அலகு5 **9**
சிற்றிலக்கியவரலாறு ,சமயஇலக்கியவரலாறு

பாட நூல்கள்

1. கதிர்முருகு, "அழகர்கிள்ளைவிடுதூது", சாரதாபதிப்பகம், 2011
2. சோ.கந்தசாமி"பன்னிருதிருமுறை", உலகத்தமிழாராய்ச்சிநிறுவனம், 2008
3. கண்ணதாசன், "இயேசுகாவியம்", கண்ணதாசன்பதிப்பகம், 2014

பார்வைநூல்கள்

1. கதிர்முருகு, "முக்கூடற்பள்ளுமூலமும்உரையும்", சாரதாபதிப்பகம், 2017
2. புலியூர்க்கேசிகன், "திருக்குற்றாலக்குறவஞ்சி", செண்பகாபதிப்பகம், 2010
3. தமிழமுதன், "அற்புதத்திருவந்தாதி", பாரிநிலையம், 2011
4. த.கோவேந்தன், "நாலாயிரத்திவ்யப்பிரபந்தம்உரை", சாரதாபதிப்பகம், 2015
5. கமலாமுருகன், "ஆசியஜோதிமூலமும்உரையும்", சாரதாபதிப்பகம், 2012
6. கமலாமுருகன், "பராபரக்கண்ணிமூலமும்உரையும்", சாரதாபதிப்பகம், 2013
7. சு.ஆனந்தன், "தமிழ்இலக்கியவரலாறு", பாரிநிலையம், 2018

Course Coordinator **HOD**

BAL202	**FRENCH-II**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	4	0	0	4
	Prerequisite course – Grade 12				
	Course Coordinator Name & Department: - Ms. Tushita Naidu K / Département De Française				
COURSE OBJECTIVES: - Learners will understand the complexity of the grammar and how to overcome it with simple rules.					
COURSE OUTCOMES (COs)					

CO1	Remember to interpret the language.
CO2	Understand familiarize with methodological approaches in the study of literary and cultural texts, such as close reading, socio-historical contextualization, and literary and cultural theory.
CO3	Apply advanced proficiency in spoken and written French.
CO4	Apply the development of skills in linguistics, translation, and comparative studies.
CO5	Analyze remember the anatomy of conjugations in past tense.
CO6	Analyze the given text critically and enhance communication skills.

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies (HS)	Basic Sciences	Engg Sciences (ES)	Professional Core (PC)	Core Elective	Non-Major Elective	Open Elective	Any other	Project/Term Paper/ Seminar/ Internship (PR
		√								

4	Approval		Academic Council Meeting

UNIT I -Quelle journee! 9

La Conjugaison pronominale -L'imperatif -L'expression de la quantite (peu-in peu de- quelque – etc.)

UNIT II - Qu'on est bien ici ! 9

Prepositions et adverbs de lieu - Verbs experimant un deplacement (employ des prepositions)

Le lodgement/la localisation/ l'orientation/l'etat physique/le temps qu'il fait

UNIT III -En se detend? 9

L'imparfait-Emplois du passé compose et de l'imparfait-Expression de la duree-L'enchainement des idees (alors, donc, mais) /Le sens reciproque

UNIT IV- On s'appelle? 9

Les pronoms complements direct -Les pronoms compliments indirects de personne -c'est/ il est- Imperatif des verbs avec pronoms-La fornation des mots

UNIT V Un bon conseil ! 9

Expression du deroulement de l'action--passe recent--Present progressif-future proche-Les phrases rappotrees- La place de l'adjectif- La proposition relative finale avec -qui

TEXT BOOKS:

A1 ECHO- J. GIRARDET, J. PECHEURB CLE PUBLICATION

Course Coordinator HOD

BAL203	**Hindi-II**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	4	0	0	4
	Prerequisite course – Grade 12				
	Course Coordinator Name & Department:- Dr. K. MustakHusaain / Department of Hindi				

COURSE OBJECTIVES: -
Learners will understand and improve the skills in the Language of Hindi

COURSE OUTCOMES (COs)

CO1	Remember of Ramayana In Sabari part
CO2	Understand the historical stories
CO3	Apply the concept of translation
CO4	Apply and develop the letter writing skills
CO5	Analyze and develop the speaking skills
CO6	Analyze knowledge in letter writing and speaking skills

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

UNIT I **09**

MODERN POETRY - SHABARI

UNIT II **09**

ONE ACT PLAY - EKANKI SANKALAM

UNIT III **09**

TRANSLATION - HINDI – ENGLISH ONLY

UNIT IV **09**

LETTER WRITING - Leave letter - Job Application - Ordering books - Letter to Publisher - Personal letter

UNIT V **09**

CONVERSATION - Doctor & Patient - Teacher & Student - Storekeeper & Buyer - Two Friends - Booking clerk & Passenger at Railway station – Auto rickshaw driver and passenger.

Text Books:

By Naresh Mehtha,Veerendra Kumar Mishra

Reference Books:

UNIT 1 – Publisheres - LokbharathiPrakashan ,1 Floor, DuebariBuilding,Mahathma Gandhi Marg, Allahabad – 1.

UNIT II – Publishers – Vani Prakasam, New Delhi-110002
UNIT III – Publishers – Dakshin Bharath Hindi Prachar Sabha, Chennai- 17

CourseCoordinator **HOD**

	ENGLISH - II	L	T	P	C
BEH201	Total Contact Hours – 45	4	0	0	4
	Prerequisite – Higher Secondary Level				
	Course Coordinator Name & Dept.: Mr.S.KUMARESAN - English				

COURSE OBJECTIVES:-
Learners will have better understanding of the English language skills and its implementation it in day to day life activities.

COURSE OUTCOMES (COs)	
CO1	Remember and recall the concepts of English language
CO2	Understand the necessity of grammar in Communication
CO3	Apply the plots and themes discussed
CO4	Analyze the various characters involved
CO5	Evaluate the characters and summarize the prescribed literature
CO6	Create essays by evaluating the literary techniques and devices used.

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PSO 2	PS O3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
		✓								

4	**Approval**	Academic Council Meeting

UNIT 1: PROSE **12**

The Refugee – K.A. Abbas – Author biography – Summary – Critical Analysis.- The Lion and the Lamb – Leonard Clark – Author biography – Summary – Critical Analysis.

UNIT 2: POEMS **12**

1. The Solitary Reaper – William Wordsworth – Author biography – Summary – Critical Analysis.- Gift – Alice Walker – Author biography – Summary – Critical Analysis.

UNIT 3: SHORT STORIES **12**

The Fortune-Teller – Karel Capek – Author biography – Summary – Critical Analysis - The Postmaster – Rabindranath Tagore – Author biography – Summary – Critical Analysis.

UNIT 4: ONE-ACT PLAYS **12**

The Death Trap – Saki (H.H. Munro) – Author biography – Summary – Critical Analysis -. The Dear Departed: A Comedy in One-Act – Stanley Houghton – Author biography – Summary – Critical Analysis.

UNIT 5: COMMUNICATIVE GRAMMAR **12**

Seeking and giving information – statements and questions 2. Being informal – phrasal verbs 3. Expressing ability, possibility, etc – Modals and other devices

TEXT BOOKS:

1. The Death Trap by Saki, The Novels and Plays of Saki, 2001
2. Pooja Khanna, "English Communication", S.CHAND Publishing, 2016
3. Rabindranath Tagore, "The Postmaster", Penguin India, 2000

REFERENCE BOOKS:

1. K.A.Abbas Suresh Kohli, "An Evening in Calcutta", HarperCollins, 2015
2. Stanley Houghton, "Five one act plays", Alpha Edition, 2019
3. Edited Prof. Jasbir Jain, "Strings of Gold (Part- II)", MacMillan, 2016

Course Coordinator **HOD**

BCI203	ENVIRONMENTAL STUDIES	L	T	P	C
	Total Contact Hours – 30	2	0	0	2
	Prerequisite – Plus Two				
	Course Designed by – Dept. of Chemistry				

COURSE OBJECTIVES: -

Learners wil learn about the science from the basic and understood all theoretical background with all concepts thoroughly to protect the habitat of biotic and abiotic ecosystem

COURSE OUTCOMES (COs)

CO1	Remember the basic concepts of natural resources, ecosystem and environmental pollution
CO2	Understand about the Biodiversity and its conservation
CO3	Apply Environmental Pollution and Management.
CO4	Apply organic environmental approach to protect our habitat for the next generation.
CO5	Analyze the impact of population and Urbanization to affect the system of habitat loss
CO6	Analyze case studies relate to environment and healt.

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M							H	M
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

UNIT I INTRODUCTION TO ENVIRONMENTAL SCIENCES: NATURAL RESOURCES 6

Environmental sciences-relevance-significance-public awareness-forest resources-water resources-mineral resources-food resources-conflicts over resource sharing-exploitation-land use pattern-environmental impact-fertilizer-pesticide problems-case studies

UNIT II ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION 6

Ecosystem-concept-structure and function-producers, consumers and decomposers-food chain-food web-ecological pyramids-energy flow-forest, grassland, desert and aquatic ecosystem-Biodiversity: definition-genetic, species and ecosystem diversity-values and uses of biodiversity-biodiversity at global, national (India) and local levels-hotspots, threats to biodiversity-conservation of biodiversity-*in situ* and *ex situ*

UNIT III ENVIRONMENTAL POLLUTION AND MANAGEMENT 6

Environmental pollution-causes-effects and control measures of air, water, marine, soil, solid waste, thermal, nuclear pollution and disaster management-floods, earthquake, cyclone and landslides-role of individuals in prevention of pollution-pollution case studies

UNIT IV SOCIAL ISSUES- HUMAN POPULATION 6

Urban issues-energy-water conservation-environmental ethics-global warming-resettlement and rehabilitation issues-environmental legislations-Environmental protection Act, 1986-air, water, wildlife and forest conservation Act-population growth and explosion-human rights and value education-environmental health-HIV/AIDS-role of IT in environment and human health-women and child welfare-public awareness-case studies

UNIT V FIELD WORK 6

Visit to local area-local polluted site-local simple ecosystem-report submission

REFERENCE BOOK

1. Kumarasamy k., a. Alagappa Moses and M. Vasanthy, 2004. Environmental Studies, Bharathidasan University Pub, 1, Trichy
2. Rajamannar, 2004, Environmental Studies, EVR College Pub, Trichy
3. Kalavathy, S. (ED), 2004, Environmental Studies, Bishop Heber College Pub, Trichy

Course Coordinator **HOD**

BMI201	CELL BIOLOGY	L	T	P	C
	Total Contact Hours – 45	3	1	0	4
	Prerequisite – Higher Secondary level biology, basic concepts in cell signaling				
	Course Designed by – Dr.S.Sharmila/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics of cells and cellular components. The purpose of this course is providing a clear understanding the structure, function, types and its culture.

COURSE OUTCOMES (COs)

CO1	Remember the history and fundamental principles of cellular biology.
CO2	Understand the cellular components and their structure and functions.
CO3	Apply the concept of cell theory.
CO4	Apply the role of cell organelles in physiology.
CO5	Analyze the theory to identify the various cell structures.
CO6	Analyze the cell cycles and growth of cells.

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
					✓					

4	Approval		Academic Council Meeting

UNIT I INTRODUCTION **9**

An Overview of cells – Origin and evolution of cells- Cell theory, Classification of cells – Prokaryotic cells and Eukaryotic cells- Comparison of prokaryotic and eukaryotic cells Cell cycle – components in cell cycle control – cyclic- CDKs – check points in cell cycle -abnormalities in cell cycle

UNIT II CELL MEMBRANE **9**

Cell Membrane – Fluid mosaic model of membrane structure- Membrane proteins and their properties-Membrane carbohydrates and their role- Transport across membranes – Diffusion - active and passive diffusion.

UNIT III ENDOPLASMIC RETICULUM **9**

Endoplasmic reticulum – Types, structure and function- Golgi apparatus – Structure and function- Lysosome– Structure and functions- Morphology and functions of peroxisomes and **glyoxisomes - Ribosomes – Types structure and function

UNIT IV NUCLEUS **9**

Nucleus: Structure and function. Chromosomes, chromatin structure- Mitochondria – Structure and functions- Cytoskeleton: Types of filaments and their functions. Microtubules – Chemistry and functions – Cilia and flagella- Cell –cell interactions.

UNIT V CELL DEATH **9**

Introduction to Necrosis, Senescence, Apoptosis – Programmed cell death- Mechanism of Apoptosis- Oncogenes – Types of cancer

TEXT BOOK:

1. Molecular Cell Biology (Lodish, Molecular Cell Biology) by Harvey Lodish, Arnold Berk, Chris A. Kaiser and Monty Krieger -2007

REFERENCE BOOKS

2. Molecular Biology of the Cell, 4th edition by Bruce Albert's, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter. New York: Garland Science; 2002.
3. Cell and Molecular Biology: Concepts and Experiments, Fourth Edition by Gerald Karp-2004
4. The World of the Cell, 7th Edition by Wayne M. Becker, Lewis J. Kleinsmith, Jeff Hardin and Gregory Paul Bertoni (Feb 29, 2008)

Course Coordinator **HOD**

BMI202	GENETICS	L	T	P	C
	Total Contact Hours – 30	3	1	0	4
	Prerequisite – Basic biology, concepts in genetics				
	Course Designed by – Dr.Jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics on genetics, its laws, genes and chromosomes, inheritance, heredity. The purpose of this course is providing a clear understanding the causes of genetic disorders and the methods of gene transfer.

COURSE OUTCOMES (COs)

CO1	Remember the basics about genes and genetics.
CO2	Understand the mechanism of genetic materials.
CO3	Apply the mechanism of gene transfer.
CO4	Apply the familiarity about genetic materials and diseases.
CO5	Analyze the concept in sex determination.
CO6	Analyze the role of genetic materials in cells.

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

UNIT I BASICS OF GENETICS **9**

Classical gentics, Mendelian Laws- Mendel's experiment-monohybrid cross-phenotype, genotype, Dihybrid inheritance, Interaction of genes, Fine structure of Genes

UNIT II CHROMOSOMES **9**

Chromosome structure and organization in prokaryotes and eukaryotes, Unusual chromosomes-chromosome banding, chromosome abnormalities- genetic disorders

UNIT III ALLELES **9**

Classical concepts of allelomorphism, Multiple alleles, ABO blood groups, Rh factor, sex linkage in Drosophila, linkage in human beings, mechanism of sex determination, XX-XY mechanisms of sex determination, sex determination in Drosophila, environmental factors and sex determination, sex differentiation.

UNIT IV CROSSING OVER **9**

Coupling and Repulsion-Hypothesis, Test cross in maize and crossing over, theory of crossing over, molecular mechanism of crossing over, sex chromosomes and sex linked inherited disorders, colour blindness, hemophilia, Muscular dystrophy.

UNIT V GENE TRANSFER **9**

Transformation, Tansduction, Conjugation, Plasmids and Episomes

TEXT BOOK:

Gardner; Principle of Genetics

REFERENCE BOOKS:

1. Fundamentals of Biotechnology, Prave. P. Faust, V. Sitih. W., Sukatsh, DA, 1987 ASM press

2. An introduction to Genetic Engineering, Desmond, S.T., Nicholl, 1994. Cambridge press.

Course Coordinator **HOD**

BMI203	**MOLECULAR BIOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	1	0	4
	Prerequisite – Basic biology, concepts in genetics				
	Course Designed by – Dr.L.Jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics knowledge about the general dogma of cell. The purpose of this course is providing a clear understanding the genetic materials structure and functions.

COURSE OUTCOMES (COs)

CO1	Remember the basic of molecular biology.
CO2	Understand the structure of DNA and RNA.
CO3	Apply the mechanisms of DNA Replication.
CO4	Apply the importance of transcription and translation in RNA processing.
CO5	Analyse the gene expression.
CO6	Analyse the concept of codons.

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
					✓					

4	Approval		Academic Council Meeting

	CELL BIOLOGY LAB	L	T	P	C

UNIT I INTRODUCTION TO MOLECULAR BIOLOGY - DNA AND RNA 9

Scope and History- Structure of DNA-Nucleoside, Nucleotide, Base pairing, Double Helix-features of Watson and Crick model, major and minor groove, Supercoiling- twist, writhe and linking number Types of DNA- Structure and function of mRNA, rRNA, tRNA.Secondary structures in RNA.

UNIT II REPLICATION 9

Types and functions of DNA polymerases in Prokaryote and Eukaryote-Replication in prokaryote and Eukaryote- Plasmid Replication- rolling circle model.

UNIT III TRANSCRIPTION AND POST TRANSCRIPTIONAL MODIFICATIONS 9

Fine structure of prokaryotic and eukaryotic gene.Transcription of mRNA,rRNA, and tRNA genes in Prokaryote and eukaryote. Post transcriptional processing of mRNA – 5'capping, splicing, polyadenylation and RNA editing.

UNIT IV TRANSLATION AND POST TRANSLATIONAL PROCESSING 9

Genetic code and Wobble hypothesis- Translation in prokaryote and eukaryote-Post translational modifications

UNIT V GENE REGULATION 9

Principles of gene regulation- Transcriptional and post transcriptional gene regulation-activators, co-activators,suppressors, co-suppressors, moderators, silencers, insulators, enhancers. Operon-*lac* operon, *trp*operon, *ara*operon and *gal* operon.

TEXT BOOKS:

1. Karp G. Cell and Molecular Biology – Concepts and Experiments, 6 th Edn. John Wiley and Sons., 1998.
2. Verma PS and Agarwal VK. Cell Biology (Cytology, Biomolecules, Molecular Biology), Paperback, S. Chand and Company Ltd., 2016.
3. Molecular Biology of Gene - Watson

REFERENCE BOOKS:

McLennan A, Bates A, Turner P and White M. Bios Instant Notes Molecular Biology, 4 th Edn. Taylor and Francis, 2012.

1. Cox MM, Doudna JA and O'Donnell M. Molecular biology: Principles and Practice, WH Freeman and Company, 2012.
3. Molecular and Cellular Biology- Stefen Wolfe

4. Molecular biology of Gene,fifth edition Author James D. Watson 2004Benjamin cummings

Course Coordinator **HOD**

	Total Contact Hours –30	0	0	4	2
	Prerequisite course – Biology at Higher Secondary Education				
	Course Coordinator Name & Department :- Dr.V.Padmapriya & Biotechnology				

COURSE OBJECTIVES: - Learners will be familiar with basic cell biology experiments. Learners will understand the microscopical observation of cells

COURSE OUTCOMES (COs)

CO1	Perform the differential staining and measure osmotic potential.
CO2	Differentiate the structure of prokaryotes and eukaryotes
CO3	Grasp the microscopic observation of chromosomes in cells.
CO4	Manipulate the estimation of Hb, WBC and RBC levels as compared to the control
CO5	Sketch the difference between mitosis and meiotic division

Mapping of Course Outcomes with Program outcomes (POs)
(H/ML indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M							H	M
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

I QUALITATIVE ANALYSIS

1. Cell Division: Mitosis – onion root tip: Meiosis – Transdescantia
2. Polytene chromosomes – chironomous larvae
3. Microscopic observation of prokaryotic and eukaryotic cell (differential staining)
4. Screening of leaf pigments – paper chromatography
5. Haemoglobin estimation
6. WBC and RBC count – Haemocytometer
7. Osmotic potential – (sucrose / salt solution)

II PERMANENT SLIDE OBSERVATION

8. Meiosis
9. Plant cell
10. Mitochondria
11. Chloroplast

TEXT BOOKS

1. Smith and Wood, Cell Biology, Chapman and Halls, 1996.
2. Bruce Alberts and other, Molecular Biology of the Cell, Garland Publishing, 3rd ed., 1994.
3. Veerakumari L. Bioinstrumentation. MJP Publisher; 2019.

REFERENCE BOOKS:

1. Julio E. Celis, Cell Biology: A Laboratory Handbook, Academic Press, 3rd ed, 2005.
2. Gerald Karp, Cell and Molecular Biology", John Wiley and Sons Inc. New York, 1996.
3. Kates M, Work E. Laboratory techniques in biochemistry and molecular biology. North-Holland Publishing Company; 1986.
4. Harvey DT. The Essence of Chromatography. ACS Publications;2003.
5. Westermeier R, Westermeier R. Electrophoresis in practice. Weinheim Germany: Wiley-Vch; 2001.

Course Coordinator **HOD**

BSS201	VALUE EDUCATION	L	T	P	C
	Total Contact Hours – 30	2	0	0	2
	Prerequisite – Plus Two				
	Course Designed by –Department of Commerce				

COURSE OBJECTIVES: -

Learners wil enable the students to understand the Social values. To provide knowledge on the features for life. To acquire the knowledge on Human rights. To impart the knowledge on Environment and Ecological balance. To educate the knowledge on Social evils..

COURSE OUTCOMES (COs)

CO1	Remember the basic concept of human values, Social Value role of medias, Self-introspection – Self esteem
CO2	Understand the duties and responsibilities of individuals and role of media
CO3	Apply Salient features for life, : Truth, commitment,, honesty and integrity, forgiveness and love and also positive creative thinking
CO4	Apply Universal declaration of Human rights, peace and nonviolence – Dr. APJ Abdul Kalam's ten points for enlightened citizenship.
CO5	Analyze living and nonliving environmental balance, Ecological balance and conservations and enrichment

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-ow

1	COs/Pos	PO 1	PO2	PO3	PO4	PO5	PO 6	PO7	PS O1	PSO2	PS O3
2	CO1	H	M	M							
	CO2	H	H	H		L					
	CO3	M	H	M	M				H		
	CO4	H	M	L							
	CO5	H	H	M			M				
	CO6	M	M	L							

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
		✓								
4	**Approval**	Academic Council Meeting								

UNIT I INTRODUCTION **6**

Value Education - Definition - relevance to present day - Concept of Human Values - self introspection - Self esteem.

UNIT II FAMILY VALUES **6**

Family values - Components, structure and responsibilities of family - Neutralization of anger - Adjustability - Threats of family life - Status of women in family and society - Caring for needy and elderly - Time allotment for sharing ideas and concerns.

UNIT III ETHICAL VALUES **6**

Ethical values - Professional ethics - Mass media ethics - Advertising ethics - Influence of ethics on family life - psychology of children and youth - Leadership qualities - Personality development.

UNIT IV SOCIAL VALUES **6**

Social values- Faith, service and secularism - Social sense and commitment - Students and Politics - Social awareness, Consumer awareness, Consumer rights and responsibilities - Redressal mechanisms.

UNIT V GLOBALIZATION **6**

Effect of international affairs on values of life/ Issue of Globalization - Modern warfare – Terrorism- Environmental issues - mutual respect of different cultures, religions and their beliefs.

REFERENCE BOOKS:

1. T. Anchukandam and J. Kuttainimathathil (Ed) Grow Free Live Free, Krisitu Jyoti Publications, Bangalore (1995)

2. Mani Jacob (Ed) Resource Book for Value Education, Institute for Value Education, New Delhi 2002.

3. DBNI, NCERT, SCERT, Dharma Bharti National Institute of Peace and Value Education, Secunderabad, 2002.

4. Daniel and Selvamony - Value Education Today, (Madras Christian College, Tambaram and ALACHE, New Delhi, 1990)

5. S. Ignacimuthu - Values for Life - Better Yourself Books, Mumbai, 1991.

6. M.M.M.Mascaronhas Centre for Research Education Science and Training for Family Life Promotion - Family Life Education, Bangalore, 1993.\

Course Coordinator **HOD**

SEMESTER III

BAL301	**தமிழ் – III**	**L**	**T**	**P**	**C**
	Total Contact Hours – 60	4	0	0	4
	Prerequisite course – TAMIL –II				
	Course Coordinator Name& Department :முனைவர்.ம.சித்ராகண்ணு&தமிழ்த்துறை				

COURSE OBJECTIVES : காப்பிய இலக்கியம் மற்றும் நீதி இலக்கியத்தை அறியச் செய்தல்

COURSE OUTCOMES (COs)

CO1	ஐம்பெரும் காப்பியங்களைபற்றி அறிவர்
CO2	பிற்கால காப்பியங்களைபற்றி அறிவர்
CO3	முக்கால நீதி இலக்கியங்களைபற்றி அறிவர்
CO4	பிற்கால நீதி இலக்கியங்களைபற்றி அறிவர்
CO5	காப்பிய மற்றும் நீதி இலக்கிய வரலாற்றைபற்றி அறிவர்
CO6	காப்பியம் மற்றும் நீதி இலக்கியங்களில் தெளிவான அறிவைப் பெறுவர்

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H	M	M
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
		✓									
4	Approval		Academic Council Meeting								

அலகு1 **9**

சிலப்பதிகாரம்-இளங்கோவடிகள்- அடைக்கலக்காதை - 115-148, 201-219
மணிமேகலை- சீத்தலைச்சாத்தனார்-ஆபுத்திரன்திறம்அறிவித்தகாதை-1 - 115
சீவகசிந்தாமணி- திருத்தக்கத்தேவர்- குணமாலையார்இலம்பகம்-851 - 860

அலகு2 **9**

கம்பராமாயணம்- கம்பர்- அயோத்தியகாண்டம்- கங்கைப்படலம் - 10
தேம்பாவணி- வீரமாமுனிவர்- நாட்டுப்படலம் - 10
சீறாப்புராணம்-உமறுப்புலவர்--மானுக்குப்பிணைநின்றபடலம்- 1- 10

அலகு3 **9**

திருக்குறள் - திருவள்ளுவர் - கல்வி - 1 - 10
நாலடியார் - பொருட்பால் - நட்பாராய்தல் - 1 - 10
இனியவைநாற்பது - பூதஞ்சேந்தனார் - 1 – 10

அலகு4 **9**

மூதுரை-அவ்வையார்- 1- 10 நன்னெறி- சிவப்பிரகாசர் - 8,12,18,24,39
புதியஆத்திசூடி - பாரதியார் - 1- 25

அலகு5 **9**

காப்பியஇலக்கியவரலாறு , நீதிஇலக்கியவரலாறு

பாட நூல்கள்

1. ந.மு.வேங்கடசாமிநாட்டார், "சிலப்பதிகாரம்", ராமையாபதிப்பகம், 2010
2. வீரமாமுனிவர், "தேம்பாவணிமூலமும்உரையும்", சாரதாபதிப்பகம், 2014
3. கலைஞர்மு.கருணாநிதி, "திருக்குறள்கலைஞர்உரை", திருமகள்நிலையம், 2010

பார்வைநூல்கள்:

1. புலியூர்க்கேசிகன், "மணிமேகலைமூலமும்உரையும்", சாரதாபதிப்பகம், 2017
2. ஆசிரியர்குழு, "சீவகசிந்தாமணிமூலமும்உரையும்", சாரதாபதிப்பகம், 2015
3. சு.ஆனந்தன், "தமிழ்இலக்கியவரலாறு", பாரிநிலையம், 2018
4. பத்மதேவன், "நாலடியார்மூலமும்உரையும்", கற்பகம்புத்தகாலயம், 2010
5. கதிர்முருகு, "நன்னெறிமூலமும்உரையும்", சாரதாபதிப்பகம், 2016
6. அ.சீனிவாசன், "பாரதியின்புதியஆத்திச்சூடி: ஒருவிளக்கவுரை" , 1999

Course Coordinator **HOD**

BAL302	**FRENCH -III**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	4	0	0	4
	Prerequisite course – Grade 12				
	Course Coordinator Name & Department: - Ms. Tushita Naidu K / Département De Française				

COURSE OBJECTIVES: - To develop the technical aspects of the language and varied grammatical nuances to interpret the subject matter											
COURSE OUTCOMES (COs)											
CO1	Remember the impart the various aspects that makeup the language.										
CO2	Understand facts, procedures, practice certain grammatical structures, and practice communicative strategies.										
CO3	Apply the culture of the language natives.										
CO4	Apply the basic and advanced grammar.										
CO5	Analyze to remember the interlink between the conjugations										
CO6	Analyze and understand grammatical strictures.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
4	Approval		Academic Council Meeting								

UNIT I Vivement demain! 9

Le future- La comparaison des qualities, des quantities et des actions

UNIT II Le Tu as du boulot? **9**

Le pronom (en)-Le pronom (Y)-Expression de la condition

UNIT III -Qu'en pensez - vous? **9**

Le subjonctif (employ lie a quelques verbs)- Expression de la quantite (poids et mesure-evaluation-restriction)

UNIT IV - C'est tout un programme! **9**

Les propositions relatives introduites par (qui, que, ou)-Les adverbs (place, formation des adverbs en-ment)-La forme ((en + participle present))

UNIT V On se retrouve ! **9**

Emploi et conjugaison des quatre temps de l'indicatif quatre temps de l'indicatif:--passe recent--Present -Passe compose-Imparfait et future

TEXT BOOKS:

A2 ECHO- J. GIRARDET, J. PECHEURB CLE PUBLICATION.

Course Coordinator **HOD**

BAL303	Hindi-III	L	T	P	C
	Total Contact Hours – 45	4	0	0	4
	Prerequisite course – Grade 12				
	Course Coordinator Name & Department:- Dr. K. MustakHusaain / Department of Hindi				

COURSE OBJECTIVES: -

To understand and improve the skills in the Language of Hindi

COURSE OUTCOMES (COs)

CO1	Remember of Ramayana in Panchavati part
CO2	Understand the history of Hindi literature
CO3	Apply the concept of Hindi grammatical speech
CO4	Apply and develop the translation skills
CO5	Analyze and develop the unseen passage skills
CO6	Analyze and create the skills in Hindi language

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
		√								

4	Approval		Academic Council Meeting

UNIT I **09**

POETRY - PANCHAVATI

UNIT II **09**

HISTORY OF HINDI LITERATURE - Aadi Kaal and Bhakthi Kaal - general knowledge of the trends of the difference streams

UNIT III **09**

ALANKAR – Anupras – Yamak - Slesh - VakrokthiUpama – Rupak – Drishtanth – Virodhabas.

UNIT IV **09**

TRANSLATION - HINDI – ENGLISH

UNIT V **09**

COMPREHENSION

Text Books:

By MaithilisharanGupt, AnuvadhAbhyas – III

Reference Books:

Publisheres - Dakshin Bharath Hindi Prachar Sabha, Chennai- 17

CourseCoordinator **HOD**

BEH301	ENGLISH - III	L	T	P	C
	Total Contact Hours – 60	4	0	0	4
	Prerequisite course – + 2 level English				
	Course Coordinator Name & Dept: Mrs. B.JANUA SHERLY – English				

COURSE OBJECTIVES:- To enhance the reading, writing, listening and speaking of the English language skills

COURSE OUTCOMES (COs)

CO1	Remember and recollect the value of LSRW skills.
CO2	Understand the competence of the four modes of language skills.
CO3	Apply the grammatical concepts and the correct usage of the English language.
CO4	Analyze their personality traits and develop interpersonal skills for a better career in life
CO5	Evaluate the knowledge and write resume official letters and reports
CO6	Create and develop their ability as critical thinkers and readers.

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PS O3
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
		✓								

4	**Approval**	Academic Council Meeting

UNIT 1 - LISTENING SKILLS **12**

Types of Listening (Theory / Definition) - Tips for Effective Listening -Academic Listening (Lectures) - Listening to Radio and Television

UNIT 2 - TELEPHONE SKILLS **12**

Basics of Telephone communication -How to handle calls- telephone manners -Leaving a message -Making requests -Greeting and Leave Taking over phone (etiquette) - Handling the situations especially trouble shooting Teleconference - handling Tele interviews for Call Centers

UNIT 3 - WRITING SKILLS **12**

Standard Business letter - Report writing- Email drafting and Etiquettes - Preparing Agenda and writing minutes for meetings - Making notes on Business conversations

UNIT 4 - CAREER SKILLS **12**

Applying for job -Cover letters -Resume and Effective Profiling - Interviews - Group discussions

UNIT 5 – PERSONAL SKILLS **12**

Empathy (Understanding third person's point of view) -Intrapersonal skills -Interpersonal skills- Problem solving

TEXT BOOKS:

1. Improve Your IELTS Listening and Speaking Skill by Barry Cusack, 2007

2. Roche Marc, "Advanced English Writing Skills: Master class for English Language, Roche Publishing ESL, 2019

REFERENCE BOOKS:

1. Frederick H. Wentz, "A Workbook to Develop Skills For Employment", Create space Independent Pub,2012

2. S. P. Dhanavel, "English and Soft Skills", Orient Black Swan, First edition, 2010
3. English for Communication by Board of Editors, Emerald

Course Coordinator **HOD**

BMI301	**BIOCHEMISTRY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	1	0	4
	Prerequisite – Basic biochemistry of Sugars and proteins				
	Course Designed by – Dr.S.Selvakumar/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics with biochemical molecules present in cell. The purpose of this course is providing a clear understanding the importance of biochemical molecules in cellular functions.

COURSE OUTCOMES (COs)

CO1	Remember the basic knowledge about biomolecules.
CO2	Understand the importance of carbohydrate, protein and lipids.
CO3	Apply the importance of biomolecules.
CO4	Apply the processes and control of bioenergetics and metabolism, as chemical reactions.
CO5	Analyze the principles of biochemistry to analytical determination of biomolecules.
CO6	Analyze the metabolites origin and its functions.

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval	Academic Council Meeting									

UNIT I INTRODUCTION **9**

Introduction to biochemistry – Biomolecules, structure of water & its importance – Important noncovalent forces – Hydrogen bonds, electrostatic, hydrophobic & Vanderwaals forces – Acid, base & buffers – pH, Biological buffers and their significance.

UNIT II CARBOHYDRATES **9**

Classification, structure & properties of carbohydrates – mono, di, oligo & polysaccharides- Classification, structure & properties of amino acids & proteins- Classification, structure & properties of Lipids – Lipoproteins Structure & functions of nucleic acids

UNIT III BIOENERGETICS **9**

Principles of Bio-energetic; Metabolism of carbohydrates, fats, proteins, purines, pyrimidines- their biosynthesis & degradation; mechanism of oxidative phosphorylation & its inhibitors, photo phosphorylation

UNIT IV METABOLITES **9**

Prostaglandins, leukotrienes, thromboxines, interferons and interleukins; antibodies; alkaloids; plant and animal pigments

UNIT V SEPARATION METHODS **9**

Separation methods: Chromatography - electrophoresis and immunoelectrophoresis, high voltage electrophoresis and isoelectric focusing. Isolation methods– centrifugation, ultra – centrifugation, density gradient centrifugation

TEXT BOOKS:

1. Harper's review of biochemistry By David.W.Martin ,Peter.A.Mayes , Victor.W.Rodwell

LANGE medical publications.

2. Practical Biochemistry – Principles & Techniques By Keith Wilson & John Walker. Oxford university press

REFERENCE BOOKS :

1. Understanding Enzymes By Trevor palmer. Published by Ellis Horwood LTD.

2. Biochemistry Lippincott's Illustrated Reviews by Pamela.C. Champe & Richard.A.Harvey.

Lippincott-Raven publishers

Course Coordinator **HOD**

BMI302	**IMMUNOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – Basics of immune system				
	Course Designed by – Dr.s.Sharmila/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics with human immune system. The purpose of this course is providing a clear understanding of the concepts the types of immune cells, immunity and antigen antibody reactions.

COURSE OUTCOMES (COs)

CO1	Remember the types of immunity
CO2	Understand the basic concept of antigen, antibody and immune responses
CO3	Apply the antigen antibody reaction and tests for diagnosing the diseases.
CO4	Apply the role of B Lymphocytes and T Lymphocytes in humans.
CO5	Analyse the importance of graft rejection process..
CO6	Analyse the real time application of drugs in targeting tumour antigens.

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
					✓					

4	Approval	Academic Council Meeting

UNIT I THE IMMUNE SYSTEM **9**

Introduction, Immunity, antigens &their classification, complement and their biological functions, types of immune responses, anatomy of immune response.

UNIT II HUMORAL IMMUNITY

B-lymphocytes and their maturation, activation &differentiation, structure and function of immunoglobulin, immunoglobulin classes, antibody production, mono-clonal antibodies and diagnosis major histocompatibility complex

UNIT III CELLULLAR IMMUNOLOGY **9**

T-Lymphocytes their classification, maturation, activation & differentiation, antigen presenting, cells (APC), macrophages, langerhans cells, their origin and function, mechanisms of phagocytosis, Cytokines and their role in immune response, immunosuppression, immune tolerence.

UNIT IV ANTIGEN - ANTIBODY INTERACTION AND HYPERSENSITIVITY 9

Principle and application: Precipitation- immuno diffusion & widal test, Agglutination reactions, radio immuno assay, ELISA, Complement fixation test, Immuno fluorescence technique, Immunoelecctrophoresis-Hypersensitivity reactions

UNITV TRANSPLANTATION AND AUTO IMMUNITY **9**

Graft rejection, evidence and mechanisms of graft rejection, prevention of graft rejection-immunosuppressive drugs, mechanisms of immunity to tumour antigens. Auto antibodies in humans, pathogenic mechanisms -autoimmune diseases- treatment of auto immune disorders

TEXT BOOKS:

1. Owen J, Punt J and Stranford S. Kuby Immunology, 7th Edn., Macmillan Education, India,2001.
2. Shetti N. Immunology: Introductory Text book, 2nd Edn., New Age International Limited,2005.
3. Janis Kuby,2007. “Immunology” W.H. Freeman & Co. 6th ed.

REFERENCE BOOKS:

1. Lydyard P, Whelan A and Fanger M. Bios Instant notes in Immunology, 3rd Edn., GarlandScience Publishers, 2011.
2. Delves PJ, Martin SJ, Burton DR and Roitt IM. Roitt's Essential Immunology, 12th Edn.,Wiley Publishers, 2011.
3. Tizard, 1992. “Introduction to Immunology” Saunders collage publication, 3rded.
4. Abbas,2009. “Basic Immunology” W.B. Saunders company, 2nded.

Course Coordinator **HOD**

BMI303	MICROBIAL DIVERSITY	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – Classification of Microorganisms				
	Course Designed by – Dr.S.Sharmila/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics with environmental microbiology. The purpose of this course is providing a clear understanding importance of soil microbes in agricultural development.

COURSE OUTCOMES (COs)

CO1	Remember the basic classifications of living organisms..
CO2	Understand the classification strategy in microorganisms
CO3	Apply the classifications for identify the microbes.
CO4	Apply the importance of microbial classifications.
CO5	Analyse the characteristics of microbes by classification.
CO6	Analyse and understand the microbes.

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
					✓					

4	Approval		Academic Council Meeting

UNIT I **9**

Microbial Classification: Whittaker's five kingdom classification of living system.

UNIT II **9**

Archaebacteria: – Cell structure, metabolic character, function and reproduction of Methanogens.

UNIT III **9**

Eubacteria: Cell morphology, function, reproduction and of

a) Photosynthetic eubacteria (cyanobacteria).

b) Gram negative eubacteria (Spirochetes, Rickttsias, Chlamydias)

c) Gram positive eubacteria (Actinomycetes).

d) Spore forming bacteria (spore formation and germination)

e) Sulfur bacteria and Nitrogen fixing bacteria.

UNIT IV **9**

Brief description of eukaryotic Algae & Fungi and protozoa : General characteristics, vegetative and reproductive structure of the following groups of Microorganism particularly Protozoa (Entamoeba, Plasmodium), Algae (Cyanophyta, Cholorophyta), Fungi (Phycomycetis, Bacidiomycetis).

UNIT V **9**

General properties of Actinomycetes of plants and animals

TEXT BOOKS

1. Principles of Microbial Diversity James W. Brown Paperback – 1 Jan 2015

REFERENCES BOOKS

1. H.N. Thatoi, B.B. Mishra, Microbial Biotechnology: Methods and Applications, ISBN: 978-81-8487-131-9 , Publication Year: 2012 .

2. R.N. Kharwar (Microbial Diversity and Biotechnology in Food Security Hardcover.

Course Coordinator **HOD**

BAL002	அடிப்படைத் தமிழ் - I	L	T	P	C
	Total Contact Hours – 30	2	0	0	2
	Prerequisite course – +2 Level Tamil				
	Course Coordinator Name & Department :- ஸ்ரீதேவி&தமிழ்த்துறை				

COURSE OBJECTIVES : தமிழ்மொழியின்அடிப்படைக்கூறுகள்பற்றிஅறியச்செய்தல்

COURSE OUTCOMES (COs)

CO1	தமிழ் எழுத்துக்களைஅறிவர்
CO2	தமிழ் எழுத்துக்களில் உள்ள வேறுபாடுகளைஅறிவர்
CO3	சொல்லமைப்புபற்றிஅறிவர்
CO4	சொற்களை உருவாக்கும்அறிவைப்பெறுவர்
CO5	சொற்களை தொடராக மாற்றும்திறனைப்பெறுவர்
CO6	எழுத்துக்கள், சொற்கள், தொடர்கள்பற்றிதெளிவானஅறிவைப்பெறுவர்

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	M	H						M	H	M
	CO2	M	H								
	CO3	M	H								
	CO4	M	H								
	CO5	M	H								
	CO6	M	H								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
							✓			
4	Approval		Academic Council Meeting							

அலகு –1 **9**

தமிழ் எழுத்து அறிமுகம் - உயிரெழுத்து - மெய்யெழுத்து - பெயர், முறை , வடிவம், ஒலி அளவு (மாத்திரை) - சுட்டு வினா எழுத்துக்கள் - எழுத்துக்களை கண்டறியும் பயிற்சி

அலகு – 2 **12**

உயிர்மெய் எழுத்துக்கள் - எண்ணிக்கை, பெயர், முறை , வடிவம், ஒலி அளவு (மாத்திரை) - எழுத்துக்களை அகரவரிசைப்படுத்துதல் - எழுத்து வேறுபாடு அறியும் பயிற்சி

அலகு – 3 **12**

சொல்லமைப்பு - ஒரேழுத்துச் சொற்கள், பல எழுத்துச் சொற்கள் - சொல்வகை - பெயர் வினை - சொற்பொருள் வேறுபாடு அறிதல் - சொற்களை உருவாக்கும் பயிற்சி

அலகு – 4 **12**

தொடர் அமைப்பு - சொற்கள் தொடராக அமையும் முறை - தொடர் வேறுபாடு - செய்தித் தொடர், வினாத் தொடர், உணர்ச்சித் தொடர், ஏவல் தொடர்- சொற்களை தொடரில் பயன்படுத்தும் பயிற்சி

பாட நூல்கள்

.1ஆறுமுகநாவலர்,"தமிழ் இலக்கணம்", பாரிநிலையம், 2012
2. கழகப்புலவர்குழுவினர்,"நன்னூல்–எழுத்ததிகாரம்", கழகவெளியீடு, 1996
3. கழகப்புலவர்குழுவினர்,"நன்னூல்–சொல்லதிகாரம்", கழகவெளியீடு, 1996

பார்வைநூல்கள்

1. பவணந்திமுனிவர், "நன்னூல் -எழுத்ததிகாரம்", முல்லைநிலையம், 1994
2. சோம.இளவரசு,"நன்னூல்சொல்லதிகாரம்", : மெய்யப்பன்பதிப்பகம், 2012
3. கூழங்கைத்தம்பிரான்,"நன்னூல்",உலகத்தமிழாராய்ச்சிநிறுவனம், 1998

Course Coordinator **HOD**

BCA351	**சிறப்புத்தமிழ் – I**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	2	0	0	2
	Prerequisite course – Tamil Under Part 1				
	Course Coordinator Name& Department :முனைவர்.ம.சித்ராகண்ணு&தமிழ்த்துறை				
COURSE OBJECTIVES : தமிழர் நாகரீகம் பண்பாடு பற்றி அறியச் செய்தல்					
COURSE OUTCOMES (COs)					

CO1	தமிழரின்அரசியல், தொழில், சமூகஅமைப்புபற்றிஅறிவர்
CO2	தமிழர்திருமணமுறை, குடும்பவாழ்வுபற்றிஅறிவர்
CO3	தமிழரின்உணவு, உடை, உறைவிடம்பற்றிஅறிவர்
CO4	தமிழரின்கல்வி, வானியல், விளையாட்டு, மகளிர், விழாக்கள்பற்றி அறிவர்
CO5	சங்ககாலமருத்துவம், கட்டடக்கலைப்பற்றி அறிவர்
CO6	சங்ககாலதமிழரின்நாகரிகம்பண்பாடுபற்றிதெளிவானஅறிவைப்அறிவர்

Mapping of Course Outcomes with Program outcomes (POs)
(L/M/H indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	M			H				H	M	M
	CO2	M			H						
	CO3	M			H						
	CO4	M			H						
	CO5	M			H						
	CO6	M			H						
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
							✓				
4	Approval		Academic Council Meeting								

அலகு **1** **6**

நாகரிகமும் பண்பாடும் - சங்க காலத்து அரசியல் நிலை - சங்ககாலத் தொழிற்பிரிவினரும் சமூக அமைப்பும் - மகளிர் நிலை

அலகு **2** **6**

பண்டைத் தமிழர் திருமணமுறை நல்லறம் - குடும்ப வாழ்வு பற்றிய தமிழர் கொள்கை –

அலகு 3 **6**

பண்டையத் தமிழரின் உணவு, உடை, உறையுள் - சங்க கால விழாக்கள்

அலகு **4** **6**

பண்டைத் தமிழரின் கல்விநிலை - பண்டைத் தமிழரின் வானியல் அறிவு
அலகு 5 **6**
பண்டைத் தமிழரின் விளையாட்டும் பொழுதுபோக்கும் - மருத்துவக் கலை

பாட நூல்:

1. அ.தட்சிணாமூர்த்தி, "தமிழர் நாகரிகமும் பண்பாடும்", ஐந்திணைப் பதிப்பகம், 2017
2. ஞா.தேவநேயப் பாவாணர், "பண்டைத் தமிழர் நாகரிகமும் பண்பாடும்", பூம்புகார் பதிப்பகம், 2017
3. கே கே பிள்ளை, "தமிழக வரலாறு மக்களும் பண்பாடும்", உலகத் தமிழாராய்ச்சி நிறுவனம், 2015

பார்வை நூல்கள்:

1. □□. □□□□□□□□□, □□□□□□ □□□□□□□□□□ □□□□□□□□□□□, □□□□□□ □□□□□□□□□□□□□, 2016
2. □□□□□□□□□□, □□□□□□ □□□□□□□:□□□ □□□□□□□□□□□□ □□□□□□□□□□□, □□□□□□ □□□□□□□□□□□□□□, 2011
3. □□.□□□□□□□□□□□□□□□□□, □□□□□ □□□□□□□□□ □□□□□□ □□□□□□□□□□, □□□□□□□ □□□□□□□□□□, 2012

பாடநெறி ஒருங்கிணைப்பாளர் துறைத்தலைவர்

	BIOCHEMISTRY LAB	L	T	P	C
BMI3L1	Total Contact Hours – 45	0	0	4	2
	Prerequisite – basic cell biology				
	Course Designed by – Dr.L.jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES: - Learners will be familiar with various biochemical experiments .Learners will understand the principle and determination of biomolecucles by each experiment.

COURSE OUTCOMES (COs)

CO1	Perform qualitative analyses of lipids
CO2	Hanadle various amino-acids separation by TLC.
CO3	Caliberate the basic principle involved in qualitative analysis of amino acids
CO4	Manipulates the determination of saponification, acid and iodine number
CO5	Sketches the classification of carbohydrates

Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M							H	M
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

LIST OF EXPERIMENTS

1. pH measurements and preparation of buffers.

2. Qualitative tests for Carbohydrates.

3. Estimation of sugars.

4. Estimation of proteins by Lowry's method / Biuret method.

5. Estimation of cholesterol by Zak's method.

6. Determination of saponification number of lipids.

7. Estimation of Amino acids.

8. Separation of amino acids - Thin layer chromatography.

9. Separation of sugars - Paper chromatography

10. Biochemical estimation of DNA /RNA using Spectrophotometer

TEXT BOOKS:

1. Biochemistry Laboratory Manual - Mark Brandt, Ph.D. 3rd edition , 2002
2. Biochemistry Laboratory Manual – Dr. Dennis Welsh**,** 2013
3. Biochemistry Laboratory Manual Che 4350. Andrew J. Bonham, Ph.D., 2013.

Course Coordinator **HOD**

SEMESTER IV

BAL401	□□□□□ **– IV**	**L**	**T**	**P**	**C**
	Total Contact Hours – 60	4	0	0	4
	Prerequisite course – TAMIL –III				
	Course Coordinator Name& Department :முனைவர்.ம.சித்ராகண்ணு&தமிழ்த்துறை				
COURSE OBJECTIVES : சங்க இலக்கியத்தைப் பற்றி அறியச் செய்தல்					
COURSE OUTCOMES (COs)					
CO1	எட்டுத்தொகையில் நற்றிணை, குறுந்தொகை, கலித்தொகை இலக்கியங்களை அறிவர்				
CO2	எட்டுத்தொகையில் புறநானூறு, பதிற்றுப்பத்து இலக்கியங்களை அறிவர்				
CO3	பத்துப்பாட்டு இலக்கியத்தில் பொருநராற்றுப்படை, பெரும்பாணாற்றுப்படை பற்றி அறிவர்				
CO4	பத்துப்பாட்டில் நெடுநல்வாடை, பட்டினப்பாலை, முல்லைப்பாட்டு பற்றி அறிவர்				

CO5	எட்டுத்தொகை, பத்துப்பாட்டு இலக்கிய வரலாற்றை அறிவர்
CO6	சங்க இலக்கியத்தைப் பற்றிய உயரிய சிந்தனையைப் பெறுவர்

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M						H	M	M
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
		✓								

4	Approval		Academic Council Meeting

அலகு1 **9**

நற்றிணை - 10, 110, 129
குறுந்தொகை - 8, 25, 32
கலித்தொகை - 6, 37, 51

அலகு2 **9**

புறநானூறு - 89, 109, 204
பதிற்றுப்பத்து - 42,46,49(5ம்பத்து)

அலகு3 **9**

பொருநராற்றுப்படை - 151 - 213
பெரும்பாணாற்றுப்படை - 5 - 15,
- 170 - 184

அலகு4 **9**

நெடுநல்வாடை - 1 - 25
பட்டினப்பாலை - 106 - 158
முல்லைப்பாட்டு - 1 - 28

அலகு5 **9**

எட்டுத்தொகைவரலாறு- பத்துப்பாட்டுவரலாறு

பாட நூல்கள்

1. வேங்கடராமன், "நற்றிணைமூலமும்உரையும்", உ.வே.சாநூல்நிலையம்,2013
2. புலியூர்க்கேசிகன், "குறுந்தொகைமூலமும்உரையும்", சாரதாபதிப்பகம், 2010

3. புலியூர்க்கேசிகன், "கலித்தொகைமூலமும்உரையும்", சாரதாபதிப்பகம், 2015

பார்வைநூல்கள்

1. புலியூர்க்கேசிகன், "புறநானூறுமூலமும்உரையும்", சாரதாபதிப்பகம், 2010
2. ஔவைசு.துரைசாமிப்பிள்ளை, "பதிற்றுப்பத்துஉரை", சாரதாபதிப்பகம், 2008
3. கதிர்முருகு, "பத்துப்பாட்டுமூலமும்உரையும்", சாரதாபதிப்பகம், 2010
4. ச.வே.சுப்ரமணியம், "சங்கஇலக்கியம்", மணிவாசகர்பதிப்பகம், 2006

Course Coordinator **HOD**

BAL402	FRENCH-IV	L	T	P	C
	Total Contact Hours – 45	4	0	0	4
	Prerequisite course – Grade 12				
	Course Coordinator Name & Department: - Ms. Tushita Naidu K / Département De Française				

COURSE OBJECTIVES: -
To introduce students to the complexity of the grammar and how to overcome it with simple rules.

COURSE OUTCOMES (COs)

CO1	Remember the culture of the language natives in advanced setup.
CO2	Understand the integral grammar structure in French.
CO3	Apply encourage the development of skills in linguistics
CO4	Apply the Oral and Written skill set
CO5	Analyse and remember the language construction
CO6	Analyze and enhance advanced fluency in language

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M								

	CO2	H	M						H		
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
		√									
4	Approval		Academic Council Meeting								

UNIT I Vous plaisantez! 9

Le conditionnel present -expression de l'hypothese-demandes polies-suggestions et conseils

UNIT II On s'entend bien! 9

Les constructions du discours rapport-Les constructions (faire + verbe)-et (laisser + verbe)

UNIT III A vos risqué et perils! 9

Le subjonctif Present- La construction passive pour metre en valeur l'object direct de l' action

UNIT IV C'est tout un programme!
9

Les pronom possessives -Les adjectifs et les pronoms indefinis-Les pronom demonstratifs:

Les constructions --celui+de

UNIT V C'est la fete !
9

Les fornes de l'appreciation : trop/ pas assez –si-Les constructions verbe+verbes

TEXT BOOKS:

A2 ECHO- J. GIRARDET, J. PECHEURB CLE PUBLICATION.

Course Coordinator **HOD**

BAL403	**Hindi-IV**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	4	0	0	4
	Prerequisite course – Hindi as second language in Grade 12				
	Course Coordinator Name & Department:- Dr. K. Mustak Husaain / Department of Hindi				

COURSE OBJECTIVES: -

To understand and improve the skills in the Language of Hindi

COURSE OUTCOMES (COs)	
CO1	Rememberthe skills of the leadership
CO2	Understand and develop the skills to overcome the mistake
CO3	Apply the concept of Hindi essay writing
CO4	Apply and develop the translation skills
CO5	Analyze the unseen passage skills
CO6	Analyze and create and develop the Hindi language skills

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
		✓									
4	Approval		Academic Council Meeting								

UNIT I **09**
DRAMA – Andher Nagari

UNIT II **09**
NOVEL - GABAN - Premchand

UNIT III **09**
GENERAL ESSAY

UNIT IV **09**
TRANSLATION - HINDI – ENGLISH

UNIT V **09**
COMPREHENSION

Text Books:
ByBharathendu Harischandra**,** Veerendra Kumar Mishra, Anuvadh Abhyas – III

Reference Books:

UNIT 1 - Publisher–Vani Prakashan, New Delhi – 110 002.
UNIT II – Publisher - Rajkamal Prakashan, New Delhi – 110 002
UNIT III – Aadarsh Nibnandh, Vinodh Pustak Mandir, Hospital Road, Agra -282002
UNIT IV - Dakshin Bharath Hindi Prachar Sabha, Chennai- 17
UNIT V - Dakshin Bharath Hindi Prachar Sabha, Chennai- 17

CourseCoordinator **HOD**

BEH401	**ENGLISH - IV**	**L**	**T**	**P**	**C**
	Total Contact Hours -60	4	0	0	4
	Prerequisite course – + 2 level English				
	Course Coordinator Name & Dept. :Ms.E.REKHA - English				

COURSE OBJECTIVES: -
To focus on the balanced development of the English language communication skills.

COURSE OUTCOMES (COs)

CO1	Remember the basic concepts of English literature
CO2	Understand the importance of the English language.
CO3	Apply the themes and values by comprehending the given text.
CO4	Analyse the grammar and the literary texts.
CO5	Evaluate the characters and the genre prescribed.
CO6	Create comprehensive essays efficiently.

Mapping of Course Outcomes with Program outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
		✓									
4	Approval		Academic Council Meeting								

UNIT 1 - PROSE **12**

Lalajee – Jim Corbett – Author Biography – Plot – Theme - Summary - Critical analysis; **Face of Judas** – Bonnie Chamberlin - Author Biography – Plot – Theme - Summary - Critical analysis.

UNIT 2 - POETRY **12**

Laugh and Be Merry – **John Masefield** – Author Biography - Theme – Poetic devices – Annotations - Summary – Critical analysis; **Matilda** - **Hilaire Belloc**- Author Biography - Theme – Poetic devices – Annotations - Summary – Critical analysis.

UNIT 3: SHORT STORIES **12**

Hunchback Sundari – **C.Raja Gopalachari** – Author Biography - Plot – Theme - Character sketch – Summary – Critical analysis; **The Eyes Are Not There** - **Ruskin Bond**- Author Biography - Plot – Theme - Character sketch – Summary – Critical analysis.

UNIT 4: ONE-ACT PLAYS

Macbeth Soliloquy – **Out, Out, Brief Candle** - **Shakespeare** – Author Biography - Plot – Theme - Character sketch – Summary – Critical analysis; **Julius Ceasar - Anthony's Funeral Speech** – Author Biography - Plot – Theme - Character sketch – Summary – Critical analysis.

UNIT 5: FUNCTIONAL ENGLISH **12**

Wh – Questions - Pattern – Active and Passive voice – usage of passive voice – structure of passive verb; Modal verbs – Tenses.

TEXT BOOKS:

1. Corbett, "My India", Rupa Publications India Pvt. Ltd., 2018
2. Stories of Innocent by C.Rajagopalachari, Bharathiya Vidya Bhavan, 2009

REFERENCE BOOKS:

1. Shakespeare – The Complete Work; Wilco Publishing House, Mumbai, India. 2005
2. Hilaire Belloc, "Matilda", Random House UK, 1994
3. Shakespeare, "Macbeth", Macmillan Publisher, 2014

Course Coordinator **HOD**

BMI401	**CLINICAL MICROBIOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	3	2	0	4
	Prerequisite – Introduction to medical microbiology				
	Course Designed by – Dr.Anbuselvi/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics clinically importance bacteria fungi and virus. The purpose of this course is providing a clear understanding the microbial diseases and the treatments involved in therapeutic measures.

COURSE OUTCOMES (COs)

CO1	Remember the basic of microbiology in personal health.
CO2	Understand the collection and processing of the bacterial and fungal clinical specimens.
CO3	Apply and knowledge of microorganism and their relevance of infectious diseases.
CO4	Apply the importance of microbial classifications.
CO5	Analyse the principles of prevention and treatment of infectious diseases in humans.
CO6	Analyse the microbial disease and diagnosis and treatment methods.

Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

UNIT I **9**

Introduction to medical microbiology - Infectious Diseases process – Diagnosis – Process of sample collection, transport and examinations of the specimens, Antibiogram and serological test.

UNIT II **9**

Bacteriology: Gram positive organisms-pathogenicity and laboratory diagnosis of *Staphylococcus aureus, Streptococccus pyogenes, Pneumococcus, Bacillus anthracis, Corynebacterium diptheriae, Clostridium tetani, Clostridium botulinum, Mycobacterium tuberculosis, Mycobacterium leprae.*

UNIT III **9**

Bacteriology: Gram negative organisms:- pathogenicity and laboratory diagnosis of *E.coli, Klebsiella sp, Salmonella typhi, Shigella dysenteriae, Pseudomonas aeroginosa, Vibrio cholerae.*

UNIT IV **9**

Virology: Approaches to viral diagnosis- Serological and Molecular techniques, Pathogenicity and Laboratory diagnosis of viral infections - Hepatitis, Polio, Rabies, Influenza, Measles, Mumps, and HIV.

UNIT V **9**

Mycology: approaches to laboratory diagnosis-Mycosis–Superficial, Subcutaneous and Systemic infections– Cryptococcosis, Madura mycosis-Histoplasmosis, *Candida allbicans*. Parasitology: Pathogenicity and laboratory diagnosis of *Entamoeba histolytica, Taenia solium, Plasmodium vivax*

TEXT BOOKS:

1. Ananathanarayanan R and Jayaram Panicker CK. Text book of Microbiology. Orient longman,1994.
2. Baird RM, Hodges NA and Denyer SP. Handbook of Microbiological Quality control in Pharmaceutical and Medical Devices, Taylor and Francis Inc., 2005.

REFERENCE BOOKS:

1. Greenwood D, Slack RB and Peutherer JF. Medical Microbiology, 16th Edn. Churchill Livingstone, London. (2002).
2. Saghee MR, Sandle T and Tidswell EC. Microbiology and Sterility Assurance in Pharmaceuticals and Medical devices, Business Horizons publishers. 2011.

Course Coordinator **HOD**

BMI402	**SOIL AND AGRICULTURAL MICROBIOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	1	0	4
	Prerequisite – Higher secondary basics with biology as a major				
	Course Designed by – Dr.S.Selvakumar/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics of environmental microbiology. The purpose of this course is providing a clear understanding importance of soil microbes in agricultural development.

COURSE OUTCOMES (COs)

CO1	Remember the microbial population of soil.
CO2	Understand the importance of microbial interaction
CO3	Apply the soil microbes in agriculture development
CO4	Apply the wide applications of soil microbes.
CO5	Analyse the soil microbes in agriculture development.
CO6	Analyse the plant diseases and role of microbes

Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval	Academic Council Meeting									

UNIT I INTRODUCTION **9**

Properties of soil (Structure, texture, formation)-Types and significance of soil microbes – Bacteria, Fungi, Actinomycetes, Algae, Protozoa, Nematode and Viruses – Factors affecting microbial population

UNIT II BIOGEOCHEMICAL CYCLE **9**

Biogeochemical cycle – Carbon, Phosphorus, Nitrogen – Biological Nitrogen fixation – Nitrogen fixers- Root nodule formation–Nitrogenase, Hydrogenase

UNIT III MICROBIAL INTERACTIONS **9**

Microbial interaction between microbes–Neutralism, Commensalism, Synergism, Mutualism, Amensalism, Symbiosis, Competition, Parasitism and Predation-Interaction of Microbes with plants – Rhizosphere and Mycorrhizae – Interaction of microbes – insects and rumen

UNIT IV PLANT PATHOLOGY **9**

Plant pathology –Bacterial diseases – Blight of rice, Citrus canker – Fungal disease – Red rot of sugarcane, Wilt of cotton, Tikka leaf spot of groundnut

UNIT V BIOINOCULANTS 9

Biofertilizer – Rhizobium and Azotobacter, Cyanobacteria, Azolla–Mass multiplication and crop response. Biopesticide – Bacterial, fungal and viral

REFERENCE BOOKS:

1. Subba Rao NS (2004). Soil Microbiology. 4th Edition, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi
2. Mishra RR (2004). Soil Microbiology. 1st Edition, CBS Publishers and Distributors, New Delhi
3. Rangaswami G and Mahadevan A (2002). Diseases of crop plants in India. 4th Edition, Printice-Hall of India Pvt. Ltd., New Delhi
4. Robert, L Tate, (1995). Soil Microbiology. 1st Edition, John Wiley & Sons, Inc. New York.

Course Coordinator **HOD**

BMI403	**ENVIRONMENTAL MICROBIOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	1	0	4
	Prerequisite – Introduction to the environmental microbiology				
	Course Designed by – Dr.S.Sharmila/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics knowledge about the microorganisms in various environmental conditions. The purpose of this course is providing a clear understanding the interaction and adaptation of microbes in various ecosystems.

COURSE OUTCOMES (COs)

CO1	Remember the basic of interaction between soil and microbes.
CO2	Understand the soil characteristics and biogeochemical cycling.
CO3	Apply the role of microbes present in the aquatic ecosystem.

CO4	Apply the importance of environmental microbes.										
CO5	Analyse the airborne pathogens using detection methods.										
CO6	Analyse the root nodule bacteria.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

UNIT I MICROBIAL INTERACTIONS **9**

Distribution of microorganisms in nature – Microbial communities in soil- Factors Influencing the microbial density in soil- zymogenous and autochthonous flora in Soil- Microbial associations – symbiotic protocooperation, Ammensalism, Commensalism, Syntropism, Parasitism and Predation with suitable examples.

UNIT II MICROBIAL DECOMPOSITION **9**

Microbial decomposition; Cellulose, Hemicellulose, Lignin, Pectin and Chitin – Factors influencing degradation- Acetate utilization - bioconversion of organicwastes – sugarcane wastes- coir pith composition- composting, principles and Applications- conversion process.

UNIT III BIOGEOCHEMICAL CYCLE **9**

Microorganisms in the Decomposition of organic matter- Carbon cycle – Nitrogen Cycle - Nitrogen fixing microorganisms - Root nodule bacteria – non symbiotic Nitrogen fixers – biofertilizers in agriculture - Rhizobium and phosphate Solubilizers - Mycorrhizial association – Phosphorous cycle

UNIT IV AQUATIC MICROBIOLOGY **9**

Water microbiology, algae, phytoplankton- eutrophication- water treatment- Primary, secondary and tertiary-Drinking water- Portability- MPN technique.

UNIT V AEROMICROBIOLOGY **9**

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

TEXT BOOKS:

1. Atlas R. M.and Bartha. R 1992, Microbial Ecology. Fundamental and application, 3rd edition Bengamin and Cummings

2. Alexander A M 1987. Introduction to Soil Microbiology, 5th edition John Wiley and sons,

3. Alexander, A M 1974. Microbiology Ecology, Jhon Willy & Sons

REFERENCE BOOKS:

1.Mitchell R 1974, Introduction to Environmental Microbiology, Prentice Gall Inc., Englewood Cliffs

2. Rangasamy, G and D J Bagyaraj, Agricultural microbiology, Asia Publishing House, New Delhi.

3. Rheinhermer , G. 1986 . Aquatic Microbiology, John Wiley and Sons, NY

4. Grant. W. D. P. E. Long. 1981 Environmental Microbiology, Thomson Litho Ltd

Course Coordinator **HOD**

BMI4L1	**CLINICAL MICROBIOLOGY LAB**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	0	0	4	2
	Prerequisite – Introduction to medical microbiology				
	Course Designed by – Dr.S.Selvakumar/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics with the fundamental knowledge in microbial disease diagnosis. The purpose of this course is providing a clear understand the human disease-causing microbes, identification and treatment methods

COURSE OUTCOMES (COs)

CO1	Perform the basics behind the physiological reactions in prokaryotic cells.
CO2	Handle and operate the various human specimens for diagnosis.
CO3	Caliberate the equipments according to the test objectives
CO4	Manipulate the obtained values with reference values

CO5	Sketches the experimental techniques for culturing various microbes										
CO1	Perform the interpretation and inferences										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

LIST OF EXPERIMENTS

1. Collection, transport, processing of specimen and Identification of bacteria from clinical specimens –Urine, Blood, Sputum, Pus and Faeces.
2. Slide agglutination -Blood grouping
3. Tube agglutination- WIDAL
4. Precipitation – RPR
5. Immunodiffusion- Radial, Ouchterlony's
6. Immunoelectrophoresis- Rocket and Counter current
7. ELISA
8. SDS-PAGE
9. Observation of fungi- LCB or KOH mount
10. Western blotting techniques

TEXT BOOKS:

1. Engelkirk PG and Duben-Engelkirk J. Burton's Microbiology for the Health

Sciences,10th Edn. Wolters Kluwer Health, 2000.
2. Jay JM, Loessner MJ and Golden DA, Clinical Microbiology, 7th Edn. Springer,2005.
3. Park K. Parks Text Book of Clinical Microbiology, 5th Ed., Banarsidas BhanotPublishers, 2017.

REFERENCES BOOKS

1. Jorgensen, James H.Manual of Clinical Microbiology. 2Volume set.

2. Microbiology Bio 204 Laboratory Manual

3. Laboratory Manual in General Microbiology (1916)

4. Microbiology Bio 12421L Laboratory manual (Donna Cain, Hershell Hanks, Mary Weis, Carroll Bottoms, Jonathan Lawson)

Course Coordinator **HOD**

SEMESTER – V

BMI501	**FOOD MICROBIOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	4	1	0	5
	Prerequisite – Higher secondary basics with biology as a major				
	Course Designed by – Dr.Anbuselvi/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics of with food preservation methods can understand the functions of system.. The purpose of this course is providing a clear understanding of the concepts production of different fermented foods**.**

COURSE OUTCOMES (COs)

CO1	Remember the important microorganisms

CO2	Understand the general principles and application for preservation methods
CO3	Apply the equipment according to the preservation methods
CO4	Apply the Fermented food processes.
CO5	Analyse the food borne diseases.
CO6	Analyse the food standards, quality etc.,

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
					✓					
4	Approval		Academic Council Meeting							

UNIT I **12**

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

UNIT II **12**

Principles of food preservation – General principles and application methods – Asepsis – Techniques of removal – use of temperature (low & high) - Drying, radiation and chemical preservatives.

UNIT III **12**

Spoilage of food – cereals, vegetables, fruits, egg and milk – canned foods and sea foods.

UNIT IV **12**

Fermented food – pickled cucumber, Sauerkraut- soysauce, Bread, Idli – Fermented dairy products – Yoghurt and cheese.

UNIT V **12**

Food borne diseases & Food Quality control Measures – Food poisoning and Food borne infections – Bacterial and Mycotoxins- Investigation of food poisoning outbreaks- food standards, quality control- HACCP, FDA, WHO.

TEXT BOOKS:

1. Frazier WC and Westhoff DC. Food Microbiology, 3rd ed., Tata Mcgraw Hill PublishingCo., New Delhi, 1978.
2. Jay JM. Modern Food Microbiology, 4th edition, Van Nostra and Rainhokdd Co., 1991.

REFERENCE BOOKS:

1. Adams MR and Moss MD. Food Microbiology, New Age International limited, 1995.
2. Roday S. Food Hygiene and Sanitation, Tata Mcgraw Hill Publications, 1998.

Course Coordinator **HOD**

BMI502	**FERMENTATION TECHNOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	4	1	0	5
	Prerequisite – Principles of the chemical engineering and downstream processing				
	Course Designed by – Dr.Jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics with fermentation techniques. The purpose of this course is providing a clear understand the production of methods of production of beverages, vitamins, antibiotics and enzymes

COURSE OUTCOMES (COs)

CO1	Remember the fermentation process.
CO2	Understand the basic concept of industrially important microbial strain screening methods.
CO3	Apply the different methods in the production of vitamins, enzymes using microbes.
CO4	Apply the standards that to be followed during production.
CO5	Analyse the importance of microbes in SCP production.

CO6	Analyse the methods for downstream process										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

UNIT –I FERMENTATION TECHNIQUES **9**

Fermentation- Definition & types - Submerged and Solid state.Fermentors & its types (Tower, cylindroconical & airlift) – Batch fermentation – Continuous fermentation.

UNIT –II INDUSTRIAL STRAINS **9**

Industrially important strains- Screening methods- Strain development for Improved yield- Mutation, Recombination and protoplasmic fusion.

UNIT –III ALCHOLIC PRODUCTION **9**

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

UNIT- IV BIOINNOCULANTS **9**

Single cell protein- Bakers yeast, spirulina- Details of mushroom development-Oyster (Pleurotus) and Button (Agaricus) mushroom.

UNIT –V DOWNSTREAM PROCESSING **9**

Downstream process- Intercellular and extracellular- Centrifugation, filtration, Floatation- solvent extraction, precipitation- Breakage of cells- physical and Chemical methods.

TEXT BOOKS:

1. Stanbury PT and Whitaker. Principles of Fermentation Technology, Pergamon Press, NY,1984.
2. Casida LEJR. Industrial Microbiology, New Age International Publishers, 1968.

REFERENCE BOOKS:

1. Prescott and Rehm. Industrial Microbiology, Wiley and Sons, 1979.
2. Michael L Shuler and Fikret Kargi. Bioprocess Engineering, Basic Concepts, 2nd Ed.,Prentice Hall of India Pvt. Ltd., 2002.

Course Coordinator **HOD**

BMI503	**rDNA TECHNOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	1	0	4
	Prerequisite – General biology, Cell biology, Microbiology				
	Course Designed by – Dr.L.jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics with different restriction enzymes and vectors. The purpose of this course is providing a clear understand the gene transfer techniques and sequencing methods.

COURSE OUTCOMES (COs)

CO1	Remember the DNA, RNA and its isolation methods.
CO2	Understand the basic concept of gene manipulation.
CO3	Apply the plasmid and cosmids as vectors.
CO4	Apply the role of hybrid vectors

CO5	Analyse the importance of gene transfer techniques.										
CO6	Analyse the new sequencing methods based on the already proposed standards.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

UNIT- I GENE MANIPULATION **9**

Gene manipulation – Definition and Application, Restriction Enzymes, Discovery,Types and Mode of Action, Ligases and Methylases.

UNIT –II –PLASMID **9**

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

UNIT -III VECTORS **9**

Vectors – Plasmid based Vectors- Natural (PSC101, PSF2124, PMB1), Artificial – pBR322 & pUC Construction: Phage based Vectors- ג (Lamda) phage Vectors and its Derivatives: Hybrid Vectors- Phagemid, Phasmid and Cosmid, BAC and YAC.

UNIT –IV GENE TRANSFER **9**

Gene Transfer Techniques: Physical – Biolistic Method, Chemical- Calcium chloride and DEAE Methods , Biological invitro package method - Screening and Selection of recombinants- Direct Method – Selection by Complementation, -Indirect Methods- Immunological and Genetic Methods.

UNIT- V SEQUENCING TECHNIQUES **9**

PCR , DNA Sequencing (Sanger's Method) Blotting (Southern, Western, Northern) Techniques, RFLP and Application, - RAPD and Application - Microarray. Protein Engineering.

TEXT BOOKS:

1. Old RW and Primrose. Principles of Gene Manipulation, 5th edition, Blackwell ScientificPublication, Boston, 1999.
2. Winnecker ED. From gene to clones, Introduction to Gene Technology, VCH Publication,FRG., 1987.

REFERENCE BOOKS:

1. Brown TA. An introduction to Gene Cloning, 3rd Ed., Champman and Hall, 1995.
2. Glick BR and Pasternak JJ. Molecular Biotechnology - Principles and Application ofrecombinant DNA, ASM Press, Washington, 1994.

Course Coordinator **HOD**

BMI5L1	**FOOD MICROBIOLOGY LAB**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	0	0	4	2
	Prerequisite – Basic Microbiology				
	Course Designed by – Dr.S.Sharmila/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics with isolation and identification of different microbes from various food samples. The purpose of this course is providing a clear understand the process of production of fermented products

COURSE OUTCOMES (COs)

CO1	Perform the complicated microbiological tests.
CO2	Handle and operate the sophisticated instruments and equipments.
CO3	Caliberate the equipments according to the test objectives

CO4	Manipulate the equipments according to the test objectives										
CO5	Sketches and write the interpretation and inferences										
CO1	Perform the interpretation and inferences										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

LIST OF EXPERIMENTS

1. Isolation of *Lactobacillus* from curd sample.

2. Immobilization of yeast

3. Quality analysis of milk using the Methylene blue reductase test

4. Isolation of microorganisms from food spoilers

5. Enumeration of microorganisms in juice sample

6. Preparation of cheese and yogurt

7. Estimation of water quality using MPN technique

8. Enumeration of microbial isolates from Milk sample

9. Isolation of coli phages from waste water

10. Physical examination of Milk sample

11. Extracellular enzyme activities – cellulase, protease, amylase.

TEXT BOOKS:

1. Ray B. Fundamentals of Food Microbiology, CRC Press, USA, 1996.
2. Jay JM. Modern Food Microbiology, Chapman and Hall, New York, 1996.

REFERENCE BOOKS:

1. Banwart GJ. Basic Food Microbiology, CBS Publishers & Distributors Pvt. Ltd, 1993.
2. Frazier WC and Westhoff DC. Food Microbiology, Mc Graw-Hill, New York, 1988.

Course Coordinator **HOD**

BMI5L2	**FERMENTATION TECHNOLOGY LAB**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	0	0	4	2
	Prerequisite – Principles of the chemical engineering and downstream processing				
	Course Designed by – Dr.S.Anbuselvi/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics with the production of fermented products. The purpose of this course is providing a clear understand the production of biofuels and bio surfactant

COURSE OUTCOMES (COs)

CO1	Perform the bioreactors for large scale production.
CO2	Handle and operate the basic machineries in order to obtain the beneficial products effectively.
CO3	Caliberate the production method sequentially.

CO4	Manipulate the fermenter and other related instruments professionally										
CO5	Sketches the skills in developing the fermented products.										
CO6	Perform the interpretation and inferences										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

LIST OF EXPERIMENTS

1. Fermentative production of amylase by *Aspergillus niger* using soy bean meal.
2. Wine production using grapes by *Saccharomyces cerevisiae*
3. Operational procedures of bioreactors.
4. Production of Antibiotic Bacitracin by bacillus sp.
5. Production of Vitamin B_{12}.
6. Cultivation of mushroom *in vitro* studies.
7. Fermentation of citrus juices.
8. Bio-ethanol production by using *Zymomonas mobilis*.
9. Bio-surfactant production

10. Production of probiotics from lactic acid bacteria.

TEXT BOOKS:

1. Stanburry PF and Whitaker . Principles of fermentation technology, Pergamon Press, 2nd Edition, Butterworth Heinemann - Elsevier, 1999.
2. Sinnotl RK. Coulson and Richardson's Chemical Engineering, 3rd Ed., ButterworthHeinemann - Elsevier Pub, 2001.

REFERENCE BOOKS:

1. Arnold Demain and Julian E Davis. Manual of Industrial Microbiology andBiotechnology, 2nd Ed, ASM Press, Washington DC, 1999.
2. Ashok Pandey, Carlos Ricardo Soccol and Christian Larroche. Current developments inSolid Substrate fermentation, Oxford University Press, Great Clarendon Street, 2008.

Course Coordinator **HOD**

BMI601	**MICROBIAL BACTERIOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	1	0	4
	Prerequisite – Basics of medical microbiology and clinical pathogenesis				
	Course Designed by – Dr.Jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics knowledge about pathogenicity of microbes. The purpose of this course is providing a clear understanding the microbial diseases.

COURSE OUTCOMES (COs)

CO1	Remember the common microbial flora present in the human body.
CO2	Understand the importance of handling and storage of specimens.
CO3	Apply the mechanisms of pathogenesis of bacterial diseases.

CO4	Apply the role of microbial characteristics in identifying the pathogens.										
CO5	Analyze the diagnosis methods for microbial disease identification.										
CO6	Analyze the role of pathogens in human diseases.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval	Academic Council Meeting									

UNIT I INTRODUCTION **9**

Normal microbial flora of human body; General attributes and virulence factors of bacteria causing infections- Host Parasite relationships

UNIT II COLLECTION OF SAMPLE **9**

Specimen Collection, Transport and Storage; Specimen processing- (Blood, Urine, GSF, Sputum, other body fluids)

UNIT III CLASSIFICATION **9**

Classification morphology, cultural characteristics, pathogenicity, epidemiology, laboratory diagnosis, treatment, prevention and control of diseases caused by: Staphylococci, Streptococci, Pneumococci, Neisseriae (Gonococci and Meningococci), Corynebacterium, Mycobacterium, Clostridium, Bacillus, Pseudomonas and Haemophilus.

UNIT IV HUMAN PATHOGENS **9**

Human Pathogens - of Salmonella, Shigella, Vibrios, Brucella, Bordetella, Escherichia, Gramnegative anaerobes, Spirochaetes, Rickettsiae, Chlamydiae, Mycoplasmas and Ureoplasmas

UNIT V ZOONOTIC DISEASES 9

Zoonotic diseases and their control; Hospital acquired infections and their control; Hospital waste disposal; Ethical committee and their functions.

TEXT BOOKS

1. Salle, A.J. (1992). Fundamental Principles of Bacteriology, 7th Edition, Mc. Graw Hill Publishing Co. Ltd., New York
2. Ananthanarayanan R. and Jayaram Panicker C.K. (1994). Text book of Microbiology. Orient Longman.
3. Baron, E.J. and Finegold S.M. (1995). Scientific Company, Diagnostic Microbiology Blackwell Scientific Company

REFERENCE BOOKS

1.Bergeys Manual of determinative Bacteriology
2. Ananthanarayanan R. and Jayaram Panicker C.K. (1994). Text book of Microbiology. Orient Longman.

Course Coordinator **HOD**

BMI602	**VIROLOGY, MYCOLOGY AND PARASITOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	1	0	4
	Prerequisite – Basics of medical microbiology and clinical pathogenesis				
	Course Designed by – Dr.S.Sharmila/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics with viral and fungal diseases. The purpose of this course is providing a clear understand about the various parasites causing infections in humans.

COURSE OUTCOMES (COs)

CO1	Remember the definition and properties of viruses and fungi.
CO2	Understand the basic concept of detection of viruses and antigens in clinical specimens.
CO3	Apply the uses of bacteriophages in microbiology.
CO4	Apply the medical importance of fungi..

CO5	Analyse the applications of bacteriophages in bacterial genetics.										
CO6	Analyse the diagnostic methods for identifying parasitical infections.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

UNIT-I VIRAL PROPERTIES **9**

General properties of viruses - Detection of viruses and antigens in clinical specimens - Serological diagnosis of virus infections. Cultivation of viruses. Structure & properties of viroids, prions.

UNIT-II TYPES OF VIRUSES **9**

Arthropod borne and rodent borne virus diseases - Picorna viruses and diseases, Hepatitis viruses-Rabies and other neuro viruses - Orthomyxo and paramyxo viruses. Pox, Adeno, Horpes, Reo, Rota and AIDS viruses-Oncogenic viruses-Viral vaccines, their preparation and their immunisation schedules-Viruses of importance to plants and soil

UNIT-III BACTERIOPHAGES **9**

Viruses of importance to bacteria - Bacteriophages - Their structure, types - Uses in Microbiology - Typing and application in bacterial genetics.

UNIT-IV FUNGAL MYCOSES **9**

General Introduction Morphology and taxonomy of fungi of medical importance-Detection and recovery of fungi from clinical specimens- Dermatophytes and agents of superficial mycoses Yeasts of medical importance dimorphic fungi causing systemic mycoses

UNIT-V PARASITICAL INFECTIONS **9**

Classification Morphology, Pathogenicity, lab diagnosis of common protozoan diseases- Amoebiasis, Giardiasis, Balantidiosis, Trypanosomiasis, Malaria, Toxoplasmosis, Leishmaniasis. Classification Morphology, Pathogenicity, lab diagnosis of common parasitic metazoan diseases – Ascariasis, Hook worm, Filariasis, Hydatidosis, Taenia infection.

TEXT BOOKS:

1. Ananthanarayanan R and Jayaram Panicker CK. Text book of Microbiology, OrientLongman, 1994.
2. Baron EJ and Finegold SM. Diagnostic Microbiology, Blackwell Scientific Company,1995.

REFERENCE BOOKS:

1. Singh V. Text book of Virology, 1st Edn., IBDC Publishers, 2010.
2. Oarsman SNJ, Van Zyl GU, Nutt L, Anderson MI and Preiser W. Virology IllustratedColour text, 1st Edn., Elsevier Health Sciences, 2012.

Course Coordinator **HOD**

BMI6L1	**IMMUNOLOGY LAB**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	0	0	4	2
	Prerequisite – basics of immune system				
	Course Designed by – Dr.S.Sharmila/Microbiology				

COURSE OBJECTIVES :-

Learners having knowledge in basics with the immunological techniques. The purpose of this course is providing a clear understand the different diagnostic tests that are used in identifying the diseases.

COURSE OUTCOMES (COs)

CO1	Perform the complicated diagnostic tests.
CO2	Handle and operate the sophisticated instruments and equipments.
CO3	Caliberate the equipment according to the diagnostic test objectives.

CO4	Manipulate the obtained values with reference range values.
CO5	Sketches the skills in developing the ELISA techniques/.
CO1	Perform the interpretation and inferences

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
					✓					

4	Approval		Academic Council Meeting

BMI6P1	**PROJECT WORK**	**L**	**T**	**P**	**C**
	Total Contact Hours -10 per week	0	0	10	6
	Prerequisite – Biochemistry, Microbiology, Bioprocess, Downstream process				
	Course Designed by– Dr.Jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES: - To facilitate the students to understand the current scenario in computing technology and present the research report on their findings as per the acceptable format.

COURSE OUTCOMES (COs)

CO1	List out the concept and objectives, nature, types and methods of project.
CO2	Choose the process and steps involved in preparation of project work, research gap
CO3	Practice the research design, and methodology , sampling techniques & sampling design

CO4	Calculate the statistical tools in the project for data analysis										
CO5	Measure the major findings, suggestions and conclusion										
CO6	Design the model for project report										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M								H
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
					✓						
4	Approval		Academic Council Meeting								

LIST OF EXPERIMENTS

1. SDS- Slab gel electrophoresis of immunoglobulins
2. Western blotting
3. Immunoelectrophoresis
4. Countercurrent Electrophoresis
5. Rocket Immunoelectrophoresis
6. Single radial immunodiffusion
7. Double immunodiffusion
8. Dot- ELISA
9. DEAE cellulose chromatography for IgG.

TEXT BOOKS:

1. Myers RL and Richard L Myers. Immunology A Laboratory Manual, 5th Ed.,McGraw-hills Higher Education, 1954.
2. Henrikk Joakim Stafseth, Stockten and Newman. A Laboratory Manual forImmunology, Burgesss, 2004.

REFERENCE BOOKS:

1. Lydyard P and Whelan A and Fanger M. Bios Instant notes in Immunology, 3rdEdition, Garland Science Publishers, 2011.
2. Delves PJ, Martin SJ, Burton DR and Roitt IM. Roitt's Essential Immunology, 12thEdition, Wiley Publishers, 2011.

Course Coordinator **HOD**

BMIE01	**MAJOR ELECTIVE I – MICROBIAL METABOLISM**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	3	2	0	4
	Prerequisite – Microbiology, Environmental biotechnology				
	Course Designed by – Dr.L.jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES :-

Learners will get the knowledge about microbial metabolism. Learners will also know about waste water management

COURSE OUTCOMES (COs)

CO1	Remeber the fundamental knowledge of microbial metabolism
CO2	Understand about microbial metabolism

CO3	Apply the use of bioenergetics
CO4	Apply and learn about microbial physiology
CO5	Analyze about different macromolecule metabolism
CO6	Analyze about metabolic dysfunction

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
						✓				

4	Approval		Academic Council Meeting

UNIT I **6**

Bioenergetics:. Gibbs free energy, endergonic & exergonic reactions,. Standard state free energy changes-DG, DG^0 and DG'^0, Relationship between equilibrium constant and DG'^o, Feasibility of reactions. Simple problems, ATP-Structure, properties and energy currency of the cell, Importance of Coupled reactions, High energy compounds, simple problems. Introduction to Metabolism - Catabolism, anabolism, catabolic, anabolic and amphibolic pathways

UNIT II 6

Carbohydrate Metabolism: Introduction, Aerobic and anaerobic pathways: Glycolysis and its regulation , Gluconeogenesis and its regulation.TCA cycle, amphibolic & anaplerotic reactions. Electron Transport chain, Oxidative phosphorylation, & production of ATP, balance sheet of glucose oxidation, Oxidative stress., Pentose phosphate pathway (HMP shunt) Photosynthesis – 'light'

and 'dark' reactions

UNIT III 6

Lipid Metabolism: Beta – oxidations of saturated fatty acids. Ketone bodies, production during starving and diabetes Biosynthesis of fatty acids – Acetyl-CoA carboxylase reaction, Fatty acid synthase complex, biosynthesis of palmitate, energetics, Regulation of fatty acid biosynthesis. Biosynthesis of cholesterol, regulation.

UNIT IV 6

Amino Acid/ Nucleic Acid Metabolism: Biodegradation of amino acids – deamination, transamination, decarboxylation, urea cycle including its regulation. Biosynthesis of amino acids, Disorders of amino acid metabolism (phenylketonuria, alkaptonuria, Biologically active amines Recycling of Purine and Pyrimidine nucleotides by salvage pathways. Lesch-Nyhan syndrome & Gout.

Reference Books

1. Lehninger, Nelson and Cox, Principles of Biochemistry, 4th Edition, W.H.Freeman & Company, 2004. (T1)
2. Voet & Voet, Fundamentals of Biochemistry, Upgrade Edition, Wiley, 2002.

Course Coordinator **HOD**

BMIE02	**DAIRY TECHNOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course – Basic Biology at Secondary Education				
	Course Coordinator Name & Department:- Dr.L.Jeyanthy Rebacca & Biotechnology				

COURSE OBJECTIVES:-

Learners will be familiar with the different production methods of dairy and fermented foods. Learners will understand the indigenous milk products.

COURSE OUTCOMES (COs)

CO1	Recall the milk products and fermented foods.

CO2	Recognize the different types of each fermented products.
CO3	Apply the role of beneficial microbes in the production of fermented foods.
CO4	Analyze the therapeutic effects of fermented milk products.
CO5	Evaluate the importance of milk products in healthy lifestyle.
CO6	Create and design different production methodologies.

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO3
2	CO1	H	M								
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
						✓				
4	Approval	Academic Council Meeting								

UNIT I **9**

Market milk – Collection, Transportation of milk – Clarification - Chilling – Homogenisation – Sterilization - Pasteurization – UHT processing of fluid milk.

UNIT II **9**

Preparation, types and defects – Butter, Ghee, Ice cream. AGMARK standards, Manufacture of milk powder - whole milk, skim milk powder, spray drying.

UNIT III **9**

Preparation of Cheese, Different types of Cheese, Manufacture of Dahi and Yoghurt, Therapeutic effects of fermented milk products.

UNIT IV **9**

Indigenous milk products and by products – Preparation of Khoa and Khoa based products, Peda, Gulab jamun, Rasagolla, Kulfi – utilization of skim milk – butter milk and whey.

UNIT V **9**

Cleaning and Sanitation – Sterilization agent - Can Washing - Manual & Mechanical washing – Packaging of milk & Milk Products – Packaging Material – Filling system – Aseptic Packaging.

TEXT BOOKS:

1. Sukumar de, 2000, "Outlines of Dairy Technology" Oxford University Press.
2. Bhattacharya A and Rajan RP, 2002, "An over view on Yogurt, beverage and food world"

REFERENCE BOOKS:

1. Andrews, 2004, "Biochemistry of Milk Products", Black rabbit books, 2nd ed.
2. Ananthakrishnan CP and Padmanabhan, "The technology of milk processing" Shrilakshmi Ppublications.

Course Coordinator **HOD**

BMIE03	**MAJOR ELECTIVE I - FUNDAMENTALS OF MICROBIAL REMEDIATION**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	3	2	0	4
	Prerequisite – Microbiology, Environmental biotechnology				
	Course Designed by – Dr.L.jayanthi Rebhaka/Microbiology				
COURSE OBJECTIVES :- Learners will get the knowledge about microbial remediation.Learners will also know about waste water management					
COURSE OUTCOMES (COs)					

CO1	Remeber the fundamental knowledge of bioremediation
CO2	Understand about bioaugmentation
CO3	Applythe use of microbes in solid waste management
CO4	Apply and learn about microbial leaching
CO5	Analyze about different pollutants
CO6	Analyze about waste water treatment

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
						✓					
4	Approval		Academic Council Meeting								

UNIT I INTRODUCTION **6**

Bioremediation- process and organisms involved- Constraints and priorities of bioremediation. Major pollutants and polluted sites- Bioaugmentation; Ex-situ and in-situ processes; Intrinsic and engineered bioremediation.

UNIT II POLLUTANTS **6**

Pollutants and associated risks; Polyaromatic hydrocarbon pollution; organic pollutant degradation- Microbial aspects and metabolic aspects; Factors affecting the process; Recent developments.

UNIT III WASTE WATER TREATMENT **6**

Microbes involved in aerobic and anaerobic processes in nature- Water treatment- BOD, COD, dissolved gases, removal of heavy metals, total organic carbon removal; secondary waste water treatments; use of membrane bioreactor; aquaculture effluent treatment; Aerobic sludge and landfill leachate process; aerobic digestion.

UNIT IV SOILD WASTE MANAGEMENT 6

Composting of solid wastes, treatment of organic pollutants, anaerobic digestion: methane production and important factors involved, sulphur, iron and nitrate reduction, hydrocarbon degradation, dechlorination, nitroaromatic compounds degradation, bioremediation of dyes, bioremediation in paper and pulp industries; Aerobic and anaerobic digesters: design; various types of digester for bioremediation of industrial effluents; Pros and cons of anaerobic process.

UNIT V MICROBIAL LEACHING 6

Microbial leaching of ores- process, microorganisms involved and metal recovery with special reference to copper and iron, Biotransformation of heavy metals and xenobiotics, Petroleum biodegradation; reductive and aerobic dechlorination. A brief account of biodegradable plastics and super bug

TEXT BOOKS:

1. Pandey A, Lasroche C, Soccol C. R and Dussop C. G. Advances in Fermentation technology (2008). Asiatech publishers Inc

2. Mathuriya A. S. Industrial Biotechnology (2009) Ane Books Pvt. Ltd

Course Coordinator **HOD**

MAJOR ELECTIVE – II

BMIE04	**INDUSTRIAL WASTE TREATMENT**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	3	2	0	4
	Prerequisite – Environmental biotechnology, Waste management				
	Course Designed by – Dr.S.Selvakumar/Microbiology				
COURSE OBJECTIVES :- Learner will get the knowledge on sources and characteristics of industrial wastewater and the learners will also learn the application of physio chemical and biological treatment methods for recovery, reuse and disposal					
COURSE OUTCOMES (COs)					
CO1	Remember the fundamental knowledge of the effluent discharge standards and waste minimization technology				

CO2	Understand the characteristics of industrial waste water and treatment methods
CO3	Apply knowledge about conventional methods of treatment for industrial waste
CO4	Apply various biological treatment methods
CO5	Analyze the combined treatment of industrial and municipal wastes
CO6	Analyze about various types of effluent released from industries

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
						✓				

4	Approval		Academic Council Meeting

UNIT I INTRODUCTION 6

Effects of industrial wastes on streams, land and air, waste water treatment plants, water quality criteria – effluent standards : Process modification, method and material changes, housekeeping etc., to reduce water discharges and strength of the waste and established recovery methods for bye products within the plant operations.

UNIT II CHARACTERISTICS OF WASTE 6

Characteristics of major industrial waste water (liquid wastes) Chemical Industries: Petrochemicals & refineries, pharmaceuticals. Apparel Industries: Textile, synthetic fibres, leather, paper-Agro Industries: Fertilizer Food Industries: Heat – packing pickles, canning poultry and eggs, distillers, sugar. Metallurgical Industries: Thermal power station, nuclear power plants.

UNIT III WASTE TREATMENT 6

Conventional methods of treatment and disposal of industrial wastes-Equalization and neutralization, separation of solids – sedimentation and filtrations

UNIT IV BIOLOGICAL TREATMENT 6

Removal of organic contents: Biological treatment methods, aerobic and anaerobic, digestion, tickling filters, stabilization ponds, activated sludge process – oxidation ditch.

UNIT V PHYSICOCHEMICAL TREATMENT 6

Physico Chemical Treatment Method – Neutralization, coagulation, flocculation, adsorption and precipitation. Combined treatment of industrial and municipal wastes

TEXT BOOKS:

1. EckenfalderW.W,"Industrial Water Pollution Control", McGraw Hill, New York, 1989

REFERENCES:

1. Arceivala S.J &ShyamAsolekarR,"Waste Water Treatment and Pollution Control Tata McGraw Hill, 1998.
2. Nelson Leonard Nemerow," Theories and practice of industrial waste treatment", Addison Wesley Pub. Co., 1963
3. World Bank Group "Pollution prevention and Treatment Hand Book" World Bank and UNEP Washington DC, 1998.

BMIE05	**PRODUCTION OF MICROBIAL BIOMASS**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	3	2	0	4
	Prerequisite – Microbiology, Environmental biotechnology				
	Course Designed by – Dr.S.Sharmila/Microbiology				
COURSE OBJECTIVES :- Learner will get knowledge on sources and characteristics of microbial biomass and its culture					
COURSE OUTCOMES (COs)					
CO1	Remember the fundamental knowledge of the effluent discharge standards and waste minimization technology				

CO2	Understand the characteristics of industrial waste water and treatment methods
CO3	Apply knowledge about conventional methods of treatment for industrial waste
CO4	Apply various biological treatment methods
CO5	Analyze the combined treatment of industrial and municipal wastes
CO6	Analyze about various types of effluent released from industries

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR
						✓				

4	Approval		Academic Council Meeting

UNIT I INTRODUCTION **6**

Microbial cells as products for commercial use-Selection and Improvement of Strains for biomass production-Characteristics of Single-Cell Biomass: Composition, Nutritional Value and Toxicological Status-Formulation of media composition for Biomass Production

UNIT II BIOREACTORS **6**

Types of fermentation system fir Biomass Production: Batch Culture; Continuous Culture; Fed-Batch Culture; Mixed culture; General principle of culture maintenance and preparation: bacterial culture (lactic acid cultures; propionic acid culture; acetic acid bacteria)

UNIT II SINGLE CELL PROTEINS **6**

Single cell protein: microorganisms used; raw material used as substrate; condition for growth and production; nutritive value and uses of SCP- Baker's yeast; Production of probiotic biomass; and mold cultures- Mushroom production: cultivation of different types of mushroom; edible

mushroom; diseases of mushrooms therapeutic value of an edible mushroom; production of pectin and microbial conversion of woody biomass.

UNIT III MICROBIAL INOCULANTS 6

Microbial inoculants- Selection and establishment of nitrogen fixing bacteria- Production of Rhizobium, Azotobacter, Azospirilla, cyanobacteria and other nitrogen fixing bacterial cultures Quality control of bio inoculants; Phosphate solubilizing bacteria; mycorrhiza; plant growth promoting rhizobacteria (PGPR); Biocontrol microbial inoculants

UNIT IV MICRO AND MACRO ALGAE 6

Cyanobacterial and algal fuels; Fine chemicals (restriction enzymes etc) and nutraceuticals from algae; UV absorbing pigments Industrial products from macro algae - seaweed biotechnology; Bioweapons and Bioshields.

TEXT BOOKS:

1. Robert A Andersen. 2005. Algal Culturing Techniques. Academic Press
2. L. M. Prescott, J. P. Harley and D. A. Klein Microbiology-, McGraw Hill
3. N. J. Pelczar, S. Chand, R. Krieg. Microbiology- Tata McGraw Hill

REFERENCES:

1. Casida, Industrial microbiology-, L.E. New age international Ltd, Publishers New Delhi:

2. Frazier, Food microbiology. W.C. Tata McGraw Hill

BMIE06	**BIOCHEMICAL ENGINEERING**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	3	2	0	4
	Prerequisite – Microbiology, Biochemistry				
	Course Designed by – Dr.L.Jayanthi Rebhaka/Microbiology				

COURSE OBJECTIVES :-

Learner will get knowledge on biochemical engineering using microorganisms.Learners will also get an idea about production of various enzymes

COURSE OUTCOMES (COs)

CO1	Remember the fundamental knowledge of the effluent discharge standards and waste minimization technology

CO2	Understand the characteristics of industrial waste water and treatment methods
CO3	Apply knowledge about conventional methods of treatment for industrial waste
CO4	Apply various biological treatment methods
CO5	Analyze the combined treatment of industrial and municipal wastes
CO6	Analyze about various types of effluent released from industries

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	M						H		
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR	
						✓					
4	Approval		Academic Council Meeting								

UNIT I INTRODUCTION **6**

Material balances; Energy balances; Material and Energy balance together; Kinetics of enzyme catalyzed reactions.

UNIT II STOICHIOMETRY **6**

Growth stoichiometry- Kinetics of microbial growth and product formation in batch, Fed batch and continuous cultures; Sterilization of air and medium

UNIT III HEAT AND MASS TRANSFER **6**

Heat Conduction and Molecular Diffusion; Fluid Flow and Momentum Transfer; Laminar versus Turbulent Flow; Aeration and agitation; Power requirements for mixing; Mass and heat transfer in Biological reactions; Scale-up Principles.

UNIT IV BIOREACTORS DESIGN **6**

Types and of Bioreactors- Bioreactor design for microbial culture, animal cell culture, enzymatic reactions and waste treatment; Instrumentation and control of bioprocess.

UNIT V DOWNSTREAM PROCESSING 6

Downstream processing- Cell disruption: Mechanical and non-mechanical methods - Recovery and purification of products: Separation of insoluble products-filtration – Micro to Nano filtration, centrifugation, flocculation and coagulation-Separation of soluble products- liquid-liquid extraction, precipitation, adsorption, dialysis, reverse osmosis, chromatography-purification-crystallization and drying

TEXT BOOKS

1. Principles of Fermentation Technology by P. F. Stanbury, A. Whitaker, S. J. Hall. Publisher: Butterworth-Heinemann

2. Biochemical Engineering by S. Aiba, A.E. Humphrey and N.F. Millis. Publisher: University of Tokyo Press.

REFERENCE

1. Bioreaction Engineering Principles by J. Nielson and J. Villadsen Publisher: Plenum Press.

2. Bioprocess Engineering Basic Concepts by M.L. Shuler and F. Kargi. Publisher: Prentice Hall.

BBA011	**BUSINESS PROCESS OURTSOURCING - MANAGEMENT**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	**2**	**0**	**0**	**2**
	Prerequisite course – +2 studied in Higher Secondary Studies				
	Course Coordinator Name &Department: -Ms.D.K.Sowmiyalakshmi, Business Administration				

COURSE OBJECTIVES: -

To familiarize the students with the basic fundamentals of BPO.
To impart knowledge on types of BPO and call centers .
To enable the students on the concept Health care BPO & Transaction BPO.
To peep into the concept of Human Resource BPO and the career opportunities in BPO

COURSE OUTCOMES (COs)	
CO1	Underline the basic fundamentals of BPO.
CO2	Discuss the awareness about the models of BPO.

CO3	Initiate the concept of Health Care BPO.
CO4	Identify the elements of Transaction processing BPO.
CO5	Evaluate the career opportunities in BPO.
CO6	Formulate the challenges faced by BPO industry.

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO 3
2	CO1	H	H						H	M	L
	CO2	M	L								
	CO3	L	H								
	CO4	H	H								
	CO5	H	H								
	CO6	M	L								
3	Category	Part 1 Tamil/Linguistic Study	Part II Linguistic English	Part III Core	Part III Substream	Part IV Basic/ Advanced Tamil/ EVS/VE/ SBE/ Soft Skill	Part III Project	Part V Extension Activity			
						✓					
4	Approval	Academic Council Meeting									

BPO MANAGEMENT

Unit I

Business Process Outsourcing – Basics – Benefits of BPO – Growth Drivers – BPO Models and Types of Vendors – Offshore BPO – Evolution Destinations – Challenges of Off shoring – BPO Companies in India.

Unit II

BPO Industry – Employment Opportunities – Employee Structure – Skill Set Required – Compensation Levels – Contact Centre BPO – Types of Call Centres – Technology – Components and working of a Call center – Issues and Problems – Case Study – Intelenet Global.

Unit III

Healthcare BPO – Structure of the American Healthcare Sector – Activity Profile – Future Trends and Threats – Case Study – Cbay Systems. Transaction Processing BPO - Elements of Back – Office Serivces – Financial Services – Insurance – Case Studies – Datamatics – Hinjuja TMT. Human Resource BPO – Reasons for outsourcing HR – Activities involved in HR BPO – HR Outsourcing Trends – Career in HR BPO – Emerging BPO Domains – Media and Entertainment BPO – Publishing BPO.

Text Books:-

Business Process Outsourcing Sarika Kulkarni Jaico Publishing House, Delhi 2005

Reference Books:-

BPO DIGEST Deepak Shikapur Ameya (Inspiring Books) 2004.

Course Coordinator HOD

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BBE002	**DESKTOP PUBLISHING**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	2	0	0	2
	Prerequisite course – Higher Secondary Level				
	Course Coordinator Name & Department :- N.Mathimagal& BCA				

COURSE OBJECTIVES:-

The learner will have the knowledge about the use of Computer Hardware and basic Software

COURSE OUTCOMES (COs)	
CO1	Gain knowledge of basic concepts of Computer Hardware and basic Software
CO2	Analyze the use of Netscape to access the Course Home Page and Tips and Tricks. .

CO3	Discussthe basic Principles and development of publishing and printing .
CO4	Identify the basic Knowledge and operations of a prepress computer system
CO5	Demonstrate the typography.
CO6	Test real time application using a basic concept.

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO2	PS O3
2	**CO1**	**H**	**L**						H		
	CO2	**M**	**L**								
	CO3	**H**	**-**								
	CO4	**H**	**L**								
	CO5	**M**	**L**								
	CO6	**H**	**L**								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
									✓	
4	Approval	Academic Council Meeting								

DESKTOP PUBLISHING

UNIT-1

Classification of Computer Hardware and basic Software.Different Hardware and Software with• their uses.Types of Software i.e. System, - Application etc. Different types of Input & Output devices.Workshop safety and environmental awareness - Principles and development of publishing and printing - Desktop publishing.

UNIT-2

Knowledge and operations of a prepress computer system – Typography - Image processing.

UNIT -3

Finished art work - Other related processes – Case Study.

Reference Books:-

G.Dalin. M.Sc software engineering, HSI PUBLICATIONS

Course Coordinator HOD

BCA001	**COMPUTER APPLICATION**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	2	0	0	2
	Prerequisite course – Higher Secondary Level				
	Course Coordinator Name & Department :- N.Mathimagal& BCA				

COURSE OBJECTIVES:-

The learner will have the knowledge about the basic operations of a computer system, computer applications software, input, and output and storage devices.

COURSE OUTCOMES (COs)

CO1	Define the Characteristics, History, Classification, Personal Computers and Applications.
CO2	Demonstrate understanding of the basic operations of a computer system.
CO3	Explain the principles of operations of computer systems used in a particular application, specifically in terms of the systems' hardware and software components.
CO4	Discuss the various types of Processors, Input and Output devices, OS & DOS command.
CO5	Identify the suitable Storage Devices and Software's to solve the problem.
CO6	Use computer applications software to solve problems.

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PS O3**
2	**CO1**	H	L						H		
	CO2	H	L								
	CO3	H	-								
	CO4	H	L								
	CO5	M	-								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
									✓	
4	Approval	Academic Council Meeting								

COMPUTER APPLICATION

UNIT–I:-

Brief History of Development of Computers ,Computer System Concept, Computer System Characteristics ,Capabilities and Limitations, Types of Computers-.,Personal Computer (PCs) - IBM PCs, Types of PCs- Desktop, Laptop, Notebook, Palmtop, etc. Basic Components of a Computer System - Control Unit, ALU, Input/Output semiconductor Memory.Storage fundamentals - Primary Vs Secondary memory.

UNIT–II:-

Input		GRAPHICAL AND WEB DESIGNING	L	T	P	C

Devices :Keyboard, Mouse, Joystick, Scanners, Digital Camera, MICR,OCR, OMR, , Light pen, Touch Screen. Output Devices Monitors - Characteristics and types of monitor, Size, Resolution, Refresh Rate, Dot Pitch, Video Standard - VGA, SVGA, XGA etc. Printers - Daisy wheel, Dot Matrix, Inkjet, Laser. Plotter, Sound Card and Speakers.

UNIT–III:-

Various Storage Devices - Magnetic Disks, Hard Disk Drives, Floppy, Disks, Optical Disks, Computer Software ,Need, Types of Software's - System software, Application software System Software - Operating System, compiler ,Assemblers, Interpreter .

TEXT & REFERENCE BOOKS:-

1. **COMPUTERS TODAY BY S.K. BASANDRA, GALGOTIA PUBLICATIONS.**
2. **FUNDAMENTALS OF INFORMATION TECHNOLOGY BY ALEXIS LEON & MATHEWS LEON, VIKAS PUBLISHING HOUSE, NEW DELHI.**
3. **DOS QUICK REFERENCE BY RAJEEV MATHUR, GALGOTIA PUBLICATIONS**.

Course Coordinator HOD

	Total Contact Hours - 30	2	0	0	2
	Prerequisite course – Nil				
	Course Coordinator Name &Department :- Jennifer P. & CS				

COURSE OBJECTIVES :-
To gain knowledge in basic web designing concepts.

COURSE OUTCOMES (COs)	
CO1	Remember the web basics and graphic design.
CO2	Understand thedeisgn principle.
O3	Analyze the color theory and tyogrpahy.
CO4	Apply the basic principle and drawing design.
CO5	Implement the communication design and layout techniques
CO6	Illustrate a real time application using image processing concept.

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L							H	
	CO2	H	L								
	CO3	H	L								
	CO4	H	-								
	CO5	M	L								
	CO6	H	L								
3	Category	Part I Tamil/Linguistic Part II	Linguistic	Part III Core	Part III Substream	Part III Project	Advanced Tamil/ EVS/VE/	Part V Extension Activity			
							✓				
4	Approval	Academic Council Meeting									

GRAPHICAL AND WEB DESIGN

Unit-1:-

Introduction to Graphic Design – Drawing – Design Principle.

Unit -2:-

Color theory – Typography – Idea Generation.

Unit -3:-

Stylisation – Communication Design – Lay outing Techniques – Image Processing – Page Layouting.

Reference Books:-

1. **Computer Graphics: Principles and Practice in C, by J. D. Foley, A. Van Dam, S. K. Feiner, J. F. Hughes. Addison-Wesley, 2nd ed**

Course Coordinator HOD

BCA003	**MULTIMEDIA**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	2	0	0	2
	Prerequisite course – Higher Secondary Level				
	Course Coordinator Name & Department :- N.Mathimagal& BCA				

COURSE OBJECTIVES:-

The learner will have the knowledge about the principles of different types of media and able to identify the proper applications of multimedia, how multimedia can be used in various application areas, and evaluate the appropriate multimedia systems and develop effective multimedia applications.

COURSE OUTCOMES (COs)

CO1	Gain knowledge of basic concepts of multimedia
CO2	Analyze the multimedia application problems.
CO3	Discuss the Video capturing, Sound capturing, editing concepts.
CO4	Identify the basic multimedia design principles.
CO5	Demonstrate the multimedia system and Design Process
CO6	Test real time application using a multimedia concept.

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO 1**	**PSO2**	**PS O3**
2	**CO1**	**H**	**L**						H		
	CO2	**M**	**L**								
	CO3	**H**	**-**								
	CO4	**H**	**L**								
	CO5	**M**	**L**								
	CO6	**H**	**L**								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
									✓	

4	Approval	Academic Council Meeting

MULTIMEDIA

UNIT-1:-

Multimedia Fundamentals: Define the concept of multimedia, fundamental criteria for the design of a multimedia presentation, multimedia application goals &objectives, opportunities in multimedia production, Role of multimedia development team members, avoiding problems in planning a multimedia application.

UNIT-2:-

Multimedia Building Blocks: Text, Graphics, video capturing, Sound capturing, editing. Basic design principle: proximity, visual hierarchy, Symmetry / Asymmetry, Repetition, unity, Contrast, dynamics, Emphasis, Multimedia Authoring tools.

UNIT-3 :-

Design, Development and evaluation of multimedia a system:The development of user interface design, Design Process,

Reference Books:-

1. **John Villamil-Casanova, Louis Molina, An introduction to multimedia**
2. **Mohammad Dastbaz, Desgning Interactive Multimedia Systems**
3. **Bohdan O. Szuprowicz, Multimedia Networking**
4. **Stephen McGloughlin, Multimedia on the web**

Course Coordinator HOD

BCA004	**NETWORKING AND MAINTENANCE**	**L**	**T**	**P**	**C**
	Total Contact Hours - 30	2	0	0	2
	Prerequisite course – Computer Science / Mathematics Studied in Higher Secondary Studies.				
	Course Coordinator Name &Department :- E.Srimathi/CS				

COURSE OBJECTIVES :-

Learners familiar with the basic concepts of Microprosser, Controller, Server and to demonstrate the traditional imperative design of CPUs, cards,PCs and BIOS.

COURSE OUTCOMES (COs)

CO1	Design the structure of Micro Processor and PCs and CPUs
CO2	Understand the structure of PC architecture and the study of various PCs
CO3	Understand the Basics of Processor
CO4	Study the Computer Organisation& Operating Systems(Windows And Linux) Types Of Computer
CO5	Working with Background And Number System
CO6	Used to develop the Backups, Switches Routers, BIOS, Floppy Disk and zip Driver

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	M	L								
	CO5	H	-								
	CO6	H	L								
3	Category	Part I Tamil/Linguistic Study	Part II Linguistic English	Part III Core	Part III Substream	Part III Project	Part IV Basic/ Advanced Tamil/ EVS/VE/ SBE/ Soft Skill	Part V Extension Activity			
							✓				
4	Approval	Academic Council Meeting									

NETWORKING AND MAINTENANCE

UNIT -1 :- COMPUTER HARDWARE

Computer Organizations and Operating Systems(Windows and Linux) , Basic Electrical Engineering and Electronics , Microprocessors , Computer Hardware , Internet and Viruses , Principles of Data Communication & Network Maintenance , Digital Fundamentals , Computer Assembling and Software Installations , Hardware Lab , Project

UNIT -2:- COMPUTER ORGANISATION & OPERATING SYSTEMS(WINDOWS AND LINUX)TYPES OF COMPUTER

Analog, Digital, and Hybrid type, Hardware, Software, System software, Application software, Stored Program Concept and Von Newman Architecture, Firm ware, Human ware, Stored Program Concept, Evolution of computers, Generation of computer.

UNIT-3: - BACKGROUND AND NUMBER SYSTEM

Information Representation and Codes, Data Types, Complements, Addition and Subtraction of Binary Numbers, Fixed Point and Floating Point Representation, Octal and Hexadecimal System , Conversion of Number Systems, Alpha Numeric Codes – ASCII & EBCDIC, Error Detection Codes, Building Blocks of Computers, Combinational Blocks (Gates, Multiplexes, Decoders, Encoders etc.), Sequential Building Blocks (Flip Flops, Registers, Counters, Random Access Memory, etc.)

Reference Books:

1. **IBM PC and CLONES, B.Govindrajalu, Tata McGrawhill Publishers, IBM PC and CLONES**
2. **Computer Installation and Servicing, D.Balasubramanian, Tata McGraw Hill**
3. **Computer Installation and Servicing**
4. **The complete PC upgrade and Maintenance, Mark Minasi, BPB Publication, The complete PC upgrade and Maintenance**

Course Coordinator HOD

BCA006	WEB DESIGNING	L	T	P	C
	Total Contact Hours – 30	2	0	0	2
	Prerequisite course – Higher Secondary Level				
	Course Coordinator Name & Department:- V.Ramya& BCA				

COURSE OBJECTIVES: -

To gain knowledge in basic web designing concepts.

COURSE OUTCOMES (COs)

CO1	Definethe web basics and server side scripting.
CO2	Execute the HTML coding and linking process.
CO3	Analyze the hyperlinks and special characters.
CO4	Relatethe Embedded Style Sheets & Linking External Style Sheets.
CO5	Use the backgrounds and user style sheets.
CO6	Test real time application using web designing concept.

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PS O3
2	**CO1**	H	L							H	
	CO2	M	L								
	CO3	H	-								
	CO4	H	-								
	CO5	H	-								
	CO6	H	-								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
									✓	
4	Approval	Academic Council Meeting								

WEB DESIGNING

UNIT -1

Introduction, Syllabus, Calendar, Terminology, Files and Folders, Purchasing Domain/Hosting, Remote Hosting, FTP, HTML basics, Starting a Website, HTML Coding

UNIT-2
Terminology, Starting a Website, HTML Coding

UNIT-3
HTML Coding, Wireframe, Website Design/Development, FTP, Basics of CSS Coding, CSS Coding, Internal CSS

Reference Books:-

1. **Blanck, Peter. *eQuality: The Struggle for Web Accessibility by Persons with Cognitive***
2. ***Disabilities*, Cambridge Disability Law and Policy Series, 2015.**
3. **Burgstahle, Sheryl. *Universal Design in Higher Education: From Principles to Practice*, Harvard Education Press, 2008.**
4. **Byrne, Jim. *60 hot to touch Accessible Web Design tips – the tips no web developer can live without!*, Jim Byrne, 2006, (ISBN: 978-1-4116-6729-7).**
5. **Chisholm, and May. *Universal Design for Web Applications: Web Applications That Reach Everyone*, O'Reilly Media, 2008.**
6. **Clark, Joe. *Building Accessible Websites*, New Riders Publishing, 2002.**

Course Coordinator HOD

BSC001	**ANIMATION**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	2	0	0	2
	Prerequisite course – Higher Secondary Level				
	Course Coordinator Name & Department :- N.Mathimagal& BCA				

COURSE OBJECTIVES:-

The learner will have the knowledge about the use of animation, digitized sound, video control, and scanned images.

COURSE OUTCOMES (COs)

CO1	Gain knowledge of basic concepts of Animations
CO2	Analyze the use of Netscape to access the Course Home Page and Tips and Tricks. .
CO3	Discussthe basic instructional design principles in the development of stacks..
CO4	Identify the basicFormulate a working definition of interactive multimedia.
CO5	Demonstrate the competence in using the authoring program Hyper Studio.
CO6	Test real time application using a basic concept.

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO 1**	**PSO2**	**PS O3**
2	**CO1**	**H**	**L**						H		
	CO2	**M**	**L**								
	CO3	**H**	**-**								
	CO4	**H**	**L**								
	CO5	**M**	**L**								
	CO6	**H**	**L**								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
									✓	
4	Approval	Academic Council Meeting								

ANIMATION
Unit - 1

INTRODUCTION:

Elements of Information Technology - Introduction to Programming Languages - Basics of Animation.-Foundation Art. -Computer Based 2D Animation. - Multimedia & Computer Graphics. Introduction to 3D Animation & Modeling- Introduction to Mass Communication & Media Literacy

Unit - 2
3-D Animation-I.- Production Process-I. - Multimedia-I. - Composing and Editing. - Color Theory.

Unit- 3

Script Writing-I. - Content Development Direction-I. - Gaming Technology - Digital Editing and Motion Graphics-I. - Visual Effects-I. - V.F.X.-I.

REFERENCE BOOKS :

1. **Introduction to mass Communication : Medial Literacy & Culture By Stanley Baran The Tata McGraw Hill**
2. **The Media in your life - By Jean Folkerts& Stephen Lacy by Pearson Publications.**

Course Coordinator HOD

BSC002	COMPUTER HARDWARE AND NETWORKING	L	T	P	C
	Total Contact Hours – 30	2	0	0	2
	Prerequisite course – Higher Secondary Level				
	Course Coordinator Name & Department :- Ms.K.HemaLakshmi / CS				

COURSE OBJECTIVES :-

Learners familiar with the basic concepts of Microprocessor,Controller, Server and to demonstrate the traditional imperative design of CPUs,cards,PCsand BIOS.

COURSE OUTCOMES (COs)

CO1	Define the structure of Micro Processor and PCs and CPUs
CO2	State the structure of PC architecture and the study of various PCs
CO3	Describe the basics of Processor
CO4	Study the CPU,Chips,Processor and Controllers
CO5	Examine the working of Internal Components cards and Higher Level Processor
CO6	Relate the Backups,SwitchesRouters,BIOS,Floppy Disk and zip Driver

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	**CO1**	H	-						H		
	CO2	H	L								
	CO3	H	L								
	CO4	M	-								
	CO5	H	L								
	CO6	M	-								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
									✓	
4	Approval	Academic Council Meeting								

COMPUTER HARDWARE AND NETWORKING

UNIT-1

Microprocessor System Introduction of System overview, Introduction to Processors, Memory Interfacing, Interfacing I/O Devices, Interfacing Data Converters, Display Interface, Serial I/O and Data Communication, Higher level Processors

UNIT - 2

Introduction to PC Architecture Study of PC-AT/ATX System, Pentium, Core, Core 2 Cord, Core 2 Duo, I3, I5, I7 Processor Basics of Processor and CPU Block Diagram of Computer and Computer Generation Motherboards, Chipset and Controllers, BIOS and the Boot Process, Computer Memory.

UNIT-3

Internal Components IDE and SATA Devices: Hard Disk Drive and CD/DVDs Drives, SCSI Devices, Floppy Disk, Zip Drive, Backup Drive, Expansion Cards- LAN Card, IDE Card , VGA and SVGA Cards, Sound Card, Interface Cards, I/O cards, Video Cards, USB Card, Fire-Wire Cards, Internal Ports, Cables and Connector Types. Introduction of Network Cable like UTP, STP, Fiber Optics, Hub, Unmanageable Switch, Manageable Switch, Router, Modem, Wi-Fi, Access Point, PCI Wireless Card, USB Wireless Device, Print Server, USB Network Sharer, Backup Device, Server Hardware etc.

Reference Book:

(1) Microprocessor Architecture Programming and Application with the 8085 Ramesh GaonkarPenram International Publication.

(2) Electronics and Radio Engineering M.L. Gupta Dhanpatrai& Sons, New Delhi.

(3) PC AND CLONES Hardware, Troubleshooting and Maintenance B. Govindarajalu, Tata Mc-graw-Hill Publication.

(4) PC Troubleshooting and Repair Stephen J. Bigelow Dream tech Press, New Delhi

Course Coordinator HOD

BSC003	**COMPUTER PROGRAMMING**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	2	0	0	2
	Prerequisite course – Higher Secondary Level				
	Course Coordinator Name & Department :- Ms.K.HemaLakshmi/ CS				

COURSE OBJECTIVES :-

Learners will be familiar with the programming language C, Algorithm,and Design the flowchart and implement the programs using the concept such asFunctions,Pointers and Strings.

COURSE OUTCOMES (COs)

CO1	Apply and Write the clear, structure and Looping of elementary C programs.
CO2	Explain algorithmic thinking and apply it to programming.
CO3	Describe problem-solving techniques.
CO4	Ability to use C with Various operators Expressions and Decision making control.
CO5	Write Code using Arrays with single dimensions, Two dimensions and Multidimensional and Various Strings operations
CO6	Examine programs using Functions, Pointers, Structures and Union

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
2	**CO1**	H	-						H	
	CO2	H	L							
	CO3	H	L							
	CO4	H	-							
	CO5	M	L							
	CO6	H	-							
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
									✓	
4	Approval	Academic Council Meeting								

COMPUTER PROGRAMMING

UNIT-1:-

INTRODUCTION:-

Generation and Classification of Computers – Basic organization of a Computer – Number System – Binary – Decimal – Conversion – Problems. Need for logical Analysis and thinking algorithm – Pseudo code –Flow Chart.

UNIT-2:-

PROGRAMMING BASICS:-

Problem formulation – Problem solving – introduction to "C" programming – Fundamentals – structure of C Program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in C- Managing input and output operations – Decision making and Branching – Looping Statements – Solving simple scientific and statistical problems.

UNIT -3:-

ARRAYS, STRINGS, FUNCTIONS AND STRUCTUES:-

Arrays – Initialization – Declaration – One Dimensional and Two Dimensional Arrays – String – String Operations – String Arrays.Simple programs – sorting – searching – matrix operations. Function – definition of function – declaration of function – Recursion – pointers – pointer and arrays – example problems – need for structure data type – structure definition – structure declaration – structure within a structure – union - storage classes, pre-processor directives.

Text Books:-

1. Anita Goel and Ajay Mittal, "Computer Fundamentals and programming in C", Dorling Kindersley (India) Pvt Ltd., Pearson Education in South Asia 2011.
2. PradipDey, ManasGhosh, "fundamentals of computing and programming in c", First edition, Oxford University Press, 2009.
3. Yashavant P. Kanethar, "Let Us C", BPB Publications, 2011.

Reference Books:-

1. **Byron S Gottfried, " Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill 2006.**
2. **Dromey R.G., How to Solve it by Computer", Pearson Education, Fourth Reprint, 2007.**

Course Coordinator HOD

BSC004	COMPUTER TECHNOLOGY	L	T	P	C
	Total Contact Hours – 30	2	0	0	2
	Prerequisite course – Higher Secondary Level				
	Course Coordinator Name & Department :- Ms.K.HemaLakshmi/ CS				

COURSE OBJECTIVES :-

Learners will be Explore and demonstrate knowledge of how to maintain computer equipment and solvecommon hardware problems

COURSE OUTCOMES (COs)

CO1	Design, implement and evaluate computer technologies.
CO2	Think critically, creatively and analytically in developing technological solutions to simpleand complex problems. .
CO3	Plan, analyze, design and construct information systems to identified specifications.
CO4	Ability to efficient code in the relevant programming language(s). .
CO5	Evaluate, and use computer software. Use software tools for creating, finding, organizing, and communicating information.
CO6	Work effectively as a team member to achieve a common stated goal.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
2	**CO1**	H	-						H	
	CO2	H	L							
	CO3	H	L							
	CO4	H	-							
	CO5	M	L							
	CO6	H	-							

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
									✓	
4	Approval	Academic Council Meeting								

COMPUTER TECHNOLOGY

UNIT - 1

Digital Logic: Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point). Computer Organization and Architecture: Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage. Programming and Data Structures: Programming in C; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps

UNIT - 2

Algorithms: Analysis, Asymptotic notation, Notions of space and time complexity, Worst and average case analysis; Design: Greedy approach, Dynamic programming, Divide-and-conquer; Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching. Asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds, Basic concepts of complexity classes – P, NP, NP-hard, NP-complete.

UNIT -3

Theory of Computation: Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability. Compiler Design: Lexical analysis, Parsing, Syntax directed translation, Runtime environments, Intermediate and target code generation, Basics of code optimization. Operating System: Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems, I/O systems, Protection and security. Databases: ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.

Reference Books:

1. A First Course in Computers" by Sanjay Sexena

2. Computer Organization and Architecture – Carl Hamcher&SafatZaky

3. Computer Architecture and Organization – J. P. Hayes